

MEĐUNARODNI NAUČNI SKUP „DANI ARČIBALDA RAJSA“
TEMATSKI ZBORNIK RADOVA MEĐUNARODNOG ZNAČAJA

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THEMATIC CONFERENCE PROCEEDINGS OF INTERNATIONAL SIGNIFICANCE

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P R E D G O V O R

Poštovani, pred Vama je Tematski zbornik radova učesnika međunarodnog naučnog skupa „Dani Arčibalda Rajsa“, koji je u organizaciji Kriminalističko-policijske akademije, a uz pomoć Ministarstva unutrašnjih poslova Republike Srbije i Ministarstva prosvete i nauke, održan na Kriminalističko-policijskoj akademiji.

U godini kada Ministarstvo unutrašnjih poslova i Kriminalističko-policijska akademija obeležavaju dva veka ovog ministarstva i 90 godina visokog policijskog obrazovanja u Srbiji, u znak zahvalnosti i sećanja na istaknutog kriminalistu, jednog od reformatora policije Srbije i osnivača i direktora prve moderne visoke policijske škole u Srbiji, prof. dr Rudolfa Arčibalda Rajsa, ovaj skup nosi njegovo ime.

Tematski zbornik se sastoji iz dva toma i sadrži 86 radova nastavnika i saradnika Kriminalističko-policijske akademije iz Zemuna, Fakulteta bezbednosti iz Skoplja i Beograda, Policijske akademije iz Bratislave, Visoke škole unutrašnjih poslova u Banjaluci, Pravnog fakulteta Univerziteta u Kragujevcu, Novom Sadu, Prištini, Nišu i Beogradu, Fakulteta za specijalnu edukaciju i rehabilitaciju, Beogradskog centra za bezbednosnu politiku, Policijske akademije „Alexandru Ioan Cuza“ iz Bukurešta, Državnog univerziteta unutrašnjih poslova u Lvivu - Ukrajina, Fakulteta za sport i fizičko vaspitanje Univerziteta u Beogradu, Medicinskog fakulteta u Kosovskoj Mitrovici, Prirodno-matematičkog fakulteta Univerziteta u Novom Sadu, Instituta za međunarodnu politiku i privredu, Veleučilišta u Velikoj Gorici – Hrvatska, Elektrotehničkog fakulteta Univerziteta u Beogradu, Fakulteta bezbednosnih nauka Univerziteta u Mariboru, kao i naučnika i stručnjaka predstavnika Ministarstva unutrašnjih poslova Republike Srbije, Republike Crne Gore, Republike Srpske i Makedonije. Autori radova su eminentni stručnjaci iz oblasti prava, bezbednosti, kriminalistike, forenzike, medicine, pripadnici nacionalnog sistema bezbednosti ili učestvuju u edukaciji pripadnika policije i vojske, kao i drugih službi bezbednosti. Svaki rad je recenziran od strane dva kompetentna međunarodna recenzenta, a celokupan Tematski zbornik recenziran je od strane četvorice kompetentnih međunarodnih recenzenta.

Radovi objavljeni u Tematskom zborniku sadrže prikaz savremenih tendencija u razvoju sistema policijskog obrazovanja, razvoja policije i savremenih koncepata bezbednosti, kriminalistike i forenzike. Dalje sledi analiza aktivnosti pravne države u suzbijanju kriminala, zatim stanja i kretanja u ovim oblastima, kao i predlozi za njihovo sistemsko prevazilaženje. Tematski zbornik radova predstavlja značajan doprinos postojećem fondu naučnog i stručnog znanja iz oblasti kriminalističke, bezbednosne i kaznenopravne teorije i prakse. Publikovanje ovog Tematskog zbornika vodi uspostavljanju i unapređivanju međusobne saradnje obrazovnih, naučnih i stručnih institucija na nacionalnom, regionalnom i međunarodnom nivou.

Naposletku, želimo da se zahvalimo svim autorima i učesnicima skupa, kao i recenzentima prof. dr Vidu Jakulinu, prof. dr Oleksandru Marinu, prof. dr Mi-odragu Simoviću i prof. dr Vaclavu Krajniku. Takođe, zahvaljujemo se Ministarstvu unutrašnjih poslova Republike Srbije, koje je podržalo organizaciju i održavanje skupa, kao i Ministarstvu prosvete i nauke Republike Srbije, koje je finansijski potpomoglo izdavanje ovog Tematskog zbornika radova.

Beograd, jun 2011. godine

Programski i Organizacioni odbor

P R E F A C E

In front of you is the Thematic Proceedings of the International Scientific Conference “Archibald Reiss Days”, which was organized by and held at the Academy of Criminalistic and Police Studies, with the support of the Ministry of Interior of the Republic of Serbia.

In the year when the Ministry of Interior of the Republic of Serbia and the Academy of Criminalistic and Police Studies celebrate the 200th anniversary of this Ministry and the 90th anniversary of higher police education in Serbia, as a sign of appreciation and in memory of the prominent criminalist, one of the reformist of Serbian police and founder and director of the first modern higher police school in Serbia, Dr. Archibald Rodolphe Reiss, this Conference has been named after him.

The Thematic Conference Proceedings consists of two volumes and contains 86 papers by teachers and associates of the Academy of Criminalistic and Police Academy in Belgrade, Faculty of Security in Skopje, Faculty of Security in Belgrade, Academy of Police Force in Bratislava, Higher School of Internal Affairs in Banja Luka, Faculty of Law of the University of Kragujevac, Faculty of Law of the University of Novi Sad, Faculty of Law of the University of Pristina, Faculty of Law of the University of Nis, Faculty of Law of the University of Belgrade, Faculty of Special Education and Rehabilitation, Belgrade Centre for Security Policy, Police Academy “Alexandru Ioan Cuza” in Bucharest, Lviv State University of Internal Affairs - Ukraine, Faculty of Sport and Physical Education of the University of Belgrade, Faculty of Medicine in Kosovska Mitrovica, Faculty of Sciences of the University of Novi Sad, Institute of International Politics and Economics, University of Velika Gorica – Croatia, School of Electrical Engineering of the University of Belgrade, Faculty of Criminal Justice and Security of the University of Maribor, as well as scientists and experts – representatives of the Ministry of Interior of the Republic of Serbia, Republic of Montenegro, Republic Srpska and Macedonia. The authors of the papers are eminent experts in the field of law, security, criminalistics, forensics and medicine, members of national security system or participants in education of members of the police and army, as well as other security services. Each paper has been reviewed by two competent international reviewers, and the Thematic Conference Proceedings in whole has been reviewed by four competent international reviewers.

The papers published in the Thematic Conference Proceedings contain the overview of contemporary trends in the development of police educational system, development of the police and contemporary security, criminalistic and forensic concepts. Furthermore, they provide us with the analysis of the rule of law activities in crime suppression, situation and trends in the above-mentioned fields, as well as suggestions on how to systematically deal with these issues. The Thematic Conference Proceedings represents a significant contribution to the existing fund of scientific and expert knowledge in the field of criminalistic, security, penal and legal theory and practice. Publication of this Thematic Conference Proceedings contributes to improving of mutual cooperation between educational, scientific and expert institutions at national, regional and international level.

Finally, we wish to extend our gratitude to all authors and participants at the Conference, as well as to reviewers: Mr Vid Jakulin, PhD, Mr Oleksandr Marin, PhD, Mr Miodrag Simović, PhD, and Mr Vaclav Krajnik, PhD. We also wish to thank the Ministry of Interior of the Republic of Serbia on its support in organization and realization of the Conference, as well as the Ministry of Education and Science of the Republic of Serbia, for its financial support in publishing of the Thematic Conference Proceedings.

Belgrade, June 2011

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Introductory Papers

CRIMINALISTICS IN SLOVENIA: AN OVERVIEW OF RESEARCH

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Introduction

In recent years, a decrease in effectiveness in detection and investigation of serious economic and organized crime has been noted in Slovenia. Therefore, a special working group of experts has been established to analyse the situation, find the reasons for inefficiency and suggest improvements. (Jevšek, 2010). The results of the study indicated different causes for less efficient investigation, among others also: inappropriate legislation, inappropriate organization of criminal police, inappropriate selection and education of investigators, not enough resources, not enough cooperation with other agencies, etc. (Jevšek, 2010)

To improve the effectiveness, several measures were suggested and are being carried out: reorganization of police at the local, regional and national level, introduction of criminal intelligence model (intelligence led policing), mixed investigation teams, “one stop office” approach, new legislation on police organization and police powers and improvement of police education. Also, an independent National Bureau of Investigation (Slovene “FBI”) has been established within Criminal Investigation Department of the General Police Directorate and became operational on January 1, 2010. So far, after one year, the results are optimistic.

On the other hand, this situation was also an opportunity to question the progress Slovenia has made in regards to the development of criminalistics, a discipline that provides criminal investigators with the knowledge necessary for successful execution of their duties. It put forth questions such as: Have we paid enough professional and scholarly attention to criminalistics? Has practice been sufficiently developed? Has criminalistics followed the trajectory of other associated disciplines? What is the actual history of “Slovene” criminalistics? Who were its pioneers? Was there enough interest and support for research from criminal justice institutions (especially from police, state prosecution, justice department)?

A brief review of professional literature indicates that so far these issues have received relatively little attention in Slovenia. There are some brief notes on the history of Slovene criminalistics in various textbooks, and some diploma theses, but no comprehensive analysis of the development or significance has been carried out. Although a small number of scientific papers have already addressed the critical situation of the field of criminalistics (for example, Pečar, 1969, 1973, Maver, 2002), it seemed appropriate to revisit this situation and also make improvements in this field. Namely, more knowledge of phenomenology of crime, typology of offenders, tactics and techniques of investigation, forensic

science, information technology, problems and errors committed in the course of criminal investigation is needed for successful investigation – and these are the core issues of science of criminalistics. (Maver, 2009)

There are different concepts and definitions of criminalistics/criminal investigation and its status as a discipline or a science. The difference is especially between the traditional Hans Gross criminalistic/criminology concept and West European and American criminalistics/forensic science concept. Our premise is that criminalistics is a complex science of detection and investigation of criminal offences which includes topics like introduction to criminal investigation, investigative tactics, techniques (forensics) and methodics. (Maver et al. 2004) However, this concept is also susceptible to changes.

For the purpose of this study, the following methods were used: an analysis of the available literature, an analysis of completed research projects, comparative method, historical method, statistical method, and, finally, an analysis of study programmes and interviews.

Origins and development of criminalistics in Slovenia

Pioneers of Slovene criminalistics

The history of Slovene criminalistics precedes the period prior to the First World War and is closely connected with the work of Professor **Metod Dolenc**, a lawyer, who developed his interest for criminalistics under the influence of dr. Hans Gross between 1904 and 1914 while being in Graz. During this period he wrote his first professional articles about the psychology of confession and the "development of auxiliary criminal science disciplines" and published them in a periodical "Slovenski pravnik" (Slovene Lawyer) (Skaberne, 1961: 235). Following the Gross' model, he founded in 1921, at the Faculty of Law, University of Ljubljana, the **Institute of Criminalistics**, which he directed until his death in 1941. In 1925, a special assistant was appointed at the Institute, dr. Hinko Lučovnik, who intended to specialize in criminal investigation, but due to financial difficulties this post was abolished in 1927 leaving the Institute in a state of disarray (Skaberne, idem). Professor Dolenc was a lecturer at the Faculty of Law teaching, among other subjects, subjective and objective aspects of criminal investigation, thus making a legitimate claim to be **the first Slovene theoretical expert in criminalistics**.

More systematic publishing activity began in **1950**, when a new periodical was launched, *Kriminalistična služba* (Criminal Investigation Service). This periodical, published by the State Secretariat for Internal Affairs, began as an internal professional gazette and was labelled as a highly confidential document. (In 1959 it was renamed **Revija za kriminalistiko in kriminologijo** - Review of Criminalistics and Criminology - and has been published continuously until the present day.) In the same year, the State Secretariat for Internal Affairs established its first **forensic laboratory** (Center za kriminalistično-tehnične preiskave) (Golja, 2006).

The first Slovene textbook "**Introduction to Criminalistics**" was published in **1951** by Professor **Avgust Munda**. It was written as a handbook for Faculty of Law students, "yet it might serve also to criminal investigation professionals" (Munda, 1951: 3). In his writing, the author was inspired by German authors

(H. Gross, Hellwig, Jeserich, Meinert, Schneikert, Weingert), Russian authors (Tregubov, Šaver-Vinberg) and by some German translations of other European criminal investigation experts of the time (Bischoff, Locard) (Munda, 1951:268-269). Professor Munda laid, with his textbook, the foundations of a classical structure for criminal investigation textbooks in Slovenia by focussing upon an introduction to criminal investigation (for example, concepts, history, methods and crime investigation institutions), some criminalistic or forensic methods (for example, dactyloscopy, blood traces and shoeprints), methods of crime investigation (for example, the psychology of interrogation and crime scene investigation) and those methods of investigation used with the most frequent criminal offences. Professor Munda was teaching procedural criminal law and criminal investigation at the Faculty of Law until his retirement in 1956 and advocated the idea of making criminal investigation a regular subject at the Faculty of Law (Lučovnik, 1959: 17). He also published three professional articles related to criminal investigation.

Munda's academic work at the Faculty of Law was in 1956 assumed by Professor **Hinko Lučovnik** who was teaching criminalistics until his death in 1960 (Vodopivec, 1960). Lučovnik was succeeded by Professor **Janez Pečar** who taught criminalistics until 1987. Both Lučovnik and Pečar wrote only a small number of articles within the field of criminal investigation paying most attention to criminal law and criminology. Despite this, they can be considered pioneers of Slovene criminalistics in the academic sphere. It is of crucial importance to mention two contributions by Janez Pečar, published in *Revija za kriminalistiko in kriminologijo* in 1969 and 1973. Both papers point to a rather critical situation of criminalistics in Slovenia and also to a need of research work in this field (Pečar, 1969, 1973). The author draws attention to delays in the progress of criminalistics in Slovenia in comparison to other countries. He makes an appeal to agencies of social control to promote the development of this science and its application to the practical investigation of crimes – if not within educational institutions, then at least within a framework of affiliation with university institutions (Pečar, 1973).

In spite of criticisms concerning scientific research and publishing in the field of criminalistics, the situation regarding practical investigation of crime – especially in the **field of forensic science** was not one of quite so much concern. However, the majority of publications in this period were written by practitioners. Among them we should mention, above all, the head of a forensic laboratory, **Vlado Vidic**, who published in *Revija za kriminalistiko in kriminologijo* (Kriminalistična služba) between the years of 1950 and 1960. He published over 20 articles that dealt with a variety of investigative issues, including ballistics, dactyloscopy, tool prints, footprints and polygraphs (e.g. Vidic, 1951, 1952, 1957, 1960). Vidic, who underwent training at the Institute for Scientific Police and Criminology at the University of Lausanne in the years 1953/54 (Golja, 2006), published, in 1973, "**Criminalistic technique**" (Kriminalistična tehnika) the first specialized textbook of forensics in Slovenia (Vidic, 1973). Although this textbook was an internal publication (rather than a widely available one), designed basically for the education and training of police officers and criminal investigators, it was nevertheless used also by lawyers. Vidic ceased publishing in *Revija za kriminalistiko in kriminologijo* after 1960 and after that for 20 years there were no major domestic articles published in the area of criminalistics. Apart from Vidic, it is also important to note the influence of **Janez Golja** who also trained at the University of Lausanne between 1972 and 1973 and was afterwards, for many years, head of the Centre for Forensic Examinations (Golja, 2006). In this way, a Western European doctrine of forensic science was adopted by the Slovene national forensic laboratory.

The second major textbook of criminalistics in the 1980s was also written by a criminal investigation practitioner and the head of the Centre for Forensic Examinations, **Ciril Žerjav**. His "**Criminalistics**" was published in 1983 (Žerjav, 1983). The book was revised in 1994 and modified into a broader and more contemporary textbook, becoming the next edition of his "Criminalistics" (Žerjav, 1994). This textbook was mainly designed for the training of police officers in the former cadet school, while students at the Faculty of Law mostly used Yugoslav textbooks, written by professors Vlado Vodinelić, Tomislav Marković and Živojin Aleksić, because no suitable Slovene criminal investigation university textbook existed at that time.

Research work at the Institute of Criminology

A step forward was made in academic and research terms when the Institute of Criminology at the Faculty of Law in Ljubljana employed, in 1976, **Darko Maver**, a graduate of the Faculty of Law, who specialized in criminal investigation research. His employment was financed by the Republic Secretariat for Internal Affairs and this decision (coupled with Pečar's efforts) led to a period of more systematic and specialized Slovene research of criminal investigation. Maver created already through his diploma thesis at the Faculty of Law, an entirely new branch of criminal investigation, odorology, i.e. the use of odours in the investigation of criminal offences (Maver, 1976).

The first empirical research study of crime investigation methods was also carried out by Maver during the course of his master's thesis at the Faculty of Law. His empirical research explored shoplifting and was published in the book "**Shoplifting in Self-Service Stores**" (Pečar, Maver, Zobec, 1981). On the basis of this research, a number of lectures and seminars were organized by the Institute of Criminology for shopkeepers and store personnel, which contributed to better and more efficient detection and investigation of shoplifting in stores. Empirical research of this type has not been carried out for some time.

During his doctoral research, Maver undertook extensive theoretical research about the characteristics of the **truth-finding process in criminal investigation**. As knowledge about epistemological and psychological aspects of criminal investigation were rather scarce in Slovenia, as well as in Central Europe, the author focused his attention upon literature from the former Soviet Union and undertook a three month study visit to former Leningrad. Under the mentorship of professor Krylov, he collected at the Leningrad Faculty of Law relevant materials for his dissertation and became acquainted with numerous new areas of criminal investigation, which were more or less unknown in the Occident. A doctoral dissertation "Collecting and Establishing Facts about a Criminal Offence and its Perpetrator as a Truth-Finding Process in Criminal Investigation" was written under the mentorship of professor Živojin Aleksić from the Belgrade Faculty of Law and it remains the only research work of this kind in Slovenia. The dissertation was published under the title "**Criminal Investigation Fact-Finding Process**" (Maver, 1988, 1990) and has become a mandatory textbook for students of the Faculty of Law in Ljubljana. He also completed a number of empirical research studies concerning criminal investigation, including work on legal and investigative aspects of a suspect interview (Maver, 1988) and with Edo Posega a study on missing persons (Maver, 1983) and burglary (Maver, Posega, 1989). After getting Ph.D. in 1987 at the University of Belgrade, Maver became lecturer (later professor) of criminalistics at the Faculty of Law, University of Ljubljana and later at the Faculty of Criminal Justice.

Criminalistics in Slovenia after 1991

After the first elections of the new independent state and personnel changes at the highest levels of the Police (militia) and the Ministry of the Interior (former Republic Secretariat for Internal Affairs), some important changes took place. These include a reorganization of police training, more support for research work, greater openness towards foreign countries, and closer international cooperation in the field of criminal investigation. These developments enhanced the possibility of acquiring internationally-generated knowledge. The accumulation of knowledge and expertise regarding criminal investigation was further enabled through various other developments, including the integration of Slovenia to Interpol (1992); Europol (2001); the Middle European Police Academy (MEPA); the *European Network of Forensic Science Institutes* (ENFSI), the signing of bilateral agreements pledging cooperation in regard to action against organized crime and drugs and the beginning of cooperation with the FBI, DEA, Secret Service, BKA and other crime investigation bureaus. During this period, the **Association of Criminal Investigators of Slovenia** was established, and, crucially, the **College of Police and Security Studies** was founded in 1996 by the Ministry of the Interior. The College also obtained the status of affiliate member of the University of Ljubljana, but in 2003 was reorganized and renamed the **Faculty of Criminal Justice and Security (FCJS) and became integrated into the University of Maribor.**

In terms of postgraduate study activities, a number of monographs have been produced, dealing with theoretical work into individual criminal investigation topics. They have brought new knowledge to light and represent an important contribution to pedagogic activity. **Anton Dvoršek** continued with research into the investigation of economic crime and obtained his doctoral degree at the Faculty of Law in Ljubljana following the submission of "Crime Investigation Strategy of Reduction of Economic Crime" (Dvoršek, 2000). With this research, he laid the foundations for a new branch of criminal investigation and became a pioneer of crime investigation strategy in Slovenia. He published his findings in a textbook "**Crime Investigation Strategy**" (Dvoršek, 2001), created a new university study subject and taught on undergraduate and postgraduate programmes at FCJS. Soon afterwards, he published another textbook "**Crime Investigation Methodics**" (Dvoršek, 2003). Dvoršek also carried out several empirical research projects addressing the investigation of property crimes, in particular burglaries and robberies. Articles, resulting from this research, deal with burglaries in apartments and residential houses (Dvoršek, 1991), the investigation and prevention of robberies in Slovenia (Dvoršek, Meško, Bučar, Ručman, 2005) and also with the police and investigative aspects of work with victims of crime (Dvoršek, Meško, Maver, 2007). Yet, Dvoršek's principal research interest was focused on crime investigation strategies (Dvoršek 2001, 2002) and recently on **criminal intelligence (intelligence led policing)** (Potparič, Dvoršek, 2010).

At the FCJS another expert engaged in research and teaching in the area of criminal investigation is **Bojan Dobovšek**. In his master's thesis, he addressed questions of **organized crime** (Dobovšek, 1997, 2008; Dobovšek, Pirnat, 2008) and, in his doctoral dissertation, he looked at **corruption in public administration** (Dobovšek, 2003). Although these research studies have been more concerned with criminological rather than criminal investigation issues, he nevertheless paid some attention to issues of criminal investigation. In his scientific papers, he has addressed some contemporary issues of criminal investigation (e.g. Petrović, Dobovšek, 2006; Dvoršek, Dobovšek, 1996; Dobovšek, Meško, 2005). As an experienced lecturer of criminal investigation, he can certainly be considered as one of the co-founders of the study Slovene criminalistics.

Research into psychological aspects of crime investigation, and in particular of the **psycho-physiological examination of deception** has been undertaken by **Polona Selič**. As a doctor of psychology and a criminal investigator, she directed most of her attention to polygraph examinations and, with **Andrej Juratovec**, laid the foundations of the **Slovene polygraph school**. They were both trained in Zagreb and in the United States and became the first Slovene members of the American Polygraph Association. Their research and practical experiences resulted in a series of scientific papers, presenting not only various methods of polygraph examinations, but also the most recent research findings from abroad (Selič, 2001, 2003, 2005, Selič in Juratovec, 2004, 2004a). Selič also wrote papers about interview tactics for criminal offenders by a mixed gender pairing of criminalists (Selič, 1999), about interrogation of suspects who have committed serious criminal offences (Selič, 2000) and about non-verbal communication (Selič, 2007). She has also dealt with offender profiling and operative case analysis (Maver, Selič, 2001).

Investigative psychology has also been taught at the FCJS by **Peter Umek** and **Igor Areh**. Areh directed most of his research attention to bystander witnesses of criminal offences and treated this subject in his master's thesis "Reliability of Testimony" (Areh, 2003) and, later, in his doctoral dissertation "The Impact of Personality Characteristics on the Reliability of Testimony" (Areh, 2007). These are some of the rare empirical research studies from the field of criminal investigation (investigative psychology) which have been published in scientific papers (Areh, 2004, 2004a, 2008). Umek, too, tackled the same theme in the 1990s (Umek, 1993, 1995, 1996) and later on published some articles together with Areh (Areh, Umek, 2004, 2007). Both of them were also concerned with the practical and theoretical aspects of the psychological profiling of criminal offenders.

The only empirical crime investigation research that was completed during this period was a study carried out by the Institute of Criminology. Jager and collaborators undertook an analysis of statistical data for all criminal offences committed in the period 2000-2002 and examined a selected sample of court files (Jager, Gorkič, Mozetič, Čibej, Brvar, 2006). This research project entitled "**Analysis of the Effectiveness of Police Investigation of Crimes in Terms of the Development of Criminal Investigation and Standards of Evidence in Criminal Procedure**" is one of the rare domestic research projects dealing with the efficiency of criminal investigation. In spite of the extensive work that was carried out (or because of it), this research nevertheless gives us only some preliminary foundations for further study. Maver also participated in this research, although he has not been involved in empirical criminalistics research since his departure from the Institute in 1990. During this period he published scientific papers about **typical defence strategies** and strategies of investigation (Maver, 2000, 2001a) about **ethics** in criminal investigation (Maver, 2000a), criminalistic classification of criminal offences (Maver, 20002a), **operative criminal investigation analysis** (Maver, Selič, 2001), deception as a tactic of criminal investigation work (Maver, 2008) and the investigation of war crimes (Maver, 1997a) and two important university textbooks, namely "**Criminalistics**" (Maver, 1997) and, together with co-authors, the most comprehensive criminal investigation textbook which has ever been published in Slovenia "**Criminalistics: Introduction, Tactics and Techniques**" (Maver and co-authors, 2004). This textbook has been used as a basic textbook at all three law faculties in Slovenia as well as at the FCJS and at the Police Academy.

Katja Drobnič, PhD was an expert who was particularly active in the area of **forensic sciences/ criminalistics**. She focused her interest on **biological traces** and,

in particular, on blood traces and DNA identification. Besides a number of articles on DNA, published in domestic and foreign periodicals and other publications, we shall mention only those which are relevant to criminal investigation. Among them are some papers on the identification of persons and traces by DNA examination (Drobnič, 1999, 2001, 2001a, 2002, 2003) and on blood traces (Drobnič 2002a, 2010). Besides Drobnič, other experts from the Centre for Forensic Examinations (in 2010 renamed to National Forensic Laboratory) carried out empirical research studies. One of them is **Matej Trapečar, PhD** (Trapečar, Balažic, Drobnič, 2007; Trapečar, Balažic, 2007; Trapečar, Kern Vinkovič, 2008) who wrote about different methods of fingerprint recovery (e.g. from human skin and from fruit) and who tried to combine fingerprint examination with DNA analyses. These are quite interesting studies, yet require more extensive testing and verification. Trapečar also obtained his Ph.D. from the field of biometric identification methods. (Trapečar, 2010) The area of **forensic chemistry** has been covered by **Sonja Klemenc**, who obtained her Ph. D. for research into forensic examination of heroin (Klemenc, 2003) and who has published some papers in this area with her colleagues (Budič, Klemenc, 2000; Gostič, Klemenc, Štefane, 2009).

A series of articles related to forensic sciences, in particular ballistics, has been written by **Janez Golja**, a long-term head of the Centre for Forensic Examinations. Similar to his colleague Janez Vidic from the previous period, Golja closely followed international progress in forensic science and attempted to integrate it into the forensic work undertaken in Slovenia. He also wrote reports on and made assessments of the activities of the Centre for Forensic Examinations, performed the role of a forensic expert, undertook pedagogic activities and was deeply engaged in international cooperation. He was also **one of the founding members of ENFSI** (*European Network of Forensic Science Institutes*) and the initiator of the integration of Slovenia to **ASCLD** (*American Society of Crime Laboratory Directors*). Some papers on criminalistics were published also by **Andrej Gerjevič** who was engaged in the pedagogic process after completing his specialization study (Gerjevič, 2006).

Recently, the Faculty of Criminal Justice and Security has engaged a new assistant for criminal investigation, **Danijela Frangež**, who received her master's degree by conducting research in burglaries (Frangež, 2008) and who has already published some articles in this area (for example, Frangež, 2008).

In spite of the relatively modest research activity in criminalistics, it is nevertheless interesting to note that the situation regarding teaching has considerably improved over time, in particular at the university level of education. The number of academic hours dedicated to criminalistics, forensic sciences, crime investigation methods and investigative psychology has considerably increased in recent years. This especially applies to the **Faculty of Criminal Justice and Security**, where up to **1,325 academic hours** are devoted to criminal investigation courses, seminars and practical work at undergraduate and postgraduate level. It is also worth mentioning that the specialist study of criminal investigation was introduced to the Faculty of Criminal Justice and Security as it enabled police personnel to acquire specialised knowledge and expertise, in such areas as methods of criminal investigation and "investigative strategy" amongst others. Some of the top officials in the Slovene police completed this study and obtained the title of "criminal investigation specialist". With the onset of the Bologna reform, this programme was unfortunately abolished.

Other faculties are not so favourable to the teaching of criminalistics. At the Faculty of Law in Ljubljana, with Bologna reform criminalistics became an optional subject with 45 hours. At the Faculty of Law in Maribor, it is also an autonomous subject with 45 hours, but with the introduction of a new programme, it was abolished as a non-legal subject. At the European Faculty of Law in Nova Gorica it is an optional subject with 45 hours. This means that the future prosecutors, judges and attorneys will be without the appropriate knowledge required for their work.

GENERAL DISCUSSION AND CONCLUSIONS

Some general remarks on research and publishing activity in the field of criminalistics

The present review clearly indicates that publishing activity in criminalistics was intense between 1950 and 1960. It was followed by a period of inactivity and was again resurrected in the 1980s, when the Institute of Criminology engaged and trained a researcher in criminal investigation. Although his research work was financed by the former Republic Secretariat for Internal Affairs, which supported the development of criminalistics at an academic level, it must nevertheless be admitted that there was no major interest for the integration of research findings into crime investigation practice. With the departure of this researcher from the Institute in 1990, the Institute's activity in this area ceased completely, resulting in an absence of research studies. During this time, developments in Slovene criminalistics came with the influence of **Professor Vlado Vodinec and Živojin Aleksić** and some Russian authors. This lent criminalistics a more theoretical focus that enabled the exploration of new and interesting themes, which had not previously been dealt with by Western criminal investigation research. In general, access to Russian sources has always been somewhat limited, due to a lack of available literature and an ignorance of language and Cyrillic alphabet; in this regard, we held a certain advantage over Western countries.

From 1990, research activity into criminalistics, although still not particularly developed, was taken over by the College of *Police and Security Studies*, and later reorganized into the **Faculty of Criminal Justice and Security of the University of Maribor**. The research work of its academic staff was carried out mainly in the context of **postgraduate and doctoral programmes** at other faculties, in particular the Faculty of Law and the Faculty of Social Sciences. Recently, however, FCJS started postgraduate study programs for both masters and doctoral degrees, which include also the field of criminalistics. Research into criminal investigation must be based on the study of practical procedures and on empirically established problems and the pursuit of appropriate solutions, which is a rather difficult task in itself. It requires a direct follow-up of investigative procedures, observation of decision-making processes, criminal investigation theorising by criminalists and measurement of the efficiency of criminal investigation procedures. Needless to say, this kind of research is difficult to carry out without substantial degree of cooperation of the involved parties. It is not surprising therefore, that the focus of researchers has concentrated on criminological and security issues, which are easier to study. Such attitudes resulted in a diminished role and significance of criminal investigation at the academic level. This trend is clearly indicated by the number of research studies and published articles from criminalistics, especially

in comparison with publications from criminology and criminal justice as well as by the general status of criminal investigation as a science and university subject (see Table 2).

Table 2: Comparison of the number of research studies from criminal justice, criminology and criminal investigation in Slovenia (Source: Institute of Criminology at the Faculty of Law in Ljubljana, Research, Meško, 2002, 2006).

Institution	Total number	Criminology	Criminal investigation
<i>Institute of Criminology</i>			
1954 - 2009	160	90	4 (+ 2)*
Faculty of Criminal Justice and Security			
1996 – 2001 - VPVŠ	40	6	2
2001 – 2005 - FVV	50	11	1
2006 - 2009	5 (31)	5	0 (+6)*
Total (1954 – 2009):	255 (286)	112	7 (15)* = 3%

* Research studies of internal character

From the total number of completed research studies, **only 3% focused on criminal investigation.**

A similar situation can be noticed in the publication of articles in scientific periodicals and collections of papers. Although the number of papers from criminal investigation looks rather impressive, it nevertheless constitutes **only 12% of published papers.**

Table 3: Articles published in professional and scientific periodicals

Periodical	Total	Criminal investigation	%
Revija za kriminalistiko in kriminologijo (1950-2009)	960	135	14%
Varstvoslovje (1999-2009)	298	21	7%
Zbornik VŠNZ (1991-1996)	117	7	6%
Varnost (1981-1992)	296	36	12%
Policija (1993-1995)	37	5	13%
Total	1.708	204	12%

It can be said that more than 200 scientific and professional papers in the area of criminal investigation is not a large body of work if it represents only 12% of all papers, published over a 60-year period.

It seems that criminalistics as a scientific and practical discipline has undergone a crisis both in Slovenia and further afield. It has gradually lost its autonomy and been integrated into criminology, police sciences and criminal justice. Although it is still possible to gain an academic appointment in criminalistics and it is still adequately represented in study programmes, it is nevertheless impossible neither to obtain a university degree nor to obtain a respective M.A. or Ph. D degree. **Criminal investigation is classified as a research discipline in Slovenia within the category “criminology and social work”** and criminalists

are very often classified with criminologists (e.g. Meško, Tičar, 2008: 288, 289). At the same time, there is an increasing **split between anthropologically-oriented criminal investigation (e.g. tactics and methods) and criminalistic technique, which is becoming, as a forensic science, increasingly autonomous**. On the one hand, this is understandable, because natural and technical sciences have developed in a way that makes it incredibly hard for a non-expert to follow. Investigators, prosecutors, attorneys and judges are no longer in a position to have a knowledge and expertise of this large field of science and for this reason they leave it to experts and focus their attention on its practical application (for example, on crime scene investigation). In order to be efficient in their work, investigators are supposed to know about criminalistics as much as it is necessary for a practical search, detection and protection of traces at crime scene, while the **laboratory and expert work should be left to forensic experts**. It is particularly important to know the procedures, methods and standards of the search for and protection of traces and thus to avoid errors that might compromise the prosecution. The value of the integrity of physical evidence has also become increasingly important, i.e. the **chain of custody**. What is also still unclear is a **distinction between criminalistics and investigative (forensic) psychology** as many of themes are duplicated (for example, interrogation, collection of information, polygraph examination, hypnosis, non-verbal communication, lying and deception). In any case, criminal investigation definitely requires a fresh impetus as well as a renewed degree of endeavour for the consolidation of its status of an autonomous science. It would also be necessary to make a clear delimitation between criminalistics and related disciplines. If we want to meet all these objectives, there will be enough work for all researchers working within the discipline of criminal investigation.

Achievements and plans for the future

In spite of all what has been said, it can nevertheless be stated that **experts in Slovenia have been involved in some quite innovative fields of criminalistics, although their findings and published articles have failed to have much impact at an international level**. We wrote about some criminal investigation issues which have only recently been addressed abroad (in particular in Western countries). The aforementioned authors (Maver, for example) addressed issues such as criminal investigation thinking, the role of logic in criminal investigation, the role of intuition and creative thinking in solving crime investigation problems and criminal investigation gnoseological process in the 1980s, and we can see that these topics have only recently been considered within Anglo-American literature (see e.g. Rossmo, 2009). These questions have already been dealt with in literature by some German and Swiss criminalists (for example Hans Walder, William Pfister, Reiner Magulski) and in particular by authors from the former Soviet Union, yet this does not reduce the importance of their contribution to the development of criminal investigation in Slovenia.

In a similar way, we developed a new area of investigative strategy (Dvoršek) which was, to some extent, modelled upon the work conducted by German criminalists. Dvoršek has also written about subjects that are not very frequently encountered in Anglo-American literature (for example, strategies of Sun Cu in the fight against economic and other crime, links between investigative strategy and criminal policy and criminal intelligence activities).

Although Slovene authors have not published to a great extent in foreign scientific periodicals, we must not disregard some important contributions

published in the prominent German periodical *Kriminalistik*, *Forensic Science International*, *Journal of Forensic Science* and in collections of papers from international criminal investigation conferences and symposia.

In spite of the individual achievements of Slovene criminalists, the **problem of empirical research has remained** due to an absence of these studies. This situation has not changed considerably in the last ten years. On the one hand, there is a lack of researchers who are motivated to engage in such research, and, on the other, there is also a **lack of institutional support** and interest in these studies. Although empirical research studies certainly require a lot of work and patience and arouse suspicion amongst research subjects, they are nevertheless important for the improvement of crime investigation work in the detection and investigation of crimes and the collection of evidence. They contribute to reducing the number of failures in the investigation of crimes. It is not surprising that the attention of researchers from abroad (in particular from Great Britain and the USA) has recently focused on the examination of failures in criminal investigation and sentencing (see e.g. Rossmo, 2009) and on the efficiency of crime investigation (e.g. Newburn, Williamson, Wright, 2007). Such research studies are practically non-existent in Slovenia. It seems that we are mostly satisfied with *ad hoc* findings and with the dissemination of their findings to the professional public at conferences and symposia or by publishing them in professional papers. This is also useful, of course, but still not enough. At this moment, there are only two research studies in criminal investigation being undertaken and even these are of an internal character. Daniela Frangež has been preparing, in the context of her doctoral dissertation, empirical research on detection, investigation and evidential issues associated with sexual abuse of children, while former director of Criminal Investigation Department Aleksander Jevšek is currently carrying out a research on criminalistic post-mortem diagnostics as a topic for his Ph.D. at the FCJS and another doctoral candidate Damjan Potparič is preparing his dissertation on criminal intelligence model.

So, the situation is not so bad as it might look. New negotiations, undertaken with the Ministry of the Interior and the General Police Administration, have been promising and give hope for better possibilities of empirical research in the field of criminal investigation as well as in pre-trial and criminal proceedings. In this regard, it would be especially important to analyse reasons for the dismissal of charges and to establish where possible miscarriages of justice occur. It would be interesting and useful to investigate failures and errors committed in the pre-trial period and those criminal proceedings resulting in acquittals. The important question is what criminal investigation and additional special knowledge would be necessary to make investigators more efficient in exercising of their powers and how to acquire this knowledge. This particularly applies to complex cases of the investigation of economic and financial crime, international organized crime, corruption and the most serious violent criminal offences. Transmission of foreign knowledge and experiences is certainly helpful yet it is also necessary to develop a domestic knowledge and to examine the Slovene context. **If the foundation of the new National Bureau of Investigation and the reorganisation of the police are not accompanied by changes to education and training, based on the results of robust research work, we cannot realistically hope to expect more optimistic results in the detection and investigation of the more serious criminal offences.** The establishment of this Bureau provides therefore an excellent opportunity for a fresh impetus to systematic research work in the field of criminal investigation. Users have exhibited an interest and motivation for this research, yet it will be still necessary to find financial means and to set up a long-term research programme.

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RISK MANAGEMENT AND QUALIFICATION IN MINE ACTION PLANNING

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Abstract: The connection between risk and the management process is the decision on risk acceptability or risk treatment, if that risk is unacceptable. Risk analysis develops statistical techniques for determining risk probability and foresight in an unsafe environment.

The Mine Action Strategy aims to create a safer and more secure environment for development and poverty reduction by reducing suffering, threat and socio-economic impact caused by landmines and other explosive remnants of war.

Mines are a growing problem at this rate of demining. The role of police, after discovery of mine, is alarm and security of finding mines.

In the region, there are different mine risk education. Mine risk education (MRE) seeks to increase the likelihood that at-risk individuals will adopt safer behaviours. To be successful, MRE must take into account individual circumstances and offer realistic alternatives. MRE should be incorporated into mine clearance and survivor assistance programs to ensure effectiveness, and to obtain information from affected communities to support mine clearance priority-setting. The incorporation of MRE into curriculum development of education systems is particularly worthwhile.

According to the UN statistics, approximately 200 new mines are laid down in the ground every 30 minutes.

Therefore, it is very important to provide high quality education, which can quickly meet international capacity and necessity in the field of humanitarian demining.

Basic forms of mine risk education were conducted and still are conducted through the following activities: presentations and lectures in schools, public companies, by holding the panels; TV/radio spots, jingles; educational notebooks and special booklets, informative leaflets and media-covered projects, fairs, exhibitions with info-desks and promotional material.

The article presented the needs and conditions for the development of the qualification and certification system of the humanitarian demining personnel with concept based on European and ISO standards.

Key words: demining, education, mine risk, landmines, qualification.

Risk management

Risk management is the process of identifying, assessing and addressing risks allowing operational decisions to be made that balance risk costs against benefits. Risk compares the probability of an event occurring and the severity of the outcome if it happens. Risk management will aim to reduce one or both of these factors to levels at which their effect can be discounted, accepted or mitigated through other precautions.

In terms of mine action, the risk management process can be considered in six phases.

- Phase 1: Identify the quantity, nature and extent of the mine hazard.
- Phase 2: Assess the impact of the mine hazard in order to take timely, efficient and effective measures against it.
- Phase 3: Develop a mine action programme which, in line with the national recovery plan, puts in place appropriate plans and decisions to address the risk and balance it against humanitarian, political, economic and environmental costs.
- Phase 4: Implement the mine action plan.
- Phase 5: Evaluate all elements of the mine action plan including measures of effectiveness and lessons learnt.
- Phase 6: Assess and manage the residual risk against acceptable criteria.

For a risk management action plan to be effective, it should contain specifics. These specifics include identifying risks upfront, analyzing how risks will affect a project, potential risk planning, and monitoring risk. Monitoring risk is performed by controls set within the risk management plan that deal with potential risk.

A risk management plan should also include specific roles and responsibilities of the project manager, team members, and stakeholders. Risk management plans should be reviewed from time to time to ensure the controls you set are working. Acceptable risks should not be ignored, but instead analyzed for future projects by identifying how the risk was triggered and how it was resolved.

Good risk management plans go hand in hand with project planning and should be systematic in nature. Risk will only be improved by discovering it and dealing with it. Once you discover and assess risk, how you control potential risks is key in your overall plan.

Basic categories must include cost of the project, scope of the project, project schedule and deliverables, and the quality of the project. Controls should be set for each part of your project, but how your controls work remain the same. By using past project experience, create these controls:

- Identify and plan for risks
- Keep documentation of risks
- Identify risk triggers
- Review risks
- Re-analyze risks at set periods
- Determine who will be responsible for possible risks
- Set risk strategies

After these controls have been set, decide what techniques you will use to monitor or eliminate risks. In your risk management plan, outline how risks were identified and documented.

Effective mine action legislation should give the authority to perform the following tasks:

- Coordinate mine action within the country;
- Manage and disseminate mine action information;
- Prepare and implement a national mine action strategy and plan and annual workplans;
- Set criteria for mine action priorities;
- Accredite mine action operators and monitor mine action activities;
- Draft and adopt national mine action standards;
- Task mine action activities according to the national workplan;
- Ensure the quality management of mine action activities.

Risk analysis

Risk analysis includes a number of techniques that can be used in uncertain situations, when it is not clear what would be the consequences and potential harm of future developments. There are various perceptions of the connection between risk analysis and risk assessment. Risk analysis develops statistical techniques for determining risk probability and foresight in an unsafe environment. Mine action seeks to reduce the risk from these weapons to a level where people can live safely and in which economic, social and health development can occur free from the constraints imposed by mine and by landmines and/or unexploded ordnance contamination.

Mine-risk education (MRE)

Mine-risk education, or MRE, refers to educational activities aimed at reducing the risk of injury from mines and unexploded ordnance by raising awareness and promoting behavioural change through public-information campaigns, education and training, and liaison with communities. MRE ensures that communities are aware of the risks from mines, unexploded ordnance and/or abandoned munitions and are encouraged to behave in ways that reduce the risk to people, property and the environment. Objectives are to reduce the risk to a level where people can live safely and to recreate an environment where economic and social development can occur free from the constraints imposed by landmine contamination. MRE, along with demining (which includes technical surveys, mapping, clearance of unexploded ordnance and mines, marking unsafe areas, and documenting areas that have been cleared), contributes to mine-risk reduction, or limiting the risk of physical injury from mines and unexploded ordnance that already contaminates the land. Advocacy and the destruction of landmine stockpiles focus on preventing future use of mines.

Maps resulting from the impact surveys and technical surveys are stored in an information management system, including a variety of programme databases, and provide baseline data for clearance organisations and operational planning. Humanitarian mine clearance aims to clear land, so that civilians can return to their homes and their everyday routines without the threat of landmines and unexploded remnants of war (ERW), which include unexploded ordnance and abandoned explosive ordnance. This means that all the mines and ERW affecting

the places where ordinary people live must be cleared, and their safety in areas that have been cleared must be guaranteed. Mines are cleared and the areas are thoroughly verified so that they can say without a doubt that the land is now safe, and people can use it without worrying about the weapons. The aim of humanitarian demining is to restore peace and security at the community level.

Mine clearance method

Surveying

Surveying, or the formal gathering of mine-related information, is required before actual clearance can begin. Impact surveys assess the socio-economic impact of the mine contamination and help assign priorities for the clearance of particular areas. Impact surveys make use of all available sources of information, including minefield records (where they exist), data about mine victims, and interviews with former combatants and local people. Technical surveys then define the minefields and provide detailed maps for the clearance operations.

Maps

Maps resulting from the impact surveys and technical surveys are stored in an information management system, including a variety of programme databases, and provide baseline data for clearance organisations and operational planning.

Minefield Marking

Minefield marking is carried out when a mined area is identified, but clearance operations cannot take place immediately. Minefield marking, which is intended to deter people from entering mined areas, has to be carried out in combination with mine awareness, so that the local population understands the meaning and importance of the signs.

Manual Clearance

Manual clearance relies on trained deminers using metal detectors and long thin prodders to locate the mines, which are then destroyed by controlled explosion.

Mine Detection Dogs

Mine detection dogs detect the presence of explosives in the ground by smell. Dogs are used in combination with manual deminers.

Mechanical Clearance

Mechanical clearance relies on flails, rollers, vegetation cutters and excavators, often attached to armoured bulldozers, to destroy the mines in the ground. These machines can only be used in certain terrains, and are expensive to operate. In most situations, they are also not 100% reliable, and the work needs to be checked by other techniques.

Education

The procedures for the accreditation of companies/laboratories and certification of equipment are well known and need only comply with the adopted practice of implementing the technical harmonization with the European Union, which results from the National Strategy for harmonization of technical legislation with EU technical legislation.

Table 1: *The level of competence and responsibility for Humanitarian Demining*

1. level	A person trained to level 1 is competent to perform the written instructions under the supervision of qualified person on the 2nd and 3 degree. A person with a first conviction degree is not responsible for the selection of methods and techniques, nor authorized to make a decision on the assessment of results of action.
2. level	A person trained to level 2 is competent to carry out humanitarian demining operations in accordance with approved procedures/process, within which he/she chooses a technology/equipment, prepares instructions for the first degree, and interprets and evaluates results.
3. level	3rd Person degree is competent to define and conduct humanitarian demining, determines and defines the methods, technology and procedures/processes to ensure compliance with the guidelines and/or standards, compliance with the environment that affects the humanitarian demining and whose activities affect humanitarian demining, evaluate and interpret results, and assume responsibility for the reliability of the results.

Engineering education in humanitarian demining operations within the civilian educational system shows up as an optimal and so far the only possible solution of demining, especially when mines and explosive means remain as the traces of war, and the possibility of engaging the military capacity to the necessary extent and intensity passes.

Organizational and managerial skills are especially important, because the engineer or the pyrotechnology engineer is assigned responsibilities of humanitarian demining in the management site, management of the company/group of deminers and/or inspection.

Education and certification is based on civilian education system of professional studies and lifelong education.

Mine risk education (MRE) seeks to increase the likelihood that at-risk individuals will adopt safer behaviours. To be successful, MRE must take into account individual circumstances and offer realistic alternatives. MRE should be incorporated into mine clearance and survivor assistance programs to ensure effectiveness, and to obtain information from affected communities to support mine clearance priority-setting. The incorporation of MRE into curriculum development of education systems is particularly worthwhile.

Conclusion

Mine Action programmes have generally applied some version of the prioritisation categories, with specific choices typically based on local knowledge, politics, and efforts to make efficient use of resources to minimize lost time through redeployment, reallocation of resources, etc. Recently the process starts with the strategic planning process, which uses various sources of information such as the results of the landmine impact survey to determine what the scope of the problem is and what resources are required to address the problem in a given period.

During this process, many political and operational factors are taken into consideration and this planning process repeats itself over the life of the

programme. This is followed by the annual planning process, with the purpose of developing an annual work programme with specific objectives.

Mine action comprises five complementary activities:

- a) Mine risk education;
- b) Humanitarian demining (i.e. mine and UXO survey, mapping, marking and clearance);
- c) Victim assistance, including rehabilitation and reintegration for mine and UXO victims;
- d) Stockpile destruction; and
- e) Advocacy against the use of anti-personnel mines.

The primary responsibility for mine action lies with the Government of the victim state within its national boundaries. This responsibility means the management and coordination of a national mine action program that includes the development of national authority and other operational organizations, able to develop, maintain and apply appropriate national legislation, rules and standards.

The competence of the people who are engaged in organization and performing of humanitarian demining is an essential pre-requisite for the achievement of safety, quality of the process, effectiveness and the reliability of the results. The article presented the needs and conditions for the development of the qualification and certification system of the humanitarian demining personnel with concept based on European and ISO standards.

International community on a global basis, offers the following solutions to the Croatian Government:

- establishing a national centre for mine action,
- legal, normative and subordinate regulations,
- mine-information system, geoinformation system,
- orthophoto System,
- planning system operating plans,
- training of deminers, various specialists in the field of demining,
- management training in demining,
- evaluation, testing equipment,
- cluster Croatian demining companies,
- supply of machinery and equipment for mining,
- development of standards for the implementation of humanitarian demining.

Analyzing the existing regulations governing the training of personnel in this area, required level of knowledge the possibility of lifelong education and training were established.

Basic forms of mine risk education (MRE) were conducted and still are conducted through the following activities:

- Presentations and lectures in schools, public companies, by holding the panels;
- TV/radio spots, jingles;
- Educational notebooks and special booklets, informative leaflets;

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- Media-covered projects, fairs, expositions with info-desks and promotional material;
 - Marking of April 4 - the “International Day for Mine Awareness and Assistance in Mine Action” and events related to “April – month of struggle against mines”;
 - “With Ladle against Mines”;
 - Different initiatives of show business people, concerts, art exhibitions, sports events where people speak of the mine problem.

Given the preconditions for the development of education and certification of personnel, using the experience of education in humanitarian demining and demining action, a centre for monitoring and training in demining and the Mine Action Strategy should be established at the regional level.

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CRIMINOLOGICAL AND CRIMINAL LAW ASPECTS OF THEFT OF CULTURAL PROPERTY¹

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Abstract: The authors are dealing with criminological and criminal law aspects of theft of cultural goods, as a form of the criminal offence of aggravated theft. Cultural goods are of great importance for every society, as well as ours, and among criminal offences related to their endangerment, the criminal offence of theft of cultural good is the most difficult and most commonly present. The paper deals with the perpetrators of these criminal offences, types of cultural goods that are most often the object of this criminal offence, places in which they are most commonly performed, as well as motives of the perpetrators. Also, the paper contains the criminal law analysis of this incrimination and all its elements, according to the Criminal Code of the Republic of Serbia. At the same time, the comparative law analysis of solutions on this issue in certain countries was presented, particularly in those dedicating great importance to the protection of cultural goods. In the final part of the paper, statistical data on frequency and other characteristics of this criminal offence in Serbia for the period 2000-2006 are given.

Key words: cultural good, theft, aggravated theft, perpetrators, motives, the Criminal Code of the Republic of Serbia.

The significance of the criminal law protection of cultural property

In contemporary society cultural property is becoming an ever more important and valuable matter. These positive developments in terms of evaluation of objects of culture go parallel with corresponding changes in the sphere of criminality involving cultural property which is gaining in proportion.² This phenomenon requires also adequate changes in the field of legal, and particularly criminal law protection, which is witnessed by relatively frequent amending of criminal legislation, whose former solutions do not contribute any more to the realization of the efficient legal protection.³

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² De Schutter, B.: L'harmonisation du droit pénal et la coopération pénale internationale comme instruments de protection des biens culturels. *Revue Internationale de criminologie et de police technique*, no. 1 (1986), p. 73; *Theft of Cultural Property in Canada*, Ottawa, 1990.

³ Frigo, M.: *Droit interne et droit international en matière de trafic illicite des biens culturels: l'exemple italien*. *Protection pénale du patrimoine archéologique*, présentée par V. Negri, Lyon, 1992, p. 132; Driessen,

The same is true for the protection of cultural property on international level, which is regulated by numerous international legal acts.⁴ Cultural development of modern humanity affects the rise in significance and value of all kinds of cultural property, which explains a steadily growing demand for such property, although its creation as well is constantly on the increase. The raising of cultural level of people of all standings in the present-day society is but one of the reasons for an increased demand for cultural property, which is true not only for the highly developed countries but for others as well. This situation motivates also an increased care in this field, enhancing the preservation and collection of objects of culture for various institutions in the field (museums, galleries, as well as private collections) and for different purposes, such as decoration of all sorts of spaces and premises, including open spaces, which is a phenomenon characteristic of civilized societies. These elements contribute to a constant rise in value of such property, another reason being the increase of knowledge about art and monuments of culture acquired through corresponding literature. The rise in value of cultural property is nowadays rather accelerated so that in many a case the prices reach enormous amounts. Such developments in the spheres of significance and value of cultural property parallel a precipitated development of criminal activities aimed at acquiring various objects of culture and gaining considerable benefit from their sale.⁵

Among various kinds of criminal offences by which perpetrators try to acquire items of cultural property, thefts are undoubtedly the most frequent forms of criminal activity instrumental in this sphere (see Picture No. 2 at the end of the paper). The contributing factors in this respect are, first of all, the high value of these objects, but also the fact that they are exposed mostly in public places, becoming thus more accessible and more open to information as to their location, independently of the degree of the existing security measures. On the contrary, other high value objects such as money, securities and jewellery, in most cases are relatively inaccessible (since they are kept in strong-boxes, safes, strong rooms) and void of information as to their location or existence. All these elements are relevant for the considerable increase in number of thefts of cultural property, both in the world and in our country.⁶

The whole situation in this field contributes to the increase of awareness of the significance of the respective criminal law protection, which also includes the sphere of criminal legislation in many countries. Although criminal law provisions covering the criminal offence of theft may be applied also to cases of theft of cultural property — which is in fact the practice in most countries — many other countries have introduced in their criminal legislation special provisions in regard to the theft of cultural property. Such cases of theft are usually defined as serious theft and/or aggravated forms of the criminal offence of theft. Thus, for instance, the Spanish Criminal Code, in its Article 235, paragraph 1, defines as an aggravated form of theft the act of stealing an object of artistic, historical, cultural

K.: Systematischer Vergleich der Denkmalschutzgesetze in der Bundesrepublik, Deutsche Kunst und Denkmalpflege, Heft 1, 32 Jahrgang, München-Berlin, 1974.

⁴ Gay, R.: Le régime international de l'importation, l'exportation et du transfert de propriété culturels. *Annuaire français de droit international*, XVI, 1970, p. 607; Brguljan, V.: Međunarodni sistem zaštite kulturnih i prirodnih dobara. Zagreb; Beograd: Republički zavod za zaštitu spomenika kulture, 1985; Pindić, D.: Međunarodne konvencije o zaštiti kulturnih dobara: njihovo ostvarivanje i problemi, Beograd: Centar za međunarodno pravo, 1987.

⁵ Kostić, S.: Ugroženost kulturno-historijskih dobara oblicima klasičnog kriminaliteta i njihova zaštita, Zbornik radova Sprečavanje i otkrivanje krivičnih djela izvršenih na štetu kulturnih dobara, Zagreb, 1988, p. 52.

⁶ De Schutter, B.: op. cit., p. 73; Lakčević, D.; Bošković, M.: Stanje i kretanje kriminaliteta izvršenog na štetu kulturnih dobara u SFRJ za razdoblje 1984 – 1988. Zbornik radova Sprečavanje i otkrivanje krivičnih djela izvršenih na štetu kulturnih dobara, Zagreb, 1988, p. 32; Theft of Cultural Property in Canada: op. cit., p. 3.

or scientific value,⁷ while the Austrian Criminal Code in Article 28 relating to aggravated theft, in paragraph 1, sub-paragraph 3, provides as one of the forms of that criminal offence the theft of objects of general scientific, ethnological, artistic or historical value that are kept in an accessible collection or at another similar place or public edifice.⁸ Similarly, the Greek Criminal Code, in its Article 374, b, as one of the forms of aggravated theft defines the stealing of an object of considerable scientific, artistic or historical value, which property is kept in a generally accessible collection, in a public edifice or in some other public place.⁹ The Criminal Code of Portugal, in its Article 204, paragraph 2, d, specifies as a qualified form of the criminal offence of theft, the act of stealing an object of significant scientific, artistic or historical value, which is kept in a collection or at a public exhibition or at some other place accessible to the general public.¹⁰ The Criminal Code of Finland as well, in its chapter XXVIII, Article 2, provides for the offence of theft in case of stealing of objects located in a public collection of books or manuscripts or in a public collection of scientific, artistic or historical items.¹¹ In the Criminal Code of Croatia a theft of cultural property is defined in Article 217, paragraph 2, sub-paragraph 3 by using the similar terms — theft of a property or an object having a scientific, artistic, historical or technical significance, or placed in a public collection, protected private collection or exhibited to the general public.¹²

In our country the Criminal Code of the Republic of Serbia (hereinafter — CCS), also provides for the theft of cultural property as a special form of the criminal offence of theft that is classified in the category of aggravated theft.

The perpetrators of the cultural property thefts

There is a belief that perpetrators of the cultural property thefts are good experts in art, while, according to the detectives' and merchants' opinions, most of them do not possess any special knowledge in art and they steal everything just to gain profit, either furniture, paintings, silver and gold objects or jewellery. Some of the perpetrators choose objects by accident at the beginning, but in time they conceive that it is important to know what they steal and this is why they go to the libraries and study the books about art and guidebooks with prices of the antique objects. They often locate their targets easily, using the magazines where the owners of the wealthy villas show their interiors, such as *Grande-Bretagne*, *Apollo* or *Country Life*, where the complete descriptions and inventories of the precious works are published¹³. During the investigation of the series of the thefts carried out in French castles during the period of 1986-1987, the police found the collections of the magazines *Les Châteaux de France* at the perpetrators', with the photos of the interiors, where the objects which had to be stolen were marked¹⁴. If the private collections are open for public, the perpetrators join the guided groups, in order to plan the details of the theft and gather the information.

According to the B. Dobovšek's classification¹⁵, the perpetrators of the

⁷ Valle Muniz, J. M., Morales Garcia, O.; Fernandes Palma, R.: Código penal y Leyes Penales Especiales. Aranzadi Editorial, 1997, p. 218.

⁸ Forreger, E.; Serini, E.: Strafgesetzbuch StGB. Wien : Manzsche Verlags und Universitätsbuchhandlung, 1989, p. 128

⁹ Krivični zakonik Grčke, Beograd : Institut za uporedno pravo, 1957, p. 204.

¹⁰ Código Penal. Coimbra : Coimbra Editora, 1997, p.129.

¹¹ Ancel, M.: Les codes pénaux européens : T. 2. Paris : Centre français de droit comparé, 1958, p. 577

¹² Narodne novine, no. 110 (1997), p. 3491

¹³ Massy, L.: Le vol d'oeuvres d'art, Bruxelles : Bruylant, 2000, p. 99, 121-123; Roux, E.; Paringaux, R. P.: Razzia sur l'art. Paris : Fayard, 1999, p. 69

¹⁴ Bourguignon, A.; Choppin, J.E.: L'art vole : enquête sur le vol et le trafic d'objets d'art. Paris : Éditions la Découverte, 1994, p. 26.

¹⁵ Dobovšek, B. : Problematika preiskovanja kaznivih dejanj povezanih z umetninami [Elektronski vir]. 8. slovenski dnevi varstvoslovja Varnost v sodobni družbi groženj in tveganj, Bled, 30. maj - 1. junij 2007, Maribor

cultural property thefts can be divided into several categories:

- The perpetrators who carry out the theft as an order, among these there are often various returnees. They deliver the stolen object at once to the customer known beforehand, more exactly to the person who ordered, for the price fixed before the theft.

- The perpetrators who carry out the crime for further sale, who do not know the value of the works of art and who sell them at considerably lower prices. The drug dependents who steal the easily accessible liturgy objects in the sacral buildings belong to this category and they finance their drug habit by selling them or they exchange them for drugs directly.

- The collectors to whom the price is not important as well as the way they come in possession of their desired work of art for their collection. They can order thefts and also have the high social status.

- The persons from the prominent professions (restorers, art historians, auctioneers from the auction houses), who forget the ethic principles of their field because of the financial profit.

- The specialists (middlemen, mediators), who order to the perpetrators which objects to steal.

- Various dealers who take an advantage and steal the cultural property wanted at the market. First they hide the stolen object and then offer it for sale.

- The middlemen who know the value of the cultural property, where it is placed, the weakness of the security system and the way how to steal it and remove it to the safe place.

- The mediators, who are the link to the person who orders or directly to the collectors of those objects.

The organized criminal and terrorist groups are also there to carry out the cultural property thefts; they sell the valuable art and antique objects in order to gain money for paying drugs or weapons. Lately, the trade of cultural objects appears as a form of gathering the financial means for terrorist groups and terrorist attacks¹⁶.

The French authors Bourguignon and Choppin present the classification of the perpetrators of the museum thefts in the form of a triptych, where on the left there is *an aesthete*, more exactly a collector who steals for himself *for the love of art* and who does not sell these things for a long time; on the right there is *an appropriate* perpetrator who uses the absence of the alarm system or incautiousness of the security workers; on the central board there is a *profiteer*, who steals paintings from museums, in order to sell them and whose motive is gaining the huge financial profit¹⁷. According to Massy's understanding, the professional theft perpetrator focuses more on ill documented and easily accessible art objects, conceiving that *the less is worth more* and that, because of lack of the art and antique objects register, it is very difficult to consider their provenience. The inexperienced perpetrators are more attracted by famous works of art which cannot be sold easily, no matter what the price is. Although they usually end in private collections, it is much more possible that one day they will be found which sometimes happens after several decades. Perpetrators often know how to steal, but not how to sell the plunder, which is why the role of a dealer is important, without whom the theft perpetrators would be faced with the great difficulties with the selling¹⁸.

: Fakulteta za varnostne vede, 2007, p. 5

¹⁶ Dobovšek, B.: Financing terrorism through art, Review of international affairs, 60 , no. 1136 (2009), p. 93-104

¹⁷ Bourguignon, A.; Choppin, J.E.: op. cit., p.77

¹⁸ Massy, L.: op.cit., p. 126, 131, 135

Motives for the cultural property thefts

Whatever the reasons which lead the perpetrators to the theft of the works of art, the motives like profit or desire for owning them are constant. Basing on numerous cases of thefts, investigators identified other motives, too, like collecting, desire for proving that the buildings are not adequately secured, investing into works of art, financing the other forms of criminality, patriotic motives, political and social motives (e.g. religious intolerance)¹⁹. Briginole-Saracco²⁰ makes differences between passionate collectors (who are occupied with making a high-quality collection, who enjoy owning the certain work of art, while the others are delighted), the heirs (who did not put a great effort into getting the things, to which they are emotionally attached by family) and investors (for whom the purchasing of the art objects is the means of investment, more exactly, speculation)²¹.

The motives for collecting the works of art are different, from almost sacred love towards art and fun, to satisfying a need for distinction and public recognition, profit, fashion, acquiring the tax exemption, etc. But, it is evident that the works of art are being much less stolen for individual pleasure and for their own beauty, than for high prices they reach at auctions and huge profits that they can achieve by stealing them and selling them illegally. The theft of Gainsborough's *Duchess of Devonshire* in 1876, which was carried out by Adam Worth, is the earliest example in history that a work of art attracted the attention of the organized criminal, when the work of art had to be used in exchange for freeing a prisoner. Vincenzo Peruggia having taken the advantage, stole *Mona Lisa* from the Louvre (1911), considering that it was the way he fulfilled his patriotic duty, to return the picture from France to Italy; and Arsene Goedertier, stole *Van Eyck's Ghent Altarpiece* (1934) for asking for ransom. Kempton Bunto asked for a certain sum to be paid on the account of the poor for the return of Goya's *Duke of Wellington* portrait. The thefts of Velasquez's, Guardy's and Coregio's paintings in the pinacotheca in Modena and then in the Uffizi Gallery in 1992 are used by the Brent's gang in negotiations about the improvement of the prison conditions for the gang bosses. After the theft in the Rosborough house near Dublin in Ireland in 1986, Martin Cahill used the stolen works of art as barter in exchange for the drug. The terrorists and revolutionaries aimed to the art and antique objects thefts for financing their own political activities, or they use them as the means for blackmails in negotiations about releasing the political prisoners. An illustrative example is the theft from the private Lord Alfred Bate's collection in Rosborough house, which was carried out by Rose Dugdale in 1974, with the help of the Irish Republic Army activists²².

The place of carrying out and the most common sacrifices of the cultural works of art thefts

According to Kursar-Trcek, the victims of the criminal acts against the works of art can be individuals and institutions, and they can be divided into two big groups: *public sector* (national galleries and museums, archaeological findings

¹⁹ Conklin, E. J.: *Art crime*. Westport (Conn.); London : Praeger, 1994, p. 130; Massy, L: op.cit., p. 104, 105; Kursar-Trček, A. : *Vrste kaznivih dejanj zoper umetnine*. Slovenski dnevi varstvoslovja, Ljubljana : Visoka policijsko-varnostna šola, 2002, p. 8; Dobovšek, B.: *Problematika preiskovanja*: op.cit., p. 6

²⁰ Briginole-Saracco, M. : *L'assurance des objets d'art*. Paris: L'Argus, 1990.

²¹ Bazin, G. (1967). *The Museum Age*. Brussels : Desoer S. A. Publisher, 1967, p. 86. According to Bazin in 1675 one Abbot wrote to Miss de Sevigne that the pictures were nice as much as the cash and that they were good investment because they could be sold at any time for the double sum in relation to the purchase price.

²² Haupt, S.: *Tableaux volés : Enquête sur les vols dans le monde de l'art*. Lyon : Éditions Stéphane Bachès, 2006.

on land, sea and lakes, parks, libraries, sacral objects, governmental institutions) and *private sector* (private galleries and museums)²³. The analysis of the criminal acts in connection with the cultural works of art of Serbia in the period of 2000-2006, shows that the target of the cultural works of art thefts were the museums and galleries, churches and monasteries, archaeological localities, flats and houses of private collectors, as well as the others (see the Graph number 3 at the end of the work). Among the stolen objects there are artistic paintings, numismatic materials, silver and gold objects, icons, books, old weapons and others²⁴ (see the Graph number 4 at the end of the work). It is noticed that the number of the criminal acts carried out in the museums is growing from year to year, while in other places (in galleries, churches, monasteries, archaeological findings, flats, houses, etc.) the number is reducing. The statistically important trend of reducing is noticed only in flats and houses. In regard to the type of the stolen works of art, it is noticed that the number of the stolen artistic paintings, silver and gold objects, icons and old weapons is reducing, while the number of the stolen numismatic objects, books and other objects is growing from year to year. In regard to found and returned stolen works of art according to the types, the most difficult to be found and returned are the silver and gold objects and icons, while the number of found and returned artistic paintings, numismatic objects and books is growing from year to year.

One of the biggest artistic paintings thefts from the museums in Serbia within the observed period was carried out in 2006 in the City Museum in Novi Sad. Two masked and armed perpetrators, under the threat of arms, stole four pictures from the collection of the foreign art which Dr Ratko Ilic gave to the museum in the form of legacy, and they are still being searched for: *Christ's Head* of the unknown author from the German or Dutch painting school from the 16th century, Francesco Mole's *Landscape with the fisherman* from the 17th century, Ruben's *Seneca* from the 17th century, Rembrandt's *Father's portrait* from the 17th century, which are on the Interpol notice of the most wanted artistic works of art, as well as on the site of the Ministry of Internal Affairs of Republic of Serbia. In March 2001, 15 paintings, sketches and studies of the Serbian painter Paja Jovanovic had also been stolen from the exhibition in the Museum in Arandjelovac and later found by the police and returned to the National Museum in Belgrade. The targets of the theft perpetrators were the private collections in Belgrade, Sremska Mitrovica and Novi Sad and among the stolen items there were the paintings of Sava Sumanovic and Uros Predic.

The target of the thefts perpetrators in Serbia were the sacral objects, too, from which the liturgy objects, especially icons and relics are being stolen. The Serbs have a long and interesting history which is full of thieves of the liturgy objects, which were mentioned as early as in the Karyes Typicon, one of the oldest Serbian document in Hilandar, in which the one who steals a book, an icon or other church object is damned. The other criminal statutes written later in Serbia also treated "*svjatostatstvo*"²⁵, i.e. the church thefts in a specific way. Those thefts are stirred by the big demand of the orthodox icons, because the buyers are located all around the world, but the icons are mainly in Russia or in the Balkans. The case of the theft of the three capital icons, work of the zograph Georgije Stojanovic, from the iconostasis of the St. Nichola's church in Sibac, carried out in 1971 is known. This iconostasis was originally painted for the Lower church in Sremski Karlovci and in 1830s it was repurchased by the church in Sibac. According to Lessek's

²³ Kursar-Trček, A.: op. cit., p. 10

²⁴ The others are medals, decorations, needlepoints, old rugs, period furniture, photos, maps, jewelry etc.

²⁵ Svjatotatec is the person who desecrates the sacred objects or who pilfers the church property. The term "svjatostatstvo" describes the thefts in church.

conceiving until these capital icons thefts it was one of the best protected altar partitions from the first half of the 18th century, as one of the rare testimony of the baroque in the Serbian art, in which the meeting of the post-Byzantium tradition with the new elements of the western baroque took place²⁶. Two icons from the iconostasis in Sibac, Virgin with Christ and St. Peter and Paul were found and returned to the church in 2006, 35 years after the theft, while the third one, The Icon of Christ, is still being looked for.

The action of the criminal offence of theft of cultural property

According to the terms used in this Criminal Code of Serbia the criminal offence of theft of cultural property exists if the criminal offence of theft (Article 203 of the CCS) is committed in regard to cultural property or in regard to natural asset (Article 204, paragraph 2. of the CCS). The importance of the object of protection relating to this kind of criminal offence requires stricter punishment for this offence and this has been the reason for establishing this incrimination.

Since the criminal offence of theft of cultural property is a special form of theft, it comprises all legal elements of the basic offence of theft, with the proviso that there is yet another special element involving the kind of the object of that criminal offence, i.e. a cultural property.

The theft of a cultural property as a form of the criminal offence of theft has to be defined in connection with the general concept of theft. This concept is defined in the CCS as depriving another of a movable property with the intent to gain by such deprivation, for oneself or for another, unlawful property benefit. These elements characterize also the theft of cultural property, with the proviso that the object in case of this criminal offence is a cultural property or natural asset not belonging to the perpetrator. Therefore, these will be analyzed in the following text as a mode of explaining also the structure of the being of the criminal offence of theft of the cultural property, as specified by the CCS.

The action of the criminal offence of theft of cultural property, just as in case of theft in general, is deprivation of another's movable property (in this case another's movable cultural property or archaeological discovery).

The very notion of deprivation is defined in the criminal law theory in different ways, so that there are several theories giving rise both to conceptions of the action of criminal offence of theft and to determining the time of its completion. According to one of these conceptions (the contact theory), the action consists of the contact between the perpetrator and the thing (object, property), i.e. of the very touching it by the perpetrator with intent to interrupt the actual holding of the actual holder, so that the action of the criminal offence is completed in the moment of perpetrator's touching the thing with the purpose of interrupting the existing holding (possession). According to the second conception (amotion theory), the action consists of touching and moving the thing in order to interrupt the existing and actual holding, so that the action is considered completed at the very moment of touching and moving the thing from its place with the purpose of interrupting its actual holding. The third conception (ablation theory) determines the action of the criminal offence as shifting a thing (object, property) to another place with the purpose of interrupting its former

²⁶ Lesek, M. : Umetnička baština u Sremu. Novi Sad : Matica srpska, 2000, p. 5, 11.

actual holding, so that the action is considered completed at the time when the object of theft was not only touched and moved, but also when it has been placed (while being moved from its previous location) to another place. According to the fourth conception (illation theory), the action of the criminal offence includes not only shifting the thing that is the object of theft to another place, but such place should be a safe one, i.e. a place in relation to which there is no doubt that previous actual holding has been interrupted. Consequently, according to that conception it is considered that the action of the criminal offence is completed only when the perpetrator of the offence has put away the thing he took to a safe place. According to the fifth conception (apprehension theory), the action of the criminal offence of theft consists of the interruption of actual holding of the previous holder of the thing being the object of theft, and establishing by the volition of the perpetrator of criminal offence a new actual holding of it on the part of the perpetrator or a third person.²⁷ According to this conception, the action is considered completed not only when the actual holding by previous holder has been interrupted, but also when actual holding has been established by a new holder.²⁸ This conception is widely accepted in Yugoslavia, both in theory²⁹ and practice.³⁰ The above conception will therefore be the basis of further elaboration of issues relating to the notion of the act of commission of this criminal offence. Along these lines, deprivation as the action of the criminal offence of theft may be any action by which actual holding is interrupted of a person actually holding the relevant thing (regardless of whether the actual holder is a genuine, lawful owner or not) and by which the actual holding is established of another person (perpetrator of the criminal offence), with the proviso that the force or immediate threat of attack to life and limb have not been applied (since in that case the action would be qualified as robbery). Since the action of the criminal offence of theft is instrumental in interrupting the existing actual holding and in establishing a new one, it is essential for the concept of completed action to meet both requirements, so that if only the actual holding has been interrupted of the previous holder, without establishing the actual holding of another, the action may not be considered completed; consequently, in this case one may speak only of an attempt to commit a criminal offence of theft.³¹

The very act of deprivation as an action of the criminal offence may be committed in several ways, depending of the nature of the matter which is the object of theft, i.e. of whether this is a material object or accumulated energy, a telephone impulse, electronic data information, etc. The act depends also on other features of the object (size, weight, physical condition and the like). In the event of theft of a cultural property, the action depends on the nature and kind of property that is the object of deprivation. The deprivation may be effected only by bodily movements of the perpetrator with or without the use of tools or other auxiliary instruments (rope, elevating device and the like) or by applying other means (machines, equipment, etc.) or, as the case may be, by using a trained animal.

The deprivation is not completed just by the interruption of actual holding, but only after the new one has been established. Therefore, there is no completed

²⁷ Tahović, J.: Krivično pravo : posebni deo. Beograd : Savremena administracija, 1961, p. 322; Čejović, B.; Milanović, V.: Krivično pravo : posebni deo. Niš : Studentski kulturni centar, 1995, p. 309; Jovanović, Lj.; Jovašević, D.; Đurić, V.: Krivično pravo : posebni deo. Niš : Centar za publikacije, 2000, p. 394.

²⁸ Lazarević, Lj.: Krivično pravo Jugoslavije : posebni deo. Beograd : Savremena administracija, 1995, p. 633.

²⁹ Živanović, T.: Osnovi krivičnog prava : posebni deo : knj. 1, sv. 2. Beograd, 1939, p.14; Stajčić, A.; Vešović, M.: Krivično pravo : posebni deo, Sarajevo : Svjetlost, 1983, p. 146; Stojanović, Z.; Perić O.: Komentar Krivičnog zakona Republike Srbije i Krivični zakon Republike Crne Gore sa objašnjenjima. Beograd : Službeni list SRJ, 1996, p. 262.

³⁰ Verdict of the Federal Supreme Court, Ku. 53/55; Đorđević, M.: Praktikum za krivično pravo : posebni deo. Beograd : Naučna knjiga, 1970, p. 147; Verdict of the Supreme Court of Serbia, Kž. 11/87; Jovanović, Lj.; Jovašević, D.: Praktikum za krivično pravo. Beograd : Policijska akademija, 1996, p. 209

³¹ Komentar Krivičnog zakona Republike Srbije. Beograd : Savremena administracija, 1995, p. 585

criminal offence of theft without meeting that requirement, too. For instance, if the perpetrator took another person's property and then lost it by dropping it in water or in a fire, there shall be no completed criminal offence of theft, but only an attempt (where the perpetrator intended to gain unlawful property benefit for him or for another person).³²

Another frequent controversial issue concerns a situation of a perpetrator who has interrupted previous actual holding and established his own, but has still remained in the closed space where the property was taken by him (for instance, in another person's apartment, shop and the like). The solution usually depends on special circumstances characterizing the specific situation. Thus, if the perpetrator who is still in somebody else's premises (room, etc.) has put the object in his pocket or a kit-bag, the theft is only attempted; on the other hand, if he lives or works in such spaces (hotel client, guest in an apartment, salesman in a shop, worker in a workshop), the action is considered completed only after the object has been taken out of such closed spaces. However, if the perpetrator is a person only authorized to enter such spaces (customer in a shop, museum visitor), the criminal offence is considered completed as soon as he has put the object in his pocket or kitbag, intending to take it out of the closed space in such a way.³³

Since theft is committed by depriving an owner of his movable object, such object according to the concept of deprivation has to be actually held by another person. There is no deprivation where the object is in actual holding by a person intending to effect deprivation because the object is already in his holding.³⁴ However, should several persons simultaneously actually hold an object, every one of them, insofar as not being the owner, may commit deprivation and/or theft, because he has taken away the object that was in another person's actual holding. Joint actual holding is possible in case of co-owners, but also in the case of persons who are not owners but only actual holders (workers in a shop, monks in a monastery, co-owners of a gallery exhibiting works of art of an outside painter, etc.). It is also possible that some of the actual co-holders is the owner of the object, while the others are not, and in such a case these other persons may commit deprivation having the character of theft (apprentice in a workshop in regard to the owner, servant in a private household in regard to the employer, tenant in regard to the apartment owner).³⁵

Actual holding does not depend on the ground of the holding. An object of property thus may be in actual holding on any of the legal grounds (an owner, a person keeping the property in custody, holding it for repair, for use, etc), but also without any ground whatsoever (in the event of finding an object, accidental holding), including the unlawful ways (stolen objects, objects taken by fraud).³⁶ It is essential only that the object of property is within somebody's actual holding and that such holding concerns another person and not the perpetrator. Property that is in nobody's actual holding (for instance, a property deserted by owner, or a lost property)³⁷ cannot be the object of deprivation, as it is accessible to everybody (being in a street, on a seacoast, on the road, etc.). However, in the event that someone has lost the object at a specific spot known to him (a shop, a coffee-shop, a specific yard, etc.), it is considered that the actual holding still exists, because the actual holder may try to find the property.³⁸ In another case, the property lost at

³² Radovanović, M.; Đorđević, M.: *Krivično pravo : posebni deo*. Beograd : Savremena administracija, 1977, p. 235.

³³ Komentar Krivičnog zakona Republike Srbije: op. cit., p. 586.

³⁴ Babić, M.: *Krivično pravo : posebni deo*. Banja Luka : Pravni fakultet, 1995, p. 144; Kambovski, V.: *Krivično pravo : poseben del*. Skopje : Studentski zbor, 1983, p. 418.

³⁵ Rousselet, M.; Patin, M.: *Droit pénal spécial*, Paris : Sirey, 1958, p. 513

³⁶ Stojanović, Z.; Perić, O.: op. cit. : p. 261; Čejović, B.; Milanović, V.: op. cit. : 1995, p. 118

³⁷ Stajić, A.; Vešović, M.: op. cit., p. 146

³⁸ Verdict of the Federal Supreme Court, Kž. 34/62. *Pravni život*, no. 4 (1962), p. 76

an unknown spot and being in somebody else's premises (apartment, coffee-shop, shop), falling thus in actual holding of the owner of such spaces, it may be the object of theft by other persons; however, if it is taken by the owner of such spaces (where the property was lost or forgotten), there would be no criminal offence of theft, but the offence of concealed apprehension³⁹.

The very concept of actual holding is conceived as a matter-of-fact relationship between the actual holder and the object of property, that relationship including the possibility of free treatment, influence and disposal of the object, but not the ownership character, unless the actual holder is at the same time the legal owner. As a rule, the property should be within reaching distance from the actual holder, so that he can control it at every moment and to treat it accordingly. This, however, does not mean that actual holding is terminated if the actual holder has placed it at some other place (a chair, a hat-stand, a parking lot), or if he left it temporarily in his apartment (or any other closed space of his). Moreover, there shall be no termination of actual holding if the object of property is handed over to another person to use it for a moment (a pen given to someone in the post-office to fill out a form), or to look over the object (object of art on sale), or to test it (a coat in a dress shop)⁴⁰. Actual holding shall not terminate as well in respect to objects of property handed over to another for the purpose of using them to work with (tools or material handed over to workers in a company or factory, household appliances used by servants in an apartment, etc.), or for the purpose of using them within a space belonging to their actual holder (furniture in a rented apartment)⁴¹. The same is true in the event of an actual holder being unable to control his property due to illness, loss of consciousness, injury or other similar cause.

Everybody may be an actual holder, including children and persons lacking the capacity of understanding their own actions (being not imputable), regardless of the fact of their lacking the capacity to engage in legal transactions, because actual holding is not a legal category but an actual relationship included in such persons' capacity to actually treat them (in spite of the quality of their volition); consequently, such property may be in their actual holding and it may also be stolen by them.

There is, however, a controversy as to the existence of actual holding in regard to objects of property which are closed and locked up within another movable object (property) that is handed over to another person for keeping safe (property locked up in a suitcase, strong-box or a wardrobe). The conception prevails according to which the actual holder of such a locked up object is also the actual holder of the property within the other object. However, if the property which is locked up is handed over to another person to actually hold it, with the proviso that the giver of property who keeps the keys with him may freely take the locked property out and dispose of it, in the capacity of its actual holder, the actual holding of the suitcase, strongbox or wardrobe is vested with the person being entrusted the property for keeping, while the actual holding of objects of property which are locked up remains with the one who already has the actual holding of these objects⁴².

³⁹ Komentar Krivičnog zakona Republike Srbije: op. cit., p. 582; Živanović, T.: op.cit., p. 12

⁴⁰ Jovanović, Lj.; Jovašević, D.; Đurić, V.: op. cit., p. 393; Verdict of the Supreme Court of Yugoslavia, KŽ. 131/65, Pravni život, no. 2 (1966), p. 78; Verdict of the Supreme Court of Croatia, Ku. 265/71-3; Čejović, B.: Krivično pravo u sudskoj praksi : II : posebni deo. Beograd : Jugoslovenski zavod za produktivnost rada, 1986, p. 308

⁴¹ Radovanović, M.; Đorđević, M.: op. cit., p. 234; Čejović, B.; Milanović, V.: op. cit., p. 309; Verdict of the Supreme Military Court II k. No. 953/58. Pravni život, no. 9-10 (1954), p. 42

⁴² Komentar Krivičnog zakona Republike Srbije: op. cit., p. 584

The object of the criminal offence of theft of cultural property

The object of theft of cultural property is cultural property. The concept of cultural property is defined in the Law on Cultural Property of Serbia, enacted in 1994.⁴³ According to the wording of the Law, “cultural property relates to objects and creations of material and spiritual culture which are of general interest and which enjoy special protection as defined by the present Law”. This definition of cultural property is completed by the provision enumerating the kinds of cultural property included in the concept, which is a way of necessary specification of objects belonging to the category of cultural property.

Pursuant to the legal definition of the concept of cultural property provided for in the actual Law on Cultural Property, three elements are characteristic for such property, i.e.: (1) that it includes objects and creations of material and spiritual culture; (2) that these objects and creations are of general interest; and (3) that they enjoy special protection as provided for by the Law on Cultural Property.⁴⁴ There is neither an explanation nor a definition of the first of the mentioned elements in the Law. Only eight kinds of cultural property are listed instead. These are the following: monuments of culture, cultural and historical regional entirities, archaeological excavation sites, renowned places, artistic and historical works of art, archival materials, motion picture archival, and old and rare books.

The second element of the concept of cultural property according to the statutory definition — denoting this property as being of general interest points at the substantive feature of cultural property which gives ground for qualifying and determining it as a cultural property. The Law along these lines provides for three categories of cultural property classified in terms of their significance: cultural property, cultural property of great significance, and cultural property of exceptional significance. There are detailed conditions, i.e. criteria, specified in the Law for the classification of cultural property objects into specific categories according to their importance; this, in other words, is also the mode of determining the characteristics of each category of cultural property.⁴⁵

The third element of the notion of cultural property points at the formal side of that element, i.e. the fact that cultural property enjoys special protection as provided for by the Law on Cultural Property. In order for a cultural property, which otherwise has all the characteristics of such property, to enjoy special protection pursuant to the Law on Cultural Property, it should be determined beforehand as such. Corresponding mode and conditions for such determination are prescribed by the Law on Cultural Property which also provides for the pertinent jurisdiction.

In addition to cultural property to be determined in the above manner, there are cultural property objects, too, that are considered as such on the ground of the Law itself. These include artistic and historical works of art, archival materials, motion-picture archival and old and rare books that are kept safe in the institutions charged with the protection of cultural property. Such institutions include: institutions for the protection of monuments of culture, museums, archives, motion-picture archive and, under specific conditions, also institutions charged with the activity of protection of nature, and libraries.

⁴³ Official Herald of the Republic of Serbia, No. 71. from 22. III 1994

⁴⁴ Simović-Hiber, I.: Krivičnopravna zaštita kulturnih dobara. Pravni život, no. 11 (1995), p. 682

⁴⁵ Simović-Hiber, I.: Povodom novog modela krivičnopravne zaštite kulturnih dobara, Jugoslovenska revija za kriminologiju i krivično pravo, no. 3 (1994), p. 89.

In regard to determination of the concept of cultural property, one should take into account the fact that the Law on Cultural Property prescribes that the environment of an immovable cultural property, too, enjoys the same protection as the cultural property itself. Pronouncing the environment of a cultural property protected is effected by the same agency that is in charge of determining the status of that very cultural property, and this is the Government of the Republic of Serbia, which is competent for these activities under the statute.

The object of that criminal offence may be also a part of cultural property object. Two cases are possible in this respect. The first one concerns the deprivation of a part of cultural property which, as such, undoubtedly has no value and significance as an entirety of the cultural property, but which at the same time represents a cultural property (for instance an icon taken out of the iconostasis, or a page from a book representing a cultural property). Such parts of cultural property, since they too represent cultural property, undoubtedly may be an object of the criminal offence of theft of cultural property. In the second case the part as such, although belonging to the entirety of cultural property, does not represent a cultural property (for instance stealing a roof from a monastery, or stealing of gold incorporated into a cultural property), but still has a certain value. In such a case one should consider that there exist two concurrent criminal offences: the offence of damaging a cultural property and the offence of ordinary theft (or, as the case may be, of aggravated theft, should considerable value be involved). The only exception in this respect would be if one of these criminal offences would be included into the other⁴⁶ (for instance, if small value was stolen, while the loss incurred by the cultural property has been considerable, so that the offence of petty theft would be in apparent concurrence with the other offence on the ground of inclusion).

The property that is the object of theft should be another person's property, i.e. it should belong to another. Whether in a concrete case there is ownership and who the owner is, has to be determined pursuant to the property law provisions. A thing belongs to someone else if it is owned by anyone except the perpetrator of the criminal offence. Along these lines, the property belonging to a perpetrator of the criminal offence cannot be the object of theft, and if it is actually held by some other person, and the owner takes it away from that person, there shall be a criminal offence of taking the law in one's own hands. Otherwise, it is not relevant whether the holder of the right of ownership is a natural or legal person, which applies also to the form of ownership - private property, state or social property — as well as whether co-ownership is at issue. Consequently, there shall be a criminal offence of theft if the perpetrator is a co-owner of the stolen object, because by committing theft he in fact unlawfully appropriates a portion belonging to other co-owners;⁴⁷ here also the value and size of perpetrator's portion is irrelevant for the existence of the criminal offence of theft. However, that circumstance may be pertinent for the court in terms of characterizing the offence and assessing an adequate punishment.

Due to the fact that the object of theft has to belong to another, objects that cannot be owned at all and that serve as public good (air, sea water, rain), may not be the object of theft. Property not belonging to anyone or whose owner has deserted it, manifesting thus his intention to renounce the right of ownership (for instance, things thrown away, or forsaken), is considered as not being apt as object

⁴⁶ Komentar Krivičnog zakona Republike Srbije : op. cit., p. 233.

⁴⁷ Atanacković, D.: Krivično pravo : posebni deo, Beograd : Privredna štampa, 1981, p. 459; Verdict of the Supreme Court of Serbia, Kž. 135/51; Komentar Krivičnog zakona Republike Srbije : op. cit., p. 582

of theft;⁴⁸ if a thing is accidentally lost, and the person finding it appropriates it unlawfully, there shall be a criminal offence of not disclosing the fact of finding a lost property. Cultural property excavated at archaeological sites may be the object of theft, and if it is discovered at another generally accessible place, it may be the object of not disclosing the fact of its finding.

The object of theft may be only a movable property, since an immovable property may not physically be taken away, which is the meaning of the term deprivation, conceived in respect to the criminal offence of theft. The concept of movable property in criminal law is not the same as the one in civil law, so that in criminal law a movable property is everything which can be moved and shifted to another place.⁴⁹ Consequently, in criminal law movable objects (things) are also those that according to their nature may be moved, although in terms of the civil law, they are considered as belonging to some immovable property making its component part; movable property in terms of criminal law includes also parts of an immovable object that may be separated from it (doors and windows of a house, tiles from a roof, parts of immovable installations, equipment or machines, trees in a forest, separated or shoved away parts of an immovable cultural property, and the like). Some authors make a difference in this respect between movable objects (that are of such a character due to their nature) and objects that are made movable (by the fact of their separation from an immovable property); according to such distinction, both kinds of such property may be the object of the criminal offence of theft.⁵⁰ It is understandable that the portions of a movable object that may be separated from it are also movables. Since cultural property too may consist of both movable and immovable objects, the object of theft of cultural property may be only a movable cultural property; at the same time, as previously stated, the object of such theft may include also all parts of an immovable cultural property that are separated from it in one way or another (wrenched out or dismantled, etc.). The same solution should apply to objects found at archaeological excavation sites, which fall in the category of immovable cultural property; these objects, after being dug out, become movable cultural property and thus may become an object of theft of cultural property.

The intent as the element of the criminal offence of theft of cultural property

The criminal offence of theft of cultural property is characterized also by the element of intent (premeditation), which pursuant to the CCS is a statutory feature of the criminal offence of theft and, by that very fact, of the criminal offence of theft of cultural property.

The current Criminal Code of the Republic of Serbia defines the intent as a characteristic of the criminal offence of theft, which applies also to the theft of cultural property. Consequently, the intention on the part of the offender to acquire unlawful property benefit for himself or for another by effecting deprivation is the essential element of the offence. Such benefit may take different forms, for instance increasing one's property, using the object of theft, consuming it, enjoyment of the object by possessing it (the case of a valuable painting), disposing of stolen

⁴⁸ Verdict of the Supreme Military Court, II K. No. 408/77, Supreme Military Court, Collection of Court Decisions (in Serbian language), book I, Belgrade, 1985

⁴⁹ Manzini, V: Trattato di diritto penale italiano, vol. IX. Torino : Unione tipografica - Editrice, 1963, p. 35

⁵⁰ Lambert, L.: Cours de droit penal special. Lyon:I. Desvigne, 1950, p. 56

property and the like.⁵¹ Without such inner, subjective element of taking away a movable property belonging to another person, there is no criminal offence of theft but some other offence.

The term appropriation in case of this criminal offence includes the creation of a possibility of permanent disposal of the stolen object (use, sale, handing it over to another person, leasing, mortgaging, remodelling and other kinds of property disposal), but not acquiring ownership, since there is no acquiring through theft in terms of civil law.

Intention as an essential element of the existence of criminal offence of theft, including the offence of theft of cultural property, must refer to acquiring property benefit, and not to some other kind of benefit, in which case some other criminal offence would exist, such as taking away an object belonging to another person - where there is no need for intention as a necessary element of existence of the criminal offence.

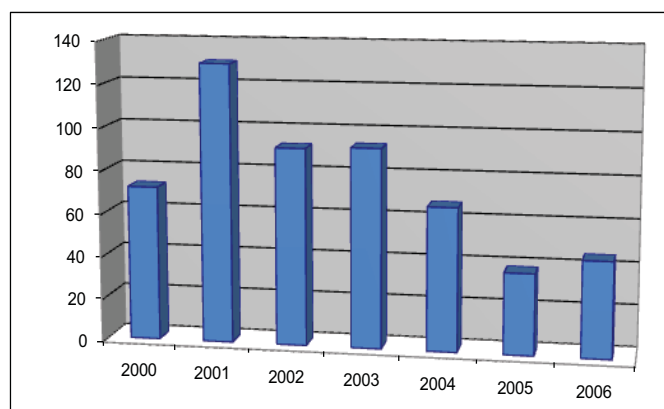
Offender's intention to acquire property benefit by appropriating a stolen object may be realized by all sorts of action (through sale, use, lease, etc.). The benefit has to be unlawful; in other words, it is necessary that it be achieved in an unlawful way, i.e. by employing the object acquired through an illegal action having the form of theft. Such benefit also may be acquired for the offender himself (where he personally uses the property, or keeps the money gained from selling it), but also for another (if he makes a present to someone else or gives to another the money obtained through selling the stolen property). For the criminal offence to take place it is sufficient that there is the above mentioned intention of the perpetrator, regardless of whether such intention has been materialized, so that the offence of theft does exist even if the perpetrator failed to acquire property benefit, either because he was not successful with it or if he gave up that aim (for instance, he was not able to sell the object or has thrown it away). The essential point is that his intention was present at the time of taking the property away.

Theft of cultural property is an aggravated form of theft, involving therefore also a stricter punishment than the one otherwise prescribed for ordinary theft. There are several justified reasons thereof and they in fact were the grounds for treating the theft of cultural property as an aggravated form of theft. One of them is, first of all, considerable and in some cases priceless value of stolen cultural property objects, and then also a number of other circumstances characteristic for such kind of theft and the corresponding offenders. It suffices, along these lines, to mention that the theft of a specific cultural property object is not only a loss for its owner, but also for the national and even world cultural heritage; one should add that perpetrators of these thefts manifest particular persistence and impertinence in committing such offences, especially due to the need to surmount all kinds of obstacles and protection devices (guards, burglar alarm installations, hidden cameras, photo-cell devices, and other means of technical protection). Furthermore, considerable ruthlessness and disregard for possible damage to the cultural property in the commission of these offences are also characteristic, such as cutting the paintings out of frames, inadequate treatment and packing, tearing away fixed objects of art, sometimes with intent and sometimes accidentally, etc.). These thefts, also, are usually done in an organized way since it is difficult to commit them individually, another important feature in this respect being the need to organize the sale of stolen cultural articles or their smuggling across state borders.

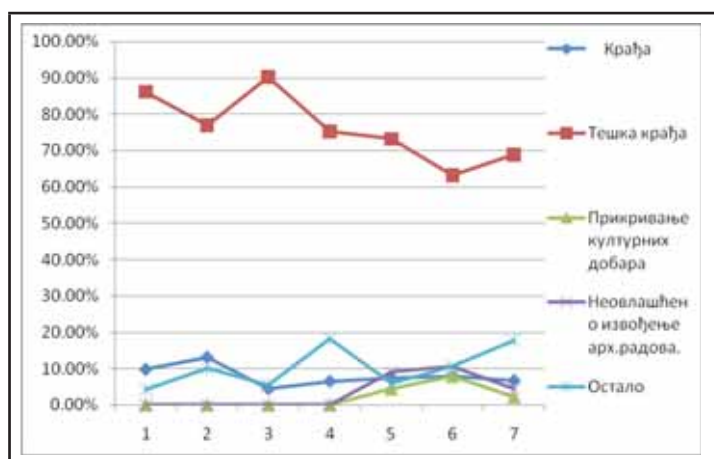
⁵¹ Atanacković, D.: Krivično pravo : posebni deo. Beograd : Privredna štampa, 1981, p. 145.

The thefts of cultural works of art in Serbia in the period of 2000-2006

According to the data of the Ministry of Internal Affairs of Republic of Serbia, in the period of 2000-2006, 537 criminal acts connected with the cultural works of art were carried out. The greatest number of these criminal acts was noticed in 2001, and the least in 2005. In connection with the structure of the criminal acts according to the legal classification, the greatest part belongs to the severe thefts of criminal acts in regard to the total number. The greatest appearance of these criminal acts was in 2002, 90.22%.

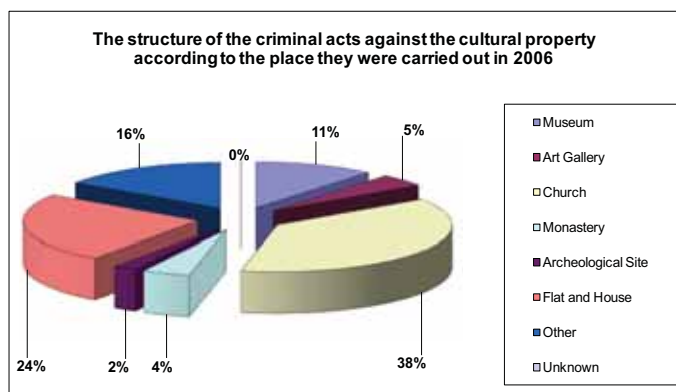


Graph 1: Total number of criminal acts against the cultural property on the territory of Republic of Serbia in the period of 2000-2006 (according to the data of the Ministry of Internal Affairs of Republic of Serbia)

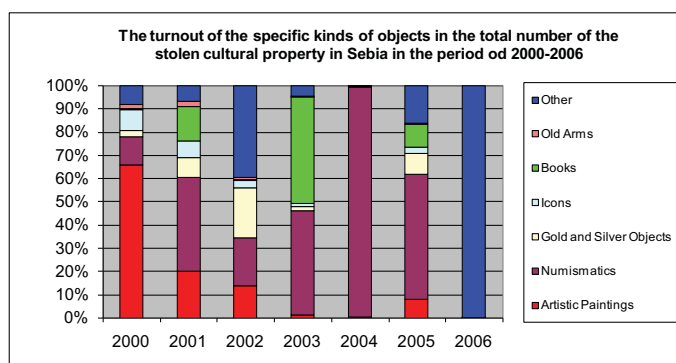


Graph 2: The turnout of some criminal acts in the total number of criminal acts against the cultural property in the period of 2000-2006⁵²

⁵² The criminal act of the theft (paragraph 203 of the Criminal Law) can be seen in this review, because some numbers of the thefts refer to the artistic objects which were not declared as the cultural property. Certain number of these criminal acts is often retrained into the severe theft, more exactly the theft of the cultural property in the court procedure.



Graph 3: *The structure of the criminal acts against the cultural property according to the place they were carried out in 2006*



Graph number 4: *The turnout of the specific kinds of objects in the total number of the stolen cultural property in Serbia in the period 2000-2006.*

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PARTICIPATION OF SPECIALISTS IN CARRYING OUT URGENT INVESTIGATIVE ACTIONS: ORGANIZATIONAL, LEGAL AND TACTICAL CHARACTERISTICS

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Short Summary

A specialist is party to criminal proceedings, that is: has the knowledge in a particular occupation, profession, lack of interest in the outcome of the case, takes part in investigative actions, has right to call an authorized person; assists the investigator, the court may use their expertise in obtaining and studying the evidence, is endowed with the necessary legal rights and responsibilities. Conditions for the specialist's participation in investigating cases are his competence and a lack of interest, the acquisition of procedural powers.

Specialists implement their expertise:

a) directly to practitioners:

- through preparation, organization and conduct of investigative actions;
- identification, seizure of evidence, where appropriate, inspection and investigation;

b) methodologically - in matters of scientific and practical means and methods of organizing and conducting investigations;

c) technically - the use of scientific and technological tools in the process of investigation, detection, seizure of evidence;

d) by advising

Fundamental principles of the interaction between an investigator and a specialist imply the procedural autonomy of a specialist leadership role of the investigator in the organization and conduct of specific investigative actions.

Urgent investigative actions are undertaken in order to prevent the delaying of the proceedings, which may result in loss or distortion of evidence in a criminal case. The most common urgent investigative actions are the examinations of the crime scenes. As the knowledge of the crime always begins with the examination and fixation of traces of things, an environment, which carries information about a crime or criminals in so-called "field" conditions, inspection of the scene with the assistance of a specialist, is considered as an effective means of knowledge of the above circumstance

Inspection of the scene falls into the category of investigative actions, tactics and training of production, which traditionally attracts the attention of criminologists. This is understandable, since months may pass from the first

investigative actions carried out when information about the incident is extremely small. That examination may provide the information needed to organize the investigation, to determine its possible directions, extension versions of the nature of the event, its participants and other circumstances of the investigation. Therefore, it is dangerous to underestimate its significance for the collection of forensic relevant information. Important information can give the traditional signs: a person (the traces of his hands, feet, teeth, etc.) of biological origin (bloodstains, saliva and semen), arms (cold, firearms, explosive devices and explosives), various instruments, vehicles, etc.

Keywords: specialist, urgent investigative actions, interaction, inspection at the scene of the crime

A specialist in a general concept (from Latin specialis - special) - is an employee of any particular specialty [1]. In legal practice, a specialist is any person whose special knowledge is needed to determine the nature, properties and objects, phenomena of production and cost-effective processes of knowledge that are required to establish the truth.

Unfortunately, the current Criminal Procedural Code of Ukraine does not provide the definition of a specialist. There is an evident need for engaging a specialist as a disinterested person, who will be given the responsibilities and rights by a remedial order calling him a specialist [2]. Draft Criminal Procedure Code provides for the definition of a specialist as the person who owns the scientific, technical or other specialized knowledge or skills, the use of which is ordered by the investigator, prosecutor, court assistance in the identification and establishment of certain facts and registration proceedings [3].

Consequently, the specialist is party to criminal proceedings, that:

- has the expertise in a particular occupation, profession, lack of interest in the outcome of the case
- takes part in investigative actions with the right to call an authorized person
- assists the investigator, the court their expertise in obtaining and studying evidence
- is endowed with the necessary legal rights and responsibilities [4].

Thus, we can identify some conditions for participation of the expert: the competence and lack of interest, the acquisition of procedural powers.

Specialists implement their expertise:

- a) directly to practitioners through:
 - preparation, organization and conduct of investigative actions;
 - identification, seizure of evidence, where appropriate, inspection and investigation;
- b) methodologically - in matters of scientific and practical means and methods of organizing and conducting investigations;
- c) technically - the use of scientific and technological tools in the process of investigation, detection, seizure of evidence;
- d) by advising

Fundamental principles of the interaction between an investigator and a specialist imply the procedural autonomy of a specialist leadership role of the investigator in the organization and conduct of specific investigative actions.

Some of the principles in the criminological literature are as follows:

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- the unity of the tasks in conducting investigative actions;
 - concerted action between a specialist and an investigator, which is the key to the effectiveness of the work;
 - specialization of functions, based on the procedural role of a specialist and an investigator with a characteristic only of the rights and responsibilities, as well as differences in the knowledge possessed by each of them;
 - cooperation in conducting the investigative actions as a necessary condition for effective use of scientific and technological tools and methods used in the course of investigative action [5,p.27].

Urgent investigative actions are undertaken in order to prevent the delaying of the proceedings, which may result in loss or distortion of evidence in a criminal case. The most common urgent investigative actions are the examinations of the crime scenes. As the knowledge of the crime always begins with the examination and fixation of traces of things, an environment, which carries information about a crime or criminals in so-called "field" conditions, inspection of the scene with the assistance of a specialist, is considered as an effective means of knowledge of the above circumstances.

Inspection of the scene falls into the category of investigative actions, tactics and training of production, which traditionally attracts the attention of criminologists. This is understandable, since months may pass from the first investigative actions carried out when information about the incident is extremely small. That examination may provide the information needed to organize the investigation, to determine its possible directions, extension versions of the nature of the event, its participants and other circumstances of the investigation. Therefore, it is dangerous to underestimate its significance for the collection of forensic relevant information. Important information can give the traditional signs: a person (the traces of his hands, feet, teeth, etc.) of biological origin (bloodstains, saliva and semen), arms (cold, firearms, explosive devices and explosives), various instruments, vehicles, etc.

Tactics of their identification and study are largely determined by which way the offense was committed - whether it was an encroachment on the life, human health, national rights and interests protected by law, what tools were used to achieve a criminal purpose, what the consequences are, and so on.

Therefore, the preparation and conduct of inspection of the origin of a rally and study group of crimes, should be organized in such a way as to ensure the identification, fixed relaxation of and the investigation and removal of the maximum number of various trace evidence of a crime; special attention should be paid to the presence of the perpetrators in the act of committing crime and the preparation of a specific set of actions aimed at discovering the traces of a criminal.

To improve the efficiency of the investigative action in preparation, it is on a specialist to decide on questions about any part of experts, in what areas of knowledge will they be needed or might be useful, what hardware might be needed.

Proceedings of sound and video recordings made during the inspection, in the future may not only be used in order to obtain more complete information about the appropriate place, the details of the situation or the detection of traces and other objects, but they also may prove useful in other investigative actions, and search operations. Thus, the participation of specialists for the inspection of crime scenes is viewed as an objective for achieving proclaimed aims of investigative actions.

An analysis of investigative practices has shown that a specialist upon arrival at the scene assists the investigator in finding, fixing, freezing, packaging

and saving traces and other evidence, the selection of comparative and concrete samples. In addition a specialist also:

- promotes the full and correct display in the record spot observations obtained forensic information and data on the use of forensic tools and techniques;
- by agreement with the head of investigation group determines the most appropriate methods of forensic engineering;
- as directed by the investigator performs a preliminary study of traces of other evidence at the scene for investigative information on persons who have committed crimes and other facts to be established;
- takes into account the results of the inspection, may participate in the development of working versions of the crime.

A specialist induced to participate in the production of spot observations during the preparatory phase should implement the following:

- a) find information about the circumstances of the accident within the required quality of the (promotion of) the investigative action;
- b) discuss the conditions of inspection and the requirements that are presented to him with the investigator;
- c) if the specialist feels competent enough, he must inform the investigator that he also may request additional expertise of other professionals;
- d) check the readiness of the available technical means for the production of investigative action [4].

Accompanied by experts, specialists attend inspections in some cases, provided the criminal procedural legislation (examination of the corpse is produced with the participation of court-medical expert or doctor) envisages it. In addition, for the inspection of certain types of crimes, the involvement of a specialist is necessary to achieve the purpose of inspecting and disclosing the crime (in the investigation of traffic offenses [6]).

In order to specify the problematic aspects of the survey of the scene, it is necessary to pay attention to:

- the violation of procedure of photos and video during the inspection, the insufficient fixation site inspection, lack of or incomplete information about the technical data of equipment in the protocol inspection;
- errors related to incorrect or inaccurate description of trails and facilities that are directly related to the crime (the investigator did not reveal themselves or are not able to remove traces of the meta event);
- lack of specialist expertise to assist the investigator during the inspection.

To avoid the above error process of searching for evidence, the use of technical means of fixation of the process and result of inspection is performed by the investigator in cooperation with a specialist and they should study the collected evidence from the beginning of the visit:

- information on the technical and forensic characteristics of the incident, establish possible circumstances (mechanism) of the evidence;
- data about the situation of the accident (the crime);
- event data, in connection with which could arise evidence or its source, the mechanism of the accident;
- comparison of identified information systems with the known evidence

arising from similar situations.

Thus, the proper organization of interaction between the investigator and the specialist, high-quality work of each in the process of investigation in general, and inspection of the scene specifically are the first clear statutory requirement that an investigator and a specialist should perform, and secondly, they represent the way to the execution of the tasks of the criminal justice: solving the crime and bringing perpetrators to justice.

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I Development of Police Education

PERSPECTIVES OF DEVELOPMENT OF POLICE EDUCATION AND TRAINING¹

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Abstract: With the development of the society, the police function in becoming more complex, requiring certain knowledge, skills and habits, and adopting professional norms and values. In that context different forms of police education and training emerged. In contemporary world there is a great variety in police education and training in terms of content, form and organization, but there are certain global tendencies like convergence of different systems, homogenisation of curriculum, implementation of modern teaching methods directed to students and learning, not teachers and teaching, developing their creativity in problem solving, and looking for optimal balance between theory and practice, followed by opening of the police training and education institutions toward civil society. Those tendencies are described in the paper, as well as specific solutions in certain countries that might have brother significance and applicability.

Key words: police, training, education

Perspectives of the Police Education and Training Development

Introduction

Historically and comparatively considered, law enforcement (both as a function and organization) is older than police education. This specific body of a state's administration is not only entrusted with the safety of a society and its citizens but also with legal powers which in certain cases allow it to restrict individuals' rights and freedoms. In the beginning, the police recruited people who, besides psychophysical predispositions and elementary literacy, neither fulfilled any other specific conditions for admission to the service nor underwent any institutionalized forms of training in the course of service. Police officers learned the ropes through personal experience and experience of elder fellow colleagues.

As the society developed and got more complex, the police scope of work got more complex, too (e.g. the police powers broadened). Over the years, dealing with

¹ This paper is the result of the realisation of the Scientific Research Project entitled „Development of Institutional Capacities, Standards and Procedures for Fighting Organized Crime and Terrorism in Climate of International Integrations“. The Project is financed by the Ministry of Science and Technological Development of the Republic of Serbia (No 179045), and carried out by the Academy of Criminalistic and Police Studies in Belgrade (2011–2014). The leader of the Project is Associate Professor Saša Mijalković, PhD.

police tasks became more demanding, so the acquisition of adequate knowledge, skills, habits and values became an absolute necessity. Therefore, the police organizations started the internal division of duties, i.e. internal specialization for specific types of related police jobs putting the stress on the prevention and suppression of crime. These demands led to the establishing of various forms of police education and training.² The first police schools were established in France and Germany in the second part of the 19th century.

The level, types, ways of organization, quality and other training courses for police jobs differ from country to country.³ Milan Pagon and his assistants, while conducting a comparative research of the police education and training systems in 17 European countries, noted that the monitored countries had remarkably different systems of the police education and training. In eight of these countries, it is possible to take a diploma in this field; in five of them, one can get a master's degree, while in four of the monitored countries you even may receive a doctor's degree. Basic police training lasts from four months to four years and includes various forms of additional specialized courses, as well as courses in management. The authors conclude that each attempt to research the history or current state of police education on a global level is a problematic undertaking with vague outcome. However, the research shows that no one can join the police forces without completing some form of police education or training.

One thing that all modern police forces have in common nowadays, no matter how big the differences among them are, is that no one can fulfil their duties successfully without acquiring, constant rewarding and updating of the relevant skills, knowledge and habits. That is an essential prerequisite for the professionalisation of the police occupation, but at the same time, it is a bad fortune of every organization in a modern, dynamic "learning society" in which everyone has to be prepared for a lifelong learning.

Police School System Today

Police school system is at the centre of attention of all modern and efficient police organizations nowadays. Namely, training of a police officer who fights against large-scale and serious safety threats at the beginning of the 21st century is inconceivable without a highly developed police school system. The officers are trained to protect human rights, use their powers in a restricted manner and employ entrusted resources rationally; they are familiar with modern information and communication technologies as well as with the means and methods of modern police work and are able to cope with the profession-related stress efficiently. Although some concrete solutions may vary, the mentioned starting points are common to all modern police forces. On the other hand, tendencies towards the convergence of the different systems have been emerging due to globalization and intensive international police cooperation. They concern the standardization of the curricula, the implementation of new, modern teaching methods aimed not at lectures and teachers, but at the process of learning and

² The concept of education implies the acquisition of specific theoretical knowledge and particular practical skills which lead to formal qualification (degree) lasting for years, while training means the acquisition of specific police skills and knowledge which do not imply taking a formal diploma, but may include certain certificates; the skills and knowledge acquired in the course of training last for a considerable shorter period of time and they are directed towards acquiring concrete, practical skills and narrow, specialized theoretical knowledge. (Milosavljevic, B., *Police Studies*, Police Academy, Belgrade, 1997, p.549)

³ E.g. The United Kingdom of Great Britain and Northern Ireland, a country with modern, extremely efficient and highly respectable police, does not have institutions for police education; instead it has a top-level system of police training.

students developing their creative qualities that will help them solve any future problems. Further steps include the search for the optimal balance between theory and practice. As the institutions for the police education open to and link with civil school institutions, it is more and more difficult to define the difference between education and training.

Until now, there has been no standardization in the field of police education and training, even in the countries such as Germany and Switzerland. The police education and training systems in European countries vary in duration, structure, curricula, attenders, issued certificates and their external validity. If this problem is observed in a wider context, taking into account non-European countries, the differences are more noticeable but understandable when unequal historical development and different traditions and cultures are considered.

This is the reason why each attempt to classify countries according to the police education and training system faces serious difficulties. Imprecise concepts and incompatible terminology make these attempts even more difficult.⁴ However, it is possible to differentiate the systems in which higher degrees in police and safety studies are acquired at civil colleges and universities that are not part of police schooling from police institutions which only organize the police training primarily encompassing practical skills and knowledge. This sharp distinction between theory which belongs to university level education and practice courses organized by police institutions is characteristic for England and other countries established on the Anglo-Saxon tradition. On the other hand, police training in most other European countries has developed into various level police education available at more or less functionally related institutions which may or may not be part of police organizations. Besides, there are some police schools in Europe in which courses they offer are somewhere between education and training. Moreover, internal police training institutions are more and more open to civil society and impacts of its educational institutions. Finally, it is important to emphasize the growing convergence between these two systems, which means that university education has lately been more concentrated on practical skills and knowledge and that police training lasts longer including wider theoretical knowledge from different subjects and disciplines. Consequently, the only criterion used for drawing distinction between education and training is the issuing of a formal externally valid diploma (education) or internally valid certificate (training).

At the same time, this obvious distinction represents an obstacle not only on the path towards integrations and international cooperation but also in the common activities which include the combat against organized crime, terrorism, illegal drugs, violent crimes, etc. The attempts of the European Council and European Union to harmonize police education in Europe have failed. However, they have not abandoned the idea. On the contrary, it has been seriously contemplated along with various initiatives aimed at harmonizing police school systems in European Union member states, as well as in the countries applying for admission to the European Union.

The most important findings of comparative experiences in organizing and functioning of police school systems are as follows:

- Despite a great organizational variety in police school institutions⁵, most of

⁴ e.g. In some countries "Police Academy" refers to police training courses while in others it refers to university degree education. There is neither distinction nor the consistent use of the terms education, training, etc.

⁵ Whether there will be one central or more regional and local police schools, whether they are comprehensive or specialized police professional or academic colleges, or whether all these elements are combined, depends on numerous factors, such as the size of a country, political and territorial organization, police model, historical heritage and administrative tradition, different social-political influences, etc.

them are characterized by flexible organization and constant tight links between the institutions in charge of police education and human resources departments. Their task is to coordinate educational profiles with professional job requirements, primarily through the redefinition of curricula and periodical evaluation of their relevancy, as well as to balance the enrolment policy with the personnel policy and real police staff requirements. Human resources departments are also included in the process of students' knowledge evaluation and final exams, thus assessing the work of police educational institutions. Besides, there is a constant link between police schools and police operational units regarding the organization and realization of the students' practice. This link between education and training lasts throughout the working life since the promotion prospects in a police career leading even to the top managing positions in the police hierarchy are constantly and tightly connected with taking graded advanced professional courses adapted to the operational and strategic levels of managing. In some countries (e.g. in Germany) the average mark earned during the basic police education reflects on the promotion prospects in future career.

- Special efforts are being made **to standardize and realize** all the elements of police education and training (selection, organization, content and realization of the curricula, teachers and instructors, teaching resources and methods, grading, etc.).

- Police educational institutions are **more and more open** to changes regarding the curricula and the methods of their realization, ready to correct any shortcomings that may arise (self regulation ability).

- Although education is not regarded as an expense, but as a future cost reduction investment, one must take care of the reciprocity between the invested money and expected effects. But, taking everything into account, it must be pointed out that considerable amounts of money are allocated to police educational institutions (for staff, equipment, modernization, etc.) and that their employees are highly respected among the police personnel at all levels.

- **The selection** of students who apply for police schools is carefully approached. An adequate selection is a key to successful education and future police career. Candidates are submitted to a detailed interview conducted by specially trained interviewers. Very often candidates must take exams which assess not only their skills but their knowledge, too. Great attention is paid to assessing a candidate's performances which indicate whether he / she will become a successful police officer. Therefore all other organizational preparations are simplified to the maximum while candidates are well informed about all the details of the selection procedure and other relevant criteria. In order to achieve the best results, testing is done throughout the year in two or more admissions. Proactive search (recruitment) is carried out so that the best candidates from the first campaign are admitted. The campaign is conducted by using printed and electronic media and visiting churches, schools and youth clubs where young people are introduced with the challenges of the police profession. Special attention is paid to the reciprocity of the candidates (regarding gender, ethnicity, race and region they come from) in relation to the general population. During the years they spend at police schools, the candidates are closely followed and their affinities are thoroughly analyzed so that each of them is adequately placed in the right position within the police forces. At the same time, each candidate may be eliminated at any time in the course of their education or training, especially in the beginning. A general presumption is that a good selection secures good candidates motivated for police jobs. If anybody "unfit" passes the selection, it is better both for the candidate and the police to find it out as soon as possible.

- Police school systems in **transitional countries** are characterized by demilitarization and efforts aimed at rejecting ideologies on the one hand while on the other hand there are growing tendencies towards making them more professional and democratic. Military-type police education and training, regarding the curricula and the life and work at police schools, is abandoned. More and more the elements of marketing are considered, especially in terms of self-financing.

- Police training is often **graded** (basic and advanced training, specialized training and training on demand of clients) and adapted to the police job requirements.

- **The curricula** are not uniform. However, it is noticed that police education has increasing multidisciplinary character emphasizing the strengthening of social competence, communication skills, information and managing skills and knowledge as well as the knowledge of foreign languages. Efforts are made to coordinate the curricula and methods used for their realization with the requirements of concrete police jobs. Hence, police schools offer specialized courses compatible with special types of police work. Besides specialized compulsory subjects, the schools often have elective subjects. Modular courses enable flexible reaction to the advances in sciences, new theories and changing practice requirements as well as to social and technological changes.

- As far as **teaching methodology** is concerned, it must be pointed out that new concepts and ideas in teaching process place the stress on practice, self-studying and students' active participation in the process of studying. The curriculum of basic training is founded on problem based learning. Case studies, usually real ones taken from practice, are used as a form of problem based learning which is directed to crime investigations, the maintenance of public peace and order, prevention of crime and community policing. Students are not expected to sit passively in classes listening to their lecturers as the only source of information, but to take active part in the learning process. They are equipped with necessary learning tools and trained to use them. The main task of instructors is not to "lecture" but facilitate the learning process. Lecturers as "teaching tools" have not disappeared. They are complementary to problem-based teaching methods such as individualized instruction modules and research assignments. Problem-based learning including scenarios is one of the most popular and the most successful instruction methods. It enables candidates to practice what they have learned under the supervision of their instructors subsequently giving them feedback created by a dynamic participation of environment. After receiving necessary information (tools), students deal with the assignments on their own (e.g. they carry out a project study which solves a concrete, complex problem). As the main objective of police education and training is to create "a thinking police officer", students are not expected to memorize bundles of information but to know where to find them (media, libraries, the Internet, statistic surveys, etc.) so they can use them for solving concrete assignments (project problems) creatively and not in a stereotype manner. Therefore, they are trained in small groups which are offered interdisciplinary courses where students participate in workshops, prepare presentations, play roles thus practicing interpersonal communication, e-learning, etc. As we can see, teachers' and students' roles have changed when compared to classic school concept and a lifelong learning has become a must for all professions including law enforcement.

- Standard examinations are being replaced by continuous **surveying and assessing** of students throughout the year. There are several ways of assessment: case solutions, essay compositions, simulations and class work in groups.

- Instead of being objects, **students (attenders)** are now subjects, i.e. the centre of teaching process. Accordingly, they have an active part in police schools management boards. Their opinions concerning teaching process issues are taken into account; their attitudes are analyzed; information from them is pooled in various ways while permanent communication is maintained.

- **Tutors** at schools and supervisors (police officers) in charge of work practice are of great importance in the education and training process of future officers. In order to fulfil the tasks successfully, both tutors and supervisors receive specially designed trainings.

- **University students** may be either full-time or part-time students whereas the latter usually study longer.

- Besides regular police training, some police schools pay great attention to **extra activities** (cultural, sports events, etc.).

- In order to provide continuous close **links** with (the best) **practice** and maintain continuous relevant knowledge, police schools and operational units are not separated. They are partners who mutually strive for better future of police organizations and higher standards for police profession. Police stations are both live laboratories for students' practice and the sources used for recruiting police instructors. A constant circulation between them prevents their ossification: being instructed in pedagogy, didactics, psychology, etc., the best police officers become police instructors. After teaching at police schools for several years, they get back to police stations. If they want, they may apply for an instructor's position again. There are special arrangements allowing full-time police instructors a periodical short returning to a police station.

- The engagement of teaching staff from other faculties **links** police schools with **civil educational system**. In some cases, this link is so tight that we may speak of some kind of an amalgam.

- There is a **close link between teaching and research**. More and more police schools are not only teaching, but also research institutions because only in this way the latest scientific discoveries may directly be implemented into teaching process. Conferences and workshops are organized with a view to exchanging scientific knowledge with other researchers. University-level police schools make efforts to become expert and advisory bodies for safety issues. They also want to either take part in legislation or at least have an influence on it by their own initiatives, comments or constructive criticism. Additionally, they are interested in participating in creating conceptual material for the spheres of politics and safety.

- Since both social environment and safety problems (methods used in police work as well as conditions regarding it) are extremely dynamic and changeable, teaching process in general (the content and methodology) is characterized by **high dynamics**, too. Hence, the necessity for continuous involvement with advances in theory, new technologies and police practice. Simultaneously, neither police schools nor their employees have a regulated full-time status. The re-accreditation mechanism forces teaching staff to improve, change, self-evaluate, as well as to evaluate teaching process, methods and achieved results.

- Special attention is paid to **ethical dimension** of education and training. Apart from skills and knowledge, students have to accept a set of values, i.e. police code of ethics.⁶

⁶ For further information in *Milasinovic, S.*, "Some Aspects of Police Work with Regard to Ethical Competence Improvement", "The Place and Role of the Police in the Prevention of Crime: Current State and Improvement Possibilities", Belgrade, Academy of Criminalistic and Police Studies, 2007

- More and more police schools consider **the commercialization** of their scope of work regardless of the form of training, meaning that the same principle will be applied to both outsiders (private security companies dealing with safety matters, large enterprises and systems) and police schools with the ambition of becoming regional, or even world (e.g. Centrex in Great Britain) police training reference centres offering their commercially based training programmes to the police of other countries.

- Lately police schools have been training their officers for the engagement in **international police missions**.

- Special attention is paid to **international cooperation** of police educational institutions. Therefore, they take part in international conferences, seminars, and scientific researches. They also work on international projects and participate in international organizations. In accordance with the Bologna process, they host foreign lecturers urging at the same time their own teaching staff and students to be active and mobile.

- Very often police schools deal with **police periodicals** (police theoretical and trade journals) in which current theoretical ideas and practice experiences are published. Moreover, **police museums and police sports associations (centres)** are often located in police schools.

Some countries have very interesting and specific solutions regarding police school institutions. The model of police schooling in **the Kingdom of Sweden** includes gradual transition from subject-based to problem-based learning in the course of primary police training so that students can better prepare for problem-based (oriented) police work and application of a new concept of community policing. The integration among subjects and a close cooperation among teachers teaching different subjects promote a problem-based training, the socialization and lifelong learning that candidates must be prepared for as well as the cooperation among tutors teaching at the National Police Academy and practical training instructors. The emphasis is on a constant integration between theory and practice. Students can prepare individually or in groups, through discussions in classes, lectures or in the course of study visits. Each form of learning contributes to the final outcome while students help one another in acquiring new knowledge. Students are trained to analyze facts, present analyses and their standpoints, listen to others and be open to different opinions. Additionally, they have to develop abilities to plan their activities, to cooperate with other fellow colleagues and face all kinds of problems that may arise in the course of their work. Students themselves organize their working days and schedules and even may give their suggestions in regard to the use of facilities on the Academy. Students are graded individually and their standpoints and opinions are valued more than memorized details and facts. Their marks are based on written and oral exams and the students' abilities to cope with a "role-play". Teachers are concentrated on individual needs of each student. Therefore, teachers must have all the information regarding students' learning (what and how they learn) in order to give feedback and comments on their knowledge. A teacher's job has considerably changed. Instead of lecturing they used in the old teaching model, now they carefully plan cases and simulations, support their students in the learning process and assess their progress. There is a growing tendency in education to raise students' awareness of international problems⁷, foreign countries and cultures.

Canadian attempts to interlink research and training as well as to coordinate the work of educational institutions deserve consideration. Canadian

⁷ For further information Kesetovic, Z., "Police Training in Sweden", *Bezbednost*, no. 4, 2003, p. 561-576

Association of Police Educators (CAPE)⁸ is an example of the cooperation and work coordination among police educational institutions. It is a national association established in order to promote and improve the quality of police education through mutual share of problems and successes. The Association also strives to develop the best practice and new research methods in police education thus supporting its members – police officers, instructors and institutions.

Quebec National Police School (ÉNPQ) is a combination of a research institute and integrated police training centre which is part of training continuum. The school is in partnership with colleges because besides offering advanced training designed to meet police job requirements, it can authorize colleges, universities or police organizations to organize and run training courses. Moreover, the school approves external professional training activities and concludes contracts with researchers, experts or educational institutions and research institutes which are of importance for the realization of ÉNPQ missions. The school also advises police departments and associations in which their representatives are engaged on matters of professional training and develops cooperation between institutions dealing with police training. Finally, the school has a mandate to conduct on-demand researches and studies with regard to police work, which may have an impact on police training, and to reveal and distribute the obtained results. ÉNPQ can also verify training activities designed at other educational institutions, especially those which could be accredited and incorporated in its curriculum. The school stimulates, facilitates and plans expertise exchange with individuals or organizations outside Quebec, particularly motivating experts from Quebec to participate in international exchange of police training missions. A systematic approach to the police training is a closed system which includes analysis, curriculum designing, evaluation, validation and training management. These segments can be divided into smaller and more logically integrated units that are easier to be managed. The procedure is designed in such a way as to provide the management with critical information that will help in making decisions regarding the assessment of training costs, the impact on organization and future needs for training. An exact analysis which is required in each system stage is designed with the aim of developing and supporting environment in pursuit of changes and trust within the organization in charge of training. It must be pointed out that a systematic approach to training offers the utmost certainty that the graduated students will be qualified to meet organization operational requirements.⁹

Students at police schools in **Romania** take part in real-life operational actions and solve authentic working problems. Both students and teachers go to crime scenes of serious crimes. Together with the police, the attenders of police schools secure public events and other similar manifestations. Police schools insist on continual psychological and pedagogical training of the teaching staff. Every five years teachers are expected to do a year's practice in police operational units. Special attention is paid to the selection, training and licensing of police officers from operational units who are to become teachers and to the adoption of the monitoring system of all activities done in the course of teachers' practice, as well as to their complete integration in the police school system. The Police Academy as a faculty, i.e. a university-level educational and research institution, has been accredited by both the Ministry of Public Administration and Home Affairs and the Ministry of Education. Every four years the Ministry of Education re-accredits schools by reviewing their curricula, teachers' performances and other material and technical resources required by the defined criteria.

⁸ More about the association on <http://www.cape-educators.com/>

⁹ For further information in Kesetovic, Z., "Police Education and Training in Canada", *Bezbednost*, 6/2003, p.919-933

Conclusion

Police education and training are of great importance for police organizations therefore they allocate considerable sums of money for their development. Despite huge differences and non-existence of a universal model, police education and training in the countries that are known as “the civilization pioneers” are similar. They are characterized by growing tendency towards convergence with the aim of approaching an ideal model which would produce “a complete police officer”. Such an officer would be ready to fulfil demanding police tasks in a complex and changeable environment. He/she would be also prepared for lifelong learning and self-improvement in the modern society and world where a constant change is an on-going process.

The process of globalization, the harmonization of national legislatures, the promotion of police cooperation, and particularly further development of mutual relations in the European Union will bring about the standardization of police education and training. ¹⁰ There is a general presumption that the process of scientific approach to police education and training as well as the professionalisation of the police and adequate confrontation with modern safety challenges and threats will influence a dynamic development in this field thus promoting the openness of police institutions to the general public and academic community simultaneously strengthening the links between education and research.

The reform of the Serbia’s Ministry of Internal Affairs which commenced in 2000 has resulted in positive changes in police education and training. Hence, we must emphasize the importance of The Police Education and Training Development Strategy ¹¹ as the main document which facilitates the reform of police educational system, the passing of acts, by-laws and modern national and international standards and principles regarding institutional organization of education with the aim of establishing and managing the system of education. Further objectives concern the assessment of institutional efficiency and the quality of educational process while special attention is paid to permanent comparison and harmonization with the achievements in the field of police education in Europe and other countries worldwide and the permanent development of education and training for the requirements of the Ministry of Internal Affairs and other safety bodies.

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REFORMED POLICE EDUCATION AND TRAINING

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Abstract: The time we live in has brought the changes that strongly influence police education. Therefore, the reform of the system of education and training was one of the strategic tasks of reforming the police and inclusion in European integration processes too, since how professional future police officers will be, how efficient and what their reputation will be among the citizens depends on the training quality.

The reform period during the recent years have included all forms of education and training. The Directorate For Police Education, Training, Professional Development and Science is in charge for this responsible task with its two organizational units, Center For Specialised Training and Professional Development of MoI employees and Police Secondary School – Basic Police Training Center in Sremska Kamenica.

Key words: reform, training, reorganizing, practical training, integration, modules, subject modular training, phases...

The first police school in Serbia started on 8th February 1921 in Belgrade. Its founder was a Swiss, Dr. Archibald Reiss, who had suffered all the hardships of World War I together with the Serbian army.

Since then, the methods of police training have changed but the purpose of police education, as a crucial element of an organized police service, has remained the same: to educate best possible police officers who will perform as best they can, applying what they have learnt and have been trained for.

Since 2002, the Ministry of Interior of the Republic of Serbia has been conducting important reform activities in implementing modern standards of policing.

Important steps were taken regarding community policing, professionalism and impartiality, cooperation with the public and citizens' associations which contributed to strengthening of their sense of safety, promotion of preventive activities of police in order to improve the general quality of life in local communities, effective inner control and the reform of police education system.

Reform of the police education system is, by general consensus, one of the strategic priorities of police reform and inclusion in European integration processes, because the quality of training determines the level of police professionalism, effectiveness and reputation they have among the public.

This responsible task was given to the Directorate for Police Education, Professional Development and Science.

It is founded in 2004 as an organizational unit of the Ministry of Interior, responsible for affairs pertaining to the creation and implementation of the policy of education of the Ministry's human resources. It is an important part of the Ministry because good training represents a foundation, and without it there cannot be competent police officers.

The transformation of existing educational institutions has started by identifying the needs of the Ministry in accordance with amendments to current legislation and the launching of new forms of training, such as Police Management Training and Trainer Development Courses.

Creating and implementing Projects for improving police performance in all lines of work within the Ministry in contemporary conditions is important, because in the democratization processes in the society, the role and position of police have been changing as well. The international dimensions of policing require well trained human resources and relations and this sets new tasks for the Directorate in order to meet the training needs of the Ministry's employees to acquire new knowledge, skills and attitudes.

The development strategy of the system of training and education for the needs of Ministry of Interior of the Republic of Serbia anticipates that Police Secondary School and Police courses turn into a modern Basic Police Training Center. Apart from this Center, the Strategy envisages formation of a Center for Specialised Training, and that Police College and Police Academy be merged into a new institution of higher education, which is not a part of the Ministry, and it is called Criminal Justice and Police Academy. The forth, equally important form of training, is permanent training, additional training and prequalification training of police officers.

Since the establishment of the Police High School in 1967 up to date, the syllabus went hand in hand with changes of overall education process in the country, in line with demands of the Ministry and social community. In light of the reformation process within the Ministry of Education and Sports and the Ministry of Internal Affairs of the Republic of Serbia, the School has actively participated in these processes since 2002 being transformed into the Basic Police Training Center.

Future police officers are now educated based on the standards which are in line with modern principles of policing, and these police officers will be ready to provide the citizens with high quality service at any moment, while respecting moral, ethical, professional norms and generally accepted civilisation values.

With the adoption of the new Law on Police and the Development strategy of police training system, the process of transformation of our four-year secondary police education into a one-year basic police training has been intensified. The new training method is considerably more cost efficient, and at the same time the quality of training is enhanced, and follows the contemporary trends in police training of the most developed European countries.

The training is for male and female participants, aged 18 to 25, who have completed a secondary school.

While making the new concept of the training and the new Curriculum we were aware that it was necessary to take into consideration the attitudes of citizens of Serbia, demands of the Ministry, experiences of other developed countries and experiences of our teachers.

Apart from that, by evaluation of the existing model of basic police staff education, by organizing professional lectures on the topic new model of education of basic police staff we obtained relevant data which were used in designing the new Curriculum.

Assessment of the existing model of education and the Curriculum was made according to half standardized questionnaire which was given to some organizational units of MoI by the school.

The survey included police officers in various lines of work, employed in the period from 1999 until 2003.

The survey gave us relevant information on actual level of training and effectiveness of police members in the domain of their practical work. Another way of gathering necessary information for creation of the new concept of training and the new Curriculum was a public survey done by "Partner" agency from Belgrade ordered by OSCE Mission.

The purpose of this research was to gain deeper insights into the attitude, opinions and observations of the public about the following matters:

1. General safety
2. Police as an institution and
3. Role of police in local community

After all legal conditions for the transformation of Police High School were met, analysis of police work done, training goals and outcomes defined, available resources examined, methodology of work determined, we started creating new curriculum.

Curriculum has subjectmodular structure and it is realized in three phases that include general topics on police work, police skills and vocational modules. General topics on police work include following subjects: Police employees: rights, obligations and duties, Penal and Penal Proceeding Law, Administrative Affairs and Misdemeanor Procedure, Human Rights and Police Ehtics Code, Basis of Security and Mental higienic aspects of police profession.

GENERAL TOPICS ON POLICE WORK	
Police employees: rights, obligations and duties	25
Penal and Penal Proceeding Law	55
Administrative Affairs and Misdemeanor Procedure	16
Human Rights and Police Ehtics Code	35
Basis of Security	9
Mental higienic aspects of police profession	45
IN TOTAL	185

Defense skills, General physical preparation – conditioning, Communication skills, Handling police weapons with shooting training, First Aid, Foreign language in professional communication, Information system and Information and communication in MOI are studied as a part of Police skills.

POLICE SKILLS

Defence skills	109
General physical preparation – conditioning	21
Communication skills	76
Handling police weapons with shooting training	71
First Aid	18
Foreing language in professional communication English/German	68
Information system	26
Information and communication in MOI	16
TOTAL NUMBER OF CLASSES	405

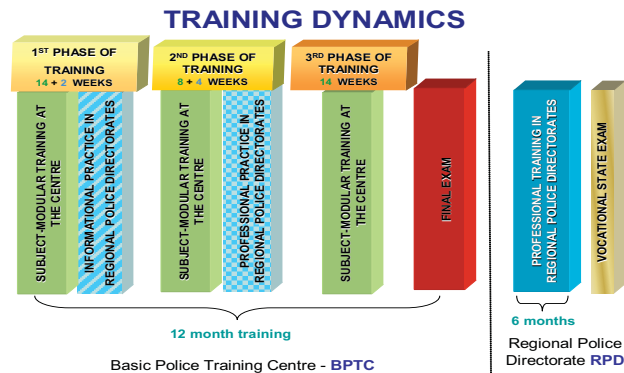
Professional modules include the training referring to: Work in security sector, Police work in local community, Application of police powers and use of police intermidiate devices, Crime suppression, Preserving public order and security and Controlling and regulating traffic.

PROFESSIONAL MODULES

Work in security sector	50
Police work in local community	30
Application of police powers and use of police intermidiate devices	256
Crime suppression	114
Preserving public order and security	98
Controlling and regulating traffic	100
TOTAL NUMBER OF CLASSES	648

These modules by the structure and organization provide acquiring various knowledge, competency, skills and inter disciplinary connected content. This type of training requires competent teaching staff trained to use andragogical training methods.

The training at the Center is realized during three phases and lasts 42 weeks, with the total of 1221 classes.



This kind of training demands a lot of practice and exercises trainees use to practice solving policing situations in a lawful and professional manner, by correlating legal, communicational and tactical topics that are time determined and in line with training within a module, where knowledge and skills from different teaching matters are merged. The special brunt lies upon police intervention trainings, from the very first notice up to final handling, as well as trainings of situations when police officers are exposed to high levels of stress.

Beside professional-practical and legal education, creating desirable attitudes is clearly defined.

These multifunctional skills and abilities should come as a result of:

- Well organized and flexible training focused on high quality police performance
- Joint work of trainers and trainees in all modules and subjects
- Applying strategies, methods and techniques of active learning and accepting knowledge, skills and attitudes during the training.

After each phase of the training at the Center, practical and professional training in police stations, the evaluation is performed. The main goal of the evaluation is to establish whether goals and outcomes of the basic police training are achieved and to what extent, according to the collected data. We saw that the quality of training is significantly improved in the frame of specific tasks due to introduction of modern and efficient methods of work with trainees, clearly defined and measurable training outcomes and larger number of classes in practical and situational training. Furthermore, trainers are more active due to dividing classes into smaller groups, but they do not express it as a problem because the work conditions are improved by equipping classrooms and training space by new teaching technology.

The quality of marking trainees is also improved by integrative and interdisciplinary approach in making of tests used for evaluating professional – theoretical knowledge. It is achieved by using standardized instruments for evaluating acquired professional competence, making a question base presented to trainees, as well as attending and marking at the final exam by external members of the commission – representatives of Police Directorate and Directorate of Professional Education, Development and Science.

According to the feedback from police authorities, field officers coordinators, field officers and heads of Regional Police Directorates it can be concluded that we achieved better trained trainees and improved the Center's reputation. That this is true can be proved by a significant interest with the young ones for enrolling the Centre.

Thanks to the assets provided by our Government and The Government of The Kingdom of Norway, classrooms and training areas were completely renovated and equipped with modern equipment and teaching material.

At the end of the third phase of training the trainees have a final exam, and are then sent to Regional directorates on professional training that lasts for six months, after which they start their employment with the Ministry.

Another organizational unit of the Directorate for professional education, development and science is the Center for specialized training and professional development.

Today's Center for specialized training and professional development provides opportunity for the employees of the Ministry of Interior to acquire competence for performing complex police work and tasks, as well as career advancement. These trainings are conducted in one of several facilities of the Center for Specialized Training and Professional Development and in other units of the Ministry as well as in national and international institutions.

Beside special trainings professional development is realized here (permanent training, development along with work). It has to enable further development of the competence police officers acquired on basic or special trainings. It is realized according to the annual programme given by the Minister, in regional police directorates and police stations. At the Center there is a department for planning, control and evaluation of the training which is in constant communication with the performers of the training which gives precise insight in quality of the training of police officers.

SVTC includes the following training Centers (TC):

Training Center "AVALA"

Training Center "JASENOVO "

Training Center "KULA"

Training Center "MAKIŠ"

Training Center "MITROVO POLJE"

Training Center "ZVEZDARA"

More than 30 different courses – activities were attended by ten thousand participants for a year.

Programme of professional development included (annually) over twenty thousand police officers.

According to the Agreement of Understanding between OSCE Mission to Serbia and the MoI of the Republic of Serbia (2003), Programme for Trainers' Development is organized and performed and it includes:

Trainers' Development Course,

Evaluation Course and

Curriculum Design Course.

Reform Outcomes

1. New Strategy of Police Education Reform
2. New Curricula based on modern training methodologies
3. Teaching staff trained to work with adults in modular training
4. New Curriculum of practical training in police stations.
5. Training Programme for police mentors and coordinators
6. New selection model for candidates for basic training, based on the desired profile of police officers
7. New Center for Specialized Police Training and Development established
8. New Criminal Justice and Police Academy established
9. Intensified and improved international cooperation in the field of police education

ACTUALITY OF REISS'S PRINCIPLES OF MODERN POLICE¹

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Abstract: Police service is based on many principles both of professional and legal nature. One century ago, Archibald Reiss took into consideration a number of issues relating to police profession and its organization in his work *Principles of Modern Police*. The aim of the authors is to verify analytically and synthetically the scientific foundation, i.e. the actuality of his *Principles of Modern Police*. More specifically, they analyze Reiss's views on the importance of police recruitment, education and training of police officers, legal status of police officers, as well as official police attributes (marks and equipment). The authors draw attention to the relationship between the police and politics, i.e. how the police can be abused by politics. Special attention is paid to different types of police forces according to Reiss, with a special regard to Uniformed (Order) Police and Criminal, Judicial Police (Criminal Investigation Department), i.e. state and local police. The authors try to include all key standpoints held by Reiss, which are even today a prerequisite of effective policing and police organization.

Key words: State Police; Uniformed Police; Criminal Investigation Department; Police Education.

Introductory Notes

Reiss, Rodolphe Archibald, is included in the group of rare philanthropists to whom the Serbian police, and thus Serbia as a state, are extremely indebted. Namely, all his life, which did not last long – he was 54 when he died (1875-1929), was dedicated to police in some way. As a world famous intellectual, born near Hausach, a town in the southwestern German state of Baden-Württemberg, he graduated in natural sciences from the University of Lausanne in Switzerland. He was appointed a professor of criminology and forensic science at the same University, and as an engaged intellectual in public life and author of scientific and political readings, he became world famous and respected as a writer. The words of his colleague and friend Edmond Locard describe probably in the most distinct manner the reputation Reiss enjoyed: "Everyone who was occupied with forensic science for the purpose of police, came to him to get advices or examples. And not

¹ This paper is the result of the realisation of the Scientific Research Project entitled „Development of Institutional Capacities, Standards and Procedures for Fighting Organized Crime and Terrorism in Climate of International Integrations“. The Project is financed by the Ministry of Science and Technological Development of the Republic of Serbia (No 179045), and carried out by the Academy of Criminalistic and Police Studies in Belgrade (2011–2014). The leader of the Project is Associate Professor Saša Mijalković, PhD.

only beginners. Who of us, irrespective of his rank, is not owed to him for a share of his knowledge?"² wondered this also world famous criminologist.²

He sacrificed his prospective academic career and accepted, at the very beginning of the First World War, the invitation of Serbian Government to come to Serbia and investigate war crimes committed by Austro-Hungarian, Bulgarian and German armies against civilians in Serbia. During those difficult times, while tumbling and forensically examining corpses of civilians all around Serbia, thanks to his theoretical knowledge, he realized directly and very quickly which were the major problems faced by the then Serbian police. Thereby his efforts were aimed at modernization of the Serbian police, especially the Criminal Investigation Department at the Ministry of Internal Affairs. However, it seems that he was not understood by the Serbian authorities of the time. He died and was buried in Belgrade after, aware the power of the written word, he had found the strength to leave behind a number of excellent books which are, even today, almost a hundred years later, no less valuable. Moreover, they are quite useful, helpful and practical. Among them, we would like to point out to his Contribution to Reorganization of the Police (Contribution à la réorganisation de la Police), a work that was first published in French in 1914, and later also in the Serbian language in 1920, as well as Principles of Modern Police published in 1915, to which this paper is dedicated.

Analysis of Reiss's Principles of Modern Police

In the *Principles of Modern Police*, which was the result of a project ordered by the Serbian Government, Reiss systematically and for the most part synthetically, elaborated over a sixty page span on almost all of the important issues which have to do with the police profession. He paid special attention to the most significant types of police in each state, whilst emphasizing the advantages and disadvantages of certain organizational models for the police and suggested a particular model of organization for the police in Serbia.

Once one starts reading Reiss's *Principles of Modern Police* (further *Principles*) one can immediately conclude that the primary function of the police, then and now, was the security and protection of people and property as well as the security of the state. The only thing that has changed is the social environment in which the police carry out their policing functions. However, despite those changes, some scientifically founded rules on certain issues pertaining to the organization of the police (regarding structure and activities) are significant even today. It is a striking fact that the police and the department of internal affairs had the same significance back then as they do now. The police based its work on conformity to the law (lawfulness), protection of the life, safety, freedoms and rights of the people and their property, they prevented "crimes and violations", and only upon executing those steps would they "punish the culprits".

Undoubtedly, Reiss expertly handled theoretical knowledge on the police. This can be seen in every word of his writings. Moreover, in addition to criminology, he was also an expert in police science (today organizational science) and organizational theory, in general. He noticed and explained trouble spots of police profession of that time in Switzerland, Germany and other countries, as well as in Serbia. He criticized negative defining of the notion of the police, as well as the selection of staff to be employed within these sectors, advocating positive

² Z. Levental, „R. A. Reiss: Švajcarac na Kajmakčalanu“, Gornji Milanovac: Decje novine; Belgrade: Den Orfelin, 1993, p. 27.

selection of staff. He rightfully advocated respect for the police profession, which, according to him is as significant as the medical profession. Police investigation of a crime is "the most important element because the decision of investigative judge is based upon it"³. Consequently, according to Reiss, the first condition for a good police service is a well chosen team of young candidates for the police force, as well as the formation of theoretical and practical schools, but also permanent education and improving of police officers, with respect for the differences in the education of higher ranking officers with lower ranking ones. He suggested that only higher ranking positions, for which broader knowledge of the law is required, be held by a jurist, whilst for the investigations, where the only laws applied are the Criminal Code and the Criminal Procedure Code, he proposed that the hired staff be students of natural and other sciences, because they can easily master the Criminal Code and the Criminal Procedure Code, yet they have technical knowledge necessary to solve a case and secure evidence.

He rightfully disposed to enclosure of the police profession within the rigid limits of the military discipline. Discipline should be strict but friendly, he would say, and the essence of management is for the leader to be such that the lower ranking officers should love and respect him, and that they should be given freedom to behave as they wish. "A good police officer needs something more than military discipline: he needs intelligence, but a disciplined spirit...is not anything more than lack of intelligence, which is very dangerous for their new vocation."⁴ Reiss also said: "that for lower ranking officers to perform their duties well, their superior should set an example, and act towards them, not as someone that is below him and whom he despises, but as he would toward a valuable collaborator, on whom even his own success relies."⁵ In respect to security check of applicants, Reiss wisely said that it is necessary to gather enough information about their background. Former military officers (*Schutzmann* in German), as he argued with good reason, are quite inadequate to work in Criminal Investigation Department. They could rather find their place in Uniformed Police Forces.

In addition to the importance of recruiting staff for the police force, Reiss had a revolutionary proposal that a state (central) police should be introduced in Serbia; it was a global-level process beginning in the early 30's of the last century and following the Great Depression. According to him, the state police should be divided in towns, as opposed to municipalities, into uniformed (order) police and "criminal or judicial police", whilst the gendarmerie would assist the police and be responsible for border patrol.⁶ Therefore, he advocated the nationalization of municipal police, as it was implemented in France and other European states, since the advantages of such an organization were well-known to him.

He advocated for the police to be well paid because of the dangers of that profession, responsibility and challenges they are faced with, "yet for the most part they have earnings that are just barely sufficient to keep them from dying from hunger"⁷. He addressed also the importance of official police attributes: grade, ranks, uniforms, weapons. He was brilliant in his observation that there is an adverse trend in all police, back then as well as now, and that is that "bureaucratic scribbling"⁸ is being introduced. For a lost umbrella, he says, numerous acts are being written and valuable time is being lost by the police officers who are turning into clerks. Also, the police are rendered numerous other tasks (in accordance with

³ R. A. Reiss, *Principi moderne policije*, Beograd, 1915, p. 6.

⁴ *Ibid.*, p. 9.

⁵ *Ibid.*, p. 23.

⁶ *Ibid.*, p. 11.

⁷ *Ibid.*

⁸ *Ibid.*, p. 12.

the negative definition of the internal affairs department that those jobs include all tasks which are not within the competence of the other administrative bodies), which draws away resources and force, thus weakening overall security. Office administration should be the responsibility of clerks, not the police, he would say.

He especially stressed the general presence, and understandably the harmfulness of misusing the police for political purposes. He emphasized that it is better for the state when the police are less involved in politics. The essence of the police is to be "beyond politics". "The greater the level of public trust enjoyed by the police (emphasized by authors), the better their work results shall be"⁹. Trust is a key component of the whole policing strategy nowadays known as community policing. Abuse went as far as that in the state and city of New York the entire police force changed with the changeover of political parties, which is devastating and damaging on multiple-levels. Keeping the police out of politics implies that it is separated from purely administrative authorities and that its organization and activities are set by special regulations. The risk of political influence is particularly high at local level. Since, as Reiss argued, "state politics is almost always occupied with needs of political parties, local politics is often focused only on individual needs ... Local politics generate 'mercenaries' of some politicians whose only duty is to please those who paid them."¹⁰ In support of his attitude on centralization of the police, Reiss also brings focus to the existing problem of different salary rates of police officers in decentralized, i.e. local police forces, as well as to efforts of some mayors and headmen to put the police in the hands of the state.

Although minimal, Reiss's retrospective view on the crime prevention is significant, because to him as a criminologist, it was extremely clear that even the most severe punishments are not the way to deal with crime. The old saying that it's better to prevent than to cure applies to police activities since, as Reiss says "a bad memory of a sentence served may keep a criminal from repeating the crime, however it does not change him morally." On the contrary, jail will make him even more immoral and an even bigger enemy to society than he already was. For this reason, I always and in every situation advised, to avoid jail sentences for the first time offenders, those who have made a mistake for the first time." More specifically, Reiss had even then proposed the professionalization of the police, general surveillance on the streets, especially over youth at schools, vagrancy, and prostitution as an unhealthy profession, which he strived to regulate. With the aim of preventive work he proposed the introduction of criminal statistics (today's analytics)," which, in his opinion, is the best source for unveiling the traces of such hubs of criminal vices." With the intent of prevention, he advocated the idea that the police should refrain from intervention whenever it was possible, as well as show patience and self-control in all specific situations, which according to him could be handled by well educated and trained police officers. As we can see, he took into consideration all major issues related to police work on crime prevention, which a modern crime prevention strategy must include even today.

Reiss dedicated most of his Principles (p. 24-60) to analyzing different types of police which are prevalent in West-European countries. According to this author, there are four types of police: Uniformed (Order) Police, Criminal or Judicial Police (non uniformed); Gendarmerie (border police) and the Central Police Administration.¹¹ Moreover, the whole study is based on their conceptual definition, on their mutual relations and their relations with citizens and other

⁹ *Ibid.*, p. 13.

¹⁰ *Ibid.*, p. 18.

¹¹ More about types of police: S. Jugovic, „Elementi uporednopravne analize vrsta policije“, *Pravni život*, br. 10/2005, Beograd, 2005, p. 251-266.

state and non state actors. The focus is on the most significant types of police: Uniformed Police and Criminal (Judicial) Police – nowadays Criminalistic Police.

Just like today, basic duty of Uniformed Police was to maintain public order in towns and villages all over the country. Even today, the term *public order* is certainly relevant both in all international conventions and domestic legal system. Reiss explains that this type of police would also participate in judicial and criminal investigations, take part in repression of crime just like Criminal Police, and also conduct order in areas of public traffic and public hygiene, etc. He insisted on forming Uniformed Police in all parts of country, managed by civil administration, instead of Gendarmerie, which was a military body. In his words: "This cannot work, because duality of command never gave good results".¹² Therefore, he was familiar with advantages of the monocratic principles that are typical for administration and police, and insisted on unity and indivisibility of police activity.

Uniformed Police maintained order in streets, public buildings, conducted general surveillance of citizens and foreigners, carried out arrests, secured crime scene (physical evidence), cooperated with Judicial Police, and substituted Judicial Police in small towns.¹³ Uniformed Police were in charge in all areas, which were divided in main sectors and sectors. Reiss suggested competences of Uniformed Police, and worked to detail relations between Uniformed Police and Judicial Police, especially matters of administration and jurisdiction. Proposed organizational solutions are specific and based on contemporary attainment in the field of organizational theory, respecting specificities of police profession. It is clearly visible in his combining of unilinear, multilinear and matrix organization, and the other contemporary principles of police founding and of internal police organization (realistic, territorial, hierarchical, monocratic, personal, etc.).

Criminal or Judicial Police, as assisting service of the judiciary, deal exclusively with criminal law cases, not the civil law ones. Since it was founded on the basis of Secret Police, secrecy is the main characteristic of its work. At the same time, Judicial Police are also technical police, because of the elements of forensic science. According to Reiss, Judicial Police would conduct court investigations, surveillance of foreigners, public morale, investigation of spies, surveillance of anarchists and fire investigations. He also analyzed qualifications that candidates and officials of Judicial Police should meet (fluency in foreign languages, intelligence, skills, special knowledge and, most significantly, general skills of the trade, not just specialized for particular offences).

Reiss advocated for legal regulation of prostitution, which, according to him, was neither crime nor minor offence, but a trade. He suggested mature, married police agents for dealing with prostitution. On the other hand, anarchists are just plain offenders who want to attract a part of electoral body, and they should be under constant surveillance. It is important to distinguish them from the people with liberal ideas.

At the time, Gendarmerie was military formation and it protected the state border. Reiss proposed that it should be headed by high ranking officials of Judicial Police because of trans-border crime. If necessary, Gendarmerie would, at the same time, assist Uniformed Police in border counties. Their training should be conducted according to special program, different from Uniformed and Judicial Police training, focused on shooting practice and self defence.

¹² R.A. Reiss, *op. cit.*, p. 24.

¹³ *Ibid.*, p. 54.

The Central Police Administration, based in Belgrade, according to the organizational scheme, would be under the Ministry of Interior Affairs or Ministry of Justice and responsible to the minister. It would be managed by Director of Police,¹⁴ who would have two assistants: commander of Public Police and head commissioner for Judicial Police affairs. He would be also assisted by a secretary. The Central Police Administration would have following departments: human resources, accounting, statistical department, judicial department, central identification department, central lab for technical researches (expert opinion), Police High School and Police College. This organizational scheme of the Central Police Administration was, to a significant extent, taken from West European countries, mainly Switzerland and France. In short, the Central Police Administration in Belgrade would manage the entire police force in the Serbian Kingdom. Reiss, successfully predicting future, suggested centralization of police, i.e. establishing state control over police by elimination of municipal, town and village police departments and replacing them by state police and creating "mobile police".

Finally, due to the fact that he was a "scholar", his text relevant to police education is particularly significant (higher and lower police school). It is interesting that the requirement for enrollment in the Higher Police School was for the candidate to have successfully completed exams at the Faculty of Law, or a specialized exam in Criminal Law or Criminal Procedure. Knowledge of a foreign language was also required, as well as the approval of the chief or director of police. The school training included theoretical and practical aspects. The duration of the training was one year with a graduation exam, which the candidate could take no more than two times.¹⁵ Training programs for main types of police differ among themselves. For Uniformed Police, Reiss proposed usual, boarding school type of education, in uniform. The head of this school should be the principle. Candidates for Judicial Police would study: *criminal law, laws, decrees, police orders and their practice (police regulations), civil knowledge, exercises in criminal law and procedure, chemistry and physics applied to police sciences, anatomy based on examining bodies, forensic medicine, scientific and technical police, relations between police and citizens and public.*¹⁶ At the same time, candidates would be engaged in practical work in police. Beside these subjects, the candidates for Uniformed Police would attend lectures in military disciplines, especially using and maintaining weapons. Also, students would be trained in riding, boxing, Japanese skills, etc.¹⁷

For admission to Police High School, Reiss suggested following conditions: successfully completed elementary school, served time in the army, single handed written CV, proven moral qualities. It should be a system of boarding school and students should wear uniforms. This school should also be divided into Judicial (Criminal) Police School and Uniformed Police School. Knowledge gained in both sections would be almost the same, but with minimal modalities, considering the nature of Uniformed Police and Judicial (Criminal) Police. It would be essential that students successfully go through programs and to adopt scientific knowledge necessary for police profession they have chosen. Education of students of this high school would be financed by the state but their wages would be smaller. Students of the Police College would finance their own close and would not receive salaries.

¹⁴ Serbia institutionalized position of Director of Police with the Police Law of 2005. This person is "operative chief" of police and minister is head officer that manages police in whole, as Reiss suggested.

¹⁵ R.A. Reiss, *op. cit.*, p. 37.

¹⁶ *Ibid.*, p. 38.

¹⁷ *Ibid.*, pp. 39-40.

That Reiss's work was not just some words on paper can be best shown from the fact that ideas of his *Principles of Modern Police* were utilized in the foundation of the first higher education institution for the police. Namely, on February 8th 1921, by Regulation of the Ministry of Internal Affairs the first state police school was established and it was no other than Archibald Reiss himself that was its founder and first director. This fact speaks volumes as to how truly he believed that a well founded police education is a necessary precondition for creating modern and more effective police service whose motto, as Reiss put it, should be "Devotion and Integrity!"¹⁸

Conclusions

The greatest ambition of every author is for the value of his texts to last as long as possible. Reiss had undoubtedly achieved this goal. The Principles of Modern Police are today, one century since their creation, still a useful, synoptic and helpful material. Written in a brilliant, simple style, thus the most difficult way of all, the Principles of Modern Police represent a solid platform for building upon the complex study of the police. Their content is valid and the science of the police undoubtedly has a historical dimension. Therefore, reanalysis of the contents of this study can be a good basis and directive for the future of police reform.

The issue of police reform is not a temporary one, nor the issue of tendency or époque, but the permanent one. In the light of transition in Southeastern Europe that is still in progress, reform of state administration, especially the police is wide and radical. Since there is no more social property, private sector in field of security is the fact that couldn't and shouldn't be ignored. The existing model of police organization in the Republic of Serbia has withstood the test of time and challenges for more than three decades. Questioning organization, regulation and types of police, their jurisdiction and their mutual relations, seems to be more actual today than ever before. For example, today the issue of Judicial Police education appears to be topical again, due to changing concepts of criminal investigation. The main condition for any kind of police reform is good acquaintance with *basic terms of police law and police science*. Principles of modern police can be useful to determine the real meaning of relevant police terms. Most of Reiss's *Principles of Modern Police* is brought to life today. Nevertheless, it shouldn't be forgotten that there is no universal term of police, although the police are a universal fact. Traditional and contemporary solutions in the field of organization of police activities for each country should be combined in an effective manner – it gives best results.

¹⁸ *Ibid.*, p. 60.

COMPETENCES OF POLICE OFFICERS AS A POSITIVE OUTCOME OF QUALITY EDUCATION

Dragan Arlov, PhD¹

Abstract: Police officers have a wide range of powers at their disposal the goal of which is to provide good quality policing. The use of means of coercion is one of legally provided powers which, among other things, make the police specific if compared with other government organs. The manner in which the powers are used in the form of coercion influences the level of consequences that might occur by their use. The task of police officers is to keep the consequences of the use of this power within the justified limits – i.e. the required harmful consequences. The outcomes of the entire education of police officers should include general and special competences of police officers to use police powers, and of course the means of coercion as a part of them, without causing unnecessary harmful consequences.

Possessing the above stated competences guarantees:

- Timely recognition – confidence that all legal conditions for the use of powers have been fulfilled;
- The possibility and the grounds to insist on the responsibility of police officers in their assessment;
- Duly made decisions on the moment when to initiate solving of a specific problem situation;
- The choice of adequate tools in order to comply to the defined principles for solving problem situations;
- The choice of quality manner of use of means of coercion (duration period, when to stop, how to chose other means...);
- Quality control of individuals the means of coercion were used against, as well as the criteria of quality of use of powers (means of coercion);
- Quality reporting on the use of means of coercion;
- The possibility of acknowledgment of the truth about the event and the grounds to reach a decision on justifiability and regularity of the used means of coercion by the people who were not present at the scene, and
- The possibility to contribute to the quality of the existing or future police officer education curricula in the form of influencing the knowledge, competence and capability of police officers and thus the achievements of the roll role of the police within a society.

The sample of 263 police officers was classified into sub-samples according to the criterion of the form of police education. Using the adequate statistical procedures, the characteristics of the entire sample as well as the individual sub-samples were defined and compared, based on specific competences to use powers (i.e. to use the means of coercion).

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The results obtained suggest the low level of determined competences of the entire sample, as well as existence of statistically significant differentiation among the defined sub-samples.

Key words: education, competences, use of means of coercion

Introduction

Police is a specific government body and police officers are representatives of the state with important powers as guarantees for successful performance of the tasks they have been entrusted by the citizens. The right of police officers to use coercive powers or means of coercion (physical force, baton, handcuffs... and even firearms) influence considerably the said specific quality of the police. The use of powers is conditioned by the obligation a police officer to be sure that all legal conditions are fulfilled for their use.²

Police officers are responsible for their judgment on the fulfilment of all legal conditions for the use of powers, including the power to use means of coercion.

The capabilities of police officers to:

- Recognize at proper time that all legal conditions have been fulfilled to use a certain power (including the coercive power),
- To decide whether to use it or not, as well as
- To decide on the moment and manner how to begin its use (in order to carry out the official task and resolve the specific problem situation which made the condition to use powers) represent the specific competences of police officers (among others).

General (the profile of the perpetrator in the function of realizing the task profile) and specific competences (among other things the stated capabilities related to the use powers including the means of coercion) should be the positive outcome of the entire quality education of police officers, and the guarantee to achieve results in professional work without any harmful consequences resulting from the use of police powers.

Specific competences, as the outcome of all forms of education of police officers are guarantee that the consequences of the use of powers in the form of means of coercion remain within the necessary framework – justified harmful consequences.

The scope of use of powers in the form of means of coercion at the territory of the Republic of Serbia is considerably lower when compared to the Republic of Slovenia³ (in absolute figures) despite the number of arguments which would be sufficient to assume quite the opposite (population, territory, unemployment rate, population standard of living, number of crimes, number of violations, number of police officers...). In the period from 2005 to 2007, the police officers

² The obligation defined by Article 31 of the Law on Police of the Republic of Serbia, as well as the responsibility of a police officer for his/her assessment. The responsibility should also be recognized in other segments of the system, particularly in that "part" which influences the competences of police officers (the field of education). The fulfilment of the mentioned obligation and the responsibility of "all" should be included in the criteria for evaluation of justifiability and regularity of applied powers (including the coercive powers).

³ Comparison with the Republic of Slovenia has been made due to the fact that Slovenia is the EU member-country (which is also the priority goal of the Republic of Serbia), as well as because of rather similar legal framework for the use of all powers (including coercive power); a very important fact is also that there are high quality statistical data on the work of the police in the Republic of Slovenia (on the use of powers also) available at mid-January for the previous year and they can simply be downloaded from their web site.

of the Republic of Slovenia used means of coercion 25,041 times against 14,179 individuals acting in 11,244 events [4]. At the territory of the Republic of Serbia in the same period there were 6,752 uses of means of coercion against 6,752 individuals acting in 6,752 events.⁴

The state-of-affairs mentioned (although illogical) suggests the need to verify the numbers and confirm them as well as the need to seek for the causes of such a state and to attempt to find solutions in order to create conditions for the police to play their role in the society.⁵

Unrealistic state-of-affairs regarding the scope of use of police powers in the form of means of coercion is possibly a consequence of restrictive choice of police officers to use their powers (the reasons should certainly be determined and they might be found in the capability of police officers to perform the tasks without the use of their powers, missing “an opportunity” to use this power due to possible consequences for themselves or the individuals against whom they would be used, “bad” experiences of other police officers who used this power, “complicated” procedure following the use of means of coercion, not having sufficient competences in this area...) or this power was used but not reported (this is also very important and must be the topic of some of specific research).

The goal of this study was to verify the level of specific competencies⁶ of police officers in the field of use of powers in the form of means of coercion (as one of possible reasons of unrealistic scope of use of this power at the territory of the Republic of Serbia) at the total sample of 263 police officers, as well as to find out if there are differences in these competencies among the groups of officers formed according to the criterion of type of education they have completed in order to perform police work.

⁴ The authors were forced to deal with the stated period because they could not obtain the numerical indicators on the state of use of coercive powers for the Republic of Serbia (there are not quality data available about the use of coercive power in the report on work at the web site of the Ministry of the Interior of the Republic of Serbia, and the competent organizational unit acts upon the request which lasts for several months while the quality of the information obtained is rather modest). At the same time, quite an illogic condition can be noticed when compared with the number of events, the number of individuals in these events as well as the number of previously used coercive means when acting against the stated number of individuals in resolving the stated number of situations. It is the consequence of the manner of monitoring the use of police powers by the competent organizational unit of the Ministry and the end-users (obviously not particularly demanding).

⁵ In the Strategy of the development of the Ministry of the Interior of the Republic of Serbia for the period from 2011 to 2016, there is an expressed need to improve the knowledge on the nature of police profession and the work of the Ministry of the general public, competent government institutions, civil society institutions, and there is an expressed readiness to engage to that effect (in the form of workshops, seminars and other activities). There is also a need of cooperative relationship between the public and police as a prerequisite for democratic work of police, acknowledgment of the citizens' points of view, as well as cooperation with private security sector. The use of powers, particularly the coercive power, influences considerably the standpoint of the public towards the police line of work. This would mean that the Ministry is (and has always been) obliged to get the public acquainted (although the lack of knowledge is not an excuse...) with the obligations and rights of their employees, but also with the obligations and rights of the citizens. Ten years ago the author of this paper „fought“ on his own initiative for the public to get acquainted with the police powers, including the coercive power, in a series on TV Novi Sad titled „Serving the citizens“.

⁶ The Strategy of the development of the Ministry of the Interior of the Republic of Serbia for the period from 2011 to 2016, the significance of competences and the results of work are pointed out as criteria for competitiveness among police personnel and as the basis for advancing in rank. This is naturally justified and necessary, but at the same time unbelievable considering the number of „cases“ of advancing in rank (even up to the top managerial positions, authorizations, the ranks of Colonel and even General) without having fulfilled the previous conditions. As a positive example, it should (again) mention the situation in the Republic of Slovenia, where there is not a single officer from the top of hierarchy who has not completed quality vocational police education (either high school or higher education) and who has not had evident results in police work.

Methodology

In order to achieve the goal of the research the description of an imaginary event was made with the elements of realistic-possible occurrence and within the framework of police work which also required the performance of a specific police task. The police received a call to the phone number of the police station for attendance and intervention by an owner of some premises who reported public mischief committed by a male (manner of mischief, characteristics of the perpetrator...). The information were sent to a police officer who was already on duty and he was sent to the scene.⁷ In this way, the police officer had some information about what was happening at the scene where he was sent. He could evaluate the quality of the information upon the arrival at the scene. In addition to this, by arriving to the scene (or in some other suitable way) the police officer could verify the quality of previous information, as well as "collect" new ones in order to define the real event, specific problem situation (PS), fulfilment of all legal conditions to use his powers, evaluate and decide on the manner of conduct – performing the task (to start or not to start, to inform the police officer on duty, the moment when to start, the choice of the means and tools, manner, goal...). Within the description of the event there are eight clearly stated problem situations as possible legal bases to use powers in the form of means of coercion and they are:

Opposing to legal official measures and actions of police officers by failure to comply – by sitting on a chair at the table as a form of passive resistance,

Making it look like a police officer or another person will be attacked by previous conduct and possessing the objects suitable to wound as a form of active resistance,

Clutching to the table and saying that he/she will not comply to the legal order of a police officer, as a form of active resistance,

Giving the impression that a police officer will be attacked by lifting the table with the intent to throw it to police officers as a form of active resistance,

Throwing the table towards the police officer as a form of attack

Giving the impression that he/she is going to attack trying to take an object (telescopic stick) as a form of active resistance

Giving the impression that he/she is going to attack a police officer by pulling, preparing to use and swinging the stick as a form of active resistance, and

Swinging the stick and moving towards a police officer as an assault.

Police officers had a task in the first part (which refers directly to concrete problem situation) to:

Recognize the problem situation as a basis for use of powers in the forms of means of coercion;

- To declare which was the problem situation they would first choose to resolve using means of coercion;

- To declare on the means of coercion they would use to resolve the previously mentioned problem situation as well as the tools they would choose, and

- To declare on the criteria for the use of means of coercion (type, manner,

⁷ The quality of information available to the police officer prior to arrival to the scene is very important because he/she should prepare for action (yes/no, manner...).

duration...), and in the second part (which refers to the obligations of police officers and the possibility of their fulfilment by the knowledge of legal acts) to:

State the basic characteristics of the report of the police officer after the use of means of coercion,

Circle the right answers on the obligation to report (obliged or not, oral or written report, within which period), as well as

To state the full name of the current by-laws specifying in more details the use of powers in the form of means of coercion.

The advantage of the interviewed police officers was in the possibility to review the entire development of the events (by careful reading of the description of the imaginary event), as opposed to the real event when they have to make judgments and predict how a concrete individual will act over time.

The sample of examinees

The sample included 263⁸ police officers "available" to the author from the territory of police departments of Novi Sad, Subotica, Kikinda and Zrenjanin. The entire sample was divided into five sub-samples according to the criteria of the type of education to: sub-sample of police officers who have finished Police High School in Sremska Kamenica (SŠUP), sub-sample of police officers who have finished the course for police officers, until the Basic Police Training Centre was established, sub-sample of police officers who have finished their education in the Basic Police Training Centre (COPO), sub-sample of police officer who have finished the Police College in Zemun (VŠUP) and sub-sample of police officers who have finished Police Academy in Belgrade (KPA).

Table 1- *Sample of examinees*

Gender		Average age	Average working experience in the Ministry of the Interior	Department of the ministry			
Male	Female			General jurisdiction	Traffic	Crime	Border
242	21	31,71	10,13	157	63	36	7
EDUCATION							TOTAL
SŠUP	COURSE	COPO	VŠUP	KPA			263
103	66	25	37	32			

Sample of monitored features

The monitored features which were in the function of determining the level of specific competencies of police officers as a goal of research were:

Quality level of recognizing problem situations within the shown event (PS) expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality:

⁸ The number which the author managed to realize within the time available and with the consent of police officers and their superiors. Overall, the interest of police officers to participate in such activities is at rather a low level and in majority of cases because of fear of consequences known only to them.

Quality level of choice to start resolving the concrete problem situation (STRS), expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality;

Quality level of choice of means-tools from the available means of coercion (ALAT) expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality;

Quality level of clear definition of final goal as a criterion to use means of coercion (KRIT), expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality;

Quality level of defining characteristics of report as an obligation of a police officer after the use of means of coercion (IZVS), expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality;

Quality level of knowledge of police officer obligations related to the report as an official document (OBVZ), expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality;

Quality level of knowledge of the name of the current by-laws which specifies in more detail the use of means of coercion (AKT), expressed by the grade 1-5, where the lower grade corresponds to the lower level of quality.

The evaluation of quality was carried out by an expert for the field of use of police powers in the form of means of coercion according to previously defined criteria for each of the monitored features in the following way:

Quality of defining-recognizing problem situations (clearly defined by eight problem situations, in the order from passive resistance, through active resistance to assault, were graded the highest level of quality - 5. Lack of quality and scope of definition of problem situation influenced the choice of the lower grade. Inexistence of clearly defined problem situations or essential mistake were graded with 1 – the lowest quality level)

Decision to start resolving a specific problem situation (the decisions of police officers to start resolving the problem situation of a lower level for both the police officers and the individual against whom it was directed – forms of passive resistance were graded with the highest quality grade, while the decision of a police officer to resolve more difficult problem situation – forms of active resistance or assault were graded with lower quality grades)

The choice of means-tools when starting to resolve "the chosen" problem situation (the highest quality grades were given to the choice of tools by the use of which the police officer would provide for the necessary and required level of pain to the individual it is used against with the guarantee that there will not be any unnecessary harmful consequences, and the lower quality grades were given to the choices of police officers of inadequate means and tools and certain occurrence of unnecessary harmful consequences of their use)

Clear definition of final goal of use of power of coercion (the highest quality grade was given to quality control over an individual, as a final goal of use of power of coercion, while the lower quality grade was given to the choice of overcoming resistance, prevention of assault, re-establishing disturbed public peace and order...)

Definition of report characteristics (the highest quality grade was given to the choice of police officer for timeliness and truthfulness as general characteristics)

of police officer's report after the use of coercive means, and the lower quality grades were given to choices to leave out some of characteristics as well as to those to be detailed, precise, comprehensive, complicated...)

Knowledge of obligations of police officers regarding reporting (the highest quality grades were given to the choice that the report is an obligation, in a written form within 24 hours, and the lower quality grades were given to all other choices according to the level of untruthfulness of the statement), and

Knowledge of the name of the current by-laws (the highest quality grade was given to the choice for the Regulations on technical features and manner of use of means of coercion, while the lower grades were given to all other statements according to the level of inaccuracy of the choice).

When evaluating the quality, the evaluator did not have any information on to which group – sub-sample the examinee belonged, which were subsequently formed according to the criteria of police education.

Statistical data processing⁹

Quality grades of the monitored features are non-parametric and thus non-parametric procedures on statistics on the frequency of their occurrence were applied on them. Scaling of the data was done and then the procedures of Multivariate Analysis of Variance (MANOVA) were applied, as well as discriminative analyses and other parametric procedures and methods. Out of univariate procedures, Roy Test, Pearson's Contingency Coefficient (c) and Multiple Correlation Coefficient (R) were used. As another indicator of similarities or differences among the sub-samples – groups, Mahalanobis distance was also calculated.

The Results

Characteristics of the entire sample

Table 2 shows the basic indicators for all monitored features at the entire sample in relation to the representation of the quality level. The representation of quality level suggests the level of specific competencies in relation to any other monitored feature, but also in total to the use of power of coercion.

The second column shows the representation of quality level of defining – recognizing the problem situations, and the data suggest the fact that it is very low considering that the most represented levels are 2 and 1.¹⁰

The third column shows the representation of the quality level for the choice to start resolving the certain problem situation and the data suggest the fact that it is also low considering that the most represented levels are 1 and 2.¹¹

The fourth column shows the representation of quality level of the choice

⁹ Data processing, as requested by the author, was done by a Specialized agency for statistical data processing and statistical design „SmartLine“, www.smartline.rs, Novi Sad.

¹⁰ The considerable number of examinees – police officers do not make the difference between passive and active resistance, and thus clutching to the table is defined as passive resistance. Making the impression that he/she is going to attack a police officer or another person, as a form of active resistance, was not recognized in the majority of cases by police officers as a basis to use coercive power.

¹¹ The considerable number of examinees, in spite of the known developments, choose to start resolving more serious problem situation clearly burdened by „real“ fulfilment of legal conditions for the use of coercive power.

of means and the first tool in starting to resolve "the chosen" problem situation and the data suggest the fact that it is particularly low considering that the most represented level is 1 as the feature of the lowest level of quality.¹²

The fifth column shows the representation of quality level of clear definition of final goal of application of coercive power and the data suggest the fact that it is low considering that the most represented levels are 2, 3 and 1.

The sixth column shows the representation of level of quality of defining the report characteristics and the data suggest the fact that it is particularly low considering that the most represented level is 1 as the feature of the lowest level of quality.

The seventh column represents the quality level of knowledge of the obligations of police officers related to reporting and the data suggest the fact that it is the highest when compared with other monitored features considering that the most represented levels are 5 and 3, and

Table 2 - Distribution of quality level of monitored features of the total sample

	PS	STRS	ALAT	KRIT	IZVS	OBVZ	AKT	total
1. (the lowest)	71	97	149	67	117	10	144	655
2.	118	80	73	93	65	75	72	576
3.	53	43	28	84	62	82	23	375
4.	13	26	12	18	11	5	1	86
5.(the highest)	8	17	1	1	8	91	23	149
total	263	263	263	263	263	263	263	

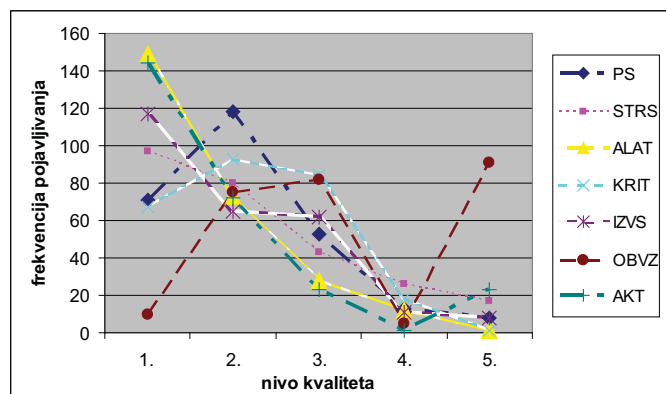
the eighth column shows the representation of the quality level of knowledge of the current by-laws and the data suggest that it is particularly low considering that the most represented level is 1 as the feature of the lowest quality level.¹³

Observed as a total, the low level of specific competences within the monitored field can be recognized from the indicators in the last column of the Table above also. It is clear that considerably larger number of occurrences of lower quality levels (1 and 2) when compared to the mean, higher and the highest quality levels exist for all features (except the level of quality referring to the knowledge of their obligations following the use of coercive power).

¹² Considerably low quality level in choosing the first tool to resolve „the chosen“ problem situation has been confirmed by many choices of police officers to start resolving the problem situation (active resistance, and often even the assault) by the use of the lever. There is also the presence of jargon in the form of common (unjustified) use of terms „key on elbow“, „ladies grasp“... but also the decisions to start resolving problem situations such as those of active resistance by clutching to the table (which is usually defined as passive resistance) with the use of baton (certainly because of the lack of trust – or lack of knowledge, the tool from the group of physical strength tools).

¹³ The examinees, the entire sample of police officers, have a particularly low level of quality of knowledge of by-laws (although it quite strange considering that its title includes the terms „technical features“ and „manners“ of use of means of coercion, and at the same time does not include conditions) which define in more detail the field of use of powers in the form of means of coercion. The considerable number of examinees do not make the difference between laws and by-laws (maybe superficiality may be assigned to the approach to the survey, reading, lack of knowledge...), and it is also noticeable that they state the by-laws from the time when they were educated for the police profession (but even then mostly incorrect considering that they do not mention the conditions and manner of use of coercive means) although this by-law was passed in 2007 by the Ministry of the Interior, as the legal obligation which had a 6-month time limit following the adoption of the Law on Police in 2005.

Graph 1- Representation of level of quality for all features – the entire sample



At Graph 1 there is an ellipse which highlights the high representation of lower quality levels for all seven monitored features at the entire sample of 263 police officers. The high level of representation of lower levels of quality suggests also the low level of specific competences of police officers in the field of application of coercive power.

Differences among sub-samples

Further in the text there are the results of analysis of differences, significance of differences and characteristics of formed sub-samples (based on features which contribute the most to differentiation of sub-samples – groups of police officers), as well as their mutual distance or closeness.

Table 3 - Significance of differences among sub-samples

analysis	n	F	p
MANOVA	7	2.731	.000
discriminative	7	2.768	.000

Based on the values shown in Table 3 (MANOVA analysis, $p=.000^{14}$ and discriminative analysis, $p=.000$), it can be concluded that there is a clearly defined line between the groups – sub-samples, when all monitored features are observed together.

¹⁴ Significance of differentiation among sub-samples in the paper was monitored at the level <05 (every differentiation lower than the shown value of 0.05 is interpreted as statistically significant, which suggests 95% probability of determining the same differentiation when the research is repeated)

Table 4 - Significance of differences among sub-samples according to individual features

	X	R	F	p	Discrimination coefficient
PS	.333	.286	5.751	.000	.055
STRS	.297	.208	2.920	.022	.025
ALAT	.275	.207	2.900	.022	.043
KRIT	.230	.205	2.838	.025	.026
IZVS	.239	.211	3.003	.019	.053
OBVZ	.207	.156	1.621	.169	.027
AKT	.250	.241	4.000	.004	.039

The values shown in table 4 also suggest statistically significant differentiation of groups – sub-samples even when they are analysed according to individual features ($p = .000; .004; .019; .022; .022; .025$). The last column of the previous Table shows the discrimination coefficients or the contribution of individual features to differentiation of sub-samples. Statistically the sub-samples do not differentiate significantly for the feature of level of quality of knowledge of police officers' obligations related to reports as official document (.169).

The last column of the previous Table shows the discrimination coefficients or the contribution of individual features to differentiation of sub-samples. It can be concluded from the shown values that the feature which contributes the most to the differentiation of the five sub-samples is the feature of quality of defining – recognizing specific problem situation as a basis to use means of coercion ($p .055$).

Table 5 - Characteristics of sub-samples

	SŠUP	COURSE	COPO	VŠUP	KPA	contribution %
PS	PS-2	PS-1	-	PS-1	PS-5	20.52
IZVS	IZVS-1	IZVS-1	-	IZVS-2	-	19.77
ALAT	-	ALAT-1	ALAT-1	ALAT-2	ALAT-4, 2	16.04
AKT	AKT-5	AKT-1	-	AKT-1	AKT-5	14.55
OBVZ	OBVZ-3	OBVZ-5	-	OBVZ-3	-	10.07
KRIT	KRIT-2	-	KRIT-2	-	KRIT-4	9.70
STRS	STRS-3, 4	STRS-1, 5	STRS-1	STRS-2	STRS-4, 5	9.33

Table 5 shows the characteristics of sub-samples (in horizontal cells there are features and quality levels of these features for each sub-sample), as indicators of specific competences of police officers with various forms of police education. The last column shows the percentage contribution of each monitored feature to the characteristics of sub-samples. It can be seen that it is the level of quality of defining-recognizing specific problem situation that contributes the most to the characteristics of sub-samples (20.52%).

It can be concluded from the previous three Tables that sub-samples of police officers formed according to the criterion of police education are significantly different when the monitored features are observed both as a whole and individually.

The levels of quality of monitored features which make the sub-sample characteristics suggest the differentiation among sub-samples "in favour of" police officers who were educated at the Police Academy (or KPA, with or without the previously completed SŠUP) and the police officers who were educated at the SŠUP.

Table 6 - Mahalanobis distance among sub-samples defined by monitored features

	SŠUP	COURSE	COPO	VŠUP	KPA
SŠUP	.00	.48	.70	.90	1.02
COURSE	.48	.00	.47	1.06	1.12
COPO	.70	.47	.00	1.20	1.34
VŠUP	.90	1.06	1.20	.00	1.62
KPA	1.02	1.12	1.34	1.62	.00

By calculating Mahalanobis distance among sub-samples, we have obtained yet another indicator of similarities and differences. The values obtained can be compared. Distances shown in the Table above suggest the least differentiation of sub-samples of police officers who acquired police education at COPO and at the course for police officers before the Basic Police Training Centre was established (.47). At the same time, the greatest differentiation is between the police officers who have acquired competences for police work (and thus specific competences for the use of coercive powers) at VŠUP and KPA (1.62).

Conclusion

General and specific competencies should have positive outcome in the form of overall quality education of police officers and the guarantee to achieve professional results in work without occurrence of harmful consequences by the use of police powers. Competences and work results are the criteria which the Ministry of the Interior of the Republic of Serbia chose in their strategy for the period from 2011 to 2016 for defining competition among police personnel and with the goal to achieve high level of professionalism.

Police officers of the Ministry of the Republic of Serbia have considerably smaller scope of application of coercive powers when compared with their fellow-officers in the Republic of Slovenia as an EU member country. This paper is an attempt to find out whether the specific competencies for the use of the said powers might be one of the reasons of the state-of-affairs at the moment.

With the help of adequate methodology, the sample of 263 police officers was used to define and compare the characteristics of the entire sample and individual sub-samples on the basis of specific competencies for the use of coercive power. Specific competences were evaluated by means of the quality level of the seven monitored features and as the outcome of anonymous choice – decision by the examined police officers.

The results obtained suggest the low level of determined competencies of the examinees belonging to the entire sample, as well as the inexistence of statistically significant differentiation among the defined sub-samples. The low level of determined competencies and differentiation of sub-samples suggest the need to define the model in the field of the use of coercive power and its application at all levels of the education of police officers.

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CONTRIBUTION OF POLICE TOPOGRAPHY TO DEVELOPMENT OF HIGHER POLICE EDUCATION IN SERBIA

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Abstract: Police topography was included in the curriculum of the Police Academy immediately following its foundation in 1993, and the contemporary concept of this subject designed for the purpose of higher police education has been confirmed by accreditation of the undergraduate studies' curriculum at the Academy of Criminalistic and Police Studies (KPA) in 2009. It has always been in the function of higher education of prospective managerial staff in the police. The paper therefore presents the achieved level of didactic and methodological standard of this subject and then offers an insight into the place and role of police topography among special forms of instruction, and finally emphasizes the importance of orienteering as sport of particular significance for police and military services, as well as for the managerial staff of special police units of the Republic of Serbia Ministry of the Interior responsible for carrying out specific security tasks.

The results presented in the paper confirm the contribution of police topography to the development of higher police education, i.e. to successful education of highly qualified personnel capable of applying the acquired skills and knowledge more efficiently in new security threats and challenges. In this way, police topography fulfills the educational and functional goals of higher police education the foundations of which were laid by Archibald Reiss.

Key Words: police education, higher police education, didactical and methodological standard of teaching at the Academy of Criminalistic and Police Studies, police jobs, Republic of Serbia MI

Introduction

Everyday police jobs, regardless of the hierarchical level they belong to, require that police officers performing them possess an adequate quantum of theoretical knowledge of a wide range, but also they also should be qualified for applying a large scope of skills which serve as "tools of their trade" or profession.¹⁵

Theoretical knowledge is acquired through class instruction, and skills are acquired in the training process, through practice and drills of various intensity and dynamics. This implies the need for a specialized institution capable of providing the realization of curricula designed for higher police education such as the KPA. These curricula are in part realized through the teaching subject called Police Topography which is studied in the second year of vocational studies (police and security optional

¹⁵ Milojević, S., (2010), Optimizacija modela posebnih oblika nastave na Kriminističko-policijskoj akademiji, *Bezbednost*, god. 52, br. 3/2010

group) and in the third year of academic studies (police optional group).

Police Topography is an interdisciplinary scholarly discipline combining geo-spatial sciences and studies in the field of police and security. It focuses on the detailed study of geometry and contents of the Earth's surface and its representations in plans and maps of larger proportions, theme-maps, photographs and other types of geo-topographic materials used in the preparation and performance of various security tasks. The text below presents main indicators of the achieved level in the development of didactic and methodological standards of police topography as a scholarly discipline studied as part of KPA undergraduate studies and points out the modalities in which it has contributed to higher police education in Serbia.

Didactic and methodological standards of police topography instruction at the academy of criminalistic and police studies

The university level of teaching at the Academy of Criminalistic and Police Studies has all crucial features of teaching in general but also some specific features relating to: the contents, technology of education, organization and its realization. Starting from the determined skill profile of the personnel, concrete realization conditions and general pedagogical demands, it is necessary to define didactical and methodical standards for separate teaching subjects to optimize the teaching process. These standards must encompass the separation, identification and distinction of the contents of the studies, organization forms, teaching principles, methods, objectives, ways of evaluation, and teaching material and literature.¹⁶

The teaching contents of police topography have been designed with an aim to enhance the skills and knowledge required for performing police duties. In the period from 1996 to 2007, the contents were innovated four times. These innovations of teaching contents were introduced on the basis of continuous research of educational needs and on the basis of the research entitled Establishing Readiness of Graduate Officers of Police for Performing Professional Tasks carried out in 2001.¹⁷ The course originally included 60 lessons distributed across two semesters, and then 75 lessons in the course of one semester. The subject has been taught under the current title since the 2002/2003 school year, when topics related to military topography were excluded from the curriculum. This opened the door to innovative approaches dedicated exclusively to police and security purposes. The introduction of the topics entitled Contemporary geo-topographic materials, devices and systems for positioning and orientation of significance for police and Topographic basis of graphic official documents of police was of great importance.

Detailed plans for each semester of instruction are made, including the topics, their order, dates of realization for every lesson.

The KPA Commission for Monitoring, Securing, Promoting, and Development of Curricula, Teaching and Conditions permanently reconsiders the objectives, structure and contents of the police topography curriculum, its compatibility with main objectives and tasks of the teaching process and requirements of the MI of the Republic of Serbia. Self-assessment is conducted by use of adequate methods for checking the set standards of the Academy, in keeping

¹⁶ Milojković, B. (2001), Didactical and methodical standard of teaching topography at Police academy in Belgrade. Science-security-police, Vol. VII, No.2, str. 84.

¹⁷ Milojević, S., Subošić, D., (2004), Analiza profesionalne osposobljenosti diplomiranih oficira policije, Nauka, bezbednost, policija, Vol. IX, No. 2, str. 137.

with the ones relevant for the university and with mandatory consideration of the students' evaluation.

Conditions for a larger scale application in the teaching process should be created so that this process should become more obvious, functional and interesting to the students.

Various forms of organization of teaching are applied at the Academy of Criminalistic and Police Studies. The chosen forms of organization correspond to the needs of contemporary education on university level. It is particularly expressed at chartometry drills on geo-topographic materials, in handling contemporary positioning means, applied procedures in orientation and moving about an unknown terrain etc. However, a high level of chosen forms of organization of the teaching process can be maintained only by constant innovation of contents of the teaching subject and methods, and by using reference literature and the latest teaching technology. It is a special quality of teaching topography at the Academy of Criminalistic and Police Studies. This educational institution makes maximum effort to equip this teaching subject with contemporary geo-topographic materials and technical means in the area of GPS and GIS technology that is the basis of an expert system i.e. the system of supporting decision making in the area of law enforcement management.¹⁸

Didactical and methodical standard of success evaluation in teaching topography encompasses monitoring, testing and grading student's work and knowledge.

The teacher continuously monitors and grades the student's work descriptively and numerically. Namely, during the course of the lectures, drills, seminars, camping and other forms of teaching, the teacher keeps written records of every student (making notes on their diligence at work in lectures, achieved results at colloquium and seminar, camping work grade, practical part, written part, and oral part of examination grades, consultations and additional work with underachievers, additional work with overachievers through consultations work in orientation section etc.). It is only by such work that the teacher can create good conditions for individualization of teaching and learn to what extent he can put a pressure on a student. All that can serve as a solid precursor to testing the knowledge at the examination and giving accurate final grades.

Testing topography is done in a combined manner. To test the students as fully and objectively as possible, the teacher uses different ways of testing in turns. Thus, during the course, the teacher does a preliminary checking. The colloquium serves to check whether the previous matter, which is the basis for further studies, has been assimilated. At the written exam, the teacher wants the explanation of the obtained results in order to have an insight in the individual work of a student. At practical work with topographic map, the teacher evaluates the degree of student's understanding the immanent contents of the map, accuracy, self-reliance, and speed in doing orientation procedures and moving about an unknown terrain etc. The way of testing, designed and organized in such a fashion, is a special quality of the didactical and methodical standard that is applied in teaching topography at the Academy of Criminalistic and Police Studies. The latest students' self-evaluation (4.91) confirms objectivity and uniformity of the assessment criteria.

Availability of good-quality contemporary literature, library and IT resources and the quality of spatial working conditions are prerequisites of

¹⁸ KPA was among the first institutions of higher education to buy GPS devices and other modern pieces of equipment in 1996, which contributed to better quality of instruction.

successful teaching process. The instruction in the subject of Police Topography is supported both by modern course books and good working conditions.

Two editions of the textbook in police topography were published in 1996 and 2009, and the workbook had three editions, the first in 1998 and the latest in 2010. The textbook and workbook were designed in keeping with didactical and methodological requirements of higher education, so as to ensure comprehensible adoption of theoretical knowledge and practical use of acquired skills in hands-on field training, as well as in performing police tasks requiring a high level of competence. Their structure involves the subject matter encompassed by the accredited curriculum and, in terms of toponometry, they function as a whole. This is of utmost importance because a large portion of the teaching material does not correspond to the strict division between lecture and drill topics. For instance, practical tasks in the workbook can only be resolved after thoroughly studying the topic in question in the course book during the lecture and through individual work. The solutions offered have to be short, direct, unambiguous, precise, and within the limits of acceptable departures. This enables the development of graphic culture, un-ambiguity, punctuality and accuracy, depending on the specific task. Besides achieving educational objectives, this places an emphasis on functionality, which is required for professional performance of prospective police managerial staff. In this way, they are instructed to look for solutions practically, systematically, instructively, comprehensibly and independently, and in the function of tactical actions of police units, which, in turn, means that they have mastered the subject curriculum and successfully prepared for their examination.

The literature used contains coloured segments of relevant maps and digital plans which enable the students to independently explore solutions in cartography and editing, practice chart-metric tasks on examples from police practice and prepare for the exam, and use these materials later in order to refresh their knowledge. The focus is on the topic of using maps with UTM coordinate grid which enables work with GPS devices and creates conditions for compatible work in an international framework, together with representatives of civilian, police, army and peacekeeping missions, which appeared to be a topical issue calling for prompt response.¹⁹

Place and role of police topography among special forms of instruction at Academy of Criminalistic and Police Studies

In the course of higher education for law enforcement officers, special attention should be given to those segments of instruction which enable the students to acquire practical knowledge and skills required in the performance of police tasks. Such special forms of instruction are organized at KPA.²⁰

They undoubtedly present a very important segment of KPA students' education.

The students thereby acquire practical knowledge and skills necessary in the execution of police duties. It is therefore of utmost importance that the contents and structure of the KPA curricula are properly evaluated and efficiently and properly incorporated. This means that methods of exact science have to be used when designing the syllabus – the method of optimization, statistical method, as

¹⁹ Milojković, B., (2007), Savremeni geotopografski materijali za potrebe policije – karakteristike i način korišćenja, BEZBEDNOST, god. 49, br. 4/07, str. 108.

²⁰ Milošević, G., Subošić, D., Mićović, D., (2010), Practical training of students within the sistem of tertiary police education in the Republic of Serbia, NBP – Žurnal za kriminalistiku i pravo, Vol. XV, No. 3, crp. 96

well as the method of empirical generalization.

The special instruction curricula have to ensure that:

- Graduate crime investigation officers have acquired sufficient practical knowledge and skills, as well as a certain amount of experience which will enable them to join in the activities of the RS MI as fast and as easily as possible;
- Material and human resources, as well as training facilities of the Ministry of the Interior are used for teaching activities, in keeping with the functional relationship between the KPA and the RS MI;
- Financial and other resources at the disposal of the KPA are used economically;
- The KPA is distinguished from other faculties and academies dealing with security as the only institution of higher education in which students acquire practical knowledge and skills, alongside with experience useful for their future engagement within the RS MI, especially at the onset of their careers;
- Current situation and tendencies in the development of law enforcers' education in Europe are taken into account, especially with respect to practical knowledge and skills;
- The programmes offered are attractive and functional, which will attract a large number of prospective students, making the KPA more competitive with respect to other institutions of higher education.²¹

The contents of Police Topography as a subject among the accredited special forms of instruction are also carried out in the form of *field instruction in performing police duties in summertime conditions*. This form of instruction comprises 60 lessons at a location outside the Academy, where the intensive and dynamic programme is realized on a daily basis over a period of time. Field instruction thus incorporate elements of basic police instruction, primarily in the field of operative police skills, such as the use of firearms and tactical use of police powers, as well as specialist police training in the use of police tactics involving units for specific security purposes. The main objective of field instruction is to combine theoretical knowledge adopted at the KPA with practical activities of uniformed police, as well as to enable the students to fully understand the subject matter of their vocational subjects, in order to be prepared for service in the RS MI.²²

The period of field instruction enables the KPA students to gain practical knowledge about and practice the following activities:

- Covering distances in both urban and rural geo-space in the conditions of limited visibility with a topographic map and a GPS device. While performing this activity, their knowledge and skills in topography are in the function of resolving tactical assignments (police ambush, chase, terrain search, arrest of dangerous or runaway criminals or terrorists). The students solve these assignments combining tactics and topography playing the roles of operatives and ranking officers, i.e. they are 'guided' by the teacher and a police officer qualified as an instructor in a certain speciality within the RS MI;
- In-depth securing of the state border and the security zone aimed at preventing and combating all forms of trans-border crime and illegal migrations;
- Emergency security services and re-establishing public order following large-scale riots – estimates and plans of crowd dispersion, organization and monitoring of interventions, managing available resources, using communications and means

²¹ Miolejević, S., (2010), Optimizacija modela posebnih oblika nastave na Kriminalističko-policijskoj akademiji, *Bezbednost*, god. 52. br. 3/2010.

²² Earlier police topography curricula also incorporated training in winter conditions and study visits which were scientifically founded and based on expert criteria, but which the Academy is currently not organizing because they remain to be prohibitively expensive for the limited funds which are available at the moment.

of crypto-protection.²³

Importance of orienteering for realization of KPA teaching processes

The KPA has ever since its foundation in 1993 worked on both organizing educational activities and forming sport clubs as forms of extracurricular activity. In addition to traditional sports, the Academy has successfully cherished marksmanship and orienteering as sports of particular significance for army and police. The sport clubs have always been managed by members of the KPA teaching staff (athletics, swimming, basketball, rowing, marksmanship and orienteering) and (senior) police officers – squad commanders (football, handball, volleyball, table tennis, judo and karate). The Academy vice dean in charge of education and the class superintendant were responsible for coordinating the work of all these clubs. Students of the KPA have so far taken part in numerous championships on the national level, as well as in competitions organized by the Ministry of Interior and, most importantly, in the competitions within university championships and leagues.

The KPA Orienteering Club was founded in 1997 and had 436 members until 2008. Following its formation and its initial successes, the club attracted an ever increasing number of members over the years, so that in the school year of 2005/06 it had 85 members. Namely, at the beginning of each school year, the club was presented within the subject Police Topography, and then the newly accepted members (first year students) finished the Initial Course in orienteering at the beginning of the summer term. The curriculum for this course was made by the national association of orienteering, based on the principles defined by Peter Palmer, a renowned orienteering expert in England. After qualifying on the Academy competition and other control competitions, they took part in the system of official O-competitions in compliance with IOF rules. Students of the last year of studies had a prominent role during the initial training course, since they acted as instructors, each in charge of 4 trainees, under supervision of the Police Topography professor. For practical exercise in orienteering techniques a number of maps of wider geo-space of Belgrade were used. Associates of the Special Physical Education Department also took part, to a certain extent, in designing the tactical performance.

Results obtained in a preliminary research showed didactical efficiency of orienteering as part of instruction in Police Topography at the KPA. The subjects in this research who took part in orienteering competitions while taking the course in Police Topography have achieved success in resolving practical tasks significantly better than those who did not participate in the orienteering competitions.²⁴

Furthermore, a correlation between successful resolving of specific tasks in police topography and motor abilities of the KPA students – members of the orienteering club - was established and explained at the level of 52% variance. The selected predictors included variables which describe the ability of an organism to provide adequate support of running motion from aerobic energy sources, to

²³ Vuletić, Ž., Ilić, A., Milojković, B., (2009), Model geotopografskog obezbeđenja upotrebe jedinica policije pri intervenciji na uspostavljanju narušenog javnog reda i mira u većem obimu, *Bezbednost*, god. 50, br.1-2/09, str. 329.

²⁴ Milojković, B., (2003), Razlika uspeha studenata policijske akademije iz topografije osposobljavanja uz primenu orijentiranja i uspeha studenata osposobljavanja na klasičan način. U *Zbornik sažetaka „Prvi srpski kongres sportskih nauka i medicine sporta“*. Beograd: Sportska medicina, časopis udruženja za medicinu sporta Srbije, suppl. 1, str. 56.

realize more efficient motion with respect to both energy and mechanics in aerobic and anaerobic conditions, as well as the requirement that an individual should be as capable of achieving absolutely maximal running velocity as possible. 25

Certain orienteering techniques were also used in the function of predicting success in the instruction of both the Academy students and members of special police units during the field training in performing police duties. The obtained results showed that situational tests used in orienteering could predict the success of subjects in the field training of police topography, i.e. the research found that the subjects engaging in orienteering showed statistically significant advantage in tackling situational tests as compared to the ones who did not practice orienteering.²⁶

However, beside the mentioned results, it was necessary to conduct research of a wider functional significance of orienteering as a university sport for overall achievements in mastering curricula. Namely, the purpose of the said research was to establish the extent of interrelatedness of achievements of the student-members of the KPA Orienteering Club in Police Topography and their achievements in other subjects which required, at least to some extent, the use of fundamental knowledge of police topography (Police Tactics, Police Management, and Special Physical Education – SPE 1 and 2). The research established that between Police Topography as a predictor on the one hand and Police Tactics and SPE 1 as criterion variables on the other hand, a linear connection could be found in the observed population, the explanation level being 20.7%, or 7.3 % variability (multiple correlation coefficients of 0.455 and 0.270 of statistical significance). A statistically significant correlation on $p < 0.001$ level was found between Police Tactics and Police topography ($F = 12.523$) and between SPE 1 and Police Topography on the significance level of $p < 0.05$.²⁷

Conclusion

Bearing in mind that geo-space is constantly changing under the influence of both creative and destructive activities of the man and nature, a conclusion can be drawn that contemporary knowledge of tactical use of police units is virtually inapplicable without familiarity with police topography, because decisions and plans regarding the deployment of such units are most frequently made on the basis of geo-topographic materials. This means that deploying police units is invariably tied to a certain geographic area. A topographic map and other relevant geo-topographic materials enable a police manager to have an insight into the given area and chose the most appropriate way of engaging the unit. Persons unfamiliar with the main features of topographic maps and the mode of their use are likely to succeed as much as an athlete arriving at the finish line after the close of an athletic competition. It is therefore justifiable to include teaching disciplines which focus on geo-space as a key determinant of tactical and weapon-related actions and interventions of police in the curricula of higher police education, the foundations of which were laid by Archibald Reiss, who established the first

²⁵ Milojković, B., Dopsaj, M., Bačanac, L.J. (2004), Povezanost između uspešnosti rešavanja specifičnih zadataka iz policijske topografije i motoričkih sposobnosti studenata Policijske akademije, Nuaka-Bezbednost-Policija, Vol. VIII No.2, str. 48.

²⁶ Milojković, B., Dopsaj, M. (2006), Situacioni testovi iz orijentiringa u funkciji predikcije uspeha pripadnika policije u terenskoj obuci iz topografije, SPORT MONT, časopis za sport, fizičku kulturu i zdravlje, 10-11/IV, str. 252.

²⁷ Milojković, B., (2009), ORGANIZATION MODEL AND FUNCTIONAL AND SIGNIFICANCE OF ORIENTERING AS UNIVERSITY SPORT AT THE CRIMINALIST AND POLICE ACADEMY IN BELGRADE, In Procesiding „FISU Conference 25th Universiade Proceedings – The role of University sports in education and society: a platform for change“, p. 154.

privately-owned Police School in Belgrade on February 8th, 1929.

However, new security threats and challenges brought about by organized crime, terrorism and emergencies, have inevitably directed the development of Police Topography as a subject towards further innovations in the topics included, such as *Contemporary Geo-Topographic Materials for Police Purposes, Their Features And Application; A Model of Geo-Topographic Support for Police Units in Re-establishing Public Order Following Large-Scale Violations; The Use of GPS Technology in the Development of Specific Purpose GIS in the Function of Road Accident Prevention, etc.*

Besides innovations in teaching topics, the innovation of teaching methods, means and organizational forms is also required, that is, task-oriented instruction should be promoted, along with cybernetics-based instruction (designed and carried out by means of computers), object lessons (independent work of students) and tutorship and mentor-work in specialized classrooms, outdoor facilities and ranges of the RS MI (within the scope of regular instruction and practical instruction in realistic settings of everyday police work).

Finally, it is necessary to point out that monitoring effects of the applied didactic and methodological standards in teaching Police Topography is a lasting process involving constant review and further development and promotion. It is obvious that the above presented features of preparing, organizing and carrying out the instruction in Police Topography contribute to a significant extent to achieving the objectives of higher police education in Serbia and their promotion.

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USING INTEGRATED APPROACH IN TEACHING ENGLISH FOR LAW ENFORCEMENT

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Abstract: This paper elaborates on the advantages of using integrated approach in teaching English for law enforcement as opposed to the traditional teaching models. It starts with an introduction to ESP (English for Specific Purposes) and then focuses specifically on English for law enforcement, its distinctive features and purpose.

The author particularly emphasizes the importance of the integration of the four skills- reading, listening, writing and speaking, in the process of creating teaching materials for learners of English for law enforcement, and provides authentic examples of lessons and activities which have been successfully implemented in the English classes at the Faculty of Security in Skopje. The integrated approach fosters students' interest, interaction and creativity, and contributes to more effective learning of English, by centering around a specific law enforcement topic and adequate exercises integrating the four skills. It has already received a positive feedback by the students and has contributed significantly to improving their English language skills, thus making it a very useful model for acquiring knowledge of English in the field of law enforcement.

Key words: English for law enforcement, ESP, teaching materials, language skills, integrated approach

Introduction

One of the greatest challenges that English language teachers face is how to make their classes more effective and more appealing to their students. In order to achieve this goal, it is necessary that language teachers provide learning materials which attract and keep students' interest and lead to effective and productive classes. This is a particularly important issue for ESP teachers whose task differs considerably from the one of EFL or ESL teachers. Namely, their task is twofold: they have to be able to address the needs of students who acquire a second language other than their native tongue, and at the same time they have to teach them a particular variety of English which is specifically related to certain profession. We must agree that achieving this goal requires much effort and time by ESP teachers. Not only do they have the task to design appropriate teaching materials, but they also have to become familiar with the specialist knowledge relevant to the learners and update the teaching materials with the latest developments in the target area. This process of creating ESP teaching materials also includes adaptation of authentic texts with specialist content. In this paper we actually address all the issues mentioned above, with particular focus on developing teaching materials for English for law enforcement, as practiced at the Faculty of Security in Skopje.

The example presented here is actually taken from one of the lessons taught to the students of the Faculty of Security, which we present as a model of a successful integration of the reading, speaking, writing and listening skill, as well as grammar.

ESP: key notions and characteristics

The origins of ESP (English for Specific Purposes) teaching as a separate branch of ESL (English as a Foreign Language) teaching can be traced back to the period after the Second World War, which marked the worldwide spread of English and its promotion into the world lingua franca. ESP has been defined differently by different authors, but for the purpose of this paper we will use the definition provided by Dudley-Evans and St John, who make a distinction between absolute and variable characteristics.

The absolute characteristics include the following:

- ESP is defined to meet specific needs of the learner;
- ESP makes use of the underlying methodology and activities of the discipline it serves;
- ESP is centred on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities.

The variable characteristics, on the other hand, are:

- ESP may be related to or designed for specific disciplines;
- ESP may use, in specific teaching situations, a different methodology from that of general English;
- ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be for learners at secondary school level;
- ESP is generally designed for intermediate or advanced students. Most ESP courses assume some basic knowledge of the language system, but it can be used with beginners. (Dudley-Evans and St John, 1998: 4-5)

The above definition implies that ESP differs from EFL in that it focuses on the specific needs which vary among its learners, and all its methodology is directed towards raising learners' competence in English and centers on the language, skills, discourse and genres related to a specific area.

According to Hutchinson and Waters, the development of ESP was fostered by three major factors:

1. The rise of English as the international language of technology and commerce after the end of the Second World War and redefinition of the reasons for learning English;
2. Revolution in linguistics which shifted its aim from defining the formal features of language usage to discovering the ways in which language is actually used in real communication;
3. New developments in educational psychology which led to the emphasis on the central importance of the learners and their attitudes to learning.

The gradual development of English as the world lingua franca led to the creation of a new generation of learners who had a very precise idea of why they were learning English. This meant that different groups of learners had different language needs and expectations, so English turned into subject to the wishes,

needs and demands of the learners, not the teachers, and consequently the teaching materials had to be adjusted and adapted to meet the needs and requirements of the target learners. Traditional teaching methodology focused on grammar, that is, the description of the rules of using English, while the new trends of learning ESP imposed the need to develop courses that would meet the needs of different types of learners who used different types of English in different situations and contexts. For this reason all teaching materials were structured with the aim to meet the learner's needs, which depended on their interests or professions. Thus, they included texts from learners' specialist area and helped to raise their motivation for learning the language. (Ibid)

ESP course design and materials development

Taking into account the specific nature of ESP courses, we can draw a logical conclusion that designing a particular ESP course and developing materials for the purpose of ESP teaching is an issue of crucial importance. ESP teaching materials are particularly useful since they play a key role in exposing learners to the language of a particular discipline as it is actually used (Dudley-Evans and St John, 1998: 171). They mainly serve as the basis for much of the language input learners receive and the language practice that occurs in the classroom. They are supposed to support learning through stimulating cognitive processes and provide a structure for learners to follow, to motivate learners through providing achievable challenges and interesting content, and to provide a resource for self-study outside of the classroom (Richards, 2001: 251-252). Literature on EFL teaching abounds in various models and approaches for achieving this task, but when it comes to ESP teaching one realizes that not all of them are suitable for this type of courses. Creating materials for ESP courses implies a review of the following issues (Bocanegra-Valle, 2010:143-144):

- What is the target topic/what will be the carrier content?
- Is this topic relevant for my students/the discipline?
- What do I, as an ESP practitioner, know about the carrier content?
- What are my students supposed to know about the carrier content?
- To what extent do materials reflect the language/conventions of the discipline?
- What are the learning goals?
- What is the target language form/function/skill?
- What materials are available, suitable and accessible?
- What teaching equipment is required and available?
- How much time should be spent on the design, development and implementation of activities?
- Will materials be classroom-oriented or provide additional work?

When ESP teachers start working on the development of teaching materials, the first step to start with is needs analysis. This step is very important since the materials are supposed to match the needs and the expectations of the target learners. Different learners have different needs, and what they are taught should be restricted to what they need. These needs, which are fairly specific, can be identified and they should determine the content of every course (Richards, 2001:32-33). After the learners' needs are assessed, adequate methodology for organizing and presenting the contents can be applied. Most authors dealing with

this issue share the view that in order to provide successful ESP teaching materials, they should be designed in a way which allows the integration of the four skills in acquiring a foreign language- reading, listening, writing and speaking. If the designers of ESP courses and teaching materials fail to achieve this objective, they run the risk of creating materials that would consist merely of discreet, segregated skills (Oxford, 2001).¹ A clear example of this segregation is the traditional grammar/translation method because it does not consider the use of language for communicative purposes (Ibid). Due to its specific features previously mentioned, and in order to generate successful language acquisition, it is recommended that in the creation of ESP teaching materials a content-based approach is used. With the use of this approach students are presented with discipline-based materials, while the main focus of instruction is the acquisition of disciplinary information (Kasper, 1997, as quoted in Basturkmen, 2006:101). Here we can talk about a two-way process: language is used as a medium for acquiring knowledge about the specific content taught, while at the same time by learning about the specific topic students acquire and practically use different language skills. The outcome of this process is a motivating and inspiring learning environment with greater students' interaction, and the teacher acting as a mediator or facilitator in achieving this two-way relationship. This approach is very useful for its cognitive dimension, since the presentation of coherent and meaningful information leads to deeper cognitive processing by the learner, which leads to better learning. (Basturkmen, 2006:101). Teaching activities, which are content-focused, stimulate learners to think and learn using the target language, while language is viewed holistically and learners learn from working with whole chunks of language and multiple skills, thus rejecting 'synthetic' approaches to course design. (Ibid: 103)².

Creating course materials for English for law enforcement using integrated approach

All the issues elaborated in the previous sections served as the basis in the process of planning and designing materials for teaching English for the students of the Faculty of Security in Skopje. The task was even more challenging, if we consider the fact that we did not have any relevant textbook at the Faculty, so we literally had to start from scratch. As one can guess from the arguments mentioned above, the initial idea turned into a time-consuming and exhaustive process, which required much efforts and creativity. In order to design functional and adequate materials and satisfy the needs and the expectations of our students, we started with the assessment of their needs, which was the initial, but very important step which gave us a clear idea of the course that we were supposed to take in achieving our goals. The needs analysis results indicated that it was necessary to design relevant materials for teaching English for law enforcement and that they should be centered around specific topics, like: trafficking in human beings, domestic violence, economic crime, juvenile delinquency, crime scene investigation etc. with concrete cases presented in a way that would integrate the four skills and would motivate and encourage students to think and solve them. Most of the students responded that particular emphasis should be put on the communicative use of the language, including activities that would develop their speaking skills, like dialogues, interviews with victims, suspects etc.(Trajkova, 2010: 81-82). From our teaching experience we knew that the materials should be between intermediate and upper-intermediate level, since we had a heterogeneous group of students, but all of them had some previous knowledge of English.

¹ "Synthetic" approaches in creating teaching materials refers to the idea that language skills are separated and each skill is dealt with separately, without combining them into a single unit.

The next step in this process was to select the types of materials we would use. We decided to design materials that would be based on authentic sources, but would be modified and adapted to the students' level of knowledge of the language. This was the most complex step of all. It required extensive reading of materials about authentic events intended for a completely different target group. We had to transform them into teaching materials that would motivate students to learn the language and become interested in the topics they covered, at the same time stimulating their interaction and involvement in class activities. Although we had some reservations at the beginning, the outcome of the whole process was more than satisfactory. As we were using the newly-designed materials in class as part of the pilot testing, we could monitor students' reaction to what they were presented as teaching materials which helped us a lot in assessing, and where necessary, improving what we had already designed, so as to make the classes even more effective, and the acquisition of language more interesting for them.

In order to illustrate the use of the integrated approach in practice, for the purposes of this paper I chose the topic of trafficking in human beings, as an example of our work.

Speaking

This lesson, like all the other lessons that we designed, starts with a discussion on the specific topic it deals with. In this case, prior to speaking, students are shown sequences from different documentaries on the topic of trafficking in human beings, so that they can get a general idea about this phenomenon. Then they are asked to brainstorm ideas about what human trafficking is and what it includes. They are encouraged to infer the notion of human trafficking by commenting on the video sequences and the cases presented there. The aim of this introductory activity is to stimulate students to freely use the language to communicate their ideas orally. In order to help them in their discussion on the topic, they are asked a number of specific questions, like:

How would you define trafficking in human beings?

What is the difference between people smuggling and trafficking?

Who can become a victim of trafficking?

What are men / women usually trafficked for?

What are the main routes of human trafficking in the world? etc.

This way of introducing the topic is very useful and productive, because it can lead to a constructive discussion, and students feel free to express their thoughts and share their views with the rest of the class. It also encourages all students to participate in the discussion, both the stronger and the weaker ones.

Reading

After the discussion part, the lesson continues with a reading part. For this purpose, our reading exercise consists of a text which provides basic information on trafficking in human beings. Bearing in mind the fact that reading exercises are not always appealing to the students, we organized the text in a way that required not only reading, but also logical thinking. In order to make it more stimulating, the text is divided into several parts. Each paragraph deals with a different aspect of the problem of human trafficking and has a separate heading. Students have the task to read the paragraphs and match them to appropriate headings. To make

it more interesting, they are given two extra headings which do not correspond to any paragraph. Since the reading text is a bit longer, we will illustrate this activity with a short excerpt:

Headings:

Deception of young women

The dirty business of pimps

Trafficking versus smuggling

Organ trafficking

Paragraphs:

Paragraph X. (Key: Trafficking versus smuggling)

*Human trafficking differs from people-smuggling. In smuggling, people voluntarily request the smuggler's service for a fee, and there may be no **deception** involved in the (illegal) agreement. On arrival at the destination, the smuggled person is usually free to find their own way.*

Paragraph Y. (key: The dirty business of pimps)

*The victims of human trafficking can be used in a variety of situations, mostly for prostitution, but also for forced **labour** and other forms of involuntary **servitude**. Young girls and women coming from poor areas are most likely to become victims of human slavery. The traffickers **operate** through false employment agencies functioning abroad and offering jobs for babysitters, models, waitresses and nurses. Girls' passports are often **confiscated** and they are **deprived of** their basic rights, held against their will, beaten, sexually abused, or **subjected to** other degrading treatment, far away from their families and the support of law and justice. Sometimes they are even trafficked for a forced marriage or domestic servitude...*

As we can see from these two paragraphs, the text provides an abundance of words, especially verbs, which are related to the topic of human trafficking. This method of integrating them into a topic-based text is very useful for students, since they are actually put in a position to try to infer their meaning from context. As a continuation of this inference process, after the reading task they are given a number of sentences connected to the text which they have to complete using the words written in bold.

Example sentence: *The trafficked girls were to mental, physical and sexual abuse. (key: subjected)*

Writing

Since the reading text provides some information on the methods used by traffickers for recruiting potential victims of human trafficking, in the writing exercise students are asked to take the role of recruiters, to work in groups of four and try to design a job advertisement in the form of a poster. They are asked to make the poster as attractive as they can, by using persuasive language and illustrate it with appropriate pictures, so as to make it appealing to the potential victims. This type of activity is very useful for fostering students' creativity, and it is very important that students do it in groups, so that even the ones with poor language skills can actively participate with the help of the stronger students. After finishing with the writing task, they should present their posters to the rest of the class, and this may lead to a discussion on the language and the methods they used so as to make it more attractive and convincing. This discussion may end with building of a psychological profile both of the traffickers and the people who are most likely to become victims of this kind of deception.

Listening

In order to wholly integrate the four skills, the writing activity is followed by a listening comprehension exercise. Since at this point students are already familiar with the concept of trafficking in human beings, it is a good idea to continue the lesson with a conversation with a person who has been directly involved in the trafficking business. For this purpose, we suggest an interview between a police officer and a female victim of human trafficking, a Russian girl called Natasha. By doing this, the story is made more authentic, and students are exposed to English as spoken by a non-native speaker, so that it may be more challenging for them to understand the whole interview.

The following is an extract from the listening part:

Police officer: *Please stop crying Natasha. The nightmare is over. He's behind bars; don't worry. We called your family and they are going to wait for you in Tashkent. You'll be all right.*

Natasha: *Will I? You have no idea how many people are involved in this! You arrested one and you think it's over? It's never going to be over!*

Police Officer: *Then help us find those others and you will be free for the rest of your life! I promised to protect you and I always keep my promises.*

Natasha: *I agreed to help you and I did, didn't I? But I am so scared for my life and my family! Tony threatened to kill them all if I ever tried to escape or say a word about anything that was going on there...*

Grammar

As we want to use an approach that would be different from the traditional grammar-based teaching model, we think that it would be more productive to integrate grammar as part of teaching one of the four skills. In this case, we integrate reported speech with reporting verbs within the listening comprehension activity. This might make the listening comprehension more demanding for the students, but our aim is to present to them a particular grammar point used in concrete communicative context. Students are given several sentences related to the listening part, and while they are listening they are asked to complete them with the missing reporting verbs.

Here are some example sentences:

1. *The FBI agent to protect Natasha from the traffickers. (key: promised)*
2. *Natasha to help the police officer but she was still scared for her life. (key: agreed)*
3. *Tony to kill Natasha's family if she ever tried to escape. (key: threatened)*

After they finish with this exercise, their next task is to try to identify and match the direct words said by the protagonists of the story to the reported sentences from the previous activity. This serves as a very good practice for students, who do not acquire grammar skills by simply learning definitions and reproducing them mechanically, but by using grammar in particular real-life contexts. By using this method, learning grammar is made more interesting for students who become motivated to engage themselves in activities involving grammar but in a different, more creative type of exercises.

Here are the direct sentences corresponding to the reported ones from the previous activity:

- a. *Ok! I'll help you get them! But I am still so scared for my life! (key: 2, speaker: Natasha)*
- b. *If you ever try to escape, I'll kill your family! (key: 3, speaker: Tony)*
- c. *I'll protect you from those people, Natasha! (key:1, speaker: police officer)*

Homework assignment

As a homework assignment students may be asked to browse the Internet and try to find information on trafficking in human beings in their country, as well as possible newspaper articles on this type of crime. They may be divided to work in groups, or individually (if group work is not possible), and they may be asked to prepare a short presentation on the results of their research.

Conclusion

If we take into consideration all the issues presented in the paper, we can draw the conclusion that designing materials for teaching English for law enforcement as part of ESP teaching is a demanding and complex process, but also a challenging venture for ESP teachers. What makes it even more complex is the fact that in this particular case the lessons relate to topics which are not, or can rarely be found in textbooks for teaching English. The integrated approach which was elaborated in this paper, supported by adequate exercises taken from practice of teaching English for law enforcement at the Faculty of Security in Skopje, is a good example of a model which manages to integrate the four language skills and the grammar in content-based texts, thus contributing to more interesting and more effective learning of English. By choosing such model, classes become more interactive and language is acquired in a more relaxing way, to the delight of the teacher as well as the students.

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DEVELOPMENT OF THE POLICE EDUCATION IN THE REPUBLIC OF SRPSKA

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Abstract: Besides good police organization, contemporary policing requires well-adjusted human resources. Police organization should keep up the step with the changes and the environment, while the employees should follow the requirement and conditions of a working post. Therefore, the education and specialization of the police employees become most efficient factors of human resources development.

Police education in the Republic of Srpska is a public area completely trusted to the Republic of Srpska Ministry of Interior. It is as old as the very Ministry, and in the 19-year-long period it has gone through more organizational and institutional transformations. Through those transformations the police education has been improving in all these years and nowadays has a full system of basic, high, specialized and permanent police education.

Police Education Administration within the Ministry of Internal Affairs is fully competent for police education. All tasks and requirements from its scope are performed through its internal organizational units – Police College and Unit for Basic and Specialized Training – Police Academy.

The strategic commitment of the Republic of Srpska police education is continuous development of basic and high police education, as well as establishment and implementation of contemporary specialized training programs, organization of gatherings, round tables and conferences, promotion of the publishing activity, and expanding the cooperation with other educational institutions, and relevant associations within the country and abroad.

Key words: police, organization, education, training, improvement.

Introduction – history of police education in the Republic of Srpska

Professional advancement of police human resources has developed significantly through last twenty years, especially in the European countries. Besides that, it is pointed out in police literature and discussions and by the very police management that it requires a reformation since it takes a central role in providing answers and solutions to the requirement of increasingly complex

social environment¹.

Human resources are a foundation of each organizational system, especially important in a system of public governance and in the police as its sub-system. This should be taken into account especially when talking about the education and improvement of the police staff. The main aim of related discussions and activities is a necessity that a contemporary system of education, specialization and development of human resources is established within the Republic of Srpska Ministry of Interior, a system that will provide the implementation of the basic requirements of this highly important public governance sub-system. The contemporary social environment and conditions are very indicative and require a solution to this issue. Any kind of human resources - related change will affect the system twenty years or more in the future. Due to that and the complexity and the sensitivity of human resources issue, human resources function is not an operational, but strategic function of the Ministry, which asks for employment of the whole potential and making decisions about its development. Great contribution should be given by researchers and professionals at first place.

Complexity of the education, specialization and development of the human resources for the RS MoI and other police and security agencies in BiH is conditioned, among other things, by the²:

- Situation, needs and possibilities of the Republic of Srpska, RS MoI and BiH;
- Transformation of both society and MoI;
- War heritage in the society;
- Contemporary security challenges in the world and in the country;
- Current reform of security structures in BiH;
- Positive 16-year-long experience of the Police College Banja Luka;
- Experience in educating police members in the world and region;
- Reform of high/college education – Bologna process.

Police education in the Republic of Srpska is a public area completely trusted to the Republic of Srpska Ministry of Interior. Namely, according to the Law on Internal Affairs³, the Ministry of Internal Affairs of the Republic of Srpska takes care of education, specialization and professional advancement of the people in order to satisfy its needs (Article 79, Paragraph 1), where high education is carried out in the Police College (Article 79, Paragraph 2) and specialization and professional advancement in the Police Academy (Article 79, Paragraph 3). The Administration that has authorization and competences to perform education within the Ministry (Administration for Police Education) is recorded into the register of educational institutions, which is managed by the Ministry of Education and Culture of the Republic of Srpska (Article 89). In addition, Law on police officers⁴ prescribes and defines that the duty of each police officer is to have constant specialization and professional advancement through courses and seminars at which the content and mode of police officers enhancement is laid down in the book of rules prescribed by the minister at the police director's proposal (Article 53). Therefore, one of the strategic goals of the RR MoI is development and improvement of education and training of the human resources that are needed in the Ministry, which implies a series of activities related to the basic, high and specialized education, as well as permanent training

¹ Improvement of the system for professional shaping of human resources is one of the crucial requirements for true professionalization of the police. Education and training of human resources in the police are the main methods of theoretical and practical preparations of the individuals for police service (Milosavljevic, 1997:548)

² Research project "Utvrdjivanje modela obrazovanja i profila diplomiranih studenata Visoke škole umutrasnjih poslova Republike Srpske – Banja Luka" (project manager Milan Danicic, PhD), Police College, Banja Luka, 2007.

³ Law on Internal Affairs, the Republic of Srpska Official Gazzete, no. 48/03.

⁴ Law on police officers, the Republic of Srpska Official Gazzete, no. 43/10.

of the employees by organizing seminars, courses, round tables, gatherings and counseling.

It is important to note that police education in the Republic of Srpska is as old as the very Ministry, and in the 19-year-long period it has gone through more organizational and institutional transformations. Through those transformations the police education has been improving in all these years and nowadays has a full system of basic, high, specialized and permanent police education. Pursuant to the Republic of Srpska Government Resolution, High School of Internal Affairs (a basic organizational unit of the Ministry) was established on 9th September 1992 with its basic tasks aimed at four-year-long process of education and training people to become police officers, as well as at organizing courses for civilians in order for them to be able to perform general policing activities⁵. Afterwards, according to the Law on Internal Affairs, Internal Affairs Personnel Education Center was set up during 1994, and its task was to educate and train, both through regular educational process and through six-month-long courses for police officers, individuals to work in the Ministry. Following that, pursuant to the Republic of Srpska Government Resolution, Higher School of Internal Affairs was established on 1st July 1995 and was set in operation on 21st November of the same year⁶. Educational process in the Higher school lasted for 5 semesters and graduates received professional qualification “jurist of internal affairs” upon their graduation. Through the realization of the Framework Agreement on RS Police reconstruction and of Madrid Declaration, and pursuant to the RS Government Resolution, Ministry of Interior established Police Academy on 2nd July 1999, which started with work on 19th July 1999. In order to accomplish further professional development and improvement of professional capabilities of Internal Affairs workers, pursuant to the RS Government Resolution, Higher School of Internal Affairs was transformed into Police College on 23rd July 2002 and was put into operation on 1st October 2002. Upon graduation, attendees receive the professional title “graduated jurist of internal affairs”. Finally, on 1st October 2002, according to the Rulebook on Internal Organization and Systematization in the RS MoI, the School Center was transformed into Police Education Administration.

As it can be noted, police education makes a part of the RS Ministry of the Interior activities. This type of organization, taking into account its advantages and disadvantages, is considered to be satisfying, since it meets our requirements and needs and provides further development and affirmation of the police education in the Republic of Srpska and Bosnia and Herzegovina.

Competences and organization of the police education in the Republic of Srpska

Police Education Administration within the Ministry of Internal Affairs is fully competent for police education. Police Education Administration is a basic organizational unit of the Republic of Srpska Ministry of Interior. Its role is, at first place, educational since it enables education and training of the individuals preparing them to work in the internal affair bodies, as well as in some other relative institutions. It educates, professionally qualifies and trains personnel for

⁵ 1.138 cadets completed High school of Internal Affairs with success, afterwards being deployed in the Republic of Srpska Ministry of Interior or other BiH police agencies (Danicic, 2002:23)

⁶ Namely, in Bosnia and Herzegovina in the former Yugoslavia, there were no higher or college police education. Police personnel was usually educated and trained in Belgrade, Zagreb, and Skopje. Upon the breakup of the FRY it was found necessary to have more higher and college – educated police personnel, therefore, the decision was made to establish Higher school of internal affairs (Matijevic, 2002:34)

their work in the Ministry, prepares curriculum, draws up proposals and curricula for acquiring sixth and seventh education level, provides boarding school accommodation and food, as well as free activities of students and individuals enrolled in a course or in some other form of professional training/qualification for the work in internal affairs bodies, keeps records and files on its educational activities, issues public documents on the level of professional qualification (profession) upon the ending of education and professional training, cooperates with other high-educational and scholarly institutions regarding the exchange and engagement of teachers and lecturers, the usage of university library, is engaged in research work and publishing, performs all other tasks concerning education, professional training and qualification of the MoI personnel.

All activities and tasks within the scope of the Police Education Administration are carried out by its four organizational units: Police College, Unit for Basic and Specialized Training – Police Academy, Common and General Affairs Department, and Department for logistics and boarding school services.

Police College is an internal organizational unit of the Police Education Administration. Fundamental activity of this school is education of higher-educated staff both for needs of the Republic of Srpska Ministry of Interior and for other police and security agencies in the Republic of Srpska and Bosnia and Herzegovina. It is the only institution for higher learning in BiH which deals with police education exclusively. It should be mentioned that students graduated from this College can get employment in any of police agencies without further education, since the College is certified by United Nations Mission and meets all conditions for education of staff for their work in police bodies. There are four departments in the College: General Education Department, Legal Sciences Department, Security and Police Department, and Crime Department. Students are enrolled in two ways in the Police College: as full-time students (upon graduating from high school) and as extramural students (individuals already employed in the Ministry or some other state agency). There are 32 PhDs and 19 assistant lecturers in the school. According to the new curriculum harmonized with Bologna process Police College studies last six and eight semesters. This is the sixth year that Police College has been carrying out its educational process within the provisions of Bologna process. It has a cooperation established with higher-education institutions from surrounding countries such as Crime-Police Academy from Belgrade and Lviv State University of Internal Affairs from Ukraine. It has been also an associated member of Banja Luka University since 2008. So far, 367 students acquired higher education and the title "jurist of internal affairs", while 570 of them gained college education and the title "graduated jurist of internal affairs". There are 581 students currently going through anticipated educational process.

Unit for Basic and Specialized Training – Police Academy was founded in 1999, as an internal organizational unit of Police Education Administration with its headquarters in Banja Luke. It conducts professional training of staff through basic and specialist training process. It educates and trains both individuals for carrying out police officer activities and individuals for conducting activities of securing facilities and persons.

The basic training is conducted through two levels. The first level of the basic training lasts for 12 months and is consisted of three phases. *The first phase* implies theoretical classes combined with practical and situational exercises and is carried out for seven months (1005 classes) in the Police Education Administration. *The second phase* consists of practical training conducted in the Public Security Centers of The Republic of Srpska for four months. *The third phase* includes the

systematization of the learned and adopted contents and situational classes. This phase is conducted in the Police Academy through 120 classes. Having completed the third phase, candidates take the final exam. The second level of basic training lasts 18 weeks and implies further education of candidates (higher and faculty degree) for carrying out the activities of authorized police official.

Specialized training is conducted in the Police Academy and is aimed at members of the Republic of Srpska Ministry of Interior who want or need specialized training for performing certain activities. Having completed the course the candidates gain the certificate which enables them to work on certain working posts within the Ministry of Interior.

The Police Education Administration is fully organized and adjusted to the activities from its scope and supplied with facilities of different purpose such as 6 cabinets, 17 classrooms, an amphitheater, a shooting range, school police station and a situational apartment. We especially point out the Criminalistics cabinet with 50-60 places and all necessary supplies and technical aids, two IT cabinets, and an amphitheater with 400 places. As an administrative part, we have 32 offices, three meeting rooms and a library. The Administration has at its disposal 120 bedroom used for students, candidates and employees accommodation.

Perspectives of the police education development

Our strategic goal is enhancing existing capacities of the Administration, as well as improvement of Police College and Police Academy activities. Having that in mind, besides constant process of enhancement of basic and higher police education, we want to develop modern programs of specialized training, as well as programs for specialists studies. We want to include new courses in our educational process such as combating contemporary forms of crime (terrorism and some forms of organized crime), community policing, crime profiling, geographical modeling, strategic management, intelligence – led policing, forensic research, etc. Besides its regular activities, Police College will continue conducting research projects for the Ministry, but if necessary, also will involve into a project of wider social significance. Publishing, organization of different gatherings, round tables and conferences are activities that we are recognized by. We are, at permanent basis, ready to establish and develop different forms of cooperation with respective institutions, but with others too, all with the aim of reaching higher quality of educational and research activities.

Regarding the above mentioned, we find it necessary to establish and strengthen cooperation with other educational institutions, relevant associations within the country and abroad in order to exchange experience and harmonize the standards of education and training. Some improvement should be made in the area of publishing, research project making and in providing better working conditions by means of setting material foundations such as construction of necessary facilities, furnishing teaching cabinets and acquiring modern equipment that will be used in police education and training. The teaching process should be revised and raised on a higher level by introducing new teaching methods and training standards and through implementation of the new modular teaching system. Curricula of specialized training should be kept enhanced on a continuous basis in order to keep up the step with the Ministry requirements, as well as with new forms of criminality.

In order to make work even more efficient, it is necessary that all members

of the Republic of Srpska MoI have the appropriate level of professional and IT training. That is why it is necessary to have constant professional education and training, as well as continuous testing of the acquired knowledge and skills. In the first part of the Strategy implementation it is anticipated that all members of the Ministry go through the basic IT training. Testing of the acquired knowledge, professionalism and continuity in the improvement should be introduced as a standard procedure that will have crucial influence at the status of each member of the Ministry of Internal Affairs. In order to have a permanent education and training of the police officers of more quality it is necessary to task the Police Education Administration to carry out the mentioned education and training, as well as to participate actively in the process of testing of the knowledge and qualification of the RS MoI police officers.

One point of the police education development can also be seen in the replacement of the traditional human resource function with the new concept of human resources management, which includes: socialization, education and training, evaluation of the work performance, planning and development of the career. The topic of this study is tightly related to the police education, so the continuation of the work will partially show the phases of the education and training process based on the concept of the human resources management.

Modern economic conditions require not only adjustment of the organization but also of the employees. Organization should be adjusted to the rapid environmental changes, and the employees to requirements imposed by the working post and conditions. Education and specialization of the employees are becoming key and most efficient factors of the development of the police human resources (Noe, R., A. i dr. 2006:331).

The first phase of the education and training in the police organization implies identification of the educational needs and requirements. Here you identify what knowledge and skill are about to be acquired by the police employees, as well as what are the people to be educated and trained for. This analysis should include analysis of the organization, work and the individual.

Organizational analysis implies identification of the educational requirements from the perspective of the organization, its objectives and interests, its business strategy, organizational units, culture, changes, resources and educational possibilities. This analysis should include human resources analysis.

Work analysis is a significant source of information necessary for performance of all tasks and activities from the area of human resources management, and therefore needed for identification of educational needs, content and program. Work analysis defines necessary knowledge, skills, capabilities and other features of successful work performance.

Analysis of the individual is the most important part of the process of identification of educational requirements. It shows the level of necessary education, as well as what knowledge and skills are to be improved and raised at the higher level. The best indicator of the need for education at the individual level is unsuccessful work performance and incompliance with the set requirements. Successfulness of the work performance depends on the many reasons of which only some, such as lack of necessary knowledge and skill, can be eliminated by the education.

The second phase of the police education and training implies setting education and training objectives. There are two types of objectives – general and

specific ones.

General objectives are usually met through the education of the employees. The most important ones of this category are: improvement of the success in work, permanent harmonization, adjustment and improvement of the knowledge, skills and capabilities of the employees, preparations for the promotion and development of the career, avoiding managerial obsolescence, solving organizational issues and directing new workers.

The most significant specific objectives of the employees' education are: improvement of the relation with the citizens, acquiring conflict management skills, raising services quality, reducing labor costs, problem solving, security at work, more efficient time management and the concept of the team work.

Third phase of police education and training consists of the identification of the content of the educational programs. Police organization requires several types and levels of educational requirements which shape specific content of certain education programs.

Upon analysis and systematization of the general criteria, it can be said that there are four types of the requirement that can be met in the contemporary organizations: 1) basic knowledge and skills, 2) technical, i.e. professional skills, 3) interpersonal skills, and 4) strategic skills.

Almost every member of the police organization needs basic knowledge and skills, especially since contemporary tasks require higher level of knowledge and skill, which police employees often lack. Technical, i.e. professional skills require necessary knowledge, techniques, methods and procedures in order for someone to perform specific police tasks (e.g. crime scene investigation, certain expertise, polygraph examination). Interpersonal skills are necessary to establish proper communication and to nurture interpersonal relations, and are especially important for manager activities. Strategic skills imply planning and shaping of police organization and its structure, making current and future policy and adjustment to the current needs of the organization.

The way the education programs are to be created and chosen largely depends on the fact how they will be realized. There are two basic types of programs:

1. Programs of education at work
2. Programs of education outside the work.

Most organizations choose to take up combined mode of education.

Fourth phase of the process of police education and training implies identification of the methods and techniques that will be applied in the process. These methods and techniques can be both used for education at work and education outside the work (Bahtijarević-Siber, F. 1999:748).

The most known methods and forms of education at work are: 1) individual instructions, 2) work rotation, 3) professional practice, 4) internship, 5) mentoring, 6) student practice.

The most often used methods and forms of education outside the work are: 1) lectures, 2) audio-visual techniques, 3) programmed learning, 4) e-learning, 5) interactive video, 6) conferences and discussions, 7) simulated work conditions, 8) case studies, and 9) other methods.

Controle and evaluation should be carried out all the way through the process of education and training so that corrective measures can be undertaken immediately. In the end, the whole process should be evaluated, and therefore we can say that the evaluation of the successfulness makes the last phase of the police education and training. Evaluation is most often done by the competent experts and managers (Amidzic, G. 2009:91-94).

Taking into consideration the above mentioned, police education in the Republic of Srpska is open for cooperation in its all fields, aiming at higher quality of basic, specialists and academic police education which would eventually mean meeting the needs of law enforcement agencies. The cooperation can include exchange of experience in the following fields: method of realization of educational/teaching process, realization of practical and situational classes within the basic police training, specialist training and police college, exchange of experience in the field of mentor – related activities, organization and realization of situational classes, exchange of certain normative acts related to basic training, exchange of curricula of specialists training, exchange of curricula of academic level, exchange of teaching aids, research work, exchange of teachers and associates, guest lectures, etc.

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THE IMPORTANCE OF STAFF TRAINING FOR COMPETENT MAKING TO ORGANIZED CRIME

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Abstract: In contemporary conditions of life organized crime is a phenomenon that involves all segments of society. Members of organized criminal groups do not choose methods and means to achieve their aims, seeking to integrate into existing systems of institutions. Modality of their action are different forms of influence, would not you manage to win the individual from the state bodies and institutions, by involving their members into highest bodies of power, corruption of important officials.

To confront this form of activity of organized criminal groups do not just accept and ratify international laws and changes in national regulations relating to the crimes of organized crime, it is very important education staff working to implement the methods and mechanisms solving this type of crime. Security institutions, responsible for combating/submit Organized Crime in terms of personnel are a complex structure, which in turn requires certain specificity in terms of personnel education. It is necessary to organize special training in specific areas, namely: prevention and observation activities, control activities, activities in information gathering, forensic analysis of this information, and activity in gathering evidence for the preparation and execution of these crimes, research and scientific activities, management and so on.

Key words: education, training, crime, organized crime.

Organized crime today

“A human being is the product of two factors: genetics and education. If genetics is something that can not be changed, then education is the most important variable sizes for human success. There is something that we could not do with quality education, training” **Mark Twain**

One of the characteristics of the modern world is the rapid development of science, engineering, technology, electronics, information. Such a development of science not only contributes to the development of the society, but also leads to the fact that the perpetrators of modern forms of organized crime, in carrying out criminal acts, others remain undiscovered Proxy and for the application of modern scientific and technical knowledge, modern technology of communication being the lowest hit on the world level. Stack point when it comes to exposing the crimes of this kind must be with the latest methods and means applied by organized crime groups (MAS)¹, and make continuing education staff who works at this problematic.

¹ UN Convention against Transnational Organized Crime, Article 2 Use of terms For the purposes of this Convention: “Organized criminal group” shall mean a structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes of offences established in

Start a new millennium is characterized by the use of science and technology in investigating crimes of organized crime. Institutions that are responsible to investigate these crimes generally go after the character of the offender, they are looking for scientific achievements to help them and facilitate the discovery and prevention of this type of crime. Education program must be related to new ways of execution and concealment of criminal acts by organized crime groups. Modern societies in the world today are under the threat of modern forms of organized crime, which knows no borders, no territorial or administrative. Organized crime is the biggest opponent of the modern world, which prevents and hinders its development. Unlike traditional crime, organized crime has a greater scope and intensity of activity in many social spheres, and also differs in that the effects caused by its action is far more serious and have a major negative impact on civilization profit. The world is almost no country that is not affected or is immune to this type of crime.

Adequate response to organized crime is possible only with the creation of adequate criminal policy, created by criminal law, criminal justice and criminological-sociologically scientists who deal with this issue. Rights of criminal policy are not allowed to create ad hoc solutions, opinions and individual works. It must be based on solid empirical and comparative research, are well organized, more professional and scientific debate, adequate training² of personnel responsible for preparing to organized crime.

The specificity of organized crime on the territory of the Republic of Macedonia

The transition of post-communist countries, including in that group the Republic of Macedonia as a process of transition from the adapted version in a different social system established a vacuum with a disturbed and unregulated new values. Such undefined terms, were generated and established organized crime. We can speak of three levels of group interdependence phenomenon of organized crime: ³(Anthropological, psychological fundamentals of human nature, socio-cultural sphere and causes that stem from the political-legal and economic spheres).

In fact, the causes of it are found in the introduction of rapid, objective and strong economical and political changes, with which the risk of the development of organized crime is very high.⁴ As a result of these changes weaken the effectiveness of criminal prosecution, it multiplies the (un) detected cases of severe organized crime. The transition from command to market economy system and cause defunctive objective entities in the market pushes toward "getting around at any price." In the struggle for survival in unregulated conditions, it becomes the leading idea to use all possible, legal and extrajudicial means of survival and profit. This, in turn, creates conditions for the emergence of organized Structure. This opens the way to the underground economy. When we talk about the specifics of organized crime, we must not point out the dangers of corruption, which are inseparable part of organized crime. In part characteristic of corruption is political

accordance with this Convention, in order to obtain, directly or indirectly, a financial or other material benefit

² The word education comes from the Latin word meaning educate lead

³ M. Labović, M. Nikolovski "Organized crime and corruption", Faculty of Security, Skopje, 2010, pp. 39

⁴ The causes of organized crime in the Balkans to countries see more B. Dobovshek//Transnational Organized crime – In the western Balkans – The HUMSEC project is supported by the European Commission under the Sixth Framework Programme "Integrating and Strengthening the European Research Area" /http://www.etcegraz.at/cms/fileadmin/user-upload/humsec/Workin_Paper

corruption in public administration and judicial system. Among other causes that are characteristic of the other countries in transition are evident in the following:⁵

- Unestablished ethical elite;
- Inconsistent principle of separation of powers in not united system of government, is a lack of legal mechanisms and procedures for mutual control and balance among the competent law enforcement institutions;
- Lack of optimal independent institution responsible for detecting, detection, prosecution on the criminal acts in the field of corruption and organized crime, especially holders of the highest state and political functions in the state;
- Lack of a comprehensive, coherent and complementary legal system against organized crime and corruption and so on.;
- Non-transparent and inconsistent systems in the process of privatization, public supply, financial management and control over state budgets and public funds, financing of political parties;
- The low standard of civil servants and officials responsible unprotected on detection and evidencing high corruption and organized crime.

I education program must include all the above characteristics, conditions, and ways that are specific to the area. We can not speak of the universal model of education in all countries, they must adapt to specific forms of organized crime which exist in these spaces. In the previous section sets out the specific conditions for the emergence of organized crime that are specific to the Republic of Macedonia. In order to successfully fight against this type of crime with the specific Proxy others have elaborate and specific factors and their implement in programs for education experts, for each of them individually and on various stages.

The necessity of continuous education

For that we can stand up to the new contemporary forms of organized crime, with all its challenges and dangers, one of the basic and necessary requirements are adequate and continuous education. Learning (education) must be lifelong. "Lifelong learning means learning directed toward the self and in its development. It is a way to understand ourselves and the world" (Gross, 1977). Professional-education process must not be basic set of information that does not change and simply transmitted from generation to generation. The emergence of new methods and means in carrying out and covering up of new forms of organized crime on a daily basis is a manifestation of new forms. Accelerated changes require flexibility, the ability to collect and display the new information and the ability to lock the old arguments and information. From here, organizations and institutions that have developed systems for continuous training are doomed to failure in advance. The only way that the professionals in these fields face new challenges in the modern world is a good education and good training. The only organization that invest in education and in training their staff, invest in yourself, in your success as well as in preparing the that type of crime. When members of the specialized institutions in addition to basic, professional training, ongoing training is needed to monitor the latest trends in this issue and timely continuously transmit knowledge, expert staff, depending on their specific functions in the entire system.

⁵ M. Labović, M. Nikolovski "Organized crime and corruption", Faculty of Security, Skopje, 2010

Manifestation of organized crime and the organization of organized crime groups are different from country to country. What is specific in some western countries, where organized crime occurs in the form of smuggling alcohol and cigarettes, the other hit in the third economic-financial crime and the like. All this leads to differences in access to the state in defining the model of combating organized crime, narrow specialization and training staff for clarification of this form of organized crime, which is typical for the area. All countries in the construction of policies to combat organized crime, taking into account all these characteristics and thus seek to build a model of education personnel who will be the best answer in the fight against organized crime in the area. Given the fact that organized crime is gaining more importance in the last period, the institutions responsible for preparation of organized crime are legally established and located between staffing, construction and especially the training of personnel. There would first of all emphasize the importance of continuing education due to the fact that we continuously changes primarily in the legal system and what changes are related to the crimes of organized crime. I said some institutions responsible for implementing the strategy for the preparation of organized crime where necessary and continuing education, and these are, after all, the Court, the Public Prosecution, Police, Customs and Financial Police. On the other hand, there are bodies / institutions that directly⁶ or indirectly have an impact on the fight against organized crime (non-law enforcement), but the nature of the task, made great contributions in the fight against organized crime. We can not speak for more the institutional approach in preparing to organized crime, from this aspect is necessary training will be tailored to the legal responsibilities to them.

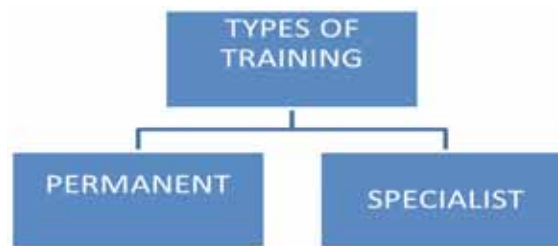
One of the modalities of education personnel

In the process of training of experts responsible for making the organized crime, it is necessary to provide them with a positive environment and atmosphere for work, in order to gain knowledge, skills and attitudes necessary to perform essential tasks in their workplace.

The profile of staff should not only possess the quantum of knowledge, but also:

- Qualities and ability to act in a proper manner on various new situations, when existing new methods of execution and cover-ups of this type of crime,
- Excellent communication skills
- To have the ability to work with others, to analyze, to be methodical and to search for solutions to outstanding problems.
- Training of personnel responsible for making the organized crime must be conceived into two main segments:
 - Permanent and
 - Specialized training

⁶ Under the authority that directly participate in the struggle with organized crime other than the security of law enforcement agencies, including other organs such. Administration of anti-money laundering and terrorist financing



- Permanent education includes accompaniment of all newspapers: the criminal law area, process, criminology, etc.. and present the paper continuously specialized staff. In this way, all individuals as part of the fight against organized crime will be always up to date with the latest developments in this issue, so they can be properly set up and perform its obligations in its purview.

- Specialized training is closely related to any specifics of certain forms of organized crime (illegal trade in weapons, drugs, violent crime, human trafficking, migrant trafficking, etc.). And more knowledge transfer and professional staff who specialize in clearing up this type of organized crime.

It is necessary to periodically check and knowledge in specific areas, conduct surveys on topics that are not treated as the same could be found in the following planning education. Accept the concept that individuals who are themselves faced with a variety of practical problems in the course of initiating a proposal topics for professional development and its clarification. This concept in which individuals take the initiative, with or without help others determine their needs for further development, formulate learning goals, identifying human and material resources for learning and assessing learning outcomes. Such a method of learning in the center holds an individual who has direct contact with these issues, their needs and preferences.

After completion of each part of education anonymously surveying will be made in order to determine a particular weakness. The questionnaire asked more questions and answers is gradation. It is recommended that part of the question concerning the choice of topics very organization, the quality of the performance of education, active participation of all stakeholders and the like. This system of preparation and organization of education provides a realistic assessment first, to detect certain defects that would certainly be overcome in organizing this type of education in the future.

Instead of conclusion

Nowadays organized crime poses a serious criminal phenomenon that affects all segments of society. In a very short period of time given the importance of infiltrating the legal system in any way prevent its eradication. Previous implementation international legislation indicates that the formal institutional system is set up, but there is no active model of implementation. Should identify existing gaps, (re) designing institutions to establish more efficient and effective control mechanisms for the implementation and coordinated cooperation between all those institutions responsible for combating organized crime, as well as specialized training of personnel of those institutions.

To educate these personnel have a higher score must be met prior several conditions:

- The aggravation of criteria in the selection of personnel working on this issue, which will be training the part of organized crime;
- Cooperation between the institutions that refer candidates to the education and scientific and educational institutions dealing with these issues;
- Tighten the criteria for selection of candidates who will conduct training;
- Enforce the concept of continuous and specialist training and the like;
- Train the representatives of certain operating units that would extend the transfer of knowledge in their bodies and institutions;
- Introduction of modern scientific and technical achievements in the preparation of staff for clarification of criminal acts and so on.

We can conclude that the success in preparing to organized crime are needed: comprehensiveness, preventions a foundation, education and efficient repression.

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4. M. Lajmon, G. Potter "Organized Crime" - the fourth edition, Magor 2009
5. M. Labovikj, M. Nikolovski - "Organized crime and corruption", Faculty of Security-Skopje, 2010,
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SIGNIFICANCE OF THE SCIENTIFIC AND EMPIRICAL RESEARCH IN THE POLICE SCIENCE DEVELOPMENT

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The paper aims to outline the significance of the scientific and empirical research on the development of police science. In particular, the research is related to the: study of police-citizens relations and levels of interaction; assessment of community policing and policing in multiethnic communities; use of police powers and upholding human rights and freedoms; conflict of interests in the police and police corruption; police public relations and management of public information's available to the police; citizens' participation in policing; development and implementation of preventive programs; quality of human resources management; assessment of system for rewards and accountability of police officers; reforms aimed at euro-standardizing of police performance.

A brief historical review of the development of scientific and research practice in countries with a long research tradition in the field of police science (USA, England) is presented in the paper for the purpose of providing the answer to the question whether and to what extent the scientific and empirical research in the field of police science in the Republic of Macedonia are considered as the basis for qualitative improvement of police work, public relations and development of the police organization (professionalism, efficiency, de-politicization and service oriented).

The next section of this paper presents the research findings of a complex longitudinal survey on the attitudes of Macedonian citizens toward police performance. The survey was carried out by the research team from the Faculty of Security – Skopje in the period 2008-2011. Furthermore, this paper has another scientific and social goal: to encourage higher education and professional educational institutions in the region engaged in the education of students for Ministries of the Interior, through joint and coordinated research activities in the field of police science, to contribute towards the exchange of theoretical and empirical knowledge about policing in the region, and thus, to contribute to the development and promotion of police science as the foundation for the reform of police organizations and their integration in collective security systems.

Key words: scientific and empirical research, police, police science.

Defining the subject of police science as a separate scientific discipline in the system of science is still emerging as a complex issue in the countries with less developed scientific tradition of police research as well as in developed countries with the studies of police. The beginnings of defining the subject of police science present an attempt to sociological, political, psychological, organizational and theoretical determination of certain aspects of policing. Modern scientific determination of the subject of police science takes the police organization as a whole. Thus understood, the police science as their object of study has police

system¹ in its two basic types: as a separate dynamic entity that is different from their surroundings and everything that is in interaction with their environment. On the one hand, there is this aspect of the police system as a separate entity (organizational, structural, functional, human, ethical, cultural and other internal aspects), and on the other hand, aspects that are expressed through the interaction of police with their environment (the role of police in society and their relations with immediate and wider environment).¹ These aspects of the police system allow the defining of the broad subject of police science, and it is a separate part of the social phenomena that are directly related to police and their activities.²

The subject of police science is not only the social phenomena that are related to police and its actions in a certain time and in a particular country, but to general (universal) study of these phenomena, to distinguish what is common for the police in general and to establish scientific arguments that claim general validity. This comparative approach in studying the police does not mean that the processing of this science for the police should specifically highlight the differences between certain countries and at the same time highlight specific features. Rather, such an approach is theoretically and scientifically justified and useful for better understanding of the matter and its greater practical importance. Besides the general interdisciplinary science of police, there is sufficient space for the development of other specific sciences that police will deal with, such as the study of the relationship of certain social phenomena with the police and their actions, or specialized and a detailed study of certain aspects of the police and policing.³

Police science by its nature and character can be defined as an empirical social science discipline, and according to its goals and methods it can be placed among the group of empirical sciences, dealing with the study of objective rules based on collected data about the phenomena which constitute its subject. The empirical nature of police science means that the police are closer to the science of management and sociology, because it deals with facts and gives explanations for the established relations. Therefore, its statements cannot be metaphysical, but based on facts, which can be checked and refuted in practice. The practical significance of the police science is big, if its task is taken as a constructive criticism of the police system offering methods that enable more efficient realization of the role of the police in accordance with social interests.⁴ Therefore, police science is also an applied science.

Scientific interest in policing issues grew rapidly after the Second World War, particularly from the mid-60s of the 20th century.⁵ Significant research activities in the study of the police are made in Western countries (England, Holland, France, Germany, Italy and Spain), the Scandinavian and other developed countries. The highlight is the rise of scientific and empirical research of certain aspects of the

¹ Franco Bruno, *Policijske znanosti (Le Scienze della Polizia)*, Selection, no. 1-2, 1990, p. 37; The author stresses that the idea that police can be a scientific subject, derived demand police be defined as a system;

² More in: Milosavljević, Bogoljub, *Nauka o Policiji, Policijska Academy*, Belgrade, 1997, pp. 17-37;

³ There are numerous attempts to determine the course of science for the police. Thus, A., *Macro (or Znanost znanosti o policiji)*, Selection, no. 6, 1990, str.437, in B., Milosavljević, op. cit., concluded that the science of the police is a special science the subject of which is the police, their organization and management, as well as close and wider environment; Heidelberg in the police lexicon in 1986, concluded that police science is questionable and that it is a special scientific field in which police work is treated with certain scientific areas, particular legal and administrative sciences, social sciences and psychology;

⁴ The trend of the development of specific science disciplines regarding the police has been present for a while. The introduction of the various scientific disciplines that study specific aspects of the police and policing varies from country to country. Thus in Germany, despite the Science of police, there is Science in police management, Police science interventions, Theories for the police and so on. Other disciplines: Police psychology, Police law, Sociology of the Police, Police Ethics, Comparative police systems and, so on.

⁵ Bittner, E., *The Function of the Police in Modern Society*, Cambridge, Mass: Oelgeschlager, Gun and Hain, Publishers, Inc., 1980, str. 121;

police in the United States. In the United States as a country with the longest tradition in scientific and empirical practice⁶ of the police, *The Encyclopedia of Police Science* was first published in 1989, and it had its third edition⁸ in 2007.

Before we elaborate some specific scientific and empirical researches in the field of the police and police activities, we will briefly elaborate two related issues: firstly, the factors that influenced the long neglect of the police as a research subject, and secondly, the rise of scientific interest for the police. Several authors⁹ agree that this is due to several reasons. Scientists dealing with the study of the police are exposed to the risk of being labeled, as supporters of the police who have the strength of the order or critics and opponents of their activities. The research on the police means that scientists are regularly faced with a number of problems. It is mostly the lack and unavailability of documented materials, the lack of clutter bibliography, analytical works and similar aids; police organizations with bureaucratic manners oppose scientific research (not allowing to provide data), partly because of the traditional closeness, and partly due to avoiding the possible criticism. The general conclusion is that "the police are more willing to provide data for others than for¹⁰themselves." Police leaders tend to encourage secrecy that has always existed in their services, which due to the functional needs can partly be justified, but not as a way to create a shield which generally provides an alibi for the entire profession. Another problem facing scientists in the research on the police and police activities is a barrier between researchers (theorists) and the police (practitioners). It is most often seen in the mutual mistrust, mutual understanding distress, and denial of competencies. Researchers collide with a specific system of values, attitudes, beliefs, prejudices and similar subjective moments that rule inside the police organization and other police subcultures. An integral part of the police subcultures is suspicion and secrecy aimed at all those who are not part of police¹¹ organizations. In the eyes of the researchers and general public, there is a tendency towards presenting the police in unrealistic light, so that they often put the blame for their failures on some other entities and processes in society which all lead to ideological and political prejudices. As a consequence of these problems, there is a possible critical or apologetic orientation of researchers to the research subject, i.e. the absence of its objectivity. In some cases, even when there is an objective attitude towards the police, the researcher can easily become a victim of auto-censorship, and sometimes of real censorship.¹² As one of the modes to avoid inconvenience and difficulties of this kind there is the choice of researchers to write as it should be, not as it really is, or as established research.¹³

Besides these problems in the police investigation, the polyvalence of the police as a research subject should be noted. It is reflected on the diversity of its shape and complexity of its organization, the breadth of its function, the differences in specific periods of time and societies. These features of the police as a research subject, the need for a multidisciplinary approach to the study and

⁶ More in: Bailey, William G., *Police science, 1964-1984, a selected, annotated bibliography*, Garland Pub., New York, 1986; Milosavljević, B., *A Bibliography Books and Police in Serbia 1841-1941*, *Safety magazine*, Vol. 5, 1996, p. 659-669;

⁷ Fosdick, R., *American Police Systems*, New York: The Century Co., 1921; *Ibid*, *European Police Systems*, New York: The Century Co., 1915; Woods, A., *Policeman and Public*, 1912; Hamilton, M., E., *Policewomen: Her Service and Ideals*, 1924;

⁸ Bailey, WG (ed.), *The Encyclopedia of Police Science*, New York: Garland Press, 1989;

⁹ *The Encyclopedia of Police Science*, (ed.), Jack R. Greene, 3th-Edition, 2007; Previous ed. Edited by William G. Bailey;

¹⁰ Earle, Easton, Dennis, Reith, Bailey, Bittner, Holdway, Loubet del Bayle, and others.

¹¹ Lapierre, JW, *Analyse des systemes politiques*, Paris, 1973, str. 18 (indicated by: Loubet del Bayle, JL, *Le police: Approche socio-politique*, str. 9;

¹² Forcase, DP, *Policing Canadian Society*, Scarborough, Ontario: Prentice-Hall Canada Inc., 1992, str. 64;

¹³ same;

the difficulties in theoretical generalization can discourage conformist oriented scientists. In this context, it is important to emphasize that the development of the research on the police or the intensity of scientific and expert discussions of it, is directly influenced by the degree of socio-economic development and the level of awareness and knowledge of citizens about police work, education and democracy. All this provides an explanation for the deficit in the research field of police science and the development of law enforcement, and criminological aspects of the police. If we analyze from the present point of view, there is consensus in science that the positive turnaround in the research on the police is due to rapid social changes that influenced the changing role of the police and the rise of sociological research on social phenomena relating to the police matter.

The contemporary studying of the police activities lacks a full scientific treatment of the subject. The biggest breakthrough in this direction was made with the appearance of comparative studies on police¹⁴ systems, which again, depending on the views of the author is more or less aimed at a broad topic and its interdisciplinary research. In countries that have no research tradition in the study, the police were studied by avoiding complex theoretical issues and retention of studying quite practical issues. For these reasons the existing literature on the science of police gives practical advice and guidelines, as well as collections of experiences and data that have yet to be analyzed and theoretically interpreted. This situation is constantly changing, particularly after the establishment of specialized scientific and educational centers and research institutes¹⁵ in developed countries and former socialist countries and the introduction of police science, police science disciplines in the circle of academic disciplines at numerous universities and academies in the world and the emergence of numerous scientific journals¹⁶ in the field.

Scientific research on some aspects of the police and police activities

There is a rich tradition of research on attitudes toward the police (ATP) in American police scholarship.¹⁷ Studies in this area tend to define ATP loosely: ATP can encompass citizens' perceptions of police performance, beliefs about police demeanor, assessments of police officers' characteristics, and citizens' preferences for police duties and practices. Understanding ATP and ATP research is important for several reasons. Decker¹⁸ points out that those police

¹⁴ Bailey notes that scientists who are determined to deal with the police and police activities must be willing to work in an unpleasant environment, the uncompromising fight against bureaucracy and the political and social non-recognition of their work. Therefore, he concludes that only a small number of scientists are willing to do that. Bailey, WG, op. cit.;

¹⁵ School Safety Skopje, as the unit of Sts. Clement of Ohrid "is participating in international scientific project" Composite "F7 of the Programme of the European Commission, together with another 17 universities in Europe. The project is a comparative study of police systems in Europe. http://cordis.europa.eu/fetch?CALLER=FP7_PROJ_EN&ACTION=D&DOC=13&CAT=PROJ&QUERY=012e1f7e796b:4e5c:4341bcb1&RCN=95216

¹⁶ National Research Institute of Police Science (Tokyo); L'Institut des Hautes études de la Sécurité Intérieure (IHESI-Paris); Le Centre d'Études et de Recherches sur la Police de l'Institut d'Études Politiques de Toulouse (Lyon) Canadian Police Research Center; Police Foundation (London); Institute for the Study of Conflict (London); Police Executive Research Forum (PERF), Office of International (OICJ) (USA); of Criminal Justice; of Criminal

¹⁷ Journal of Criminal Justice; Journal of Law; Journal of Police and Science Administration; Journal of Police Criminal Justice Quarterly (PQ); Policing: An International Journal of Police Strategies & Management; Journal of Police Crisis Negotiations; Police practice and research: an international journal; Policing & society; Policing issues & practice journal; Policing today; Women police; Law enforcement technology; Journal for women and policing; European journal of crime, criminal law & criminal justice; European journal on criminal policy & research;

¹⁸ Brandl, S., J. Frank, R. Worden, and T. Bynum. 1994. Global and specific attitudes toward the police: Disentangling the relationship. *Justice Quarterly* 11: 119–34; Frank, J., B. Smith, and K. Novak. 2005. Exploring the basis of citizens' attitudes toward the police. *Police Quarterly* 8: 206–28; Decker, Scott. 1981. Citizen

organizations which need public support, and positive attitudes toward the police are especially important in urban societies where the police are primarily reactive and depend on the public to initiate police activities. The success of the police in carrying out their duties depends heavily on the cooperation of the public, and the absence of cooperation and support makes it difficult if not impossible for the police to perform effectively.¹⁹ ATP research became even more important with the community-oriented policing movement. To explore the role of race and ethnicity in determining ATP, several studies have examined the connection between individual-level characteristics and ATP.²⁰ In addition to race and ethnicity, three domains of individual-level characteristics or variables have been identified as important predictors of ATP. These include socioeconomic status, age, and gender.²¹ A major issue facing modern policing is how to operate effectively in light of the ever increasing ethnic diversity of our population.

Public image of the police is an important concept to consider when examining both the role and consequences of the police activities in a democratic society. The way the public views the police can determine the legitimacy of the police authority and citizens' compliance with the law.²² It also influences the extent and quality of citizens' cooperation and interaction with the police. Members of the public who have relatively negative views of the police may be less likely to participate in investigations or community meetings and may be less compliant toward police during routine and otherwise benign police-citizen contacts. While public images of the police are formed both objectively and subjectively, the public's role in checking police authority depends on the formulation of a reasonably accurate image of the police and how they function.²³ The police have always employed powerful symbols to promote images of authority and capacity for control over crime to maintain their legitimacy as social control agents.²⁴ Relative to other professional groups or institutions in society, the public image of the police is generally positive. The public ranks the police consistently high among other institutions in terms of confidence, according to periodic scientific polls.²⁵

Because fairness is a fundamental value for democratic policing, the public image of the police held by various ethnic groups has been a central issue of the study. Public opinion polls and research commonly show that ethnic or racial majorities have a more favorable general opinion of the police than the members of ethnic/racial minority groups.²⁶

Several American studies²⁷ have examined the role of gender, age, and social

attitudes toward the police: A review of past findings and suggestions for future policy. *Journal of Police Science and Administration* 9: 80-87;

¹⁹ Decker, Scott, ...op. cit.;

²⁰ Ibid;

²¹ Scaglione, R., and R. Parks. 1980. Determinants of attitudes toward city police. *Criminology* 17: 485-94.

²² Webb, V., and C. Marshall. 1995. The relative importance of race and ethnicity on citizen attitudes toward the police. *American Journal of Police* 14: 45-66; Winfree, T., and C. Griffiths. 1971. Adolescent attitudes toward the police. In *Juvenile*

delinquency: Little brother grows up, ed. T. Ferdinand. Beverly Hills, CA: Sage;

²³ Tyler, T. R., and Y. J. Huo. 2002. *Trust in the law: Encouraging public cooperation with the police and courts*. New York: Russell Sage Foundation.

²⁴ Skolnick, J. H., and C. McCoy. 1984. Police accountability and the media. *American Bar Foundation Research Journal* 9 (3): 521-57; Miller, L., Braswell M., Whitehead, J., *Human relations and police work*, 6th ed. Waveland Press, Long Grove, Ill, 2010;

²⁵ Manning, P. 1977. *Police work: The social organization of policing*. Prospect Heights, IL: Waveland Press.

²⁶ Winston, R. P., Mellerski, N. C., *The public eye, ideology and the police procedural*, St. Martin's Press, New York, 1992; Gallup Organization. 2005 and earlier. Gallup/CNN/USA Today poll. <http://www.poll.gallup.com> .

²⁷ Rice, S. K., and A. R. Piquero. 2005. Perceptions of discrimination and justice in New York City. *Policing* 28 (1): 98-117; Shusta, Robert M., *Multicultural law enforcement, strategies for peacekeeping in a diverse society*, 5th ed., Pearson Education/Prentice Hall, Upper Saddle River, N.J, 2011; Miller, L., Braswell M., Whitehead, J., *Human relations and police work*, 6th ed. Waveland Press, Long Grove, Ill, 2010; Hunter, R. D., Barker, T., Mayhall, P.D., *Police-community relations and the administration of justice*, 7th ed., Pearson/Prentice Hall, Upper Saddle River, N.J, 2008;

class in shaping public images of the police. Younger persons and males tend to be less satisfied with the police or view the police as discriminatory compared to other members of the public. While these negative evaluations may be the result of differential experience with the police, the research has found these relationships to persist even after considering perceptions of specific encounters with the police. The public image of the police does not appear to depend exclusively on an individual's socioeconomic status once other explanations are taken into account. The effect of social class position may be partly a function of—or confounded by—community norms and the expectations of social status.²⁸

The research shows that public perceptions of the police are often linked to the neighborhood context in which people reside.²⁹ The differences according to neighborhood context may be attributed to actual differential treatment, perceptions of control over the police bureaucracy, or entrenched norms that develop in different areas as others have speculated.³⁰

The quality of direct experiences with police officers also shapes the way the public views the police. Citizens who come into contact with the police as suspects or have poor experiences with the police tend to have less favorable views of the police compared to people who report crimes or are otherwise assisted by the police.³¹ If a preconceived image of the police influences how one evaluates police contacts, it may be a challenge for the police to improve the public assessment of their contacts by changing the way they interact with the public.

The public image of the police can change in reaction to publicized events or highly scrutinized police actions.³² Although the police image held by the majority public often demonstrates some resiliency after such high-profile negative events by returning to pre-event levels within a few years, minority group members' attitudinal reactions to police brutality and discrimination are often more enduring. In contrast, public events that demonstrate police courage or heroism can often produce what some scholars call a "halo effect," in which the public's image of the police becomes abruptly and sharply positive.³³

The public opinion about the police is based partly upon what it sees in the media³⁴, and these opinions are likely based on images that do not reflect reality.

²⁸ Reisig, M.D., and R. B. Parks. 2000. Experience, quality of life, and neighborhood context: A hierarchical analysis of satisfaction with the police. *Justice Quarterly* 17 (3): 607–30; Dai, M., *The ways that police deal with people, the theory and practice of process-based policing*, Edwin Mellen Press, Lewiston, 2010; Winston, R. P., Mellerski, N. C., *The public eye, ideology and the police procedural*, St. Martin's Press, New York, 1992; Weitzer, R., and S. A. Tuch. 1999. Race, class, and perceptions of discrimination by the police. *Crime and Delinquency* 45: 494–507;

²⁹ Jean-Paul Brodeur, *Les visages de la police, pratiques et perceptions*, Presses de l'Université de Montréal, Montréal, 2003; Holdaway, S., *Changes in urban policing*, Routledge, 1977;

³⁰ Dunham, R. G., and G. Alpert. 1988. Neighborhood differences in attitudes toward policing: Evidence for a mixed-strategy model of policing in a multi-ethnic setting. *Journal of Criminal Law and Criminology* 79: 504–23; Reisig, M. D., and A. L. Giacomazzi. 1998. Citizen perceptions of community policing: Are attitudes towards police important? *Policing* 21: 547–61; Sampson, R. J., and D. Bartusch. 1998. Legal cynicism and subculture? Tolerance of deviance: the neighborhood context of racial differences. *Law and Society Review* 32: 777–804; Wilson, J. M., *The implementation of community policing in the U.S.*, Rutledge, New York, 2006;

³¹ Sampson, R. J., and D. Bartusch. 1998. Legal cynicism and subculture? Tolerance of deviance: the neighborhood context of racial differences. *Law and Society Review* 32: 777–804; Weitzer, R. 1999. Citizens' perceptions of police misconduct: Race and neighborhood context. *Justice Quarterly* 16: 819–46;

³² Tashevsk-Remenski, F., Mojanoski, C., Survey on the attitudes of Macedonian citizens toward police 2008-2011, Faculty of Security-Skopje; Reisig, M.D., and R. B. Parks. 2000. Experience, quality of life, and neighborhood context: A hierarchical analysis of satisfaction with the police. *Justice Quarterly* 17 (3): 607–30; Durose, M.R., Schmitt, E.L., Langan, A., *Contacts between police and the public, findings from the 2002 national survey*, U.S. Dept. of Justice, Office of Justice Programs, Bureau of Justice Statistics, Washington, DC, 2006;

³³ Jefferis, Eric S., Kaminski, R. J., Holmes, Hanley, D. E., 1997, The effect of a videotaped arrest on public perceptions of police use of force. *Journal of Criminal Justice* 25: 381–95; Souillere, D. M., 2004, Policing on primetime: A comparison of television and real-world policing. *American Journal of Criminal Justice* 28: 215–33;

³⁴ Kargin, V., Peer reporting of unethical police behavior, LFB Scholarly Pub., El Paso, 2010; Tashevsk-Remenski, F., Mojanoski, C., op.cit.; Brandl, S. G., J. Frank, R. J. Worden, and T. S. Bynum. 1994. Global and

Police departments tend to provide information to the media that reflects positively on the organization or that repairs a damaged reputation.³⁵ The media portrayal of police officers likely has an effect on how the public views the police. The apparent success of the police in solving crimes in both entertainment and news media may cause the public to have unrealistic expectations regarding what the police are able to accomplish. Further, the overrepresentation of violent and sensational crime in the media impacts the public's assessment of risk for that type of crime.³⁶

For decades, the relationship between the law enforcement and the media was often described as antagonistic, adversarial, and strained. The police resisted dissemination of information that might threaten an investigation, create fear, or endanger the public, including the media. However, as police organizations moved from a paramilitary organizational structure toward a more open community service orientation, they began to understand the value of the media as an important resource. Recognizing the ability of the media to reach specialized target publics affects public opinion, therefore large police departments are hiring public relations firms to design media campaigns that address image problems or recruitment efforts. An important factor in building positive, productive relationships with media is the willingness of the police to disseminate information. The media depend on timely, newsworthy information in order to inform the public.

According to Dean J. Champion, corruption is defined as "behavior of public officials who accept money or other bribes for doing something they are under a duty to do anyway."³⁷ In terms of law enforcement, police officers engage in corrupt actions when, for money or other favors, they fail to do something when they have a lawful duty to act or when the officer does something that he or she should not have done.³⁸

There are few studies on police corruption and its types. The issue in scientific undertakings of researchers from countries in transition still remains difficult to achieve empirical endeavor, because of the already mentioned problems the researcher faces in contact with the police organization.

The abovementioned conclusions about police work (the views of citizens, the image of police, policing multiethnic communities, police media relations and information management, police corruption, etc.) are just a small part of the research questions for the police. In the Republic of Macedonia, although there is no scientific interest to study the police and police activities, the number of scientific and empirical researches on the police is too low. The Faculty of Security-Skopje is the only higher education institution which has Department of Police Science with attention to research, study and develop police science. The research team of the Faculty fourth year in a row conducts complex longitudinal survey on the attitudes of Macedonian citizens toward police performance. Upon completion of the fifth year of study (in 2012), the team will prepare a study that will be offered as a basis for police actions to improve public perception of them.

specific attitudes toward the police: Disentangling the relationship, *Justice Quarterly* 11, 119–34; Decker, S. 1981. Citizen attitudes toward the police: A review of past findings and suggestions for future policy. *Journal of Police Science and Administration* 9 (1): 80–87;

³⁵ Media images of policing abound in the news and entertainment media, television dramas and reality shows, film, news broadcasts, and other media formats. Brown, M., *Media relations for public safety professional*, Jones and Bartlett Publishers, Sudbury, Mass, 2004; Lovell, S. J., *Good cop, bad cop*, Criminal Justice Press, 2003;

³⁶ Chermak, S., 1995. Image control: How police affect the presentation of crime news. *American Journal of Police* 14: 21–43;

³⁷ Dempsey, J. S., Fors, L., *An introduction to policing*. 3rd ed. Belmont, CA: Wadsworth-Thomson Learning, 2005;

³⁸ Most researchers identify nine main types of corruption by law enforcement officers: (1) corruption of authority, (2) kickbacks, (3) opportunistic theft, (4) shakedowns, (5) protection of illegal activities, (6) case fixing, (7) direct criminal activity, (8) internal payoffs, and (9) padding; Types and dimensions of police corruption, 2005, http://www.rouncefield.homestead.com/files/a_soc_dev_31.htm

The police and certain aspects of police activities are a research subject in the field of legal science, especially in the research on the role of the police in the investigation and criminal procedure, police actions and human freedoms and rights, the prohibition of torture and so on. Scientific circles in Macedonia agree that the research related to the police and certain aspects of the competence test and hard work are achievable, because of the closeness of the police organization with regard to collecting data for the research and unavailability of materials relevant to the research. This trend has long been present in Macedonia, despite the provision of the Code of Police Ethics, which states that the police support the research on the police. The existing practice does not support scientific knowledge about the police which, on the other hand do not bother to improve policing and introduce qualitative reform.

As I mentioned earlier: the scientific and empirical research of police increase quantum of scientific knowledge about various aspects of police work and contribute to the development of police science. Cooperation between scientific and educational institutions which conduct the research in the field of police science will help the exchange of scientific knowledge and comparative approach in the research of the police. The functional application of scientific knowledge about the police will assist in improving the methodology of policing reform and qualitative function of citizens' security and their liberties and rights.

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INFLUENCE OF THREE DIFFERENT PROGRAM CONTENTS OF THE SPECIAL PHYSICAL EDUCATION INSTRUCTION ON THE STATUS OF BASIC-MOTOR ABILITIES OF THE STUDENTS OF THE ACADEMY OF CRIMINALISTIC AND POLICE STUDIES

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Abstract: Since the establishment of the Police Academy in 1993, three curricula of special physical education (SPE) have been implemented, differing in number of classes, while the aims and tasks of the programs remained unchanged. The aim of the research was to define the influence of three different SPE instruction programs on the status of basic motor abilities (BMS) of the students of the Academy of Criminalistic and Police Studies (KPA). The sample of subjects included 244 students, 92 of which had studied according to basic instruction program (P1), 93 according to the modified (P2) and 59 students according to the current instruction program (P3). All BMS tests were realized by a standardized procedure by the SPE professors, at the end of summer semester at the first year of basic studies. For comparison of the influence of different SPE instruction programs the following tests were used: tests for measurement of maximal isometric force of back extensors (FMAXL) and flexors of the right hand fingers (FMAXDŠ), as well as the tests for assessment of speed power of leg extensors (DALJ), repetitive power of torso flexors (TRUP) and aerobic endurance (KUPER). The MANOVA results indicated that there is a statistically significant difference on the general level between the BMS with regard to different programs of studies ($F = 6.390$; $p = 0.000$). The statistically significant differences were established in the tests of DALJ ($F = 12.17$; $p = 0.000$), TRUP ($F = 16.16$; $p = 0.000$) and KUPER ($F = 7.67$; $p = 0.001$), while the tests FMAXL and FMAXDŠ did not indicate statistically significant difference. Bonferroni test showed differences between P1 and P2 (DALJ: $p = 0.000$; TRUP: $p = 0.000$), P1 and P3 (DALJ: $p = 0.047$; TRUP: $p = 0.001$; KUPER: $p = 0.000$), while between P2 and P3, the difference manifested only in KUPER test ($p = 0.042$). Based on the results, it can be concluded that the BMS status in KPA students was most affected by P1 in the direction of statistically significantly greater development of speed power of leg muscles, repetitive power of torso flexors and aerobic endurance, while the development of maximal isometric power of back extensors and flexors of the right hand fingers was equally affected by all three programs.

Key words: Instruction program, special physical education, basic-motor

abilities, the Academy of Criminalistic and Police Studies

Introduction

For quality policing it is necessary to have a good health status, psychological qualities, intellectual abilities, appropriate personality traits, necessary professional knowledge and adequate motor skills (Milosevic et al. 1988; Milosevic et al., 1995; Bozic, 1995; Copay and Charles 1998; Mudrić and Jovanovic 2000; Dopsaj et al., 2002; Blagojevic, 2003; Dopsaj et al., 2005). The adequate motor skills stand out as one of the basic preconditions for the successful completion of daily professional police duties, particularly in situations of employing the authorities, or assisting the threatened in natural catastrophes and natural disasters. Also, these capabilities are sorted out as one of the conditions for successful use of force, since they enable motor tasks to be done with appropriate speed, agility, strength, coordination, precision, as well as the appropriate intensity and endurance (Blagojevic, 2003; Blagojevic et al., 2006). For all the reasons mentioned, one of the parameters in the system of selection for police work is to check the level of motor skills development (Lord, 1998; Anderson et al., 2001; Dopsaj and Vuckovic, 2006; Dopsaj et al., 2007). Additionally, after having been employed, the police officers are required to maintain the required motor status with the help of experts, so the tests are conducted twice a year (Professional Training Programme for officers of the Ministry of the Interior of the Republic of Serbia, 2008). The importance of the development of motor skills is reflected in the place it occupies within the selection system, training and education of police personnel, as well as in the need for new models, professional training development and control of the achieved level of motor skills (Anderson et al., 2001; Dopsaj et al., 2007).

At the Academy of Criminalistic and Police Studies (KPA), within the subject Special Physical Education (SPE), a program is carried out, one of the goals of which is to develop the biological potential of various systems of the body (cardiovascular, respiratory, muscular and metabolic) and the development of basic motor skills with the necessary education about them (Blagojevic et al., 2006).

Since the establishment of the Academy of Criminalistic and Police Studies in 1993, three curricula of special physical education (SPE) have been implemented up to now (the first since its establishment until 2000, the second from 2000 till 2006, the third from 2006, i.e. from the formation of the Academy of Criminalistic and Police Studies - KPA up to now) differing in number of classes, while the aims and tasks of the curricula remained unchanged. The total number of classes of the first (primary) curriculum was 1085; the subject SPE has been studied in the course of eight semesters and it consisted of a basic and a special part. The basic part consisted of morning aerobic conditioning, swimming and skiing education, while the special part consisted of lectures, lectures with training character and exercises. The number of classes of the second (modified) curriculum was reduced by 10.18%, and the subject was divided into SPE 1 and SPE 2. The curricula contained regular classes, special forms of instruction (swimming and skiing education) and aerobic conditioning. By forming the Academy of Criminalistic and Police Studies, the curriculum of SPE (current program) has been divided into three thematically distinct instruction programs (SPE 1 – general part, SPE 2 – a special part and SPE 3 – the use of force), which are studied as a part of the academic program of basic academic studies as one-semester course, with a total

number of 240 classes, i.e. 77.88% less than in the first formed Police Academy (Jankovic, 2008).

The system of candidates' selection for the KPA is designed as a four-dimension positive selection model consisting of the success achieved in the previous education, health status, psychological structure and personal predispositions, as well as the check of the basic morphological characteristics and the basic - motor abilities. Motor skills assessment makes it possible to determine such characteristics of the candidates who will be able to effectively cope with the SPE curriculum and become fully educated staff for performing police duties after the Academy completion (Dopsaj and Vuckovic, 2006; Dopsaj et al., 2007). A well-defined educational and training treatment of SPE should transform the ability of candidates who passed the selection process and improve them in line with the professional needs of the Ministry of the Interior employees (Milosevic et al., 1988; Blagojevic, 1996; Dopsaj et al., 2002). This is one reason why it is necessary to continuously monitor the effects of SPE curriculum, where the effect of BMS is evaluated by testing motor abilities of the KPA students as future workers the Serbian Ministry of the Interior.

The aim of this study was to determine the effects of different SPE curricula on the development of motor skills of the students during the first year of basic academic studies who were educated by different SPE curricula.

The results will indicate the effectiveness of various structures of program content, curricula realization and number of SPE classes in comparison to the observed motor area.

Methods

The sample of subjects

The sample consisted of 244 subjects after completion of the first year of studies, who were educated by different SPE curricula. Out of the total sample, 92 participants were from the generation enrolled in 1994, educated according to the basic curriculum. The second group consisted of 93 participants enrolled in 2005 who were educated according to the modified curriculum. The third group comprises 59 participants enrolled in 2006, educated by the current curriculum.

Measurement methods

1. Maximal voluntary isometric muscle force of back extensors (FMAXL), was measured by tensiometric probe, by employing hardware and software systems using standardized measurement procedures, i.e., by applying the "Isometric dead drawing" test (Blagojevic et al., 2006; Dopsaj, 2006).

2. Maximal voluntary isometric muscle force of the flexors of the right hand fingers (FMAXDŠ) was measured by tensiometric probe, by employing hardware and software systems using standardized measurement procedures, i.e. by applying the "Hand squeeze" test (Blagojevic et al., 2006; Dopsaj, 2006).

3. Speed power of leg extensors (DALJ) test was evaluated by a standing long jump. Participants had the task to jump with both feet and with both hands swing from the marked line and land as far as possible. The distance between the step lines and the nearest point of support of any part of the body of respondents was measured. They were given one trial jump and two test jumps out of which a better score was recorded, which are expressed in centimeters. Measurement accuracy was 1 cm.

4. Repetitive power of torso flexors (TRUP) was estimated as the number of sit-ups with trunk rotation for 30 seconds, alternatively on the left and right. The candidate was lying on his back with legs bent at the knee at an angle of 90 degrees and feet resting on the ground, while his partner was fixing his feet. Palms were crossed behind their heads, and elbows were apart. The subject was performing torso bend with trunk rotation, first on one side, and then after returning to the starting position, on the other side. Time for exercise performance is 30 seconds, and the result is expressed by the number of correctly done sit-ups.

5. General aerobic endurance of the body was estimated by using the Cooper test (KUPER). Test time is 12 minutes and the distance crossed is measured in meters.

Statistical analysis

All data were analyzed using the descriptive statistics to calculate the basic parameters of central tendency: the arithmetic mean (MEAN), standard deviation (SD), standard error of the mean (sx) and the limits of the confidence interval at 95%.

The existence of a general difference of variability between the groups was determined by multivariate analysis of variance (MANOVA), while for the determination of partial difference between pairs of variables the Bonferroni test was used. Statistical significance was defined at 95% probability, i.e., at $p > 0.005$ level (Hair et al., 1998).

Results and discussion

The descriptive parameters for each of the three programs treated in this study are given in Table 1.

Table 1 Descriptive indicators of the selected tests

Descriptive Statistics							
Variables	Type_SPE	Mean	Std. Deviation	Std. Error (Aps)	95% Confidence Interval		N
					Lower Bound	Upper Bound	
F _{MAX} L	PA_Basic	1748.17	202.01	22.201	1704.43	1791.90	92
	PA_Modific	1728.06	222.20	22.081	1684.57	1771.56	93
	KPA_Actual	1718.24	214.65	27.723	1663.63	1772.85	59
	Total	1733.27	212.42				244
F _{MAS} DŠ	PA_Basic	640.24	82.77	8.60	623.30	657.17	92
	PA_Modific	628.21	85.26	8.55	611.37	645.06	93
	KPA_Actual	615.42	77.244	10.73	594.28	636.57	59
	Total	629.65	82.67				244
DALJ	PA_Basic	244.78	14.08	1.38	242.05	247.51	92
	PA_Modific	235.16	12.49	1.38	232.45	237.88	93
	KPA_Actual	239.39	13.18	1.73	235.99	242.80	59
	Total	239.81	13.87				244
TRUP	PA_Basic	28.68	2.84	.284	28.12	29.24	92
	PA_Modific	26.46	2.97	.282	25.90	27.01	93
	KPA_Actual	27.07	2.04	.355	26.37	27.77	59
	Total	27.44	2.89				244
KUPER	PA_Basic	2795.44	172.05	18.14	2759.72	2831.16	92
	PA_Modific	2753.51	168.96	18.04	2717.98	2789.04	93
	KPA_Actual	2681.81	184.38	22.65	2637.202	2726.419	59
	Total	2751.98	178.66				244

Based on the MANOVA results displayed in Table 2, it can be concluded that there is a statistically significant difference on the general level of the tested curricula realized in different generations compared to general physical fitness, i.e., in relation to the BMS (Wilks' Lambda 0.777; $F = 6.390$; $p = 0.000$).

Table 2 The results of MANOVA on the general level between the observed programs

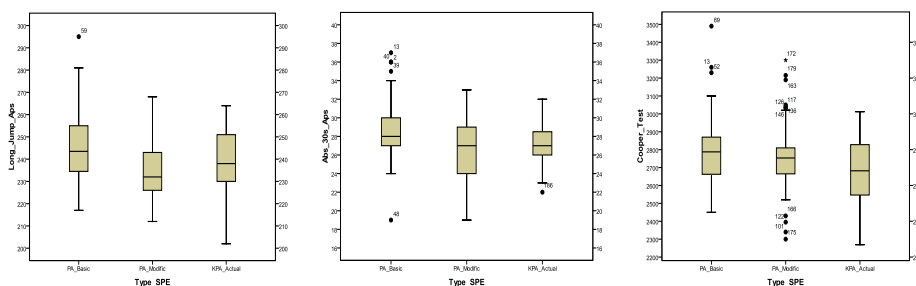
Multivariate Testsc						
Effect	Value	F	Hypothesis df	Error df	Sig.	
Type_SPE	Wilks' Lambda	0.777	6.390a	10.00	474.00	0.000

The fact that the number of classes was reduced in the second curriculum and significantly reduced in the current curriculum compared to the first one is certainly a major cause of differences in students' motor abilities. Table 3 presents the results of Bonferroni tests showing statistically significant differences in observed tests.

Table 3: Value differences of the observed motor abilities among the tested curricula

Dependent Variable	(I) Type_SPE	(J) Type_SPE	Mean Difference (I-J)	Std. Error	Sig.
F_{MAXL}	PA_Basic	PA_Modific	20.10	31.31	1.000
		KPA_Actual	29.93	35.52	1.000
	PA_Modific	KPA_Actual	9.83	35.44	1.000
$F_{MASD\check{S}}$	PA_Basic	PA_Modific	12.02	12.12	0.967
		KPA_Actual	24.81	13.75	0.217
	PA_Modific	KPA_Actual	12.79	13.72	1.000
DALJ	PA_Basic	PA_Modific	9.6149*	1.95223	0.000
		KPA_Actual	5.3870*	2.21437	0.047
	PA_Modific	KPA_Actual	-4.2280	2.20971	0.171
TRUP	PA_Basic	PA_Modific	2.2247*	.40050	0.000
		KPA_Actual	1.6118*	.45428	0.001
	PA_Modific	KPA_Actual	-.6129	.45332	0.533
KUPER	PA_Basic	PA_Modific	41.9341	25.57751	0.307
		KPA_Actual	113.6294*	29.01191	0.000
	PA_Modific	KPA_Actual	71.6953*	28.95090	0.042

On the partial level, using the Bonferroni test (Figure 1), statistically significant differences were observed in tests LONG (F = 12.17, p = 0.000), trunk (F = 16:16, p = 0.000) and Cooper (F = 7.67, p = 0.001), while in tests FMAXL and FMAXDŠ no significant differences were determined.

*Figure 1 Results of Bonferroni test for a) DALJ, b) TRUP and b) KUPER*

Maximum force expression under isometric conditions represents a "relatively stable" characteristic of the motor space of an individual, which in comparison with other motor skills declines the least with age. It is proved that a certain level of expression of contractile properties, and therefore the maximum isometric force of back and leg extensors, no matter whether in absolute or relative indicators, is of great importance for the successful and efficient performance of professional policing (Blagojevic, 1996; Vuckovic and Dopsaj, 2007). These two muscle groups are the two largest and most important muscle groups responsible for motor activity in humans on the general level, where one is responsible for locomotion and the other for the torso stability. Hand represents the basic manipulative organ and body tool in humans, while finger flexor force, i.e., grip force is identified as a limiting factor for all manipulative activities realized by

the cranial part of the body (Tyldesley and Grieve, 1996). Examination of muscle force of hand grip is widespread, since the force grip (and the muscles involved in the grip) is correlated with other muscle groups, including the lower extremities as well, and that it is a good overall criterion for reliable and valid assessment of total body strength (Bohannon, 2001). For the employees of the Ministry of the Interior, finger flexors have one of the dominant roles of the biomechanical, motor and manipulative aspects in realization of their professional tasks (Blagojevic, 2003; Dopsaj and Vuckovic, 2006). A large number of techniques applied in teaching Special Physical Education is carried out with hands, e.g., fore fist punches, top side fist punches, open edge hand punches, wardrobe grips in preparation for throwing techniques, most of the levers, as well as techniques of pressure and pinching (Milosevic et al., 2001; Blagojevic, 2006). Also, different specific police skills in the use of force are realized only by arms or hands (handcuffs, the official baton and firearms), where well-developed contractile properties of finger flexors play an important role in their application efficiency (Anderson and Plecas, 2000; Vuckovic et al., 2001). In order to achieve improvement a long and systematic work is necessary, which is dominantly characteristic for athletes and highly trained amateurs. Bearing in mind the eliminatory criterion of entrance examination, i.e. motor tests, as well as selection of candidates who possess the level of measured force in isometric conditions approximately equal to the projected standards specified through the colloquial obligations, we can say that during the first year of study most students, regardless of the number of classes, neither during classes nor in extracurricular activities have chosen the "hard" training by the method of maximum and sub maximum stress.

On the other hand, speed, repetitive and aerobic capacities are characterized by higher adaptability of the training treatment, as well as faster decrease with respect to age and the way of life. The objectives of SPE are projected in relation to professional obligations for future police officers, where the most important place is reserved for demand for efficient and professional tasks closely associated with the maintenance of adequate medical, psychological and social status.

Speed strength is defined by the dependence of strength and muscle shortening velocity, and as such can be defined as the ability of muscles to move, with or without added resistance, which is implemented in a given distance, realized at the greatest possible speed (Blagojevic et al., 2003). Speed strength is manifested in strikes, throws, levers, blocks, and other self-defense techniques (Milosevic et al., 2001), and as such, is one of the preconditions for successful SPE curriculum realization, i.e. it is one of the prerequisites for the effective functioning of police during the use of force. Speed leg muscle strength is important in potential conflict situations and directly affects the efficiency of techniques performance from the SPE curriculum that have characteristics of closed kinematic schemes where the initial force is produced in the lower extremities. Bearing in mind that the speed leg muscle strength is defined by genetic factors to a great extent, it can be concluded from the obtained results that a longer work applied in the first curriculum is required for improvement of this area.

Repetitive power means the ability of realization of many fast and powerful movements in the time interval up to 15, i.e. maximum 20 seconds, which are made in the sub maximal intensity zone (Milosevic, 1985; Dopsaj et al., 2002). Repetitive power, as an opportunity of muscular apparatus to perform consecutive muscle contraction with maximum intensity in terms of speed, demonstrated strength and motion amplitude in a defined time interval, is one of the important motor properties that significantly describe the specific motor area of police

officers (Milosevic et al., 1988; Dopsaj et al., 2002); it is very important in the police officers' system of motor properties to successfully perform specific tasks, the result of which contains in itself the power of the dominant energy production of anaerobic glycolytic lactate-type system (Tyldesley and Grive, 1996). Repetitive torso flexor power test is important from two aspects. Firstly, the results of this test indicate the possibility of effective realization of special techniques and transfer of the initial impulse of the cranial segments of the variable contraction-relaxation mode. Secondly, the torso flexor power is significantly associated with postural status, preservation of the spinal system, as well as providing stability for the internal organs functioning. The results of statistical analysis indicate that better results require a longer period of time.

One of the motor space elements, defined as the basic physical skills are energy mechanisms of the organism (anaerobic alactate, anaerobic lactate and aerobic). The development level of aerobic energy mechanism represents the fundamentals of human working ability, i.e. the fundamentals of general professional physical fitness of civilians, members of military groups, and police officers (Milosevic et al., 1995, Bozic, 1995; Copay and Charles, 1998; Lord, 1998). General aerobic endurance of the body estimated by Cooper test can be considered a direct indicator of aerobic efficiency of an individual, i.e. the ability of tolerance to the conditions of compensatory fatigue characteristic for policing. In addition, the World Health Organization recognizes the aerobic endurance as an indicator of general health of an individual. Based on the results, it can be concluded that it was in this area that the biggest decrease of the students' ability occurred, which can lead to the general fall of working efficiency in the future professional tasks as well as an increased level of chronic diseases that result from performing police tasks (Anderson et al., 2001).

From all the stated above, we can conclude that the results of this study show a statistically significant correlation of the general ability decline of students with a reduction of the number of classes provided through the analyzed curricula. With the norms prescribed by SPE curriculum which are realized through colloquial obligations, the students are demanded to meet the requirements that should be fulfilled as a condition for passing the exam. The differences obtained represent the crucial question relating to the values that students acquire through education, as well as incorporation of these values in their future professional lives of police officers. It is evident that the framework for knowledge and skills is acquired because they are conditioned by the norms, but the full completion of education is clearly linked with the process of time in which, based on the development of skills, lasting knowledge and skills are directly acquired and built that only as such may they represent a serious capacity for progress of the police profession and thus, indirectly, the society in general.

Conclusion

The effect of different SPE curricula on the BMS development was determined by monitoring changes in the values of five motor variables. The sample of participants comprised 244 students, out of whom 92 studied the primary (P1), 93 the modified (P2) and 59 students are studying the current curriculum (P3). The sample of variables was determined in such a way that the contractile properties of maximal isometric back extensor muscle (FMAXL) and right hand finger flexors (FMAXDŠ), speed power of leg extensors (DALJ), repetitive power of torso flexors (TRUP) and aerobic endurance (KUPER) can be defined.

The aim of this study was to determine the effect of different SPE curricula during the first year of study on the development of the observed motor skills while the topic of this study was to define the motor abilities development of students at the end of first year of studies who were educated by different SPE curricula.

The importance of the research was the fact that by determining the changes of motor abilities of the Police Academy students and the Academy of Criminalistic and Police Studies students, as future senior police officers, the evaluation of the effectiveness of various programs of Special Physical Education curriculum is done, and the measures for enhancement and improvement of the quality of staff educated at the Academy of Criminalistic and Police Studies are suggested on the basis of the obtained results.

The results showed that there was a statistically significant difference between the general level of BMS with respect to various programs of study ($F = 6390$, $p = 0.000$). Statistically significant differences were determined in tests DALJ ($F = 12.17$, $p = 0.000$), TRUP ($F = 16:16$, $p = 0.000$) and KUPER ($F = 7.67$, $p = 0.001$), while at tests FMAXL and FMASDŠ there were no statistically significant differences. Bonferroni test showed differences between P1 and P2 (DALJ: $p = 0.000$; TRUP: $p = 0.000$), P1 and P3 (DALJ: $p = 0.047$; TRUP: $p = 0.001$; KUPER: $p = 0.000$), while between P2 and P3 the difference existed only in KUPER test ($p = 0.042$). Based on the results, we can conclude that the greatest impact on the BMS status of KPA students had P1, especially in the direction of statistically significant greater development of speed power of the leg muscles, repetitive power trunk flexors and aerobic endurance, while on the development of maximal isometric back extensor muscles and right hand finger flexors all three curricula had the same impact.

SPE is a specialized and professional subject and belongs to the teaching and scientific disciplines of system support. As an integral part of the General Physical Education, its aim is psychosomatic training of police officers through the achievement and maintenance of basic and special knowledge and skills, the increase of emotional resistance of workers for professional conflicts and stressful situations and the increase of general immunity. In other words, the aim of SPE education can be defined as the creation of professional, social and anthropological competence of a student as an individual, as a citizen of a civil society and as a professional in the police.

The results suggest that it is necessary to redefine SPE curriculum in terms of increasing the number of classes, in order to contribute to educational process to the positive effects of general levels of physical fitness of KPA students that are consistent with the professional needs of employees of the Ministry of the Interior of the Republic of Serbia.

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HOMOGENIZATION OF GROUPS WITH THE PURPOSE OF EFFICIENCY IMPROVEMENT IN THE SUBJECT OF SPECIAL PHYSICAL EDUCATION

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Abstract: In order to successfully accomplish the specific objectives set forth in the curriculum for Special Physical Education, it is important to assess in advance (for each student respectively) their individual biometrical status. For the purpose of accomplishment of the objectives set in this research, students were homogenized in groups according to their manifesting biometric indicators. Thereby, based on the values received when measuring the defined indicators, three homogenous groups were formed, defined as follows: below average, average, and above average. In each of these homogenous groups the candidates were measured for five biometric capacities in three points of time. The results from the measurements were processed in adequate descriptive statistical procedures, whereas the final status in the differences in the accomplishments was determined by means of the T-test. Upon the analysis of the results a situation of improvement was found, spanning from acceptably positive to significantly positive transformations of the biometric capacities in all groups. Thereby, the improvement of the results is more emphasized with candidates from homogenized groups of below average and average biometric indicators as compared to their initial status.

Key words: Special Physical Education, homogenous groups, biometric capacities, statistical indicators

Introduction

Within the education–training process of Special physical education (SPE) basic motor program¹ is realized by which the students improve individually and as a group. Also this program allows the students to develop their biometric, functional, morphological specific-biometric abilities quickly and meaningfully. Given the fact that the SPE teaching is different from other subjects by its nature that is why during the planning of the practical teaching it is necessary to find objective ratio between the requirements of the common teaching and the individual abilities of the students. In order to accomplish that, it is necessary to provide optimal conditions for uninterrupted ongoing of the common teaching, but also effective development of the mentioned abilities of the students in the area of their personal abilities. On the present level, the SPE teaching is usually planned and adapted to the abilities of the average students, even though the students are different in more activities such as the pace of overcoming of the assignments, the will for learning and exercising, the level of knowledge, the skills

¹ Homogenization represents methodical organized work form, and it is characterized with group formation consisting approximately, equal or similar features, abilities, knowledge, interests, etc.

and the experiences, the health condition, etc. Due to this condition, it is possible for that the assignments intended for the above average or for the under average students not to be adequate, i.e. they are either above or under their real abilities. In conditions like this, the basic assignment of the teaching staff is to provide conditions for optimal development and equal advance of all students which is big psychological-didactic effort, because they have to organize teaching that is neither too easy nor too hard for most of the students.

Due to the individual differences in the biometric abilities between the students on the SPE classes, those organizational forms that will allow any individual to improve its abilities are mainly chosen. For that purpose a homogenization² is made to the students in groups in accordance with the achieved abilities and knowledge. The work distribution of this kind in homogenous groups provides array of advantages such as increased differentiation in the set of tasks, intensity, load and other teaching requests, furthermore in the groups of this kind the possibility for personal promotion is higher because the tasks are approximately adjusted to the students' abilities. For reliance on these claims, some theoretical and empirical researches indicate (Spasov, Gj. 1981; Chambers, R. L. 1988, Jukich, I; Nakich, J; Milanovich, L. 2003) the usage of efficiency of this work form in the teaching and the sport. Of course, this way of election for teaching organization presents the basis for biometric abilities improvement, yet to realize this condition it is necessary to depend on the characteristics of the groups or the individuals and the speed of their improvement to choose those teaching forms that will achieve the best results on the grade-point scale. For that purpose different shapes of organized teaching are applied during the SPE classes: frontal, group, team, problem, program, differentiated, individual, etc.

Subject and aims of the research

Subject of this research are the homogenous groups that are in function of improvement of the SPE teaching efficiency.

The aim of the research is to determine what influence and efficiency is of the different shapes of SPE organized teaching over the transformation of the biometric abilities on the homogenous groups. These homogenous groups consist of students with under average, average and above average biometric abilities.

Work method

Sample of respondents

The research is made over the sample of respondents consisting totally of 76 male full time students from the Faculty of Security – Skopje, at the age of 19-21. The research is conducted before and during the first year of studies, with measurements taken in three different time points at a time span of 5 to 6 months. The first measurement is conducted during the competition procedure for registration of students, while the other two measurements after the winter and after the summer semester. For the needs of this research, according the achieved results on the entrance exam, the respondents are divided in homogenous

² Due to rationalization of the enrollment time and the semester testing, the structure of the parts of the biometric space is not fulfilled. It should be fulfilled by at least 2 – 3 tests for estimation of the biometric abilities, however, the election and the measuring characteristics of the current variables is made on the basis of previously dedicated study conducted in 2004.

groups with under average, average and above average biometric abilities. With this division in homogenous groups, the students are offered more efficient introduction and preparation in the realization of specific aims that are set with the subject program of SPE and that is successful adoption and application of elementary defensive techniques of self defense, apprehension, etc.

Sample of variables

The sample of variables consisted of five variables by which partial assessment was made of the basic biometric abilities³ (repetitive and explosive force, speed and elasticity), i.e. 30 kg weight lifting in a supine position for 30 seconds (BENCH 30), distance jump from place (DJP), raising the upper body in 30 seconds (ABS30), bending the upper body over spread legs in sitting position (ELAST) and 20 meters run with high start (R20m). These biometric tests taken in the research are used as standard tests in the testing methodology in several previous researches (Jakimov, J; Ivanovski, J; Nedev, A. 2007, Ivanovski, J. 2008, 2009) and they are important for the treated population.

Statistical methods for data transferring

The received data from the research are processed by descriptive statistical analysis, where the average values for all applied biometric variables are calculated for every measurement of the three categories of students respectively (X), furthermore the difference of the average values between the measurements is calculated, and cumulative-percentage sum of the differences is made. To confirm the statistically significant differences in the average values between the measurements for every homogenous group in the biometric tests are applied on the students (T-test) for dependent samples.

Results and discussion

Based on the received results from the initial biometric testing a group homogenization of the students is done where three categories of students with under average, average and above average biometric abilities are formed (table 1). As an affiliation criterion for the students in some of the groups, the rank on the point scale ranging from 0 to 10 was used. So, the under average group of students consists of those whose ranking is from 0 to 4 points, while the groups of average and above average students consist of those whose results are ranging from 5 to 7, and from 8 to 10 points respectively. The size of the homogenous groups in all biometric tests is different: BENCH30 (under average-10, average-39, above average-27), ABS30 (under average-15, average-42 and above average-19), ELAST (under average-9, average-40, and above average-27) and R20m (under average-10, average-45, and above average-21). In the further analysis, it is retrieved to gain knowledge for the individual background of the students in the homogenous groups in any of the biometric tests (Table 2). From the review of the data of this table, a different background and placement of the students can be seen in the groups considering the biometric tests. Hence, one student can belong

³ In the vocational literature there are more methodical organizational work forms which allow improving the biometric capabilities. As most significant work methods are: frontal, individual, combined, interval, circular method (station method), repetitive method, etc.

to the group of under average abilities in one biometric test; while in other tests the same student can have a status of average or above average student. Due to this condition, in which there is different size and unequal distribution of homogenous groups and individuals in the biometric tests, it is interesting to see the effect of the application of different teaching work methods⁴ over the transformation of the biometric abilities on the three homogenous groups.

N=76	BENCH 30			N=76	DJP		
Groups	Results	Min-max	Point scale	Groups	Results	Min-max	Point scale
Under average N=18	< 11	21-27	0	Under average N=10	< 174	190-213	0
	12 - 15		1		175-184		1
	16 - 19		2		185-194		2
	20 - 23		3		195-203		3
	24 - 27		4		204-213		4
Average N=34	28 - 31	28-39	5	Average N=39	214-222	214-240	5
	32 - 35		6		223-231		6
	36 - 39		7		232-240		7
Abov. avera. N=24	40 - 43	40-53	8	Abov. avera. N=27	241-248	241-290	8
	44 - 47		9		249-256		9
	48 +		10		257+		10

N=76	ABS 30			N=76	ELAST		
Groups	Results	Min-max	Point scale	Groups	Results	Min-max	Point scale
Under average N=15	< 16	21-24	0	Under average N=9	< 10	22-31	0
	17-18		1		11-15		1
	19-20		2		16-21		2
	21-22		3		22-26		3
	23-24		4		27-31		4
Average N=42	25-26	25-30	5	Average N=40	32-37	32-45	5
	27-28		6		38-41		6
	29-30		7		42-45		7
Abov. avera. N=19	31-32	31-37	8	Abov. avera. N=27	46-50	46-58	8
	33-34		9		51-54		9
	35+		10		55+		10

Table 1 - Criteria and norms for grouping the students in under average, average and above average

⁴ In the vocational literature there are more methodical organizational work forms which allow improving the biometric capabilities. As most significant work methods are: frontal, individual, combined, interval, circular method (station method), repetitive method, etc

N=76		R20m	
Groups	Results	Min-max	Point scale
Under average N=10	+378	344-327	0
	377-365		1
	364-352		2
	351-339		3
	338-327		4
Average N=45	326-314	326-293	5
	313-303		6
	302-293		7
Abov. avera. N=21	292-282	292-272	8
	281-271		9
	-270		10

I-Under average						II Average	III- Above average					
N	Bench 30	Djp	Abs30	Elast	R20m	N	Bench 30	Djp	Abs30	Elast	R20m	
1.	II	I	II	II	II	12.	III	II	III	II	II	
2.	I	II	I	I	I	13.	I	I	II	II	II	
3.	II	II	III	II	II	14.	I	II	I	II	II	
4.	II	III	II	I	III	15.	III	II	III	III	III	
5.	I	I	II	I	II	16.	II	II	I	II	II	
6.	I	II	II	III	II	17.	III	III	II	III	III	
7.	II	II	II	II	I	18.	II	III	II	III	II	
8.	III	II	II	III	II	19.	I	III	I	II	II	
9.	I	II	I	II	II	20.	II	II	II	III	II	
10.	II	II	I	III	II	21. ... 75.						
11.	III	II	II	II	II	76.	I	III	II	I	III	

Table 2 - Student affiliation in the homogenous groups in the biometric tests

Analyzing the received results from the tables (3-7), considering the basic statistic parameters in the homogenous groups in the biometric test, it can be seen that there is different improvement in the changes in the biometric abilities at the three categories of homogenous groups. The under average ability students show the biggest progress in the results in all biometric tests compared to the students with average and above average biometric abilities. With this group of students the values of the arithmetic means permanently increase from measurement to measurement, so the best results are achieved in the last measurement. The progress in all biometric tests is positive ranging from 7.84%DJP, 12.34% R20m, 19.92% ABS30, 21.74% ELAST to 29.25% BENCH30. Also for this group, it is characteristic to mention that the progress

in the biometric tests is much bigger between the 1st and the 2nd measurement, rather than the 2nd and the 3rd measurement. Also, the average ability students show gradual improvement at the average values in the biometric tests, but with much slower pace compared to the previous group. The cumulative-percentage progress in the biometric tests is also positive, but ranging from 2.60% DJP, 6.91% R20m, 7.71% ELAST, 8.33% BENCH30, to 9.01% ABS30. Unlike these two homogenous groups where simultaneously with the time for exercise of the teaching the results of the biometric tests also improve, that is not the case with the above average ability students. In that group a different trend of improvement of the arithmetic means values can be seen in the biometric tests. So, in the ABS30 and R20m tests, the improvements of the average values are minimal and continuous from the first to the third measurement, while the other tests BENCH 30, DJP and ELAST do not show tendency of continuous improvement. This condition can be concluded also from the cumulative-percentage progress which is negative or moderately positive, ranging from -1.53% BENCH 30, 0.44% DJP, 1.27% ABS 30, 1.34% ELAST to 2.90% R20m.

Table 3	BENCH 30			A. Diff. (II-I)	B. Diff. (III-II)	Total (A+B)	a. % (II-I)	b. % (III-II)	Total % (a+b)
	I-meas.	II-meas.	III-meas.						
Under average	X=24.16	X=29.88	X=31.55	5.72	1.67	7.39	23.67%	5.58%	29.25%
Average	X=33.88	X=35.53	X=36.76	1.65	1.23	2.88	4.87%	3.46%	8.33%
Above average	X=43.16	X=42.71	X=42.50	-0.45	-0.21	-0.66	-1.04%	-0.49%	-1.53%

Table 4	DJP			A. Diff. (II-I)	B. Diff. (III-II)	Total (A+B)	a. % (II-I)	b. % (III-II)	Total % (a+b)
	I-meas.	II-meas.	III-meas.						
Under average	X=206.51	X=219.12	X=222.94	12.61	3.82	16.43	6.10%	1.74%	7.84%
Average	X=229.97	X=231.89	X=236.01	1.92	4.11	6.03	0.83%	1.77%	2.60%
Above average	X=253.44	X=251.96	X=254.55	-1.48	2.59	1.11	-0.58%	1.02%	0.44%

Table 5	ABS 30			A. Diff. (II-I)	B. Diff. (III-II)	Total (A+B)	a. % (II-I)	b. % (III-II)	Total % (a+b)
	I-meas.	II-meas.	III-meas.						
Under average	X=23.20	X=27.20	X=27.93	4.00	0.73	4.73	17.24%	2.68%	19.92%
Average	X=27.42	X=29.38	X=29.93	1.96	0.55	2.51	7.14%	1.87%	9.01%
Above average	X=32.73	X=32.89	X=33.15	0.16	0.26	0.42	0.48%	0.79%	1.27%

Table 6	ELAST			A. Diff. (II-I)	B. Diff. (III-II)	Total (A+B)	a. % (II-I)	b. % (III-II)	Total % (a+b)
	I-meas.	II-meas.	III-meas.						
Under average	X=30.66	X=36.77	X=37.44	6.11	0.67	6.78	19.92%	1.82%	21,74%
Average	X=40.72	X=41.90	X=43.92	1.18	2.02	3.20	2.89%	4.82%	7.71%
Above average	X=49.66	X=49.62	X=50.25	-0.04	0.63	0.59	0.08%	1.26%	1.34%

Table 7	R20m			A. Diff. (II-I)	B. Diff. (III-II)	Total (A+B)	a. % (II-I)	b. % (III-II)	Total % (a+b)
	I-meas.	II-meas.	III-meas.						
Under average	X=332.80	X=301.11	X=292.60	31.69	8.51	40.20	9.52%	2.82%	12.34%
Average	X=309.13	X=289.93	X=286.00	19.20	3.93	22.13	6.21%	1.35%	7.56%
Above average	X=289.42	X=283.19	X=281.04	6.23	2.15	8.38	2.15%	0.75%	2.90%

Table (3-7 - Basic statistic indicators of the homogenous groups in the biometric tests

Due to more precise and more detailed establishment of the change significance and the improvement of the biometrical tests for any homogenous group, the T-test is applied on different samples (Tables 8-12). According to the received results from these Tables for the homogenous group with under average biometric abilities significant statistic differences are evident in the average values between all measurements at the BENCH 30, ABS30 and R20m variables, while at the DJP and ELAST variables this condition cannot be totally concluded, because between the 2nd and the 3rd measurement there is no possibility for significant statistic improvement in the biometric abilities. Also, the results from the application of this test on a homogenous group with average biometric abilities show statistic differences in the values of the arithmetic means between the measurements of the biometric tests. The full statistic significance of the differences at the average values between the measurements is noticeable on the BENCH 30, ABS 30, ELAST and R20m tests, while on the DJP test that significance is not total, because there is one insignificant statistic difference between the 1st and the 2nd measurement. Unlike these homogenous groups, at the homogenous group of above average biometric abilities there are almost no significant changes in the values of the arithmetic means between the measurements of the biometric tests with exception of the R20m test, only the results of the desired significant level are improved from ($p < 0.05$).

Table 8									
BENCH 30									
Under average				Average			Above average		
T-test	I meas	II meas	III meas	I meas	II meas	III meas	I meas	II meas	III meas
I meas.									
II meas.	t=6.02 p=.00			t=2.94 p=.00			t=.84 p=.40		
III meas.	t=8.20 p=.00	t=2.59 p=.01		t=4.48 p=.00	t=2.90 p=.00		t=1.48 p=.15	t=.45 p=.65	

Table 9									
DJP									
Under average				Average			Above average		
T-test	I meas	II meas	III meas	I meas	II meas	III meas	I meas	II meas	III meas
I meas.									
II meas.	t=2.33 p=.03			t=1.42 p=.16			t=.86 p=.39		
III meas.	t=2.96 p=.01	t=1.10 p=.29		t=3.84 p=.00	t=3.42 p=.00		t=.61 p=.54	t=2.13 p=0.4	

Table 10									
ABS 30									
Under average				Average			Above average		
T-test	I meas	II meas	III meas	I meas	II meas	III meas	I meas	II meas	III meas
I meas.									
II meas.	t=2.33 p=.03			t=1.42 p=.16			t=.86 p=.39		
III meas.	t=2.96 p=.01	t=1.10 p=.29		t=3.84 p=.00	t=3.42 p=.00		t=.61 p=.54	t=2.13 p=0.4	

Table 11									
ELAST									
Under average				Average			Above average		
T-test	I meas	II meas	III meas	I meas	II meas	III meas	I meas	II meas	III meas
I meas.									
II meas.	t=3.75 p=.00			t=1.96 p=.05			t=.04 p=.96		
III meas.	t=5.35 p=.00	t=1.10 p=.29		t=5.34 p=.00	t=3.35 p=.00		t=.67 p=.50	t=.85 p=.40	

Table 12									
R20m									
Under average				Average			Above average		
T-test	I meas	II meas	III meas	I meas	II meas	III meas	I meas	II meas	III meas
I meas.									
II meas.	t=8.80 p=.00			t=9.01 p=.00			t=2.88 p=.00		
III meas.	t=11.1 p=.00	t=5.05 p=.00		t=13.8 p=.00	t=2.61 p=.00		t=4.10 p=.00	t=.94 p=.35	

Table (8-12) - T-test of the applied biometric tests between the measurements for any homogenous group

Relating to the analyzed space, generally we can say that the effects of one-year educational-training process of SPE are suitable only for the under average and average biometric abilities students. The reason for these results should be sought in the way of teaching implementation where the proper and precise dosage of burden for all homogenous groups is disabled; therefore, the improvement in the biometric abilities of the groups is not equally present.

Conclusion

Based on the completed process and data analysis, we conclude that:

- Positive influence and effect by the application of the different shapes of organized SPE teaching is present only at the under average and average biometric abilities homogenous groups, while at the above average biometric abilities students the positive effect is minimal or there is not any.

- The cumulative-percentage progress in the biometric tests is biggest with the under average biometric abilities students compared to the progress of the average and under average biometric abilities students.

- With the students of under average and average biometric abilities there are statistic significant differences in the analyzed biometric space, while with the students of above average biometric abilities these differences are present between the measurements, but most of them are not so significant.

- It is necessary to make adjustments to the syllabus by application of adequate training-educational methods that are suitable for the real possibilities of the homogenous groups, primarily concerning the homogenous group of above average biometric abilities.

Based on the analysis of the research results, we can conclude that quite a lot of useful knowledge is gained concerning the homogenization as a teaching form. However, to enable the improvement of the efficiency of the SPE teaching process, it is necessary to continue with additional researches on this matter, but before that, it is important to detect the weaknesses confirmed by this research.

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ORIGINS AND DEVELOPMENT OF SPECIAL PHYSICAL EDUCATION

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Abstract: The introduction of this paper outlines the notion and definition of Special Physical Education. It is followed by a historic survey, briefly listing various forms of martial arts and systems, focusing on the development of the traditional Japanese jujutsu system of self-defence.

The paper further outlines the beginnings of systematic practice in schools throughout Serbia and the introduction of martial art instruction in the educational institutions since early 20th century until present day. The prominent role of Archibald Reiss in this process is then discussed. The paper ends with closing considerations.

Key Words: Special Physical Education, martial art instruction, police education, jujutsu

Origins and development of special physical education

Introduction

Special physical education is an educational and scientific discipline which develops new skills and influences the development and maintenance of the optimal level of capability and characteristics of the employees of the Ministry of the Interior, by means of applying different programme activities in the process of instruction and practice, regardless of the educational level (the Academy of Criminalistic and Police Studies, courses, in-service training for police officers, operatives, special units, gendarmerie, and others). Special physical education (henceforth: SPE) and its contents, as an integral part of overall physical culture, are directly related to the development of such skills and knowledge as are of assistance in the performance of professional tasks and duties of law enforcement officers. The influence of individual programme activities is not equal, but rather depends on the level, complexity, interconnectedness and influence on the engagement of specific body systems or sub-systems in the course of their realization. The curriculum comprises three levels (basic, directed and situational), which are grouped according to their complexity and involvement of specific means.

Beside numerous combat systems and a large number of combat sports,

eastern martial arts and marital sports form the foundation of the special physical education programme. They are organized into a special structure of the SPE system of activities which differs from the structures of other systems. The largest proportion of the SPE programme is aimed at identifying and conquering techniques of a number of combat systems (judo, karate, jujutsu) and their application in various special conditions of life and work of police officers and other security personnel.

According to a wider definition, SPE presents a complex self-defence system which incorporates specially designed and systematized techniques of attack and defence, their variations and combinations, which are studied for use in specific situations, that is, in performing specific police and operative tasks and measures (to repel an attack by armed or unarmed attackers, use means of coercion, restrain, arrest or take in a person, restore public order, etc.).

Origins of special physical education

a large number of researchers focusing on the most elementary forms of combat and the origin of certain self-defence systems have taken the stand that the beginnings of the skill of self-defence cannot be tied exclusively to a certain area, period or people (Radan, Z. 1981; Popović, S. 1985; Milošević et al., 1988; Jovanović, S. 1992, etc). There have always been various systems, which have been modified and perfected over time and which exerted influence on one another, in terms of being complementary, especially since the beginning of facilitated communication among nations and states. It is therefore assumed that martial arts in which we find some beginnings of SPE appeared in the course of history as autochthonous skills almost all over the world.

The origins of certain forms of combat and self-defence should be traced in the most primitive forms of fighting. The first combat movements of our distant ancestors were mainly instinctive, aimed at defence or attack. Historic documents (drawings, reliefs, engravings, statues, vases, etc) which depict various fighting techniques and writings which mention different styles of combat (epics, legends, myths, etc) provide evidence of the existence of certain modalities of self-defence in distant past. Different types of self-defence were known in ancient China, Japan, India, Mexico, Greece, Rome, and Egypt. According to historical sources, they date from BC and each of them had its own characteristics and similarities. From those times on they changed and started combining with one another in times of enhanced communication among civilizations (Radan, Z. 1981; Popović, S. 1985; Milošević et al., 1988; Jovanović, S. 1992, Filipović, D. 1999).

Despite similarities among fighting techniques, the evidence of which was discovered in archeological sites worldwide, a large number of authors believe that the skills that led to the development of modern self-defence systems, such as jujutsu¹ system and later aikido, judo and karate sports, first appeared and developed in the territory of Asia. A hypothesis regarding the origin and spreading of martial arts in the territory of Asia suggests that they were transferred to India from Indo-China, and then further to China and Japan (Popović, S. 1985; Filipović, D. 2002).

The development of jujutsu as a self-defence skill or warrior skill took place in specific historical circumstances (wars, frequent bans and restrictions) and was

¹ **Jujutsu** (or *jujitsu*) is a traditional name for a marital art of self defence which developed from the centuries-long Japanese budo warrior tradition. The name jiu jitsu consists of two Japanese ideograms, the first of which *ju* translates as soft, gentle, flexible, or yielding, and the latter *jutsu* stands for art or skill. Thereofre, *jujutsu* can be translated as gentle art.

influenced by religion and philosophy of the Far East. Due to this, jujutsu self-defence system presents an exceptionally sophisticated phenomenon wrapped in legends. In the genesis of *budo*² arts, jujutsu was modified and expanded from century to century, in terms of both techniques and tactics. Technically, it was perfected by incorporating new elements and tactically it was adapted to historical and social circumstances of the given region or period. Modern Japanese art of jujutsu presents the basic system of self defence throughout the world. Dozens of marital arts and hundreds of styles arise from it and, despite numerous differences, they still have many common traits (classification of techniques, Japanese terminology, and common ranking method). Historically, the development of modern jujutsu in the early 20th century was mainly based on three main jujutsu modalities: Kodokan Jujutsu, Aiki Jujutsu and Sorindji Kempo or today's karate.

Material documents and other written sources that bear evidence to the development of martial arts in the territory of Serbia were found comparatively late, although the region had been populated rather early. The latter fact is supported by different archeological sites, among which the most prominent place belongs to the site of Lepenski Vir, which testifies to a highly developed Neolithic civilization. The remains of stone and bone-made tools and weapons prove that ancient inhabitants of these regions had passed a developmental path similar to that of ancient inhabitants of other geographic areas. This territory, later inherited by the Slavs, divided two great civilizations whose economic, political and cultural influences left conspicuous traces in the lives and customs of the Slavs. Physical agility, strength, speed, skillfulness, courage and toughness played a decisive role in the survival in cruel conditions, in frequent clashes between the Roman and the Byzantine Empires and attacks of other warrior nations (Huns, Hungarians, Bulgarians, and other). These frequent wars certainly favoured fighting skills, wrestling, in the first place, but also weapons handling and horsemanship, of which there is a lot of evidence from those times – old chronicles, churches and tombstones. Besides this, the epic or heroic folk poems teem with descriptions of knights taking part in various tournaments and jousts, like the ones described in the poem about Prince Marko and Musa Kesedžija: “*They drew their sabers and charged at each other,*” or “*They took their maces and started hitting each other,*” or “*They grabbed at each other's bones and wrestled in the green grass.*” The tournaments mainly consisted of competing in one discipline and the contestants in metal armour were equipped for mounted combat, whereas jousts comprised a number of disciplines (horsemanship, weapons skills – sabre, mace, bow and arrow, spear, throwing boulders, popular wrestling, etc.). In the later period, in response to Turkish administration and tyranny, the resistance was embodied in new popular heroes who fought for justice and freedom, outlaws called hajduci. Thus among numerous important figures of the First Serbian Uprising, Vuk Karadžić singled out Hajduk Veljko Petrović: he said that the heart and physical bravery made Veljko unique not only in Serbia but probably in the whole of Europe, war-torn as it was at the time. He also expressed his belief that Veljko would have been peer of Miloš Obilić and Achilles and his doubt whether they would be worth comparing with him.³ The characteristics of these new champions of people's rights included high national awareness, courage, resourcefulness, which was reflected not only in combating enemy but also in various manifestations (fairs, and the like) where competitions were held in the boulder throwing, shooting, wrestling, riding, etc. Free-style wrestling, probably developed under the influence of antique wrestling, was particularly popular.

² *Bujutsu* is an old Japanese term with the same meaning as Chinese *Wu Schu* - martial art, and was later replaced by the term *budo*.

³ Вук Караџић, Скупљени историјски и етнографски списи, Београд, 1898.

Origins and development of special physical education

Although the beginning of growing Serbian independence dates from 1815, following the First Serbian Uprising, the remnants of Turkish rules remained as late as 1867, when last Turkish garrisons were withdrawn from Serbia. Formal and legal independence of Serbia was not recognized until the Berlin Congress in 1878. But the first time that Serbs encountered martial arts from the Far East happened in the 1807-1812 period, during which they fought in the First Serbian Uprising and in the Russian – Turkish war, when, at the initiative of the Serbian leader Karadjordje, military cooperation was established between Russia and Serbia. It was then that Russia deployed several units of the Moldova army, consisting predominantly of Kazakh regiments, to assist Serbian rebels. Beside military clashes with the Turks, the Kazakh instructors were in charge of military training of the Serbian rebel army following the example of Kazakh units. The instruction was held in keeping with Kazakh exercise rules and basically included weapons handling, movements in formation, tactics, but also elements of self-defence such as Kazakh-style wrestling (rukopashni boi), with special techniques of grips at clothing, throwing and levers on joints. The following statement also illustrates this: "Hajduk-Veljko Petrović, the duke of Krajina and commander of Negotin... loved Russians immensely and took over many of their customs. And since he liked Russian army a lot, he also trained a number of Kazakhs, equipped with spears and sabres, like the Russian ones, and his infantry had to exercise every day, both in the morning and in the evening."⁴

The beginning of systematic exercising in Serbian schools, actually some form of pre-military training, can be found as early as 1808 in the Great School of Belgrade. This included "marching and regrouping, exercises with sabre and rifle" and the instructor was Captain Petar Djurković. Public schools introduced physical exercise only in 1844 by the law on schools entitled *Ustrojenije*, which provided that comprehensive school students should practice *teloupraznjenje*, that is physical exercise, which is optionally introduced in the comprehensive schools of Belgrade. Scarcity of competent personnel and material prerequisites, along with military training which inspired suspicion with the Turks, whose military garrisons were still present in Serbian cities, did not encourage wider organization of this subject in schools. However, there is a mention of gymnastics as part of the curriculum of the first military school in Pozarevac as early as 1838. The curriculum of the Artillery School in Belgrade in 1850, which later became the Military Academy, included fencing, and the instructor was Djordje Marković Koder. In 1891, the Military Academy of the Kingdom of Serbia engaged the retired French officer, a veteran from Indo-China, Charles Doucet, a Belgian, who was a famous fencing teacher, as a full-time lecturer for fighting skills. Doucet taught both fencing and self-defence based on the French *defense personelle* system. The fighting school which Doucet opened at the Military Academy in 1891, led to the formation of the Fighting Society Serbian Sword in Belgrade in 1897.

At that time, in 1899, the first school of gendarmerie was established in Dorcol, and in 1909 a permanent gendarmerie school was founded with courses which at first lasted three months, but later extended to four months.⁵ The teaching programme was extensive and divided subjects into two categories. The second category of subjects included fighting with a knife and gymnastics. Physical education as a compulsory subject was introduced by law in the curricula of elementary schools in 1871 and since 1882 physical education in grammar

⁴ Вук Караџић, Скупљени историјски и етнографски списи, Београд, 1898.

⁵ Часопис *Полиција*, бр. 10-11, Београд, 1911, стр. 327-330.

schools was again combined with military exercises. This is why teachers were mostly officers. It is interesting to mention that in 1911 the Ministry of Education of the Kingdom of Serbia issued "Basic Rules and Instructions for Instruction in Physical Education in Secondary Schools" in which it recommended opening "wrestling and boxing schools, practicing military exercises, military service with weapons, and so on." In 1911, for the first time in Serbia the concept of jujutsu was mentioned in the book Knight games and sports and physical education of our people by Milenko Arsović. Using the works by German and Russian authors, artillery lieutenant Arsović used Europe-ized term *jujitsu* and presented in detail the fighting system of kodo kan jujutsu, suggesting the introduction of this system in the teaching process of state institutions of military-police type.

In this same year, 1911, the German language teacher Rudolf Sprope who was well acquainted with Japanese martial art called jujutsu, which was already used in many modern police agencies, with the approval of the mayor and the gendarmerie commander, held a lesson in front of our police officers. The lesson took place one afternoon in front of the Gendarmerie Commander and all gendarmerie officers, numerous police officials, and most members of the gendarmerie corps. "During this lesson our police organs could best get to know great benefits which the mastery of this art could offer to a policeman, especially in easy and reliable escort of a culprit, restraining such culprits in a fight or upon attempting escape, in defending themselves against attacks by revolvers or knives, etc. But its main characteristic is considered to be the fact that the police officer does not need to use a weapon, but uses open hand instead."⁶ In the course of the same year, 1911, a one-month course of martial arts was organized in Belgrade. That was a course in jujutsu, attended by fifteen members of the Belgrade gendarmerie squad: two gendarmes and two night guards from each company, one from the mounted squad of gendarmerie, and two from the city management. The course was held by the gendarmerie battalion commander Vasilije Andrić, who had spent two years studying at the Prussian Gendarmerie, where he had had an opportunity to get to know this way of fighting.⁷

After the World War One, the development of Japanese jujutsu in Serbia was slowly increasing. From 1920, jujutsu (known as *jujitsu*) was taught as part of fighting skill at the Military Academy and in Gendarmerie schools. Following the creation of the Kingdom of Serbs, Croats and Slovenes, the issues of education and professional development of employees of the Ministry of the Interior were given substantial attention. Thus in 1919 a set of regulations was passed, providing for the formation, equipment, powers, duties and instruction of gendarmerie. In keeping with this act, the Gendarmerie School for Non-Commissioned Officers was founded in Sremska Kamenica in February 1920, in a former Austro-Hungarian *Kadetnica*.⁸ At the same time, preparatory courses were organized in gendarmerie stations for gendarmes, as well as courses for patrol leaders.

At that time, on 8th February 1921, to be precise, the First Police School was established in Belgrade by Rodolf Archibald Reiss, DSci⁹. Among other subjects, students attended the course in Special Gymnastic Exercises and Defence as a compulsory subject. It is namely interesting to mention that within the Principles of Modern Police Project, at the request of the Government, Archibald Reiss had sent his *Proposal for Reorganization of Police* to the minister of the interior in the summer of 1915, suggesting the introduction of Senior and Junior police schools.

⁶ Часопис *Полиција*, бр. 5, Београд, 1911, стр. 142-144.

⁷ Часопис *Полиција*, бр. 7, Београд, 1911, стр. 202-207.

⁸ Богдановић, Б., Два века полиције у Србији, стр. 73.

⁹ Dr Rodolf Archibald Reiss, born in Laussane in 1879, laid the foundation of police education in Serbia.

“Students of both schools will jointly practice shooting from the revolver, gymnastic exercises, focusing on running and defence (boxing, Japanese martial art – jujutsu, etc.) and possibly riding exercises.”¹⁰ In his “*Additional Suggestions for Reorganisation of Police*” published in 1920, among other things, Doctor Reiss singles out a separate chapter entitled *Some Remarks on Physical Preparation of Court Police Agents and Public Order Police*¹¹, in which he points out that beside defence methods (jujutsu, boxing, hitting with sticks, kicks, etc.) police officers must be good at running and shooting from revolvers. This means that beside military schools, significant attention was also given to physical exercise (personal defence) in the education of police personnel in Serbia of that time.

Based on the Decision on Establishing the Central School for Police Executive Officers in 1931, the Central Police School in Zemun started working in the building of the former silk-production plant (today, the Second High School of Economics). The subjects were divided in nine groups, the third of which is of particular interest since a part of it was related to practical professional education. This group included, among other things, subjects such as fighting with a knife, arrest and restraining in various situations and jujutsu. The teacher was Vladislav Poljšak, the gymnastics teacher in the Zemun Grammar School. In 1930, the Athletic-Fencing Club with a jujutsu section was founded in Belgrade. A Russian immigrant, Master Evgeniy Maksutov was in charge of training. He later started his own private school of jujutsu in Gardoš, Zemun, and his best students were Vladislav Poljšak and Saša Šimenc, who are regarded to be the pioneers of Kodokan Judo and Jujutsu systems of self defence in Serbia.

After the World War Two, in 1946 security organs of the new Yugoslav state were formed and the process of instructing members of OZNA and KNOJ was initiated. In this period several courses were organized for professional training and instruction of militia personnel, for both managerial staff and basic-position officers of the services of both public and state security. Curricula were designed and temporary handbooks were used. Physical culture and sport were given special attention in the National Militia¹². Thus in the course of 1947 in many larger towns and cities physical culture societies were formed within a joint name Milicionar (Militiaman). Some of the sections achieved good results both in the country and abroad. Among them, the boxing and wrestling sections of Belgrade’s FD Milicionar were especially successful. The management of the people’s militia of the People’s Republic of Serbia issued an instruction for activities in physical education across organizational units of the National Militia which envisaged the formation of a professional body. Namely, the systematization of job positions included militia executives in charge of physical education. In 1948 a two-month course was held in Zagreb for physical education executives and officials (12 representatives of militia from Serbia attended and successfully completed this course). Special attention has been given to practical training in general physical education, martial arts and marksmanship. The course set the foundation for successful development of physical education among the members of the National Militia.

Soon afterwards, on January 9th, 1949, the first conference of physical education executives was held in the hall of the National Militia Headquarters for the City of Belgrade. In order to improve and promote physical agility of militia officers, physical education was to be taught in two forms: physical education classes (gymnastics, exercises, martial arts, shoulder-to-shoulder combat, obstacle

¹⁰ Рајс, А., Принципи модерне полиције-Предлог о реорганизацији полиције, addressed to the Government of Serbia in 1915. Printed in the printing house “Sveti Sava”, Belgrade, 1942, p. 37-40.

¹¹ Рајс, А., Прилог за реорганизацију полиције, Београд, Издавачка књижарница Геце Кона, 1920, p.69-71.

¹² The service was renamed *police* only in mid-1990s.

tackling, swimming with tackling obstacles and skiing with military training) and various sports competitions (running, athletic meetings, boxing and wrestling, marksmanship, etc.)

The National Militia Headquarters of the Federal People's Republic of Yugoslavia (FNRY) published an internal handbook entitled *Self-Defence* which included the programme of Russian interpretation of kodo kan judo and insisted on well-known sambo techniques, which definitely presents the first attempt to form a system of special physical education. The course book presented a comprehensive and original self-defence system with a historic survey of the development of self-defence, its theoretic background, systematization of techniques and methodology of training. It comprised 510 pages, and 397 drawings and photographs.

In 1951, three courses of self-defence took place, providing training for more than 100 militia officers.¹³ Since then, self-defence was a compulsory subject for all militia units. There was a remarkable expansion of judo sport at that time but judo masters in charge of physical education of militia officers noticed the difference between sport and self-defence and opted for jujutsu as the system of self-defence, which proved to be far more acceptable and useful for police practice.

In 1963, the Department of organization and professional education of employees of the Federal Secretariat of the Interior published a handbook entitled *Jujutsu* for its employees, especially the militia officers. The handbook tried to encompass all defensive and attack activities of applied jujutsu relevant for the service. The subject matter was presented in such a way as to be suitable for individual use and self-teaching. This is why it included over 800 photos and drawings accompanied by descriptions, illustrating complicated elements and phases of certain techniques. Beside this, a special part of the handbook explained elementary facts about anatomy and physiology, focusing on vital body parts and consequences that could result from applying certain techniques, and instructions for first aid. Here we should mention Radomir Milunović and Rados Jovanovic as the founders of self-defence instruction in the Ministry of the Interior of the Republic of Serbia. Radoš Jovanović is an outstanding name in wrestling, as one of the most renowned referees in the world (engaged in 8 Olympic Games), a judo veteran and one of the first self-defence masters, who taught self-defence (later SPE) at all educational institutions of police, providing instruction for tens of thousands employees of security agencies.

Sports games of police and security officers were established in 1960 and were popularly called Militia Games (*Milicijada*). Among other disciplines, self-defence (jujutsu) was included in the programme of the 1969 games in Drvar. The Federal Republic of Serbia had the best score and was an overall winner of the 14th sports games held in Belgrade in 1974, and Strahinja Tepavčević, a member of the Serbian team, received a special prize of the Federal Secretary of the Interior as the best individual competitor in self-defence. Around that time, the Department for organization and professional educations of the employees of the Federal Secretariat of Internal Affairs formed the Commission (*Dan Collegium*) for the promotion of self-defence instructors and masters. Strahinja Tepavčević from Serbia, Igor Belohan from Croatia and Peter Žmart from Slovenia were the members of this commission.¹⁴

¹³ Петковић, Н., Саветовање физкултурних руководилица у Народној милицији, "Народна милиција", бр.1, р.23-24, Београд, 1952.

¹⁴ Based on recollections of Strahinja Tepavčević, physical education professor, retired police major, an attendant of the first class of Secondary Police School in Sremska Kamenica, later an SPE teacher and currently the president of the Serbian JuJitsu Association.

The Secondary School of Internal Affairs Pane Djukić in Sremska Kamenica started working in 1967 as the main centre for education of personnel for public security sector and it included the Department for Education of Adults in Zemun (novice training). The curriculum of this four-year educational institution included three groups of subjects: general knowledge, vocational subjects, and military subjects. The first group included the subjects studied in all other secondary schools, among which was Physical Education. The second group, aimed at preparing students for professional performance of public and national security duties, included Special Physical Education, which provided instruction in jujutsu, judo and karate. The first teachers were a jujutsu master, Petar Rašković, and a judo master Svetozar Mihajlović. The two subjects were later named General Physical Education and Special Physical Education, and the teachers were Branko Dragić, Spase Savić, Lazar Adamović and Strahinja Tepavčević, masters of judo, karate and jujutsu.

A few years later, in 1972, the Higher School of Internal Affairs, as a post-secondary two-year college, was opened in Zemun, as an independent educational institution of higher education (only to become an organizational unit of the MI of the Republic of Serbia in 1991). Initially, the studies lasted for two years, and since the adoption of the new curriculum in 1977 for five semesters. The subjects taught were grouped into subjects of general education, general-professional and professional education. The group of security and police subjects included the subject of Special Physical Education (SPE), taught in all five semesters (since 2001 only the first four). The first teachers were Milovan Gačanski and Stevan Božić, karate and judo masters.

The Police Academy was founded in 1993 as an educational and scientific institution in Belgrade. SPE had a prominent place in its curriculum and was taught throughout the four-year studying period. The reform of higher police education resulted in the integration of these two institutions and the formation of the Academy of Criminalistic and Police Studies, as a new educational institution based in Zemun. SPE as a subject was allocated to the department of security and police subjects and is studied in two semesters of both academic and vocational studies as SPE 1 and SPE 2.

It is important to point out that the scientific foundations of SPE were laid in the 1980s by professors of SPE of the VSUP in Zemun, Stevan Božić, MA, Muharem Zulić, PhD, and Milenko Milošević, PhD. Having defined the structure of motor characteristics of police officers, modeled a training process in high-rank karate sport and designed and managed the system of self-defence based on cybernetics (Milošević, M. 1985; Zulić, M. 1987; Milošević, M., Gavrilović, P., Ivančević, V., 1988) they established SPE as a separate educational and scientific discipline. Thus in late 1980s, on the basis of results achieved in scientific research and the system of education of police personnel, the scientific community of the Republic of Serbia verified the scope of SPE and constituted it as separate scientific discipline belonging to the field of police and security studies.

The course book entitled *Special Physical Education* for students and police officers (Milošević, M., Zulić, M., Božić, S., 1989) defined the subject, goals and tasks of SPE from the point of view of higher education and using scientific methodology in order to define the models of basic, directed and situational training. This three-dimensional model of instruction performed in three respective stages, defined as an integral-continuous model of learning, has been used in teaching SPE 1, SPE 2, and SPE 3 at the Academy of Criminalistic and Police Studies. The largest portion of the SPE curriculum is thus aimed at identifying and mastering different judo and karate techniques and their application through jujutsu techniques in specific conditions of life and work of police officers.

Conclusion

The paper offers a brief survey of the origin and development of different fighting styles until the genesis of martial arts. The emphasis is on the continuity of this development and its interrelatedness with the development of social relationships generally.

Special attention has been given to the significance of martial art instruction in the education and training of police personnel. Upon establishing the first gendarmerie schools prior to World War One special gymnastics (jujutsu) was included among compulsory subjects. After World War Two, institutionalized education of police personnel was resumed, at first through courses and seminars, and later by establishing educational institutions of secondary and post-secondary or college levels. The syllabus was based on the findings of contemporary science and a prominent role was reserved for self-defence. Since then, the instruction in fighting skills has been systematically carried out on all levels of police personnel education, becoming at the same time a separate educational and scientific discipline which significantly contributes to professional development of law enforcers.

Although a large number of fighting systems and combat sports, as well as martial arts of judo, karate and jujutsu form the foundation of its programme, it can be concluded that SPE is a complex and practical self-defence system which combines certain techniques of attack and defence, their varieties and combinations studied with the aim to be used practically in performing police duties.

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22. Часопис "Полиција", бр.1/1911; бр.5/1911; бр.7/1911; бр.10-11/1911; бр.1-2/1921; бр.3-4/1931; бр.3-4/1932; бр.13-14/1932; бр.1-2/1936; бр.3-4/1936.

ARCHIBALD REISS AND THE FIRST POLICE SCHOOL IN BELGRADE

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Dr Rudolph Archibald Reiss

Rudolph Archibald Reiss was born on July 8, 1875 at Hechtsberg in Baden, a south German state. He finished high school in Karlsruhe, Germany and in 1893 began his chemistry studies at the Swiss University in Lausanne. As an outstanding student he received a PhD in chemistry at the age of 22 and was appointed by professor Bruner assistant for photography. With a special interest in applying scientific photography in criminology and criminal law Reiss went to Paris in 1900 for specialization under supervision of the famous Alphonse Bertillon the maker of the identification system also known as the “Bertillonage”. The Rome Anti-Anarchist Congress recommended the introduction of this anthropometric method of registration and identification of law offenders based on personal measures, or more precisely, measures of particular body parts everywhere.¹ Upon realizing how imperfect this system was Reiss began emphasizing advantages of the dactyloscopic registration and identification of criminal offenders. After he acquired a degree at the Paris Police Prefecture he returned to the University in Lausanne where he was appointed professor of forensic science in 1906 and in 1909 he founded the Institute of Scientific Police,² where students could obtain a degree in scientific policing. As one of the founding fathers of the modern criminalistics Reiss was teaching in Austria, The Netherlands, Belgium, Brazil and Russia and at the same time was appearing in courts in Switzerland, France, Italy and Romania as a forensic court expert. Reiss lived and worked in the period which was marked by the development of science and specific disciplines. With the opinion that the police techniques should be studied and taught in a systematic manner Reiss published a number of works in the field of criminalistics.³ All practitioners of police techniques of that time sought his advice or examples. He organized numerous courses of scientific police skills attended by experts sent by their governments for the purpose of professional development.⁴ The Serbian Government was also sending its domestic police experts to attend Reiss’

¹ After France Bertillonage was introduced into Russia (1890), Germany (1895), Portugal (1900), Denmark (1900) and others.

² Since 1954 the Institute for scientific police and criminology

³ Among the books Reiss wrote were: Judiciary photography (*La photographie judiciaire*), Paris, 1903; The Speaking Portrait Manual (*Manuel du portrait parle*), Lausanne, 1905; Burglaries and homicides (*Vols et homicides*), Lausanne, Paris, 1911. (the book has been published as a first volume of the Manual of the scientific police; the work on the remainin three volumes – Counterfeits, Identification and Organization of Modern Criminal Police was hindered by his leaving for Serbia in 1914 and they were never published); A Contribution to Police Reorganization (*Contribution a la reorganisation de la Police*), Paris, 1914.

⁴ In his letter to the management of the Institute of Scientific Police he reminds of the school’s reputation in the world and the fact that many experts from universities like Ferrara, Genoa and Turin come there to perfect their knowledge. In 1911 the Russian Government sent to Lausanne 17 investigating judges spearheaded by Sergei Tregubov to attend Reiss’ tscientific police training course, and in 1912 he was invited to Russia for a series of lectures to representatives of military judicial organs and students of the Aleksandrov Military Academy. Tregubov will emigrate to Serbia in 1920 and together with Toma Zivanovic establish the first Institute of Criminology in 1929.

school; one of them was Dusan Dj. Alimpic, the founder and the head of the Police Anthropometric Department in the Ministry of the Interior. Minister Stojan Protic was familiar with Reiss' affinity for the Serbian nation, which, apart from his undisputed qualifications, was the reason why the Serbian Government decided in 1914 to invite him as an independent expert to investigate war crimes against civilians in Serbia committed by the Austro-Hungarian, German and Bulgarian armies. Getting to know and love the Serbian people Reiss joined the Serbian army as a Swiss volunteer and along with them spent the whole World War I. As a foreign correspondent of influential European newspapers during the war Reiss informed the public of Europe and the world about the proportion of Austro-Hungarian mass war crimes and violation of international conventions.⁵ He summarized the findings of his investigations when teaching students at the Sorbonne with "there can be no neutrality in the face of the crime". After the war and the formation of the first common state of Yugoslav nations – the Kingdom of Serbs, Croats and Slovenes in 1918 Reiss resigned from the University in Lausanne and accepted a post in the Ministry of the Interior becoming a Belgrade resident. In the years to come he worked to reorganize and modernize the Serbian police – redeveloped the Anthropometric Police Department and called it the Scientific Department, establishing a full laboratory for criminal scientific investigation procedures. He insisted on professional development training for police clerks wanting to turn them into the scientific police by means of training in specialized schools. To this effect the first modern police school was established in Belgrade in 1921. Unfortunately, due to lack of understanding of state organs it never grew into a permanent institution. Disappointed Reiss resigns in 1922 from his public service to work only as an on-call associate of the National Bank of the Kingdom of SCS in the matters of combating counterfeit money. He died and was buried in Belgrade in 1929. "Armed with unbreakable energy and restless and never ending desire to work, this active spirit belonged by origin to Switzerland, by spirit to France and by life and culture to the whole human kind and by love and self-denial, as we know, to the Serbs and by death to Yugoslavia".⁶

The first police school in belgrade

In 1915, after he had finished his investigations of Austro-Hungarian atrocities in Macva, Reiss wrote a detailed paper explaining how the Serbian police should be reorganized in order for them to raise to the level of well organized police departments of other countries.⁷ After the war ended he was engaged, as a public servant of the Ministry of the Interior of the newly formed Kingdom of Serbs, Croats and Slovenes, in organizing and modernizing our scientific police and in reforming our police in general. By the Minister of the Interior's decision dated 14, October, 1921 no 32636 he was appointed member of the expert commission in charge of drafting a new police law,⁸ with the duty to reorganize the police

⁵ End of 1914 Reiss presented results of his research of Austro-Hungarian crimes in Lausanne before a large audience. This caused some protests of Germanophiles however; they didn't stop him from publishing the truth which he considered his duty.

⁶ Lazarevic, V.: *In Memory of Dr. Reiss*, in *The Police*, issue for August 1931, No 15 and 16, pages 689-696.

⁷ *A Contribution to Police Reorganization* was published in 1914 in French and within the preface of the Serbian issue published in 1920 Reiss said that the opinion and recommendations in the book pertain to the reorganization of the New York Police but the ideas presented there might interest all those in the police line of work.

⁸ The Chair of the Commission for Drafting the Law on Organization and Unification of the Police was the Assistant Minister of the Interior Aleksandar Mijovic, and, in addition to Reiss, members were Osman Hadzic, Head of the Ministry for Bosnia and Herzegovina, Kosta Katic, Inspector, and both Editors-in-Chief of the "Police" magazine – Dusan Dj. Alimpic and Vasa Lazarevic. Alimpic was responsible for collecting and sorting out everything that was published by then about the matter at hand (finished projects, opinions of police heads

from the grounds and enable providing the best possible protection of order and security in the country in the post-war period. The Commission finished the draft however, due to political and party circumstances the Law on the Kingdom of SCS Police Reorganization was passed in 1929 in the Kingdom of Yugoslavia after King Alexander Karadjordjević's introduction of monarchy dictatorship. Reiss achieved better success in the field of police training – the first Police School in Belgrade was opened in 1921.⁹ Considering that the first police school for teaching modern police methods was established in Rome in 1902, and that the second was in Paris in 1912, the opening of our police school in 1921 put Belgrade in line with other European capitals.

Based on the Government's Decree the Police School was officially opened on February 8, 1921 by the Minister of the Interior Milorad Draskovic, and in his speech he urged students to be outstanding "in order to for the school to be popular among all police officers and future generations of students". The Minister also pointed that the Ministry would show affinity towards the school and all of its students who invest efforts to get "very good grades".¹⁰ In his welcome speech Reiss emphasized that students are asked to invest enormous efforts in order to be able to learn everything they would need in their future careers in just four months. After noticing that previous officers, in addition to being taught how to make reports "by beautiful handwriting and in the most esteemed bureaucratic style" were not required to have any professional education in order to be admitted into service, the school had the goal to create "real honest police officers", that is, to develop in its students, in addition to scientific skills, a moral bases and professional solidarity required for their future service. You will not get rich in the police line of work, but you will have the pleasure to work for your country and to be part of your nation's elite, Reiss said to students stressing that "hard work and honesty" need to be their guiding principles.¹¹ The first training course had 18 police notaries and 10 agents and was planned to last for four months.¹² The curriculum included the following 15 subjects: Criminal Law; Criminal Proceedings; Police Laws, Decrees and Orders and Their Implementation; General Political Education; Practical Training in Criminal Law and Proceedings; Practical Chemistry and Physics; Anatomy and Hygiene; Forensic Medicine; Scientific Police; Identification and Description of Law Offenders; Criminology and General Police Matters; Practical Training in Scientific Police; Practical Training in Identification and Description; Special Gymnastic Exercises and French.¹³ Dr Reiss was appointed school Principal while the teachers were Inspectors of the Ministry of the Interior – K. Katic, A Kuzmanovic, the Editor-in-Chief of the Police magazine V. Lazarevic, Docent of the Dr Ivan Djaja University, the Head of the

in provinces, districts and municipalities, books and relevant press clipping) and to write a detailed report which would serve as a bases for the draft law which would be discussed at a wider conference of experts from all provinces.

⁹ Police school was planned to be opened in the Kingdom of Serbia as early as in 1904 by the Law on Measuring, Capturing Photos and Description of Law Offenders, however this was never followed through due to insufficient financial resources and no understanding what so ever about the need for such institution in a conservative and according the then newspaper issues "skeptical" environment.

¹⁰ „Official opening of Police School in Belgrade“, *The Police*, no 1 and 2, January 15, 1921, pages 59-62.

¹¹ „Official opening of Police School in Belgrade“, *The Police*, no 1 and 2, January 15, 1921, pages 59-62.

¹² The first round of the course was attended by the following police notaries: Rad Popovic and Bogoljub Stojanovic from Belgrade Police, Marko Popovic from Nis, Predrag Cemerikic from Prizren, Vlad. Markovic from Bitolj, Mihajlo Vukovic from Piskopej, Aleksandar Vidovic from Kosov. Mitrovica, Dragut. Ilic from Skopje, Lazar Danilovic from Pec, Dusan Milojevic from Tetovo, Ljub Acimovic from Krusevac, Dim. Dimitrijevic from Gnjilane, Aleksandar Todorovic from Kragujevac; Djordje Slavujevic from Pozarevac, Jevrem Dulovic from Kriva Palanka, Andra Crvencanin from Dorjan, Kosta Tasic from Kocan and Milan Jotovic from Novi Pazar.

¹³ Police agents were not attending all classes together with police notaries; they had special classes where they received instructions on code of conduct, reporting and practical exercises from the Criminal Law and Proceedings.

Department for Prevention of the Venereal Diseases Dr. Djordjevic, the Head of Technical Department A Andonovic and the Editor-in-Chief of the Police Gazette Z Simonovic, A. Polic, French Teacher and others. There were no precise plans for teachers to present their topics rather every teacher was allowed to specify the scope and contents which he will present to students. Aleksandar Todorovic, a Police Notary from Kragujevac, was one of the students of the first training course and by the end of the course he presented his impressions in the article „Police School“. Stating firstly that Police School is the most perfect way of addressing the future of the police, Todorovic writes that theory and practice go hand in hand in all subjects but that the program is hard and designed to accommodate academic level and that it has “one shortcoming” – that “short duration of the course is not considered“. However, learning was eased by a large number of classes in the daily school timetable- they lasted between 8 and 12 in the morning and 3 and 6 in the afternoon. Classes included both teaching and testing as well as lots of explaining and interpreting of all issues relevant for the police service. Reiss held „General Police Lectures“ with the aim of introducing police officers with all aspects of the modern police work but since he taught in French and his interpreter had to translate every sentence to Serbian lot of time was consumed this way. He thought that the program had to include writing exercises (for instance writing reports, wanted lists, indictments, court rulings, decision, etc) to provide for unique practice in the future administration and that the Slovenian Language would be better than French because it was evident that the contents of documents written in Latin alphabet were often misunderstood or not understood at all. Still, all these objections, concludes Todorovic, fade away when compared to usefulness of this technical school whose results will prove its true value “in the shortest period of time”.¹⁴ The public had great expectations in regard to this school: «It should give ready and experienced policemen with the up-to-date technical equipment... It should at least, to a certain extent, change the personal mentality of the national police cadre, that is, provide it with qualification appropriate to the spirit of the time»¹⁵ Its intention was to give qualification to «all younger and better police officers», which required some 3-4 years according to the workforce in the police, in order to have a recognized school to be able to operate further on and to prepare and teach police officers. Necessary assumptions for such an reorganization included the review of curriculum and boarding school construction for cadets who were expected to be in a greater number. It should have become the center of professional police education, open not only to police officers but all secondary high school leavers and those with completed secondary school at the level of high school.¹⁶ Lectures at the first course were completed on June 10, examinations were held in the period from 13th to 16th June, and the school holiday started on June 18. During schooling, one police notary was expelled and three agents left it, so the first course was completed by 17 notaries and 8 agents. Examinations were passed by 10 pupils with excellent rating, 9 with very good and 6 with good rating. Minister of education, Svetozar Pribičević, attended the award of diploma, congratulated them on their efforts and reminded them on the delicacy of their occupation in the society and the state. Upon the completion of this first course, the Administration of the Police School submitted to Ministry of Interior, the proposal to construct «boarding school within the school for those pupils who come from smaller places». It was obvious that without a boarding school,

¹⁴ *Police*, no. 5, 6, 7 and 8, book for March and April 1921.,page. 339-342.

¹⁵ S. Mikić: «Police School of Ministry of Interior», *Police*, no. 9 and 10, book for May 1921.,page. 475-477.

¹⁶ There were ideas that the School becomes a constituent part of The Faculty of Law, University of Belgrade. The need of creating a higher course within the Police School was indicated, the one which would be obligatory for all new canton heads, police commissioners and possible candidates for police heads without such similar higher course. *Police*, no. 9 and 10, book for May 1921.

candidates would have rather chosen governmental jobs «which offered relatively good salaries and not much work load and less efforts ensuring existence», than schooling which besides intellectual efforts implied additional financial expenses.¹⁷

As many as 50 police notaries and 13 police agents from City of Belgrade Administration were admitted to the course which began on 5th September 1921.¹⁸ Curriculum and duration of this course were the same as the first one. The course was completed on 2nd January 1922 and official ceremony for diploma award was attended by a new minister of Ministry of Interior, Mr. Voja Marinković.¹⁹ Since Reiss had meanwhile resigned from the position in a governmental job, inspector K. Jovanović, was appointed for Director of Police School. 35 police notaries completed the course, all with excellent or very good rating.²⁰

Third police course was officially opened on 2nd February 1922 at the presence of Minister Ph. D. Mijović from Ministry of Interior and lieutenant colonel and commander of gendarmerie Uzunmirković. The novelty in regard to the previous courses was completed boarding school which provided food and accommodation for 60 attendants of the Police School. Ph.D Mijović greeted attendees of this school, wished them success and pointed out that «the certificate evidence of this course should be considered as equivalent to school diploma for those who lack it».²¹ Attendees of this course, 51 police notaries and 15 police

agents of the City of Belgrade Administration,²² had the same curriculum and

¹⁷ *Police*, no. 11 and 12, book for June 1921, page. 552-553.

¹⁸ Notaries-attendees of the second course were: Andjel Bregovljanin from Lebane; Bog. Stojanović from Kumanovo; Borivoje Stakić from Belgrade; Branko Ružićić from Belgrade; Vasilije Radičević from Podgorica; Gaja Jovanović from Prijepolje; Dragoljub Koković from Tetovo; Dušan Bogičević from Berane; Dušan Miličević from Boljevac; Dušan Nikodijević from Despotovac; Djordje Orbović from Kuršumlija; Živko Kosović; Ivan Golmajer from Vračarski canton; Jerotije Miljenković from Ohrid; Jovan Milutinović from Skoplje; Kosta Budić from Belgrade; Krsta Perović; Lazar Vukotić from Nikšić; Ljubomir Damjanović from Peć; Milan Vukašinović from Negotin; Milan Kaličanin from Sjenica; Milivoje Milošević from Niš; Miloje Milošević from Veliko Orašje; Periša Bošković from Pljevlje; Milija Vujičić from Kolašin; Petar Jovanović from Vučitrn; Tihomir Carević from Prizren; Novak Vičentić from Vladimirc; Uroš Pažin from Preljine; Rade Popović from Andrijevica; Mihailo Sekulić from Bijelo Polje; Sava Prelević from Podgorica; Stanimir Djurdjević from Rača; Dušan Milosavljević from Kraljevo; Pavle Petković from Golubac; Svetislav Djordjević from Podujevo and Stojan Radičević from Užice. *Police*, no. 13, 14, 15 and 16, book for July and August 1921, page. 772-773.

¹⁹ Minister Milorad Drašković assassinated with Alija Alijagić, a member of revolutionary organization «Red Justice» in Delnice on 21st July 1921. Dr Voja Marinković took over a duty of minister of Interior in coalition government of Nikola Pašić in December 1921. In July 1922 he resigned and was replaced for a short time by (from July 30 through August 14) Kosta Kumanudi. Then Kosta Timotijević took over governance of Ministry Administration (up to 16th December 1922), whereas Milan Skršić remained for a longer time on that position (up to March 1924.).

²⁰ The first one in the rank with excellent ratings from all subjects were Živko Kosović, notary of Head Administration of Cetinje district, Periša Bošković, notary of prefecture of Pljevlje district and Djordje Srbović, notary of Kosanički canton. *Police*, no. 23 and 24, book for December 1921., page. 1235.

²¹ *Police*, no. 1 and 2, book for January 1922, page. 53-55.

²² Attendees of the third course of Police School were: Radojica Bojović, notary of prefecture of Rudnički district; Gradimir Pantelić, notary of Struški canton; Velibor Vasojević, notary of prefecture of Skopski district; Dragoljub Marković, notary of Djevdjelijski canton; Arsenije Petković, notary of Trnavski canton; Božidar Tasić, notary of Vučitrnski canton; Dimitrije Protić, notary of Kragujevački canton; Ilija Mihajlović, notary of Nikšićki canton; Krsta Andjelić, notary of Belopoljski district prefecture; Vladimir Popović, notary of Nikšićki district prefecture; Bogdan Cincar Janković, notary of Prizrenski district prefecture; Dragutin Mijatović, notary of the City of Belgrade Administration; Radenko Milić, notary of Kolubarski canton; Aleksandar Dinić, notary of Resavski canton; Dragutin Bogdanović, notary of Zlatiborski canton, Jeremija Stanković, notary of Malteški canton; Miodrag Mihajlović, notary of Timočki district prefecture; Veljko Jovanović, notary of Boljevački canton; Marko Tomić, notary of Posavo- Tamnavski canton; Sima Jovanović, notary of Radoviški canton; Gojko Djugić, notary of Čevski canton; Bogdan Toisavljević, notary of Podunavski canton; Vitomir Tanić, notary of Bitoljski canton; Milovan Arsić, notary of Oraški canton; Dragoslav Ćurković, notary of Mačva, Krajina district; Milivoje Šišavac, notary of Vlasotinački canton; Marinko Kojić, notary of Timnavski canton, Jagoš Vukamović, notary of Donjo pološki canton; Živko Stefanović, head of Vranjski district; Mašan Andjelić, notary of Budimski canton; Dragomir Rajnić, notary of Prespanski canton; Jorgač Frutunić, notary of Deževski canton; Djura Soć, notary in Ulcinjski canton; Svet.K. Todorović, notary, Negotinski canton; Vule Božović, notary, Danilovgradski canton; Joca Rogić, notary, head of Pirotski district; Risto Protić, notary, Golubački cn; Rade Popović, notary Labški cn; Dimitrije Ćusmević, notary, Novovaroški cn; Božidar Prvulović, notary and head of Toplički district; Žarko Andjelković, notary, Mačvanski and Metohijski district; Krsta Kaludjerović, notary, Mač. Andrijevački district; Damnjan Divjak, notary, Kratovski canton; Ljubisav Cvetković, notary

teaching programme as their predecessors. It was expected that all candidates from all parts of Kingdom of SCS should have been admitted to this Police School and that it could have become a well recognized «police nursery which should breed new police generation of young ideal policemen».²³ However, the attendees of the third course were mainly from pre-war Serbia including the areas of so-called Old and South Serbia liberated from the Turkish occupation during the Balkan Wars, and some from Monte Negro. Establishment of Kingdom of SCS in 1918 encompassed a common state territories (so-called provinces) with different legal status and traditions, the first thing was to do their harmonization in regard to public and then private legislation, which was found to be not easy at all. There are no data in the official magazine «Police» about the completion of this fourth course and the success made by police notaries, however, this magazine began with publishing criticisms at this period addressed to school curriculum and its founders. The most often authors of those articles were domestic police officers who made remarks to the Police school based on comparison with such institutions in European countries (the Check Republic, Belgium, Italy), without taking account of the present social, economic and political differences.

At the session of teaching personnel on 23rd September 1922., the number of weekly lessons was determined for certain subjects for the coming course.²⁴ The fourth course of police notaries at the Police school began on 3rd October 1922. and had 52 attendees and on 1st November of the same year, the fourth course began for 15 police agents of the City of Belgrade Administration. There are no available data preserved on this last course conducted at the Police school. In the „Police“ magazine from December 1922 when lectures of a fourth month course were still on, Secretary of Ministry of Interior, Ž. Simonović noted in its article on the Police school that pupils were overburdened and that the teaching programme and curriculum should have been readopted and certain subjects eliminated (for example, Physics, Chemistry and the French language), some should have been reorganized (instead of lessons in gymnastics, install gymnastic equipment which would have been used by pupils at their own choice in their spare time), and introduce the subject of criminal anthropology and psychology as well as forensic photography. The most important, as concluded by Simonović, would be to establish the Police school on a legal basis and envisaged it not to be only on a temporary basis», that is, not to be used only for education of active police officers, but for creation of new police young cadre».²⁵

of Negotinski canton; Djordje Radišić, notary, Jasenički canton, Kragujevački district; Aleksandar Godić, notary, Despotovački canton; Ivan Mikelić, notary and head of Pljevljanski district; Vasilije Radičević, notary of Cetinjski district administration; Jovan Grujičić, notary of Pljevaljski district prefecture. ; Dragoljub A. Topličanin, notary of Štavički canton.

²³ *Police*, no. 1 and 2, book for January 1922, page. 54.

²⁴ Total number of 46 weekly lessons was distributed per subjects as follows: Scientific technical police- 4 lessons, Description and identification- 7 lessons, Criminal law- 4 lessons, Criminal court proceeding- 4 lessons, Practical drills in Scientific Technical Police- 4 lessons, Criminal law seminar- 2 lessons, Laws and Ordinances-4 lessons, Forensic Medicine-3 lessons, Chemistry and Physics-2 lessons, General police knowledge-1 lesson, French language-3 lessons, Knowledge of Home Country-4 lessons and State law- 4 lessons. *Police*, no. 17 and 18, book for September 1922, page. 853.

²⁵ These were police notaries: Svetislav Jovanović, notary of Gročanski canton; Stojko Čusonjić, notary of Kolubarski canton; Miloš Dočin, notary of prefecture of Valjevski district; Radivoje Srećković, notary of Podgorski canton; Andreja Stojanović, notary of Oraški canton; Milorad Milovanović, notary of Radjevski canton; Dragutin Velimirović, notary of prefecture of Požarevački district; Pavle Bataljević, notary of Gružanski canton; Dračić Stojković, notary of Jasenički canton; Vladimir Žunjić, notary of Crnogorski canton; Milorad Milivojević, notary of Dragačevski canton; Josif Rančić, notary of Bosiljgradski canton; Dobrosav Mitić, notary of Porečki canton; Dimitrije Nenadović, notary of Poljanički canton; Luka Jeftić, notary of Timočki canton; Gligorije Momirović, notary of prefecture of Tetovski district; Sava Laketić, notary of Mileševski canton; Jakov Nikolić, notary of prefecture of Cetinjski district; Miraš Tomović, notary of prefecture of Andrijevački district; Filip Perunović, notary of Cetinjski canton; Svetolik Kurandić, notary of prefecture of Bregalnički district; Radosav Vujošević, notary of Ovče-Poljski canton; Lazar Lončarević, notary of Ohridski canton; Milivoje Vidojković, notary of Ministry of Interior; Vasilije Popović, official of prefecture of Bitoljski district; Radomir Nikolić, notary of Jemevački canton; Trajko Kostić, notary of Vučitranski canton; Čedomir

Obviously, opinion of this author was in minor. The police School in Belgrade somehow seemed to have satisfied its objective at that moment, that is, education of certain number of younger: police officers with lower ranks. Overburdened with more important issues and political and partisan disagreements, relevant governmental bodies let the school get closed instead of growing into a permanent institution for police education. It became clear, ten years later, after dictatorship was created, 6th January 1929, when the king Aleksandar Djordjević took over the entire power in the country, that the centralized state police lacked personnel qualified in professional police school and in 1931 it was opened. In that way, the correctness of the attitude of Rudolph Archibald Reiss was confirmed, related to the need of professional police education, but also the fact that his ideas could not have been developed in the Kingdom of Serbs, Croats and Slovenians at the moment when governmental administration faced serious problems.

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Maksimović, notary of Belički canton; Pavle Stefanović, notary of prefecture of Prizrenski district; Miloš Rašić, notary of the City of Belgrade Administration; Miloš Milanović, notary of prefecture of Kruševački district; Božidar M. Pantić, notary of Negotinski canton; Milo Andjelić, notary of Donjo-Moravički canton; Josif Mićković, notary of Beranski canton; Dragutin Arsenijević, notary of Ključki canton; Josif Stojković, notary of prefecture of Kragujevački district; Isidor Olič, notary of Struški canton; Radisav Cvejić, notary of Ramski canton; Aleksandar Jovanović, notary of Krajinski canton; Budimir Plečević, notary of prefecture of Rudnički district; Lazar Totar, notary of Ulcinjski canton; Svetozar Živković, notary of prefecture of Vranjski district; Veljko Mladenović, notary of Gornjo-Debarski canton; Novo Vojvodić, notary of Riječko-Cetinjski canton; Petar Laković, notary of Pomorski canton; Veljko Jovanović, notary of Ministry of Interior; Miraš Božović, notary of Djakovački canton; Blažo Vlahović, notary of Tuski-Podgorički canton; Dragutin Čakarević, notary of Golubački canton; Krsto Četković, notary of Belopoljski canton; Nikola Jovanović, notary of Kruševački canton and Borivoje Petrović, notary of Vlasotinački canton.

²⁶ *Police*, no. 23 and 24, book for December 1922, page. 1070-1073.

ESTABLISHING POLICE EDUCATION IN SERBIA AND CONTRIBUTION OF ARCHIBALD REISS¹

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Abstract: The first institutions of police education were formed in the early decades of the 20th century during the process of establishing the first forms of vocational education, training and education of the police in Serbia. The paper focuses on the need for educated and skilled police staff and the first advocates who introduced education projects for the Serbian police, as well as the establishment and operation of the first institutions of police education in Serbia.

Key words: police education, gendarmerie schools, Rice School of Police, Central Police School.

Introductory remarks

Considering the issue of police education from the historical point of view, has been partial and sporadic so far. Therefore, the impact of police education on the functioning and development of the police in the past could not be fully observed and evaluated.

This work is particularly about / 1 / the beginnings of education of the police in Serbia / 2 / the first advocates who introduced education projects for the institutionalization of the police in Serbia, and finally / 3 / the establishment and work of the first institutions of police education in Serbia.

Conception of training the police in Serbia

Until the late 19th century law enforcement personnel in Serbia wasn't particularly educated. Officials had at their disposal the knowledge acquired in various civilian schools, and specialized training courses, primarily in medicine, provided to rare exceptions. The beginnings of education of the police in Serbia can be considered as a study tour of the former Minister of Police Đorđe Cenić in Germany and Switzerland.²

The first lectures date from 1880, 1883 and 1884 when Tanasije Tasa Milenković was a member of the Belgrade police when he first held classes in the Police Service of gendarmes in the Command, and then to gendarmerie officers. After his lectures, others were held by Vljako Milenkovic, also a member of the

¹ This paper is the result of the realization of the Scientific Research Project entitled "Development of Institutional Capacities, Standards and Procedures for Fighting Organized Crime and Terrorism in Climate of International Integrations". The Project is financed by the Ministry of Science and Technological Development of the Republic of Serbia (No 179045), and carried out by the Academy of Criminalistic and Police Studies in Belgrade (2011–2014). The leader of the Project is Associate Professor Saša Mijalković, PhD.

² M. Perišić, *Ministarstvo i ministri policije u Srbiji, 1811-2001*, Beograd, MUP RS, 2002, p. 179.

Belgrade police.³

The first legal provisions concerning the training of the gendarmerie, are related to the act: The structure of the town of Belgrade 11th July 1864, after that on 11th July 1884 and the Law of the gendarmerie, when it introduced the gendarmerie in the entire territory of Serbia and in which the school is specifically mentioned, as well as the Decree on the formation of the gendarmerie of the same year (1884). According to Article 42 of this regulation "gendarme will not use the service until he has completed Recruit School. Although the decree provided instruction for the gendarmes, they neither had Recruit School, nor imparted any knowledge. The exception was Belgrade, because it, unlike places in the interior, however, maintained teaching the gendarmes preparing for police officers.

To improve a bad situation in training and education of Serbian gendarmerie in 1899: the first school for gendarmes was established. The school was located in Dorćol, and in 1899 and 1900 lectures at the school were held by two members of Directorate Miloš Đorđević and Sreta Đorđević, who received an honorarium for their service. Classes were frequently interrupted, but again, from time to time, renewed. After a year, first school for gendarmes ceased to exist.

First advocacy and projects for institutionalization of police education in Serbia

Because of the indisputable role and importance of well-trained and educated police, many important people from the period of reconstruction and the establishment of the modern Serbian state, pleaded for their planned and systematic training. Among law enforcement officials who significantly contributed to establishing police training and education the names of Dušan Lazarević Alimpić and Vasa Lazarević⁴ were prominent.

Dušan Alimpić thought that the situation in Serbia in terms of vocational education in the period before the First World War was very negative, because we had no courses in the field of police science. Therefore, in 1911 Alimpić, as the head of Anthropometric-police departments, presented to the Minister of the Interior a proposal for creation of a modern police-technical laboratory, which according to him could also contribute to the establishment of special courses for professional training of police investigative authority. The courses could cover some other subjects, such as criminal and criminal procedural law, forensics and Administrative Law, and in this way it could become a real police school for education of police officers.

After World War I and the creation of a common state of Serbs, Croats and Slovenes needs for vocational training schools and police became even more acute. Dušan Alimpić and Vasa Lazarević, as editors of "Police", continued to promote the significance and content of education curricula of the police.

In the Kingdom of Yugoslavia, however, the problem of the police service became more complex and more acute for solving, so it imposed a need for reorganization and modernization of the service. The issue of systematic professional training and education of the entire police was solved by these measures. At that time Minister of Internal Affairs issued a decision on successive sending selected officers for longer or shorter studies abroad in larger, modern-

³ Bogdanović, B. „Dva veka policije u Srbiji“, MUP RS, Beograd 2002. p.57

⁴ Božović, B., Doprinos Dušana Alimpića i Vase Lazarevića razvoju policijskog školstva, Bezbednost, 3/05, str. 502-512.

style police centers in Western Europe.

Thanks to the participation in international police cooperation (formal, through journals and private), Alimpić exerted an insight into the situation and progress of foreign police, especially in the developed countries, so he could advise what would benefit the modernization of Serbian police.

Immeasurable contribution to the establishment of police education in the Serbia was given by Archibald Reiss, who was the first architect of our modern police and founder of the police education in Serbia. The advantages of newly introduced values were breaking with the current archaic forms of policing and protection of society, independence and separation from politics and other forms of public activities and fulfilling the needs of modern societies.

The establishment of the first police school in Serbia is in connection with the name and work of Archibald Reiss. In fact, coming to Serbia Reiss as staff scientist criminologists, law enforcement expert and excellent practitioner noted that all public services and social protection in general, and especially public safety services in Serbia were undeveloped, primitive, unorganized, inadequately equipped and unprepared for the needs of modern state and society. Therefore, he was engaged by the Ministry of Interior in the organization and reform of the Serbian police.

Reiss made a contribution to the reorganization of the police by establishing lower and higher police schools. In fact, in this Appendix Reiss elaborated a project to solve the acute problems and gave long term solutions in education and other vocational training. In order to solve acute problems he introduced monthly staff training, and as a long term solution he suggested the opening of police schools. He suggested that higher schools should be in Belgrade, while the primary police schools could be opened in Belgrade and other cities in Serbia.

Establishment and operation of the first police education institutions in Serbia

Training and education of gendarmerie till First World War

It must be noted that not only foreign, but also our experiences from the 19th and early 20 century, showed that the bases for Police Service were training and education of police personnel. Therefore, on 19 May 1909 a permanent school for gendarmes was established, i.e. started to offer regular courses and lectures. The same year, the City of Belgrade, with the police gendarmerie command, formed a "gendarmerie school". Courses at this school initially lasted for three and then four months.⁵ Till mobilization, school for gendarmes served as the overall commanding centre of the gendarmerie. Starting from 1 January 1914 regular lectures in both gendarmerie battalions were introduced.

The course was attended by a small number of gendarmes. There was also the lack of room and enough professional teachers so the course lasted just two months, which was insufficient to acquire knowledge in many military and technical subjects necessary to successfully perform the gendarmerie service. However, it is indisputable that the first school for gendarmes gave some positive and useful results in training and education of the gendarmerie.

⁵ Policija, 1911, br. 16, str. 481-484

Training and education of gendarmerie between the two World Wars

After the liberation and unification of the country there was dissatisfaction with the present state of the Gendarmerie, which was without any initiative and proficiency, as well as sheer, brutal force.⁶

Some new objectives and tasks of training and education of gendarmerie were added to previous ones and they were as follows: / 1 / legal education of gendarmerie in governing and / 2 / the creation of "complete system" of education of this formation between the two world wars.

Teaching at gendarmerie stations

Education and training of gendarmes at gendarmerie stations was performed continuously. The major role was realized by the commander of that station. His duty was to subordinate gendarmes and to thoroughly present the course contents which were introduced by the curriculum and to teach them what knowledge, skills and habits a gendarme had to possess in order to carry out the service successfully. The commander was a truly leader, teacher, educator and consultant to gendarmes, both in the service, and outside it. Each station commander was directly responsible for the success of gendarme vocational education.

Teaching at gendarmerie vocational schools

Regulation on formation, equipment and teaching gendarmerie dating from 26 February 1919, predicted the opening of officers' and preparatory schools and required courses for the training of the gendarmerie. Throughout the Kingdom gendarmerie professional schools were established: / a / gendarmerie preparatory school, / b / school patrol leader / v / gendarmerie non-commissioned officer school and / g / informative courses for officers of the gendarmerie.

a) The gendarmerie preparatory school. They were formed in some gendarmerie brigades. Mission and purpose of those schools were to empower young gendarme for independent performance of duties entrusted to him, educating them in so doing, both in professional and military aspects, as good military qualities, good conduct and dealings in general.⁷ The number of participants of each course of the school depended on the current situation and needs, ranging from 40 to 120 young gendarmes.⁸ During the first two months of the course, only theoretical instructions and gendarmerie exercises according to the rules for enlistment were offered, and in the third month of the course practical problems of investigative services were dealt with.

b) **Schools for the patrol leader** were formed in each gendarmerie regiment and independent battalion. School course for patrol leaders took the original three, and then was extended to four months. Only a gendarmerie corporal who completed gendarmerie preparatory school with high marks and who gained sufficient practical experience in the service could be sent to finish such a course. The aim of this school was to prepare a gendarmerie corporal for an

⁶ Žandarmerijske škole, Policija, 1922. br. 7-8, str. 327

⁷ Škole naše žandarmerije, Policija, 1926, str. 1133.

⁸ Žandarmerijske škole, Policija, 1922, str. 324-328

independent operational and leadership role. Only in the first month of the course was covered with theoretical instructions. In the course of remaining months the attenders worked on solving the practical tasks of investigation services, drawing drafts of reports and submitting them to superior commanders, then, conducting searches of premises and persons, reviewing and passport control, crime scene investigation, drafting of complaints, providing first aid to injured persons.

v) Gendarmes non-commissioned officers' school. By the time it was realized that a well regulated and organized gendarmerie needed not only trained and qualified operating, but also management staff. Therefore, a Gendarmes non-commissioned officers' school was established in Sremska Kamenica.⁹ The task of the school was to prepare well-trained non-commissioned officers and thus provide the required number of gendarmerie officers for gendarmerie stations and their representatives.

The course at Gendarmerie non-commissioned officers' school lasted six months and about 250 to 300 students graduated from it.

The course was instructed by specially selected gendarmerie corporals, who had been in Gendarmerie service over (a minimum of two), and who had completed the gendarmerie preparatory school and a school for patrol leaders. The curriculum was very broad encompassing about 59 subjects. The first four months were covered with theoretical instructions with practical actions against culprits, and during the fifth and sixth months of the course, the attenders were required to carry out investigations and solve concrete problems.¹⁰ Special attention was paid to the fact that every non-commissioned officer of gendarmerie trained for self-management service possessed theoretical knowledge that could be applied in all circumstances.

g) Special courses for special services - Gendarmes were more able and expert on special courses for special services, such as the telegraph and telephone courses, ski courses, car-drive and motorcycle courses and dog training courses.

Reiss Police School

On the basis of a special Decree of the Ministry of Internal Affairs, mainly on the ideas of the project "Contribution to reorganizing of the police", which planned the establishment of lower and higher police schools, the first police school in Belgrade was founded and organized by A. Reiss. It was a private boarding school. The school was officially opened on February 8th 1921.

At the beginning there were 28 students (18 police clerks and 10 agents) on a four-month course and they studied the following subjects: criminal law, criminal procedure, laws, decrees and orders of the police with their applications; general political education, practical training in criminal law and procedure, practical knowledge of chemistry and physics, anatomy and hygiene, forensic medicine, scientific police, identification and description of the culprits, criminology, and general policing matters, practical training in technical policing, practical exercises in description and identification, special gymnastic exercises, and French language.

⁹ Established in the Rules of Organization žandarmeriske NČO school prescribed by the Minister of Army and Navy with FĐBr. 102,039 from the month of February 1920., Škole i nastava u žandarmeriji, Policija, 1932, p. 569.

¹⁰ Škole naše žandarmerije, Policija, 1926, str. 1136

The teachers were senior officials of the Ministry, as well as university professors. They were: Reiss who was also Director of Schools, Inspectors of the Ministry: K. Katić, A. Kuzmanović and editor of "Policeman" Lazarević, Ivan Đaja permanent professor of the University, Dr. F. Djordjevic Head of Department for preventing sexually transmitted diseases, A. Andonović Head of Technical Services; Ž. Simonović editor of "Police Gazette"; A. BA Poli a French language teacher and so on.¹¹

The school was a great success from the beginning and the students who finished it were recognized as the best investigators. However, due to insufficient support of the authorities, the school worked for only two years.

Central Police School

Reiss's project on police education introduced the concept of the so-called Reiss police schools which served as a basis for the establishment and functioning of police and other institutions of education until World War II. The most important among them is certainly the Central Police School in Zemun, which started its activities on 10 February 1931.

The task of these schools was to / 1 / prepare police guards and police-trainees, agent-trainees and educate for the police executive service / 2 / prepare the police guards and police agents for education in the supervisory staff and officers of the police guards and police agents .

Following courses were offered at the Central School: / 1 / course for police guards - interns, / 2 / course for supervisors of the police guard, / 3 / course for commanders and supervisors of the police guard, / 4 / courses for police agents - trainees and / 5 / courses for drivers, supervisors and supervisors agents.

Concluding remarks

While we do not have a rich tradition and continuity in the development of police education, and the sources and literature on police educational institutions, information set forth in this paper show that the experience, that is sources do exist, and that they certainly are not insufficient. So in the current reform (innovating, improving) the police and police education in Serbia, along with the studies of foreign achievements, it is worth to review and take our experience in training (and education) of police.

From the above mentioned it can be concluded that, before World War II, the practice represented principal characteristics of education and the main setting for expressing and developing of the police capacity. Huge exchange was achieved between the two world wars, when the Kingdom of Yugoslavia performance of the police service became more complex and under greater public scrutiny, and imposed the need for its restructuring and modernization, and within that, and in that capacity, and for professional training and education of the entire personnel of the police. The "whole system" of police personnel education was established then.

Great attention was paid to education in gendarmerie stations which dealt with the operational work and which were the bases for the establishment of institutionalized training of the gendarmerie vocational schools. Realizing the

¹¹ Exposed, including grades, indicated by: „Svečano otvaranje Policijske škole“ Policija no 1 and 2 Beograd 1921.

importance of planning and designed training and education of members of the Serbian police, institutionalized education continued in the First (Reiss) police school and later the Central Police School in Zemun. Both schools made an invaluable contribution to raising the reputation of the Serbian police. Although they did not have all the hallmarks of today's understanding of police schools, these schools were undoubtedly more than just courses, both in terms of organization, the teaching content and method of their implementation and importance they were given by the police leadership, including society (the state) as a whole.

From the historical development of our police education, it is more than obvious that it requires great effort and means allocated by the state, professional and competent scientific and teaching staff in order to have well-trained and modern police. Even today, the police produced a good police education with appropriate status, i.e. the conditions for the systematic and methodical education and police training.

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DR MARIJA ILIĆ AGAPOVA FIRST FEMALE POLICE OFFICER IN SERBIA

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Abstract: Work of dr Marija Ilić Agapova is not quite common among our scientific and professional public, including the fields in which she takes dominant position in her life and professional opus – librarianship and publishing affairs. In said fields, the injustice was partially remedied thanks to the professionals from the Library and the Museum of the City of Belgrade, being the institutions of which she was one of the founders and the first administrator. This versatile educated woman had left the dignifying trace in many other fields as well, including criminology and criminalities.

Marija Ilić was born back in 1895, in the village of Pađene near Knin, on the territory of Military province of the former Austro-Hungarian monarchy, as the youngest, thirteenth child in the family of laborers and viticulturists. This exceptional woman was ahead of more than her time in many fields. She had overmastered numerous obstacles in the most demanding field – the intellectual one, and in the areas of “men’s” professions, the hardest ones to master.

She had received her education in Russian Institute for girls in Cetinje (1908 – 1911), followed by the State secondary school in Split (1918), graduating subsequently from the Law School in Zagreb, with the title of so-called Central-European doctorate (1923). In 1926, she had also passed bar exam. She lived and worked in Belgrade.

There are numerous fields where dr Marija Ilić Agapova had given her significant contribution. Apart from previously mentioned achievements in librarianship, establishing and administrating the City Museum, the materials she had collected had constituted the initial fund of present Historical Archive of Belgrade. She wrote novels, monographs on history of Belgrade and Zemun, professional books on public libraries operation; she practiced law and worked on translation, since she was quite familiar with seven languages, so she became the member of Literary translators association of Serbia.

She had built her position in the history of criminology and criminalities by practical work in children’s police department, as well as with wide opus of papers, researching circumstances of crime occurrence, possibility of prevention, educational and social work with children offenders, including specific items of relationship of women to crime [(*Woman and Crime* (1929), *Mistress and Maid* (1929), *Children and Municipal Social Action* (1930)...)]. She was publishing in *Policija* (Police), *Žena i svet* (Woman and World), *Ženski pokret* (Woman’s Movement), *Riječ* (Word), *Savremena opština* (Modern Municipality)... She was an active fighter for woman’s rights and breaking apart patriarchal stereotype in the time before any mechanisms, quotes and laws aiding gender equality were in place – and she had lived that equality.

Key words: Marija Ilić Agapova, librarianship, practicing law, translation, the history of Belgrade, the history of criminalities, the history of criminology

Introductory remarks

The traditional understanding of the security affairs defines them as one of the fields being, almost without exception, the "realm" of men. Such associative relation of this domain to only one gender is, in fact, not surprising. Throughout the long history of various fields and works pertaining to security, also viewed in traditional "key", the men were indeed not only predominant, but usually the only actors in the security affairs.

Without elaborating more or less justified reasons for this status, the women, in this field /as well/, had to take a long journey from total exclusion to the contemporary admittance of their capabilities and competences to participate in numerous aspects of this field. Therefore, the value of remainder of the rare females who were, in spite of cultural conditionals, difficulties and prejudices, the first one to enter the demanding field such as policing – is yet greater.

In our region, the first one among them was dr Marija Ilić Agapova, the woman who had, as in numerous other fields, achieved significant results, partially known to scientific and professional public, but her pioneering role in policing was almost sent to oblivion. According to the obscure available data, she did not spend much time on professional administrative work in police, dedicated predominantly to work with educationally neglected children (Petrović, 2007: 336). That, however, did not prevent her to dedicate in even more intellectually demanding manner, to the issues of crime prevention, predominantly among women and children, by publishing numerous papers in these fields in professional magazines of the time.

Way forward to higher education

Marija Ilić was born back in 1895, in the village of Pađene near Knin, on the territory of military province of the former Austro-Hungarian monarchy. Her parents Lazar and Marija, maiden name Opačić, had had thirteen children – seven sons and six daughters. Mother was housekeeper, and father worker and vineyard keeper, which were usual occupations for the inhabitants of rocky and not too wealthy area of continental Dalmatia of the time.

Insufficiently reliable data state that the Ilić family had sent for further education each of their thirteen children, with Marija being the youngest (Durković-Jakšić, 1984: 197; Perić, 2009: 166). The way for such an opportunity to present itself to the family which probably, according to the usual parameters, could not be considered rich, remains unknown¹. It is assumed that the certain role in her education was taken by widespread legacy education for underprivileged, gifted children in so-called Serbian Dalmatia (Radulović, 2002: 6), which was rather common among the Serbs in Austro-Hungarian empire, directed, however, towards training for various craft and trade works².

She had attended primary school in her village of birth (1902 – 1908), and subsequently, as her sister, attended the Russian Institute of Empress Maria (1908-

¹ According to one of the sources, Lazar Ilić is being mentioned as „one of the wealthiest holder“ in his village, and in other sources, he is „poor worker and vineyard keeper“. (Perić, 2009: 166; Radulović, 2002: 6). Even if he was the wealthiest person in such a small village, it would be difficult for him to educate his numerous children – both boys and girls – without any assistance.

² Famous associations with donation funds were: Serbian association of economy „Businessman“, which had during its existence since 1897 to prohibition in 1947 helped education of more than 40,000 children; followed by the Welfare association „Serbian Women“, dedicated to education of girls (Krestić, P. 2009)

1911), established for girls' education within the Montenegrin court in Cetinje³. The Institute was a kind of prep school, providing the girls with the opportunity to take high school graduation, which was a prerequisite for access to the university education. Restrictiveness of regulations, and practice to the greater extend, was a great issue for continuation of higher education for girls, especially in Serbia where there was no girls' high school before 1905 (Trgovčević, 2003: 188), so the girls had taken the graduation privately, with the consent by the high school directors, and entry to the university had required consent from rector. Wives, sisters and daughters of Serbs from Austro-Hungarian Empire were in much more favorable position, being for certain the first educated women in Serbia.

In order to study at the university, Marija Ilić had passed the high school graduation in the state high school in Split in 1918, and had entered the Law School in Zagreb in the same year. She had graduated from the Law School in 1923, with the title of so-called Central-European doctorate. Such doctorate was held by some of the most famous intellectuals educated in Austro-Hungarian Empire, Germany and Italy at the time, such as our only Nobel Prize winner Ivo Andrić (in Graz 1924). Having all previous facts in mind, she was among the first highly educated women of her region "and western Serbian population in general" (Marković, 2002: 11).

The first woman who graduated from the Law School in Serbia, Smilja Jovanović, had done so prior to the World War I, in 1914, just nine years before Ilić. Studying law in that age meant conquering "the hardest male profession" (Trgovčević, 2003: 193). No reliable data exist on Marija Ilić education during the World War I, but there is a notice that she had taken "various practical courses in Rijeka and Zagreb" (Durković-Jakšić, 1984: 197), and had anyway dedicated those years to some sort of informal education.

After graduating from the university, she worked as trainee lawyer from 1923 to 1926, passing the bar exam in 1926, thus becoming an independent lawyer in Zagreb⁴. Soon after, she had moved to Belgrade, where she had found the employment and continued her studies. According to the reliable data, she had studied history with Professor Stanojević on the Faculty of Philosophy in Belgrade in 1931⁵. At the time, she was in the swing of her career, among the others in the Ministry of Internal Affairs, practiced law, translation and her, seemingly, the most accepted profession – librarianship. The will to acquire and apply knowledge was obviously still with her. Example of Marija Ilić, married Agapov, had confirmed one of the basic laws of educational needs proliferation – those needs keep growing, as they are being satisfied.

This versatile educated woman had, besides the formal education, learned foreign languages continuously. As we had noted, she had attended high school in Russian, and she was fluent in German, being an official language in Austro-Hungarian Empire, including the Italian, being the second language beyond the educated world of Dalmatia. She did speak, as expected, French, as all girls educated in Russian, Chekhov's tradition of learning French, piano and knitting. She had also learned Latin in high school, and English and Czech independently. For a resume on the crossing of nineteenth and twentieth century, especially female, such an approach to the intellectual values and life in general is rather outstanding.

³ According to Durković-Jakšić this education had lasted for three years, but Perić stipulates five years (Durković-Jakšić, 1984:197; Perić, 2009: 166).

⁴ *Prva žena policajac u našoj zemlji*, Vreme, 07. 06. 1929, 4.

⁵ There is identification with her name of Yugoslavian Academic Club of the Kingdom of Yugoslavia, dated August 27th, 1931, issued to her as a student of Faculty of Philosophy (Durković-Jakšić, 197).

Fields of professional engagement

Rich life and professional engagement of dr Marija Ilić Agapova offers plentitude of material, which may be interesting for researchers of the same subject from various perspectives. Change of optics, of course, provides a significantly different picture of this persona, but with the same key value dedication and properties. Everything known about her is a testimony of capable, persistent, meticulous, hard-working, intelligent, versatile educated, probably self-assured and non-conventional woman.

Dr Marija Ilić Agapova is predominantly known to our intellectual public as one of the founders and first administrator of the Library of the City of Belgrade. Fields of her interest, which she had visited rather thoroughly than sporadically, were much more diverse. She had had a significant role in establishing the Museum of the City of Belgrade, Historical archive of Belgrade, translated from German, Russian and Italian, being an active member of Women's movement, author of novels and historical publications, lawyer, lecturer of foreign languages in schools for adults and, interesting for the topic of this paper – the first female police officer in our country (Vreme, 7.6.1929).

Data on her are not unknown within the individual fields, but linking them to the same person was often missing. It is possible that the reason for it is indeed extraordinarily wide scope of her interest, where some fields inevitably push out the others, or perhaps identification difficulty for women changing their last names upon marriage. Whichever the reason, papers presenting Marija Ilić Agapova and her various other roles do not mention that it is the same Dr Marija Ilić, the first female police officer, and vice versa.

Identity of dr Marija Ilić Agapova testifies of numerous interlaced elements. That allows us to fit her in more than one category and classify her in various ways. By the efforts of employees of the Library of the City of Belgrade and the Administrator, literary professional Jovan Radulović, she is the best known to the public by her work on establishing that library and the city museum and managing them. Seventy years after library establishing, they had prevented for her legacy to fall into oblivion. A rich selection of her papers had been collected and republished in "Selected Papers" (Ilić Agapova, 2002), including republishing of books "Illustrated History of Belgrade" (Ilić Agapova, 2002a), novel "Son of the Defender of Belgrade" (Ilić Agapova, 2003), professional book "Public Libraries" (Ilić Agapova, 2003a), and the prize "Dr Marija Ilić Agapova" for the best librarian of the City had been established.

The Library of the City of Belgrade and the Museum of the City of Belgrade still exist as separate institutions of culture, established as a single institution by the resolution of Municipal Court of the City of Belgrade in 1931. Marija Ilić Agapova had instantly worked in the library as an officer, and had become the administrator in 1932, while she started administering the City Museum in 1941 (Marković, 2002: 11). She had dedicated most of her career to upgrading and developing library and establishing the first children department of the library countrywide. She was assisted by numerous public workers of the time to develop and upgrade the operation, build awareness on importance of libraries and museums as the institutions of culture, including Branislav Nušić and poet Sima Pandurović. She had published numerous professional papers in the field of librarianship, organized library according to the relatively new decimal system and wrote classical book "Public Libraries" (1934), which is still being recommended as

a professional literature for the librarians. Thus, it is more difficult to comprehend that no library in Belgrade had had her name by 2002 (Radulović, 2002: 6). Nowadays, one branch of the City Library in New Belgrade is named after her.

Volume of material data on Belgrade and Zemun, which she had been collected for the City Museum and Library for years, being the base for 1933 popular, yet accurate historical synthesis of the Capital history, was the seeding for the Historical Archive of the City of Belgrade (Marković, 2002: 11). Currently, this archive does not contain personal volume of Marija Ilić Agapova, in the form available for other significant personas.

As previously noted, she had obtained doctorate of law and had practiced law for many years. That was the main reference for her to join the Ministry of Internal Affairs, since it was noted that “she is among the most significant female lawyers in our country”⁶. She had published a series of articles on preemptive measures to protect women and children, necessity to adjust and modernize Penalty system of Serbia, according to the European and international codes for women and children protection, rights of children born outside marriage and other issues, considered ahead of her time.

Her vast theoretical knowledge and willingness to act in practice, Marija Ilić Agapova had given a significant contribution to sensitizing public on necessity to establish fair view of law makers, society and individuals of women. She is almost unanimously considered to be advocate for woman’s rights, even a precursor of feminism here (Radulović, 2002: 8). She had been translating papers by the most famous female authors, kept correspondence with highly educated women and men of her time on issues of gender equality, writing and lecturing on those subjects. Current, extended view of security for the reason includes specific issues of gender equality, societal security, which may be gender-determined, including individual security. Throughout her entire influence, Marija Ilić Agapova was on the path of modern standpoints, according to which “the term of security, in its social aspect, becomes even the real alternative for the term and existence of freedom” (Cvetković, 2010: 57). She had considered equality of males and females normal, she wrote about that in the manner free of aggression, she had promoted female qualities and celebrated female contribution to human society development.⁷ Herself, she was emancipated and free from interiorized prejudices and limitations, woman living a life of a dynamic intellectual, for which there was no “glass ceiling” to limit vertical success for women. Keeping her maiden name after marriage, studying law, practicing law, entering police force, typical male bastion, accepting managing positions – all of those were properties of the woman ahead of her time back then.

There are additional fields of work, creating the landscape through which this versatile educated woman had travelled. She wrote several novels and popular history books on history of Belgrade and Zemun, connecting thus her two loves – love for history and love for Belgrade. The most familiar ones are “Illustrated History of Belgrade” (1933) and “Son of the Defender of Belgrade” (1940). Historians consider accuracy and documentation of volumes she wrote about positive, with the same consideration of lightness and style by the writers. Culture Association of Serbia had granted her status of artist in 1962, for contribution in that field (Durković-Jakšić, 1984: 199)⁸.

⁶ *Prva žena policajac u našoj zemlji*, Vreme, 07. 06. 1929, 4.

⁷ In 1930, she had held lecture via Radio Belgrade on Mary Wollstonecraft (Ilić-Agapova, 2002: 374), senior, considered to be pioneer of female movement with the book *Defense of Woman Rights* from 1792. Her daughter Mary Wollstonecraft Godwin Shelley, known as Mary Shelley, is the author of the famous *Frankenstein*.

⁸ Not even love for Belgrade seems to be reciprocated to her. Only a street in Padinska Skela was named after her few years ago.

Fluency in seven foreign languages was undoubtedly the base for her work on translation and lecturing. Apart from being an author and creator herself, she often did numerous translations, predominantly from Italian and Russian, although translations of professional articles from German and French can also be found. Opus and quality of those translations is indicated by recognition obtained from the professionals in that field, who had proposed and accepted her in the Association of Literal Translators of Serbia (Perić, 1984: 166). Being a true polyglot, she had been translating various contents, in general related to history, social work, female issue, literature and other topics within her vocation. As for known literary books, she had translated "Roman Woman" by Alberto Moravia, "One True Love" by Dino Bucatti, "Maria" by Grigorije Medinski... After retiring, she worked as a part time lector for Russian and Italian with High Journalistic-Diplomatic School, and taught those foreign languages on courses for adults and archive workers.

One cannot guess the reasons for un/intentional oblivion, which had almost enveloped her work. One of the possible explanations, based on similar experiences, is that the reason holds ideological stamp. There is information that, after the World War II, she was reprehended for continuing to work and manage city cultural institutions during the occupation. After the war, she got fired in 1945, and retired in 1947 (Perić, 2009: 166). Political branding of people would not be spread randomly to other dimensions of their work in this case only. All of the regiments had achieved desired outcome for shorter or longer time by doing so, but with harming own cultural and spiritual background.

First female police officer

The least known data from rich professional biography of dr Marija Ilić Agapova is covering in fact her work in police. The reasons may be various, from lack of research of policing past issues, her short stay in the force, to different comprehension of policing of her time against current organization of forces. Historical literature does not even mention that aspect of her work – Serbian Dictionary of Biographies, Prefaces of her republished books, *In Memoriam* text published in 1984 Annual Booklet of the City of Belgrade – fail to note this fact.

Sources and literature in the field of security sciences note that dr Marija Ilić was the first woman appointed "to work in children police as a notary" (Petrović, 2007: 336). Date of this appointment was June 6th, 1929, and not July 7th as noted by Petrović, since „*Vreme*“ newspaper dated June 7th, 1929 had published "The Resolution by the Minister of Internal Affairs, General Živković, appoints dr Marija Ilić as a police trainee in the Directorate of the City of Belgrade, ninth group first category and degree, as of yesterday. Miss Ilić is the first female joining the police forces in our country"⁹. Text with the same heading and date in June was published by professional-popular magazine of the time „*Policija*“(Police)¹⁰.

Position of notary was, at the time, significant professional officer's appointment in the field of public administration (Petrović, 2007: 336), far from current understanding of that term. Terms such as "female police" and "children police" were attempts to differentiate against traditional, existing organization of police in the Kingdom of Yugoslavia, employing exclusively males. That had firstly noted that the scope of work of this new department, established pursuant

⁹ *Prva žena policajac u našoj zemlji*, *Vreme*, 07. 06. 1929, 4.

¹⁰ Nikićević, M, (1929) *Prva žena policajac u našoj zemlji*, Beograd, *Policija*, br. 11-12, 527-532.

to the amendments of Penalty Law and consequential organizational changes, are different, specific issues of women and children, as well as that those special children police department, according to the foreign experiences, should be staffed with females.

Years before this appointment, numerous public and professional workers, lawyers, doctors, teachers, had been indicating necessity for some of the works regarding "criminal activities prevention" within some police competences, to be performed by women, although they had been aware that this was considered "bold or even naïve" at the time in Serbia (Todorović, 1925: 19). The first attempt to "authorize a police notary to care for children" dates back to 1921, but had lasted for mere month. Advocates of such approach claim that the positive effects of existence of "special officer for minors" had been noticeable, even for such short period (Nikićević, 1929: 528), therefore the lack of funding for such purposes is inadmissible justification. Relation of society towards children was not different from relation to the adults, and was based on repressive actions, with children being incarcerated with the others. There was a noticeable need to establish shelters for children of streets, beggars, advisory activities, prevention of premature or "immoral" children labor, even establishing public baths and taking in alcoholics and mentally ill. Different approach was required for interrogating children, performing body search for women and similar activities. Separate problem was prostitution which was in some countries, such as England, dealt by so-called moral police, which was armed and authorized to use force. Yet again, in spite of its existence, there was a newly established female police with different methods of acting, unarmed, trained predominantly for care giving role, similar to present social works, with the task to "build the thought for return to honorable life" (Janković, 1926: 621).

Certain skepticism with advocates of female employment in police can be found in the article greeting and praising appointment of the first female police officer: "Together with Miss Ilić, one experienced and professional male police officer should have been appointed, for children affairs only. Our society is different from the ones in Germany, America or England, for a female police officer to count on the success as there. It is necessary to start with a man" (Nikićević, 1929: 531). It seems that skepticism in this field is a phase which is slow to disappear. Emphasis of this remark should have been on the word "one", since back then there were experiences that such duties were delegated to teams, and special Children departments had been established, not even looking like police departments (Sretenović, 1929: 6).

The main official duties of the first female police officer were, as she noted, founded on wide base, but within the boundaries of preventive work. Only in the extremely difficult cases, such as child seduction, persuasion to do prostitution and similar, the repressive measures would be used. The task of children police was nearest to the present comprehension of social care. It included monitoring and supervision, predominantly of educationally neglected children on places they resided, housing them in institutions, health care, collecting data on social circumstances of children's life and coordination of work with parents or institutions for child care; advisory works directed towards parents, including advocacy and advising courts and tutorial boards "in all punitive and civic matters" pertaining to children; down to giving comments in all cases of children education neglect and aiding teaching institutions in decreasing low attendance (Sretenović, 1929: 6). Members of children police would locate such children, house them and cooperate with other institutions, including juvenile homes.

Ilić herself had been promoting the standpoint that females in children police achieve greater success than males, since they win child's confidence easier, understand child's emotions and needs better and face less resistance in contact with parents, especially mothers. That had, however, perhaps understandable for the time, pulled her into the trap of cultural prejudices on nature of genders, only this time – in favor of females.

Apart from practical engagement in children police, she wrote theoretic papers and translated texts on the issues of women and children protection, presenting problems and solutions in that field in many countries worldwide to the domestic public, predominantly from England, Germany, Russia and Netherlands. She had also been publishing papers quoting literary works on abandoned or neglected children, such as works of Ilja Erenburg or Nadezda Krupskaja on "children of the street" in Russia. She was writing for journals and magazines such as

Policija, Žena i svet, Ženski pokret, Vreme, Savremena opština, Opštinske novine and other on topics of female equality, specific properties of females and children as offenders and child protection. Her work in children police and papers such as *Woman and Crime* (1929), *Mistress and Maid* (1929), *Children and Municipal Social Action* (1930) and other had given her place in history of, among the others, criminalities and criminology.

After her short work in police, there had been other attempts to appoint females in police, but without any significant steps forward, due to the lack of systematic solutions. A. Dimitrijević had also attended course for female police offices in Germany, but did not work in police, and as late as 1937, Josipa Šagovac was appointed as police officer in Zagreb (Petrović, 2007: 336).

* * *

Dr Marija Ilić Agapova had earned for her name to be mentioned in history of crime research. She was working both theoretically and practically in that field. She was the first female police officer in our country and the woman writing numerous popular, professional and scientific works in the field of children and women protection. Although she did not work in the police for long, she did give her contribution, as circumstances allowed, to affirmation of this vocation and for women in it. If her contribution in this field was not greater, judging by plentitude of her biography, that was certainly not her fault. In all professional fields she was dedicated to, which were unusually numerous, she had taken dignifying position. Each of those stories depicts her in the same manner – or is it one and the same story?

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APPLICATION OF NEW FORMS AND WORK METHODS WITH A VIEW ON POLICE OFFICERS EDUCATION

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Abstract: The development of police organisation through history is shown in this paper and the emphasis is put on the development of police organisation since the early twentieth century. The police system today is facing a great challenge and responsibility, trying to form and build autonomy of its acting in coordinates between politics, state and community, in such a degree as that supposed by the Constitution and law. Democratisation of social life, and the new role of the police, expands jurisdiction of the police above borders of the formal social control – laws – and to a great deal includes work with community representatives, which enhances establishing of informal community control, through building community relations and cooperation in solving problems. In this sense, new demands are being placed before police officers and it is possible to achieve them by changes in the education of personnel for work in the police. The necessary characteristics which should be developed during educational process are pointed out in order to successfully answer modern requests.

Key words: the police, education, forms of organisation, community.

Introduction

Institutionalisation of the police is done, among other things, under the strong influence of historical, social, political and cultural factors. The police, which were under community control for a long time and subjected to interests of ruling community structures, have now been transformed into service for citizens and the work of officers is subjected to internal and external control of democratic institutions and public. The role of police in modern social, political and economic relationship, imposed the need for education of police officers which is appropriate to current moment. It is more and more expected from police officers to master knowledge which is related not only to crime and police science but also to master knowledge from sociology, criminology, psychology and technical science. That supposes changes in educational process of candidates for work in police, which characterises proactivity of dealing with problems, task-oriented work and multi-agency solving of problems. The facts that reactive dealing and positive law norms in general, are not a good way to animate police to deal with citizens, are implying that it is necessary for the police to accept knowledge that good police work requests development of a wider range of activity, in order to act in the multitude of problem oriented cases. It is important to stress that being turned to traditional, reactive acting produces the false sense of shortage of legal powers of police in the existing legal norms. The success of the police organised in the traditional way depends to a large extent on the ability of the police officer in question, an individual, and public appears as permanent critic of the police work.

During the education process for working in the police, it is desirable to develop a sense for team work and initiative for creative approach to work in each and every individual.

Phases of development of police organisation

The police were, for a long time throughout history, viewed as expanded military power. With emerging and the development of the first cities in Ancient Egypt, police work was for the first time separated from the military, so that we can say that since then police service was not just expanded military power. In the Roman age, the first police unit was made out of military and financial composition, known as *vigilia*, meaning night watch, which had a task to provide protection from fires. In 1285, English King Edward I guaranteed to his citizens personal and estate security; among other things, there was an alert system or chase, which gave right to each adult person to call fellow citizens from 15 to 60 years old to help him or to join him in a chase which should prevent a burglar or chase him and bring him to justice. At the beginning of 17th century, settlers on the continent of America founded services which took care about community safety, like models that existed in their states. Shown examples imply that police acting is, in most cases, shaped by a community's need for safety, that it fulfills a common function and its aim is protection of safety and preserving of stability. These reasons can be seen as crucial for police institutionalization process. At the beginning of 18th century, in 1710, the first professional paid police organisation in the USA was formed in Boston. British statesman *Ser Robert Peel* founded the first modern police service in the world in 1829 - *London Metropolitan Police* whose officers, in the founder's honour are even today called bobbies. His mode of organising the police became basis for development of police forces in the largest number of societies which built their institutions on liberal and democratic tradition. Modern forms of police organisation, which are recognised in abandoning repressive acting as dominant social reacting to crime, have become a vision come true of what *Ser Robert Peel* imagined. In recent history, it is possible to determine certain phases in the development of police organisations which are common for almost all modern states. Historical, economical, social, community, political and cultural characteristics influenced the development of police organisation. Phases are not commonly overlapped but it is possible to conclude that development has passed through three stages (Kelling, L. G., Moore, H. M., 2000, p. 96-116):

- *The first phase or the so-called political era* (from 1840s to 1930s), is characterised by strong influence of political structures on police organisation and police acting. Dominant influence of political structures was reflected on resolving the issue of human resources on every level of police chain of command. Competence and professionalism were placed behind political beliefs. Police were often used in quarrels with political opponents and one of the characteristics was a high incidence of *corruption within police*. Police service was organised on the *principle of decentralisation* (Simonović, B., 2006, p. 301-307). This phase lasted until the first decade of the twentieth century (in the USA from the second half of the nineteenth century until the first decades of the twentieth century).

- *The second phase* in police development, which is connected to 1930s - 1970s period, is clearly shown on the example of the development of police in the USA. That period is characterised by *professionalism and formalism* in doing police work. At the same time, the *police organisation is closed*, insufficiently prepared for taking propositions from other social subjects for cooperation concerning

opposing crime. The attempt to minimise political influence is evident as is the breaking up of the police and local political representatives. The police were organised according to a military model, with a detached hierarchy that followed the principle of subordination and prescribing procedures for each area of police work. Within the classical concept framework it is supposed that the community is the main source with huge potential which is completely unused (Herman Goldstein, 1990, p. 14-15). The basis of police legitimacy was strict application of criminal law and holding on to stiff police professionalism in performing tasks. Because of the stated characteristics this concept was dominant in organising police worldwide and it has been known in science as *professional crime fighting, the model of professionalizing the police or classical concept of police work* (Simonović, B., 2006, p.301-307).

- *The third phase* of police development, which started in 1980s, presented a response to all weaknesses of the classical concept of police work, and it started from redefining the role of the police in community, making the new strategic aims, changes of organisation forms and bringing in new methods of acting. This approach recognized that community could have a very important role in support and active participation in many programmes. Aggressive investigation procedures (informers, undercover operations, electronic surveillance, sophisticated analyses) are more and more applied. Problem oriented work is being introduced, by bringing in proactive elements and by enhancing analyses. Tight bonds with the community are stressed in order to get better control of crime and answer community needs more successfully (*community policing*). *Ser Robert Peel*, who was the architect of modern police, put forward a similar view of police organization, and according to it, successful police work depends on, among other things, cooperation between police and citizens, approval and accepting of community and openness of police work (Жељко Никач, 2009). Having this in mind, we come to the conclusion that future police work must be professional, strategic, community-oriented and pointed at perceiving and solving community problems. This is a challenge and task for police experts to realize and make a new vision (Mark Moore, Robert Trojanowicz, 1998, p. 225).

Besides these phases some authors recognize the *fourth phase in police development, the so-called transition era*, the main characteristics of which are foot patrols, solving problems and testing the relationship between police and community (Joanna Ziembo-Vogl, Gorazd Meško, 2000, p. 523-536). This phase appears in the period between police professionalism enhancing and bringing in concept of police work in community. Police try to apply new ways of motivating citizens to participate more actively in creating safety activities in their surrounding and to restore the good reputation of police profession. Working in police patrols, beside advantages which are, among other things, seen in a speedy intervention after citizens' calls, the size of a territory in which the patrols could be working, have shown some deficiencies. Above all, the number of contacts with citizens is diminished significantly which in turn diminishes the amount of safety information and the increases alienation, meaning isolation of the police from citizens. The idea of transforming police service to citizen service was not fully done. Following the innovation in the development of information technologies and their application in the police, in literature, the fourth phase is stated as the age of *information technology*, which covers the period from 2001 until today. Precise and timely following of geographic distribution of crime (GIS), electronic surveillance of suspects, development of biometrical systems and similar, are regarded to be the most prominent characteristics of this period (Dennis Rosenbaum, 2007, p. 11-44).

New forms of police organising

New forms of police organising were born in the last decades of twentieth century and they represent a try to repress centralism and heavy bureaucratism in police acting which made police organisation inefficient in opposing the crime. It is necessary to add to this deeper and deeper erosion in relationship between police and public, especially with ethnic groups. Its main characteristic is development of direct communication between the police and citizens in narrow area, which contributes to successful solving of numerous issues from local community by applying proactive procedures in the police work. The stress is put on precaution oriented approach which promotes cooperation of police officers with the community, acting on causes of crime, eliminating fear of crime in citizens in local area and developing of partner relationships between police, citizens and their institutions, state institutions, local authorities and non governmental organisations, with the aim of safer ambient for life and work.

Precondition for implementing new forms of work and cooperation of the police with local community puts on the need of decentralism of police organisation. Past practical experiences imply that the needs of local community, at least in part that relates to opposing crime, are not in direct relationship with interests and needs of broader community. Sometimes organisations which are founded on federal (republic) level for solving global safety problems, can slow down and even stop development of proactive activities of the police on the level of local community. Philosophy of new forms of police work is viewed through innovations not only concerning police acting but through new types of organisation, as important precondition of transferring these theory models on practical level (Elmedin Muratbegović, 2010, p. cxxiv). Considering historical, social, economic and cultural characteristics of every state, and also smaller territory units in one state, new concepts of work are not unified as theory and practical activity, they are applied in different varieties in increasing number of states. It is considered that new forms of police organising are related to police activities which concern the police work in community (Community policing), problem oriented activity (Problem Oriented Policing), police acting in neighbourhood (Neighbourhood Policing), constable/patrol activity on foot (Foot Patrol), service oriented work (Service Based Policing), police work with consent (Policing by Consent) and similar (Eugene McLaughlin, John Muncie, 2001, p. 42). These concepts represent innovation in respect of the traditional police professionalism because of its trying to include as wider circle of institutions of formal social control, citizens and its societies and other interested parties.

Implementation of new forms of police organising and new work methods has aim to ensures building tighter connections between the police and the community as also enhancing of mutual trust. Presumption that the police and the community, working together on recognising and finding solutions for safety problems which bother community, and which are crime related, various deviate behaviour related and on minimising the fear of crime, can together make an ambience in which every member feels safe. The point is in idea that the police does not wait for problems to evolve but it goes toward them and resolves them in cooperation with citizens and other parties of social control (Goldstein, H., 1989, p. 25.).

In the Republic of Serbia, the project of police in local community and safety of the community, in the framework of Programme for safety and availability of justice in the Balkans, under auspices of the Department for International Development of the British government (DFID) has officially

started in four municipalities. Department of internal affairs chose locations, as representative of all communities in Serbia, in city, industrial and tourist centres. Chosen municipalities are: Novi Bečej, Kragujevac, Vrnjačka Banja i Zvezdara. Later, on behalf of the Norwegian government, the National Police of Norway, did annual programs of helping police in northern parts of Serbia, during 2003 in Bačka Palanka and during 2004 in Novi Sad. Swiss agency for development and cooperation in behalf of Swiss government applied program for helping police in Požega at the beginning of 2004. The report about development of the project and problems in its realisation has been done and in it there were recommendations for future work (Mellish. D., Đurđević, Z., 2004).

Education of police officers

In line with accepting new forms of police work, it is more and more distinct need for a broader, more complete, education of police officers. Beside general culture, the knowledge of social arts, criminal and law science, management in police as also introduction of contents which relate to development of communication skills are needed. During training for work in the police, in many countries there is more and more attention paid to trainings which are related to conflicts solving and antistress programs, at the same time cutting the number of subjects which study military skills, which minimizes the military component of training for work in the police. At the time of enrolling in police, it is very important to say precisely characteristics which candidate has to have, as those characteristics which could be developed during schooling. Taking into consideration variety of jobs in police, and variety in local communities, it is desirable that candidates show high level of tolerance, respect and adjustability. Education for work in the police considering mentioned varieties could help to realise cultural differences of various communities, especially those which they rarely encountered. For cooperation and partnership with local community it is necessary that police officers have developed communicative abilities and skills to work as a part of a team. The best candidates are those with selfinitiative, those who are willing to apply new ways of solving problems, and not those which expect from their superiors to tell them what and how to do things. Training which gives new advice and ideas can surely develop these skills.

Standards which are being set up for education of police officer in developed European and other states are the same as for education in public schools, at the same time, because of particularities of police call, part of it is regulated with special laws. Changed role of police in society has significant impact on education of police officers. The stress is put on cooperation with community, giving services, multi-agency approach in solving problems, enhancing social component of police acting. Changes in education for work in police are emerging under the pressure of changed social, community and technology circumstances in the world. Having that in mind, the need for specialisation of police candidates is more and more present, they would study more narrow scientific areas, which are significant for doing police work.

In modern conditions, it is not possible to demand from police officer successful doing of police work, and at the same time he does not have adequate knowledge about the community itself and about new facts about new work methods. Fulfillin these complex requests will be one of basic criteria for measuring efficacy and effectivity of police doping in future, a one of basic presumptions will

be high quality education programs by which education of police officers will be done. The process of decentralisation in police work gives broader possibilities for discretion deciding of police officers on field, which implies the necessity of better competence during regular schooling and continued expert education during working. Main target should be vocational police subjects, with maximum of practical content which would implement theoretical knowledge. In this part it is necessary to point that better communication and information exchange between subjects which are dealing with crime and education institution is necessary after ending the education candidates would be as soon as possible trained for doing work on their own. Common accepted attitude that more educated officer is better officer has to be promoted in right manner by advancing in career. Introducing the criteria which would enhance building of a more human relationships in police itself but also giving respect to local community in dealing with identified safety problems, would have positive impact on selection and naming candidates in police and it would protect police from misuse of local political leaders (Nikač, Ž., 2007, p.168).

Having in mind laws according to which the police in The Republic of Serbia assures that police officers acting in practise is not under or in contradiction with European standards of police acting¹, there is a need to apply in their work, through schooling and programs for personal improvement, additionally work on legal provisions which are in the Law. This is particularly in part about implementing international regulations and standards of police acting: duty of serving people, abiding law and decreasing unlawful things, human rights, avoiding discrimination in doing police tasks, limits and sustainability in use of force, prohibition of torture and application of inhuman and humiliating procedures, helping people in need, commitment of protecting classified data, the obligation of refusing unlawful orders and the resistance toward bribe and corruption. Document which presumes strategy of development of training system and education for needs of the police of Republic of Serbia, the vision of development envisions modern, sustainable system for training and education for police officers during whole working period, with presenting scientific contents on the highest scientific level². It is pointed that education for police needs rests on and respects university standards, that it is open and oriented toward internal and external control and that it is constantly promoting and developing. The mission is defined as continually promoting of police professionalism through enabling, education and constant training of police officers but also other employees in the Department of internal affairs of Republic of Serbia and interested community parties.

The reform of police education is significant in respect of changes in police subculture. In literature, police subculture is defined as support to certain values, comprehension of its own position and perspectives as also accepting of collective identity of a group (Ignjatović, Đ., 1996, p. 252). Their basic characteristics are social isolation, conservatism, suspicion toward others and stressed internal solidarity. Police subculture influences significantly work manner and practical procedures of police officers. Law and other provisions can not completely define police practice, so discrete powers of police officers in concrete matters define who and when would be stopped in traffic, when and who will be asked for identity, when would warning be applied and when would offense be stated and etc. Having in mind that personality features which are immanent to police subculture are most developed during work in police under the influence

¹ Article 12 The police law , Official journal RS, number 101/2005.

² Strategy of development of educational and training system for the police needs, Belgrade, Department of internal affairs of Republic of Serbia, 2005

of learned attitudes and behaviour, it is clear that regular police education and various facultative programs of constant improving are crucial segment for police, and that potential should be used in the best possible way. New police candidates which are just joining the profession are the most open for accepting the new philosophy of work even in situations when candidates do not have any prior experience, they are usually ready to accept certain novelties in respect to the past, which supposes closeness with citizens, orientation toward solving different problems, team work and constant need for a multitrack communication and it requests new skills and knowledge which are not asked for before or which are little used, and at the same time they are significantly different from traditional philosophy of police work. Knowing that one number of contacts between police officers and citizens is related to frustrating situations for citizens and police officers, requests are placed at interpersonal communication and social skills of police officers. Satisfying of all these requests supposes that enough attention is given to these components during education.

Conclusion

Democratisation of society enhances changes which are related to the place and role of the police, but at the same time they change international dimensions of policing, placing new demands before police officers, which means that they have to adopt knowledge and skills which are related, for example, to the development of new technologies, higher mobility of transit of people and goods and gradual disappearing of borders between states. As an important task in the education of police officers we can note a change of relationships between theoretical and practical contents. In the past, a huge disproportion was present between theoretical and practical contents, as well as between the curricula in the Republic of Serbia and European Union member-states and the states from southeast Europe. By reforming the educational system of police and transforming of the High School of Internal Affairs into the Center for Basic Police Training in Sremska Kamenica, education of candidates for work in police approaches modern European and world standards. More attention has been given to the percentage of women and national minorities, as well as to the regional proportion of candidates for work in police.

Higher acceptance of broader, demilitarized and more subtle concepts of human safety, which imply guaranteeing safety as public good and safety services and which are characterised by transparency and responsibility toward citizens, has replaced traditional understanding of safety as the sole right of political, safety and military structures. As ultimate users of public services, citizens have the right to express their thoughts about safety, and other disputable issues, in order to ensure successful and efficient assignation and use of public resources with the aim of resolving priorities. Having in mind the above stated, the education of police officers, as well as that of citizens, in future must be aimed at introducing modern concepts of police work in the Republic of Serbia.

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II Contemporary Tendencies in Criminalistics and Forensics

SOME ISSUES IN ESTABLISHING A NATIONAL CRIMINAL INTELLIGENCE MODEL – SLOVENIAN CASE

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Purpose: The purpose of this paper is to identify and analyse the success factors that are prerequisite for establishing a national criminal intelligence model and transforming it to intelligence-led policing (ILP). The paper discusses some issues related to this topic in Slovenia.

Methodology: By means of a qualitative descriptive analysis, the authors analyse existing findings on criminal intelligence and their possible impact on the development of a national criminal intelligence model as a generalised police management framework, designed to formalise and professionalise at the national level all criminal intelligence processes.

Findings: This paper identifies different critical success factors (management's readiness for change, organisation structure adjustment, training and education, improving analytical capacities, cultural shift to embrace the concept of ILP and other) that need to be addressed in establishing the national criminal intelligence model in Slovenia. In creating a national criminal intelligence model, it has to be taken into account that not all analysed success factors carry the same weight due to different national characteristics. Because of the complexity of certain success factors, the model cannot be established and implemented quickly and consequently no immediate changes can be expected towards more efficient prevention and reduction of serious crime. The findings are useful for the Slovenian police in establishing the national criminal intelligence model. In addition, the findings are useful for other South-Eastern European countries that do not yet have a national criminal intelligence model in place.

Originality/value: The paper represents an attempt to generalise experience and views regarding the establishment of a national criminal intelligence model. The establishment and implementation of the national model based on the principles of intelligence-led policing represents one of the conditions for strengthening the capacity of institutions responsible for combating serious crime both at the national and international level.

Key words: national intelligence model, Intelligence-led policing, criminal intelligence, Slovenian police, critical success factors, international police cooperation.

Article Type: Research paper

Introduction

One of contemporary tendencies in criminalistics is fast development of criminal intelligence function. The concept of criminal intelligence,¹ which emerged as a response to the ineffectiveness of crime-fighting efforts, ultimately strengthened its position when criminal intelligence was recognised as an important tool in fighting organised crime. (Peterson, 2005:5, Potparič and Dvoršek, 2010:16-17).

However, one of the main limitations in the application of the concept of criminal intelligence so far has been its reactive nature. In practical terms, criminal intelligence has therefore often been viewed as a repository of sensitive information rather than a proactive resource that could produce information critical for preventing crime and apprehending offenders. An additional problem consisted in the fact that intelligence units tended not to produce consistent, specifically defined products. Instead, intelligence reports tended to be written on an ad hoc basis to address critical matters (Carter, 2009:52). This realisation played a significant role in developing criminal intelligence towards the intelligence-led policing (ILP) concept.² ILP development arose from the realisation that quality criminal intelligence constitutes the lifeblood of a modern law enforcement organisation, making it possible to clearly understand criminal offences and crime, identify perpetrators of criminal offences, establish interconnected criminal offences, and predict problems (HMIC, 1997:1). This concept, contrary to the traditional understanding and use of intelligence exclusively as support for individual investigations, envisages using intelligence in strategic planning and resource allocation, introducing a move from investigation-led intelligence to intelligence-led policing (Ratcliffe, 2008:88, IACP, 2002:13).

The Hague Programme: Strengthening Freedom, Security, and Justice in the European Union (Council of the European Union, 2004a), introduced ILP principles in European security architecture. In this context, establishing the European criminal intelligence model (ECIM) represented implementation of the ILP concept in the EU. The ECIM is intended to achieve the following:

- Create conditions to enable EU member states and competent institutions to use common methodology to curb serious and organised forms of crime in the EU;
- Improve shared knowledge about serious and organised crime based on effective collection, exchange, and analysis of information;
- Enhance the effectiveness of Europol and other EU institutions;
- Achieve better operational results in identified priority areas; and
- Establish greater responsibility of ministers regarding the performance of tasks for the needs of the Council of the EU (Nunzi, 2007:147–148).

¹ Criminal intelligence is defined as police activity aimed at lawful collection of information from every available source and analysing it in order to provide tactical and strategic criminal intelligence. The final product of this process is criminal intelligence, which, according to Europol's definition (Brown, 2007:338), is based on raw information about crimes, events, perpetrators, suspects, and so on. Criminal intelligence is the enhancement of this basic information, providing additional knowledge about criminals' activity. Criminal intelligence provides information that is normally unknown to the police and is intended to be used to enhance investigators' efforts; it is "information designed for action".

² Ratcliffe (2008:87) defines the following key features of ILP:

It is a management philosophy and a business model;

It aims to reduce crime as well as prevent and reduce criminal offences;

It uses a top-down management approach;

It combines analyses from crime scenes with criminal intelligence on the perpetrators of criminal offences;

It uses criminal intelligence for objective decision-making concerning police resource allocation;

It focuses enforcement activities on active and serious offenders.

The existence of the ILP model is dependent on efficient operation of the following three components: the interpretation of criminal environment, the application of intelligence by analysts to influence the thinking of decision-makers, and decisions taken by decision-makers regarding resource reallocation and the selection of the most appropriate crime reduction tactics on the basis of criminal intelligence products.

The ECIM is intended to ensure more effective reduction of serious forms of crime in the EU security area based on threat identification by means of the intelligence cycle developed in the course of traditional intelligence activity. It begins with strategic understanding of present and future threats based on available information and criminal intelligence provided to Europol by EU member states. In this process, Europol was assigned the role of being a central point in the EU to receive, store, and analyse the data collected and draw up an Organised Crime Threat Assessment (OCTA). With the OCTA, data from the criminal environment is interpreted to prepare a threat assessment, thus enhancing common knowledge about the criminal environment and threats originating from it by identifying the most dangerous criminals and criminal networks and determining priority areas for reducing serious and organised forms of international crime. This new approach to crime prevention in the EU should create a basis for police forces from different member states to jointly plan investigations based on the best available criminal intelligence (Brady, 2007a).

There are, however, certain difficulties and drawbacks in the functioning of the ECIM. Despite the fact that the OCTA represents a very important segment of ILP in the EU, some member states are still very sceptical about the usefulness of the OCTA's findings in achieving operational results (HENU, 2009; Goold, 2009:19). On the other hand, Ratcliffe (2008:81–82) maintains that the OCTA, which Europol presents as the main product of criminal intelligence, does not prove that the concept of ILP is really being implemented in the EU. Namely, the main premise of the new model (i.e. that criminal intelligence guides activities against a criminal environment and that it plays the main role in allocating resources) has not been embraced in practice yet, because OCTAs do not actually bind anybody to use their findings. Similarly, Brady (2007a) found that neither governments nor member states' police forces take the ECIM seriously enough. Nevertheless, consent regarding establishing the ECIM in the EU is an important step towards promoting the use of ILP methods, a fact confirmed in a special study by the European Parliament (Goold, 2009:17–18), which sees important factors in the ECIM and OCTA that should significantly contribute to harmonising police practices in the EU and to introducing modern intelligence-led strategic planning, which will ensure the quality of threat assessments for guiding police activities at both the national and EU levels.

Therefore, the conclusion can be drawn that the ECIM cannot operate efficiently without established national criminal intelligence models³ that are characterised by an understanding of the ILP principles. It is, namely, a fact that national criminal intelligence models represent ECIM sub-systems and only their concerted action can substantially contribute to the increased efficiency of crime fighting in the EU. At the same time, ILP model is vitally dependent on an established and operating (national) criminal intelligence model, the latter being a prerequisite for the police organisation to start functioning as a business model where criminal intelligence is integrated into the central framework of all police business and decision-making.

This is also indicated by Goold (2009) and Brady (2007b), according to whom there is still a significant problem concerning the provision of information

³ A national criminal intelligence model can be viewed as a generalised police management framework designed to formalise and professionalise at the national level all criminal intelligence processes that are taking place at various levels. In formalising criminal intelligence processes we use the intelligence cycle, which comprises the following phases: tasking, collection, evaluation, collation, analysis and dissemination of intelligence. The model is instrumental in articulating organisational structures, processes and ideas related to criminal intelligence function and their mutual relations affecting coordinated operation of the model, which is ultimately aimed at crime reduction.

and intelligence to Europol by EU member states, on which Europol is almost entirely reliant. EU member states still frequently have reservations when it comes to giving agencies such as Europol more authority in criminal prosecution, and in practice, law enforcement authorities prefer to cooperate bilaterally in cross-border investigations and exchange information and criminal intelligence on an *ad hoc* basis, using bilateral agreements as the basis.

Slovenia is one of the EU member states that has yet to set up a proactive criminal intelligence model, and was assessed as early as 2006 by EU experts as still lacking a criminal intelligence concept enabling a proactive approach to reducing crime. The setting up of a Slovenian national criminal intelligence model will represent the basis for the implementation of a policing model based on the ILP concept.

Setting up the national criminal intelligence model in Slovenia

The Resolution on the National Crime Prevention and Deterrence Program for 2007–2011, according to which identifying types of crime, predicting them, and taking proper action must not rely only on people's feelings, experience, and intuition but on a professional approach based on scientific findings that provides certain answers and guidance, was set as the direction criminal intelligence should take in developing policing in Slovenia. Criminal intelligence activity was to be implemented through collecting, evaluating, analysing, and communicating criminal intelligence, which would represent the basis for decision-making and planning police activities. This wording indicates that Slovenia made the decision to implement the ILP concept in crime prevention and reduction as a response to an increasing gap between the crime rate and available resources.⁴

It should be noted that as early as 2005, at the October JHA Council meeting, Slovenia took part in adopting conclusions related to setting up the ILP concept in EU internal security architecture. One of the conclusions of this meeting addresses setting up and employing a joint ILP methodology to be sought by all EU bodies, agencies, and member states in a coordinated manner. This gives a clear indication that the member states adopted the ILP concept at the highest level, making a commitment to be involved in the activities to implement the new concept in the EU (Council of the European Union, 2005).

Unfortunately, the reality in Slovenia and most EU member states has failed to match the conclusion above concerning the ILP concept. The fact remains that ILP was embraced by only a few member states, and the majority did not express great enthusiasm for setting up the new concept, which also entails a cultural shift for most member states' law enforcement organisations (House of Lords, 2008:27). It is a question whether the member states' senior representatives even understood the meaning of the ILP concept or realised the changes that would have to be made in law enforcement organisations for the new law enforcement activity model to replace the traditional model.

⁴ The evaluation by EU Council experts on exchanging information and criminal intelligence with Europol and EU member states represented a notable contribution to the introduction of the ILP concept into the resolution on crime prevention and deterrence. In their report (Report on Slovenia SN 1378/1/06 REV 1, Brussels, 13 March 2006), EU Council experts recommended setting up an enforcement concept based on criminal intelligence that would enable a proactive approach and priority planning in fighting crime. During the discussion on the report in the EU Council working group (Multidisciplinary Group on Organised Crime), Slovenia declared it would observe the recommendations (Resolution on the National Crime Prevention and Deterrence Program for 2007–2011, 2007).

In Slovenia, however, not even the clear requirements for setting up the ILP concept stipulated in the Resolution on the National Crime Prevention and Deterrence Program for 2007–2011 yielded any progress in developing criminal intelligence model as the basic component of the ILP model. In this context, it should be noted that the 2008 Guidelines and Mandatory Instructions for Drawing up an Annual Policing Plan (MNZ, 2007:1), which are prescribed by the minister every year, established the requirement to strengthen criminal intelligence, and the 2010 Guidelines and Mandatory Instructions for Drawing up an Annual Policing Plan (MNZ, 2009: 1) even established that the reorganisation of the police at the institutional, organisational, and management levels should take the ILP concept into account in investigating serious and organised crime. However, annual police plans from 2008 to the present, despite the clearly stated objective to ensure implementation of the tasks and measures in the Resolution on the National Crime Prevention and Deterrence Program for 2007–2011 and in the *Council and Commission Action Plan* implementing the *Hague Programme*, have not defined any activities towards establishing the ILP concept.

According to some experts, it is mainly due to insufficient awareness of the significance of criminal intelligence, which is evident from the wording of annual and multi-annual policing plans, that the Slovenian police have not yet begun implementing the goal established in the Resolution on the National Crime Prevention and Deterrence Program for 2007–2011 (Dvoršek and Frangež, 2009:11).

2010 saw a notable move forward in the Slovenian police with a major reorganisation, which also took into account the need to strengthen criminal intelligence, leading to the establishment of the Criminal Intelligence Centre (CIC) within the criminal police at the national level. This centre will be in charge of further developing criminal intelligence towards setting up a national criminal intelligence model based on the ILP concept.

Simultaneously with preparations to establish the CIC, the director of criminal police in early 2010 convened a panel discussion on further development of criminal intelligence, attended by criminal police management at the national and regional levels, representatives from the Ministry of the Interior, and a representative from the Faculty of Criminal Justice and Security, the University of Maribor. This meeting discussed the current state of affairs in criminal intelligence in the Slovenian police; the ILP concept was explained, the significance of strategic analysis in the ILP concept was emphasised, the project of modernisation of the police information system in activities regarding the development of informant handling was presented, and the potential direction of developing criminal intelligence in the Slovenian police was indicated, while highlighting specific types of cooperation with the ECIM.

A year into the establishment of the CIC, the Slovenian police is closer to (although still far from) establishing a national criminal intelligence model. The CIC's main focus of attention is how to improve the collection of information by using informants. Although within the criminal police, a working group on developing criminal intelligence has been created, the latter has not tackled the problem in a project manner and in accordance with theoretical points of departure⁵. This has resulted in problems while trying to resolve open issues and

⁵ See for example Peterson (2005:15), who proposes a number of steps in developing criminal intelligence in a country: setting up the appropriate environment (support by police management, provision of funding, awareness-raising in internal and external public on added value of criminal intelligence), setting up a criminal intelligence unit, elaboration of a relevant document to define the role and manner of work of the criminal intelligence unit within the overall system, selection of adequate qualified personnel to staff the criminal

connect the already existing elements: creation of the concept of the development of operational and strategic analysis, tackling the problem of insufficient information exchange at the national and international level, provision of information for analysis from a wide range of sources, including information obtained through covert investigation measures, no connection between the project of modernisation of the police information system and the activity of setting up a NCIM, no concept of systematic awareness-raising of all employees on the significance of criminal intelligence for efficient crime reduction.

Discussion

In the development of criminal intelligence in Europe and the USA thus far, various critical factors have been identified that can stimulate or hinder the development of a national criminal intelligence model as an organisational sub-system of intelligence-led policing. Let us focus on the most important ones:

- Management commitment and cooperation (John and Maguire, 2004; Peterson, 2005; Carter, 2009);
- Project-based approach (John and Maguire, 2004; Organisation structure adjustment (John and Maguire, 2004; Peterson, 2005; Guidetti, 2006; Fuentes, 2006; Clarke, 2006; Carter and Carter, 2009);
- Education, training, and awareness-raising (John and Maguire, 2004; Churprakobkit and Puthongsiriporn, 2005; Peterson, 2005; Guidetti, 2006; Carter and Carter, 2009);
- Information and criminal intelligence management plan (John and Maguire, 2004; Guidetti, 2006; Carter, 2009);
- Improving analytical capacities (John and Maguire, 2004; Peterson, 2005; Carter, 2009; Carter and Carter, 2009);
- A cultural shift to embrace the ILP concept (John and Maguire, 2004; Fuentes, 2006; Tilley, 2008; Ratcliffe, 2008; Carter, 2009)

While it has to be taken into account that not all critical factors have the same specific weight in creating a country's national criminal intelligence model, Slovenia's experience in this area may be useful for other South-Eastern European countries, both the EU Member States and prospective member states. Let us briefly focus on the first critical factor, i.e. management commitment and cooperation. This commitment is articulated through public appearances of police officials that fully support implementation of the new model for which human and other resources instrumental to the project are made available. It is also important that senior management tasked with supervising implementation of the model be able to communicate the objectives of the new ILP model to the agency's staff and to incorporate intelligence into their strategic and tactical decisions. It therefore follows that, in order for implementation of an ILP model to be successful, high-ranking police officials need to be educated about the key challenges of the new concept, so that they will be able to publicly demonstrate their commitment to ILP and lead by example.

This concept presents a major challenge for police officials in police organisations like Slovenia's (and other South-Eastern European countries) intelligence unit, provision of training for police chiefs and employees who will steer and supervise the operation of the criminal intelligence system, setting up cooperation in the area of criminal intelligence with other agencies nationally and internationally, developing tactical and strategic criminal intelligence products, introducing regular meetings between police management and staff responsible to manage criminal intelligence.

because they lack experience in intelligence-led policing and need to grasp the essence of the new proactive model, which no longer focuses merely on intelligence-led investigations, but is primarily concerned with establishing intelligence-led policing. In a situation in which resources are limited, officials can enhance proactive policing through their redistribution and allocation, and thus consolidate their confidence in the new method of work. Ratcliffe (2004) determined that criminal intelligence is a relatively new discipline in the law enforcement environment, in which senior managers are recruited from among investigators whose view of criminal intelligence is that of case support. They prefer to think that providing strategic analytical support⁶ and criminal intelligence are merely tools for improving arrest statistics, which is an attitude that should be avoided in developing intelligence-led policing.

Similar situation is with the next critical factor, i.e. education, training, and awareness-raising. There is a broad consensus among experts that a new policing model cannot be successfully and effectively implemented without investment in education, training, and raising awareness. These activities are the key elements of introducing change in any organisation. Training must begin early enough, first of all targeting police leadership as the key driving force of organisational change, after which expertise is transferred top-down to all levels of police organisation, including patrol officers. The Slovenian police can use the capacities of the Police Academy, Faculty of Criminal Justice and Security, and take advantage of the programmes organised by CEPOL (European Police College) in the context of ILP and criminal intelligence.⁷

Education and training play a significant role in transforming the existing police culture, which sometimes resists change. This brings us to the next critical factor, a cultural shift to embrace the ILP concept. Cheurprakobkit and Puthongsiriporn (2005:296) claim that education and training programmes delivered by police academies play an important role in police organisations. Freshly trained police recruits can be used as agents of change, who will further disseminate the new policing values and methods.

In her study focusing on police culture and integration of an analytical approach in intelligence-led policing, Cope (2004) emphasises that police culture is likely to represent a serious obstacle to implementing a new model of policing. Her paper stresses the need for additional training of both police officers and analysts so that a positive working environment is established for their interaction.

It is important that training also continue after police employees leave their law enforcement training institutions. The new model and its advantages and objectives, including a new manner of policing, should be promoted through continuous awareness-raising programmes and training courses targeting all police employees.

⁶ Police organisations like Slovenia's, whose criminal intelligence capacity is underdeveloped, often lack developed strategic analysis. Enormous effort and work is required when setting up a strategic analysis to shift the traditional perception of intelligence activity as mere case investigation support towards understanding that intelligence can be used in strategic planning and resource allocation, which is a key characteristic of any ILP model. Despite limited resources, the new approach allows police officials to still successfully pursue the main goal of reducing crime. A well-developed analytical capacity will enable crime analysts to perform their duties well and include recommendations for action in the intelligence product. This is not the case with military and defence analysts, who leave the interpretation to end-users that have been trained to interpret intelligence products (Ratcliffe, 2004).

⁷ The conclusion can be drawn that there was a quality shift towards the creation of a national criminal intelligence model in Slovenia after some police chiefs, including the director of criminal police, started masters' and doctoral studies at the Faculty of Criminal Justice and Security, whose programmes also include criminal intelligence and intelligence-led policing. At the Faculty of Criminal Justice and Security, research on the creation and implementation of the national criminal intelligence model is currently taking place.

In embracing the new concept of policing, one needs to be aware that goals such as purchasing appropriate information technology, a changed organisational structure, and establishing information and criminal intelligence management can be achieved in a relatively short period of time. However, much more time and effort are required to change the existing organisational culture in order for all staff members of a law enforcement organisation to be responsible to effectively carry out their specific tasks in a criminal intelligence system, which represents a dramatic shift from traditional policing methods. A senior U.S. police official illustrates how dramatic the shift represented by the new concept of policing really is: "It's not about numbers and arrests, it's about having an impact on the criminal entity In the past a lot of guys, myself being one of them, were rewarded by the number of scalps brought in. Now, I never ask for quantity of drugs or number of arrests. But I look at the number of intelligence entries going into SIMS (State-wide Intelligence Management System)" (Ratcliffe and Guidetti, 2008:123).

If countries with criminal intelligence tradition have such problems in changing the existing police culture in order to develop criminal intelligence and a new intelligence-led policing model, we cannot be surprised at the obstacles that are being encountered in establishing a criminal intelligence model in Slovenia. The creation of a new model requires a planned and systematic approach, two characteristics that are not always considered as a priority in South-Eastern European countries. This is why patience will be required when establishing and implementing criminal intelligence and an intelligence-led policing model. Furthermore, various types of international police cooperation that are being sponsored by the EU⁸ in this area comprise elements towards the development of criminal intelligence and represent a certain pressure on police chiefs towards change. Police higher education programmes could make an important contribution in this direction with the inclusion of criminal intelligence and intelligence-led policing, as on returning to the police organisation, graduates of those programmes could be used as "change agents" who spread the new values and methods of work.

Conclusion

Although criminal intelligence and its upgrade, intelligence-led policing, do not represent a revolutionary breakthrough in the area of criminal investigation, we do agree with Ratcliffe (2009) when he says that the intelligence-led policing model is the greatest police potential of the 21st century. We are, however, still a long way away from its effective implementation in practice, given that it will require drastic changes in police management's manner of thinking. Beside Slovenia, this is also true for other South-Eastern European countries, where certain critical factors preventing a faster implementation have a considerable specific weight. It can be concluded that a transition to the ILP model requires a serious project-based approach providing an opportunity for successful and effective implementation of a new criminal intelligence model subject to the identification of critical factors. While there are no shortcuts when it comes to the implementation of the new model, an important role can be played by external assistance and by including the new findings in police education programmes.

⁸ For example: the aforementioned Southeast Europe Police Chiefs Association (SEPCA) initiative, together with Austria, Europol, SECI and OSCE, is currently running a project to implement the ILP model in Croatia, Albania, Bosnia and Herzegovina Federation, Republic of Serbia, Macedonia, Moldova and Romania. For more information, see: Petrić and Savić (2010).

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HEROIN ABUSE IN SPECIAL BODY CONDITIONS. COMPLICATIONS OF HEROIN ABUSE

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Abstract: This paper is focused on current knowledge of heroin abuse, which can be of significance in forensic medicine expertise. This refers particularly to heroin's effect in particular body conditions and complications associated with its abuse. The effects of heroin are particularly remarkable in pregnant women, individuals with liver and kidney damages, compromised lung function, head trauma, and reduction in blood volume. Characteristic heroin abuse complications include: allergic manifestations, changes in heart, lung, liver, kidneys, skin and peripheral nerves as well as possible brain stroke.

Introduction

Background

Although the psychological effects of opium have been known since old Sumerians, the first undisputed data about the opium poppy juice have been found in the writings of Theophrastus in the 3rd century B.C. The term *opium* was coined from the Greek term for juice – the substance produced from the juice of the opium poppy (*Papaver somniferum*). Opium contains 20 alkaloids. Serturmer isolated the pure substance from opium in 1806, and termed it *morphine* after Morpheus, the Greek god of dreams⁴⁵. Heroin (diacetylmorphine) is synthesized by the acetylation of morphine at positions 3 and 6. Wright, an Englishman, synthesized it in 1874, and the world of medicine gave the substance a warm welcome as the replacement of morphine and codeine³¹.

Acute toxicity of opioids

It is difficult to define precisely a toxic or lethal dose of any opioid for humans. Dreisbach¹³ stated a lethal dose of opium for adults of 2-3 g, of morphine for non-addicted of 100-400 mg, and heroin 50-75 mg.

In an overdose, stupor or even deep coma can occur. Breathing frequency is very low (sometimes only 2-4 cycles per minute). Blood pressure is normal at the beginning, but later progressively declines. If adequate oxygenation is applied early, breathing will improve. In untreated hypoxia, capillary damage occurs and a shock develops. Urine production is low. Body temperature drops, and the skin becomes cold and sweaty. Skeletal muscles are flaccid, lower jaw relaxed, so that the tongue can obstruct the airways. In newborns and children, convulsions can also occur. Death is the result of suppressed breathing. Even if

breathing is restored, death may occur due to complications of coma, such as pneumonia or shock. Noncardiogenic pulmonary edema is often encountered in opioid intoxications. It is probably the result of contamination or an anaphylactic reaction; it has been described with morphine, methadone, propoxyphene, and use of non-contaminated heroin^{38, 45, 46}.

Coma, narrow pupils, and respiratory depression clearly indicate an opioid intoxication. Needle marks further support the diagnosis. Nevertheless, a combined intoxication is not an uncommon event. Urine and stomach contents examinations can be of help, but the results are usually obtained too late to be of any therapeutic relevance^{23, 44}.

Aim of the paper

The aim of this paper is to provide a review and a comparison of the most up-to-date findings about heroin abuse, with special attention paid to its action in some bodily states, as well as on the induction of characteristic complications, from the point of view of their importance for medical examiners.

Material and methods

A significant body of literature data was reviewed, including the author's own results; the results were analyzed and compared in the light of forensic problem of heroin abuse.

Material analysis and discussion

Heroin abuse in special bodily states

Heroin taken during childbirth can severely depress breathing of the newborn, though the effect cannot be observed in the same degree in its mother²⁶.

All opioid analgesics are metabolized in the liver and should be carefully used in patients with liver diseases, since increased bioavailability or cumulative effects may occur. In patients with a history of hepatic encephalopathy, even small doses of heroin, i.e. morphine (8 mg), which would not affect those without similar liver diseases, can induce characteristic EEG changes. Higher doses of morphine are dangerous (coma) and should be avoided in the presence of liver diseases³².

An appropriate example of a disturbed morphine metabolism (the first and direct heroin metabolite) in a cirrhotic liver was given by Kotb³⁰. They studied controlled morphine (MST) release in 12 patients with post-hepatic cirrhosis, caused by HCV and HBsAg, with portal hypertension; these authors gave 30 mg MST for endoscopic sclerotherapy and compared the results with the values obtained in 10 healthy controls. Drug concentration in the plasma was measured in the samples of venous blood in intervals after 12 hours, at the highest pressure of the fluid chromatograph. Total body clearance and systemic bioavailability were assessed using the comparative method. Patients with cirrhotic liver had lower clearance (0.586 l/hour) compared to controls (0.729 l/hour). The mean residence time was prolonged in cirrhotic patients (19.37 hours), compared with

controls (7.03 hours). The elimination half life in cirrhotic patients (mean, 7.36 (SEM) hours) was doubled compared to controls (4.01 (0.15) hours). Serum concentrations were higher in all observed time periods in cirrhotics (peak at 35.2 ng/ml vs 12.8 ng/ml in controls). In view of all the changes in morphine kinetic profile in cirrhotics (who were sedated more compared to controls), lower doses were recommended, with longer free dosing intervals.

In accordance with the above, it was established in 1990 by Ruttenberg⁴⁸ that the concentration of morphine in the bile and urine in cases with liver damage (predominantly fatty change) was lower compared to that in the group with normal liver. The results were based on the study of 505 heroin addicts who had died of an overdose. The ratio of morphine concentrations in the blood and bile, i.e. in the blood and urine, was higher in the group with liver damage; the conclusion followed that morphine in these cases was excreted slower and in reduced amounts. The observation indicated a diminished ability of damaged liver to complete morphine glucuronidation, enabling its elimination.

All liver diseases with pronounced hepatocytic necrosis (chronic active hepatitis), but also diffuse fibrosis with anarchic lobule regeneration and concomitant hepatocytic ischemia, demonstrate a very reduced enzyme activity, making inactivation of illicit drugs and medicaments very difficult and their action on the CNS increased and prolonged⁴⁰. All opioid analgesics (morphine, heroin) are metabolized in the liver and have to be cautiously administered in patients with liver diseases, since increased bioavailability and cumulative effects may occur⁷. A decline of hepatic biotransformation of morphine in patients with liver dysfunction is associated with its increased pharmacologic action¹. Although individual morphine doses are well tolerated, its active metabolite, morphine-6-glucuronide, can be accumulated with chronic use^{25,7}, resulting in opioid overdose symptoms.

Almost half of intravenous heroin addicts with hepatitis demonstrate abnormal liver function, indicating a persistent, potentially contagious infection⁵¹.

In the study performed at the Centre of Forensic Medicine in Niš, 40 cases of death of intravenous heroin addicts were analyzed, detecting in half of them chronic active hepatitis and cirrhosis (alone or in combination), and in 3 cases diffuse fatty change was predominant (7.5%), meaning that this group of significant morphologic changes was found in 57.5%, while milder morphologic changes were found in the rest. In the first group, we could expect with greater probability liver function disorders described in the literature, with well-known effects on heroin metabolism²⁴.

Renal diseases also significantly alter morphine pharmacokinetics. Though individual doses of morphine are well tolerated, its active metabolites, such as morphine-6-glucuronide, can accumulate with chronic use^{26,7}, resulting in opioid overdose symptoms.

Heroin and similar opioids have to be administered carefully in patients with compromised pulmonary function (emphysema). After administration in therapeutic doses, fatal outcome may occur in patients with chronic *cor pulmonale*. These patients already utilize the compensatory mechanisms, such as increased respiration frequency; many of them have chronically increased CO₂ concentration, being less sensitive to its stimulative action. Further depressive action of opioids can be fatal⁴⁵.

Depressed breathing and relative increase of intracranial pressure due to heroin action, can be markedly exacerbated by head injury or by an already increased pressure of the cerebrospinal fluid after trauma. Though head injury is not thought to be an absolute contraindication for opioid use, in individuals with craniocerebral traumas their use may exacerbate already depressed breathing. Since they induce mental confusion, miosis, and emesis (clinical signs relevant for surveillance in head injury situations), their contribution should be carefully assessed⁴⁴.

Patients with reduced blood volume are especially sensitive to the hypotensive action of morphine and other opioids, and these have to be cautiously used in all hypotensive patients⁴⁵.

Characteristic complications of heroin abuse

Most common complications of heroin abuse are related to liver damage, described in the previous parts as special bodily states.

Scarring, hyperpigmentation, venous thrombosis, skin abscesses, cellulite, and/or real ulcerations develop in the skin, always in the region of needle marks¹⁴.

Allergic manifestations are possible, but these are not common. They usually occur in the form of urticaria or other skin changes. Histamine is released at the heroin injection site. The results of Bello et al.² suggested that heroin, i.e. its metabolic product morphine, are activated into free radicals which produce membrane lipid disorder and histamine release, suggesting that a massive release of mast cell histamine could be an extra risk factor in heroin overdoses. Anaphylactic reactions were described after morphine and codeine use, but these are rare. These reactions were proposed to be the cause of sudden deaths, episodes of pulmonary edema, and other complications frequently occurring in intravenous heroin abuse²³.

Abscesses at the heroin injection site constitute the most common infectious complication in these drug addicts (Bergstein et al., 1995). The study identified 66 patients with 70 subcutaneous abscesses. It was established that anaerobic bacteria and Gram-positive cocci were predominant; 29% were HBsAg positive, and 9% were HIV positive.

In the lungs, opportunistic infections take place, as well as edema, septic embolism, lung abscesses or foreign body granulomas (e.g. talc). Lung edema is sometimes the manifestation of a hypersensitivity reaction to heroin^{38, 46}. Hine et al.²² found in their analysis of autopsy cases of drug addicts in San Francisco, in a 5-year period, that heroin was the most common illicit drug, usually associated with alcohol and other medicaments, and that most common findings were lung edema (in 90.4%) and microscopic hepatic changes (71.0%). Osterwalder³⁷ established that after a successful treatment of heroin intoxication, a surveillance of at least 8 hours is necessary in order to exclude the possibility of lung edema.

Opioids such as morphine are potent histamine- and tryptase-releasing agents, and anaphylactic reactions to these drugs were attributed to this property. A study showing that commonly abused drugs (morphine, cocaine) release histamine from mast cells when in the presence of oxidative enzymes, suggests that the massive release of mast-cell histamine is an additional risk factor in heroin and cocaine overdose². Additionally, findings in 48 heroin-

related deaths suggested that some cases of heroin-related death might be caused by anaphylactoid shock¹⁵. Otherwise, pulmonary edema complicating heroin overdose is a well-recognized entity and regarded as the major mechanism contributing to death in heroin-addicts. Its pathogenesis is unknown, but drug-induced depressed myocardial contractility is discussed¹¹. Therefore, drug-induced myocardial alterations and/or mild inflammatory processes following hepatitis B or C infection are of special interest. These agents lead to heart failure causing final lung edema. On the one hand, regarding heart alterations, former studies using conventional histology did not demonstrate significant differences between drug addicts and controls¹⁶. On the other hand, there are reports that despite the high frequency of heart abnormalities (e.g. myocarditis and focal myocardial fibrosis), these conditions did not correlate with morphine or 6-MAM blood concentrations. To verify signs of inflammation in the heart of drug addicts, especially heroin addicts, conventional histological stainings should be applied to look for signs of myocarditis according to the Dallas criteria³⁹. In addition, immunohistochemical qualification and quantification of interstitial myocardial leucocytes, as already established for diagnosis of myocarditis in adults, can be helpful to diagnose slight-mild forms of inflammation with an increased number of inflammatory cells in the myocardium¹².

Postmortem findings in 25 intravenous addicts of centrally stimulating amines and centrally depressive narcotics (opiates) have been analysed with special reference to the presence of pathologic findings in the heart, and the cause of death. Most cases exhibited myocardial lesions of varying age, consistent with various phases of myofibrillar degeneration, such as hemorrhages, contraction bands, focal necroses, granulation tissue, stromal condensation, and scarring, indicating an active chronic process in the myocardium and subendocardium, with a bias toward the conduction system of the heart. The lesions have been found in drug addicts who died immediately following an injection of narcotic as well as in those who, irrespective of their influence, have died following intervening injuries or disease. Cardiac lesions in drug addicts seem to have a variety of causative factors: infections, toxic influence, hypersensitivity, influence of catecholamines and general hypoxia. The authors feel that the two latter suggested causes appear most regularly and deserve special attention. The significance of these heart lesions seems to vary, but at times, they may be determining factor in the fatal outcome of a case⁴³.

In the kidneys of intravenous drug addicts, in addition to amyloidosis, focal glomerulosclerosis may occur as well.

Heroin and its product morphine seemed to increase the accumulation of macromolecules in the renal mesangium, independent of the activity of mesangial cells⁴⁹.

Bernasconi et al.⁴ studied the complications related to peripheral nerves and spinal cord in 6 intravenous heroin addicts. Acute neuromuscular damage developed in the lumbosacral and brachial distribution in 4 cases, and myelopathy with acute and chronic attacks developed in 2 cases. The causative mechanisms were in the domains of vascular disorders, spinal cord infarction, and infections with secondary compressive arachnoiditis.

Brain stroke is also a well know, but not a very common complication of heroin addiction⁵³, with generalized cerebral ischemia as the pathogenetic mechanism; sometimes an embolic mechanism should be suspected as well. Comer⁸ also established that the increase of heroin effect all the way to a „high“ condition was associated with the pupil diameter constriction and drop

of blood oxygenation. Gilham et al.¹⁸ found that 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), formed as a breakdown product of synthetic street heroin, caused symptoms similar to those in Parkinson's disease in men (detoxified by way of cytochrome P450 CYP2D6 and N-demethylation process).

Conclusion

The effects of heroin are especially prominent in special conditions of the body: in pregnancy, in individuals with damaged liver and kidneys, in those with compromised lung function, in cases of head injury and in those with diminished blood volume. Characteristic complications of heroin abuse involve allergic manifestations, changes in the heart, lung, liver, kidney, skin and peripheral nerves, as well as a possible brain stroke. From the point of view of forensic medicine, in an analysis of the cause of death of heroin addicts the above-mentioned factors have to be taken into account, since they may have an impact on the fatal outcome, even at heroin concentrations lower than that most commonly reported to be lethal.

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INTERTWINED RELATIONSHIP BETWEEN BIOMETRICS AND FORENSIC SCIENCE: THE USE OF BIOMETRICS IN FORENSIC PERSONAL IDENTIFICATIONS

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Abstract: Precise identification of living or dead individuals, thus the concept of «individualization», is immensely important and much discussed in the field of forensic science. For instance, identification of crime victims and perpetrators of a crime involves proving that they are the source of physical evidence, such as fingerprints, blood or documents found at the crime scene. Given that biometrics represents identification of humans based on their quantifiable physiological or behavioural traits, it is clear how forensic science became quite a fruitful field for the employment of biometric techniques. In fact, biometrics allowed for the use of automated information systems for personal identification tasks in forensic investigations, by filtering potential candidates and selecting the best matches for final identity verification by forensic specialists. The emerging technologies and the automation of the process undoubtedly enhanced the volume, speed and accuracy of the identification processes in forensic science. Furthermore, automatic identification of humans can nowadays also be achieved via «imposed biometric characteristics», such as scars and tattoos, and is used in crime prevention, as well.

Here, we emphasize biometric characteristics that are typically employed for human identification purposes in forensic cases and discuss the reliability of findings recovered by biometric tools (i.e. selected candidates). Next, we consider statistical data (i.e. match statistics), capable of designating evidence as compelling, that is, necessary and sufficient for admissibility in court.

Keywords: human identification, biometrics, biometric systems, biometric characteristics, forensic science

Introduction

Biometrics represents identification of human beings based on their quantifiable anatomical and behavioural characteristics, through automatic, 'pattern recognition', information systems. Forensic science employs numerous basic and applied sciences, attempting to resolve matters relevant for the legal system (including analysis of biological evidence to identify people). Therefore, identification of individuals in human populations is at the core of both biometrics and forensics.

In a classical sense, biometrics is thought of as an approach of identifying humans in situations which precede criminal events, such as access control and surveillance. On the other hand, forensics deals with identifying people in post criminal event circumstances, thus after a criminal act has already occurred. The above results in the most obvious distinction between biometrics and forensics – while we can choose identification methods in the former, we cannot do so in the latter, as we do not have an insight into what will serve as evidence at the beginning of criminal investigations³⁶. Furthermore, while biometrics uses non-invasive identification methods on cooperative subjects, criminals having to be identified in forensics are often non-cooperative, while identification of corpses can include invasive techniques³⁸. Automatic identification of humans in biometrics, enabling high accuracy and speed, as well as real-time decision-making, became a crucially needed replacement of the traditional expert decision-making in forensics, based on manual sorting and comparisons. Thus, forensics and biometrics became tightly connected, in a sense that techniques and methods once developed for biometrics became widely used in forensic science as well. For instance, identifying victims and suspects based on evidence in forensics correlates to the identification process in open biometric systems³⁸. Also, multimodal biometric systems can aid in identifications based on multiple forensic evidence recovered from crime scenes³⁸.

There exists a daily need to identify people in contemporary society, not only in forensic science and criminalistics, but also in civil and governmental state of affairs, as well as in commercial settings.

Personal identification for commercial purposes includes paternity testing, e-commerce, access control to physical locations and ATM machines, employee time and attendance monitoring, making payments at retail stores, etc. As technology became more available and affordable, commercial identification tools have been directed towards consumer convenience, allowing, for example, access control to personal devices, such as laptops and cell phones, paying lunch at school canteens and even having a coffee machine “remember” person’s favourite coffee, based on their fingerprint.

Biometrics-based identification in crime prevention

One of the immensely important goals of every government is to achieve and maintain security on its territory, to prevent illegal border crossings, as well as illegal stays in the country. In that sense, many countries in the world have employed biometrics-based systems for verification of passports and other travel documents at their ports of entry. The current trend in biometric identification documents is to use multimodal biometrics, that is, multiple biometric characteristics for verification and identification of individuals. For example, biometric identification documents in the Republic of Serbia contain fingerprints of two index fingers, a digital photograph and a signature stored on a chip. This is a minimum standard for biometric passports set by the European Union¹¹ and, essentially, a standard in the world, as similar biometric passports are issued in Brazil, Spain, Singapore, Switzerland, etc. As of last month, Mexico is the first country in the world to take a step further and also include an iris scan on their identification documents⁴¹. In order to simplify border crossings for frequent travellers, several airports have implemented biometric identification systems, based on hand geometrics (Ben Gurion International Airport, Tel Aviv,

Israel), iris (Schiphol International Airport, Amsterdam, Netherlands and several airports in United Arab Emirates), fingerprint (International Airport “Nikola Tesla”, Belgrade, Republic of Serbia), etc.

In addition, it is of great significance for every country to be able to limit physical access into high security governmental institutions, confidential documents and classified data. Depending on the level of security needed to be achieved, an appropriate biometric system for the specific application can be put into place. For instance, biometric systems based on iris and retina scans of the human eye have been shown to be the most accurate, based on the smallest error rates among all biometric systems. These are, thus, optimal biometric modalities for identification purposes at military bases, weapon storage facilities, nuclear power plants, high-security laboratories, as well as prisons and police stations. Importantly, biometric tools are successfully used to limit not only physical, but also virtual access into government computer systems.

Further, identification of people is necessary in order to prevent multiple voting at the elections or multiple collections of social benefits by the same person. For instance, the UNHCR has developed a program for identifying refugees returning into Afghanistan from Palestine and seeking governmental aid. The identification process is based on iris recognition and has, in the first year of its existence, registered around 200,000 people³⁵.

Finally, fight against terrorism has become a hot topic globally in the past decade, given the terrorist attacks in the United States (2001), Spain (2004), the United Kingdom (2005), etc. One of the classic ways in which an attempt to identify potential terrorists is performed is video surveillance at airports and international borders. Such biometric systems rely on facial recognition, by first isolating a face of an unknown individual from a crowd (“face detection”) and then comparing it against a database of wanted terrorists or criminals (“watch list”). For instance, a US-VISIT program implemented at points of entry to the United States, and based on fingerprint identification, has, in the past six years, processed around 76,000,000 visitors³³. Taking advantage of a watch list comprising of 4,000,000 wanted individuals, approximately 1,800 criminals were denied entry into the country³³.

As technologies advance and the field develops, new ideas regarding hunting down terrorists emerge. For instance, gait recognition systems have been extended to the identification of people carrying cargo. Thus, the idea is not only to be able to identify individuals based on the way they walk, but also to determine if change in gait has occurred due to additional weight being carried. Such biometric systems could enable identification of suicide bombers and other terrorist carrying hidden bombs or weapons^{2,10,19}. In addition, scientists in Great Britain are developing sensors that could, in the future, replace sniff dogs trained to detect explosives and drugs. Namely, two devices in development, one based on laser absorption and another on a portable optical fibre device, are being built to reveal the presence of a specific pheromone from human sweat, excreted when humans are in fearful and stressful situations^{7,40}. There is hope that, using smell as a biometric trait, humans carrying illegal load would be identified at airports and other ports of entry, public events, army checkpoints⁸, etc.

Biometrics-based identification in forensic science

Accurate human identification is of crucial significance in criminalistics and forensics, given the burden of the final identification results. In other words, the consequences of identification of individuals in this context may lead to wrongful conviction of innocent people, as well as release of actual criminals. Thus, the goal of biometric identifications in forensics is proving or disproving the connection between an individual and a crime scene, and therefore, revealing the true crime perpetrators, as well as innocent suspects.

Introduction of biometrics into forensics science has allowed for affordable ways of compiling and maintaining large databases of biometric data, as well as searching against these biometric registries to identify individuals, in a rapid and accurate manner. However, not all biometric traits are useful for identification of perpetrators and victims of crime – iris and retina scans, for instance, cannot be acquired from a perpetrator that has fled the crime scene, nor from dead victims, due to their rapid degradation post-mortem. Here, we present an overview of biometric identifications based on evidence frequently recovered from crime scenes.

Identification of offenders based on fingerprints left at the crime scene

Automated Fingerprint Identification System (AFIS) is based on global patterns of papillary ridges, that is, on position, orientation and frequency of their end points (minutiae) on the tips of human fingers. Identification of individuals through AFIS requires comparison of query fingerprint with prints that exist in the database, resulting in a match score that depicts how similar or how different the two prints are. For instance, Integrated Automated Fingerprint Identification System (IAFIS), put into practice by the FBI in 2000, represents a ten print database from approximately 80,000,000 people. It has been estimated that around 80,000 searches are done in IAFIS per day and that response time is approximately 2 hours¹⁶.

Query prints used in forensic scenarios are typically either victim's or latent – fingerprints left by offenders at crime scenes, lifted and scanned. In general, the biggest challenges resulting in high intra-class variations (and, thus, inaccurate identifications via AFIS) are partial, distorted (smudged, for instance) and overlapped fingerprints, prints left on unsuitable surfaces (newspapers, for example), etc. While searching 100 latent prints against a database containing 10,000 fingerprints, it has been found that accurate identification (i.e. the highest scoring match is the correct candidate) occurs in up to 80% of cases, a much lower percentage in comparison to using full prints¹⁸.

In order to improve accuracy of latent fingerprint matching, a lot of effort has been made to improve matching algorithms, as well as to include extended fingerprint features into the analysis. In other words, in addition to global patterns of papillary ridges (level 1 analysis) and minutiae points (level 2 analysis), intricate details of shape, such as pores, scars, ridges and creases (level 3 analysis), are also considered^{4,14}. Some have reported that dots are the most informative and reproducible level 3 features¹.

Despite the described challenges, AFIS still represents an immensely important biometric system that daily aids in elucidation of numerous criminal acts around the World.

Identification of offenders based on palm prints left at the crime scene

The estimates are that around 30% of all latent prints found at crime scenes are palm prints¹⁷, thus making them quite an attractive trait in forensics. Challenges described above for latent fingerprint identifications – partial, distorted and overlapped prints – are also applicable in the sphere of palm print identifications. In addition, palm prints have been less exploited for personal identification in comparison to fingerprints due to the fact that it has been difficult to devise sensors that can scan larger surfaces, while acquiring high resolution images, and also due to restraints in computer capabilities²⁸. Lastly, some regions of the palm (thenar, for instance) are more difficult to successfully analyze due to a large number of creases¹⁷. Much effort has been given to overcoming the described hurdles. While earlier palm recognition biometric systems classify palm prints based on general ridge flow, followed by minutiae extraction²⁸, advanced algorithms take into account extended features, such as ridge shape (level 3 analysis), improving the accuracy of successful latent print identification to approximately 69%¹⁷. In mid 2000s, a trend towards national palm print databases has spread in the US, the UK, as well as Australia, which hosts the largest palm print database containing 4.8 million prints²⁸. Palm prints have, thus, become an increasingly exploited biometric trait in contemporary forensics.

Identification of offenders based on other 'latents' left at the crime scene

Lip prints are most often encountered at crime scenes on items such as glasses, cups, cutlery, cigarette butts, windows, etc. In the 1970s, Susuki and Tsuchihashi classified lip prints into six categories, based on “unique” grooves, fissures and criss-cross lines on their surface^{29, 34}. Although, numerous successful cases of identifications have been reported, the absence of standard protocols, as well as scientific basis for uniqueness and interpretation of these prints, hinder their use in criminal investigations as court evidence³⁴. Automatic lip recognition systems are being developed²⁰, although they are yet to be exploited in forensic cases.

In some cases, victim's skin can reveal the presence of dental marks. However, admissibility in court due to questioned accuracy of dental prints has been heavily discussed. No automatic biometric systems have been developed up to date to process this biometric trait¹².

Ear prints have been recognized as forensic evidence since 1960s and the classic forensic scenario in which they might serve as evidence are burglaries, where offenders attempt to listen at a door or a window²⁶. Criticism regarding the subjectivity present in ear print individualization reached a high point in 2004, in the Dallaher case (UK), when a man, found guilty of a murder six year prior based

on ear print evidence, was set free due to DNA analysis. It has been proposed that characteristics affecting the individuality of an ear print are the force applied by the ear to the surface while listening²⁴ duration of listening²⁵, quality of listening surface and possibly the amount of deposited secretions²⁶. Computerized ear print identification systems are still in the early stages of development³⁰.

Both socked and barefoot footprints have been analyzed as evidence from crime scenes for identification purposes²³. Despite efforts made in the past decade to develop footprint-based biometric systems for personal recognition^{27, 37}, to our knowledge, automatic footprint recognition has not been utilized in forensics up to date.

Identification of offenders based on DNA evidence left at the crime scene

Analysis of DNA for forensic purposes, or DNA profiling, has become a "gold standard" of criminal investigations. Biological evidence left at crime scenes (such as blood, saliva, urine, semen, vaginal fluid, skin, hair, etc.) is used to extract DNA to be investigated, while reference samples are most often collected via buccal swabs. While analyses of single nucleotide polymorphisms (SNPs), Y chromosome and mitochondrial DNA are also relevant, here we refer to the use of short tandem repeats (STRs), or microsatellites, non-coding, repetitive portions of DNA, which exhibit large polymorphism in the human population. DNA profiles based on STRs are stored in law enforcement databases, the two largest being FBI's "Combined DNA Index System" (CODIS) and UK's "National DNA Database" (NDNAD). While the first is based on thirteen different STR loci and contains over 8,000,000 profiles, the second includes around 3,000,000 profiles and seven STR loci, which has been set as the minimal European standard by the European Network of Forensic Science Institutes (ENFSI) and Interpol¹². Although forensic DNA analysis, based on fourteen STR loci, is performed in the Republic of Serbia, unfortunately, national DNA register and the appropriate legislation are still missing.

In order to claim that two DNA samples represent a "match" and come from the same person, it is necessary that the two profiles are identical at all investigated STR loci. While current attempts to attain DNA matches through database searches are based on searching for equals, much work is being done to enhance our searching and matching capabilities in circumstances of degraded and mixed profiles, as well as against relative DNA¹².

Identification of offenders based on facial features

Traditionally, photo-robots have been used to obtain images of wanted criminals, which aid in investigative searches. Based on eye witness memory, they represent a composite of individual facial features. The new generation of photo-robot software (EFIT-V, for instance), on the other hand, generates images of wanted criminals based on holistic facial descriptions, which are further changed in numerous iterations to reach an image which eye witness approves (iterative changes are performed based on genetic knowledge and knowledge obtained from images «unapproved» by the eye witness).

Identification of dead individuals, based on skull remains, can be performed via 2D and 3D facial reconstructions, by applying tissue depth markers and facial tissue parts from generic databases, respectively, onto the images of unidentified skull. Additionally, facial superimposition, which entails overlapping of unidentified skull images with during-life photographs, can be used for the same purpose.

Automatic facial recognition is quite useful when a perpetrator of a crime has been caught on a tape while committing a crime, for instance, or when a dead victim is found at the crime scene. 2D facial recognition systems, which can be geometric or photometric, are typically used in these instances¹³. While in geometric biometric systems human faces are modelled based on characteristic facial features (eyes, nose, lips, cheeks, chin, eyebrows) and distances, angles and areas between them, photometric systems consider human face as a hole. For instance, photometric systems based on principal component analysis (PCA) use so called «eigenfaces», which depict certain facial characteristics (facial symmetry, hairline, moustache, etc.), to describe and make distinct each human face³².

The biggest challenges in facial recognition are pose, illumination, expression (PIE), aging and facial obstructions (sunglasses, hats, makeup, etc.), and much research is done to overcome these hurdles.

Identification of offenders based on their voice

Voice is a behavioural (and anatomical) biometric trait, unique in that it allows remote identification of individuals, even without their knowledge. Its potential in criminal investigations is evident: it may be crucially important to identify speaker(s) in circumstances such as kidnappings, ransoms, threatening calls, false alarms, etc. Although forensic speaker recognition also encompasses tape authentication, speaker profiling, speech transcription, speech content analysis, etc., here we address speaker verification and identification based on voice comparisons.

One of the typical ways in which individuals can be identified based on their voice is in line-ups, through ear witnesses. While this is one of the oldest methods of speaker recognition, its biggest flaw is that it is dependent on non-expert testimony. Speaker identification by experts can be non-automated, semi-automated or automated. In the first two cases, trained phoneticians perform identifications based on either solely auditory phonetic analysis, or together with acoustic measurements via spectrographic instrumentation¹². The largest issues with these approaches are experts' subjectivity, as well as the volume of data that can be processed accurately in large criminal investigations. In the third case, the subjective expert opinion is replaced by automated process, in which voice sample is not modelled based on specific acoustic parameters, but is rather taken as a continuous signal of varying vibrations³. For example, verification of speaker identity (1:1 comparison) can entail an automatic comparison between reference sample provided by an accused and a recording of an intercepted conversation²². H. Kunzel reported using Agnitio's "ASIS" software to perform 3,400 individual voice comparisons from hundreds of intercepted phone conversations to identify five individuals involved in international organized crime²². Automatic identification of speakers (1:N comparison) is mainly performed in organized crime, terrorism and drug trafficking, where recordings from phone interceptions are compared to recordings from police stations (obtained together with

fingerprints and photographs upon incarceration). Automatic voice comparisons can be performed across several databases and multiple speakers, thus allowing analysis of thousands of voice samples simultaneously. Such systems have been implemented in France, Switzerland, Spain and the US³. Following the automatic speaker recognition, however, the process requires a specialist for final decision-making. The biggest downside of automatic systems are uncontrolled conditions encountered in forensic situations, which include low quality voice recordings due to different telephone lines and handsets, as well as short duration of voice data.

Automatic voice recognition systems seem to be more suitable for investigative purposes, and less as definitive evidence.

Identification of offenders based on handwriting

Forensic handwriting analysis is performed to establish a connection between a suspect and written evidence linked to a crime, such as a ransom note or a threatening letter. Forensic experts compare similarities and differences between reference samples and questioned documents, based on numerous writing characteristics, such as lines, loops, slant, pressure, spacing between letters, relationship between heights of different letters, etc. However, this method of identification is considered to be quite prone to subjectivity and has not always been admissible in court.

US Secret Service has launched Forensic Information System for Handwriting (FISH), which allows examiners to scan, digitalize, measure and store questioned and known handwriting samples, and subsequently perform searches against them. FISH database contains scanned threatening correspondence towards the President of the US, as well as other high government and foreign officials⁸. Searches against FISH database result in letter measurements and a list of potential candidates, which are subsequently confirmed by expert knowledge.

Despite significant developments in biometric systems based on handwriting¹², the automation of the process in forensics is yet to come.

New approaches to utilizing "old" traits in biometric and forensic identifications – soft biometrics

Soft biometrics represent biometric traits that are not sufficient for identification of individuals alone, but do possess some degree of discriminatory power. We find examples of these traits within anatomical (height, eye colour, hair colour, ethnicity, etc.), behavioural (keystroke dynamics, gait), as well as "imposed" (scars, birthmarks, tattoos) biometric characteristics. Although the use of most of these traits has been abandoned in the past (for, example Bertillon's anthropometric traits), due to their inability to precisely identify individuals, more recently attention has been devoted to developing automatic biometric systems based on soft biometrics. This is due to the fact that despite remarkable technological advancements, issues with successful human identification based on primary biometrics, such as unavailability of a trait, inability to capture a trait or low quality of a captured trait, still exist in numerous instances²¹. Thus, the idea emerged to use soft biometrics as complementary means of human recognition to primary biometric characteristics. For example, Dantcheva and

colleagues examined the reliability of eye colour as an additional instrument to human recognition via iris⁵. It has experimentally been shown that the use of soft biometrics in a multimodal biometric system significantly improves the recognition performance²¹. For instance, researchers at the Michigan State University have developed "TattooID"¹⁵, a biometric system for identification of suspects and victims based on tattoos. Not only are the tattoos frequently a symbol of gang membership, but according to the 2003 Harris poll, 16% of adult US population has at least one tattoo (<http://www.harrisinteractive.com/vault/Harris-Interactive-Poll-Research-A-Third-of-Americans-With-Tattoos-Say-They-Make-Them-Feel-More-Sexy-2003-10.pdf>). Furthermore, police routinely takes photographs of incarcerated people, thus tattoo databases are not uncommon in law enforcement. Now, instead of manually sorting, categorizing and comparing tattoo photographs, the subjectivity of the process can be replaced by automatic matching algorithms that significantly improve the accuracy, the amount of processed data and the time frame for the analysis.

The role of statistics and the admissibility of biometric data for identification in court

Challenges in 'traditional' forensic identifications have been well documented. It has been estimated that: 1) comparison of human hair samples under the microscope results in errors in 12% of cases, 2) manual inspection of latent fingerprints leads to 20% errors, 3) handwriting identifications are inaccurate in 40% of cases, 4) voice identification based on spectrographs suffers 63% error rates, and 5) identification based on bite marks yields errors in 64% of cases³¹. The "Innocence Project" permitted 14 out of 87 death row inmates to be exonerated based on DNA analysis³¹. It is, thus, obvious how incorporation of biometric tools and methods into forensic science was a desperately needed addition.

It should be emphasized that classic automatic biometric systems do not include a true decision-making step¹². Rather, these systems function by principles of sorting and ranking - search outputs are lists of best-matching potential candidates. Given that the prime goal in forensics is to confirm or deny the role of an individual in a crime, lists of best-matching potential candidates obtained by automatic systems are then processed by forensic experts, who, based on statistical support for each candidate from the list, together with their visual/auditory inspection, reach final decision to be presented in court. It is important to stress that the global recommendation is to dissociate from subjective opinion in forensic identification decision-making process¹². For instance, positive identification of individuals via fingerprints, admissible in the Republic of Serbia's courts, requires twelve matching minutiae between two fingerprint samples. In the past decade, many countries, including the UK and the US, have abandoned such approach. In contrast, current trend is to include likelihood ratios in forensic biometric systems, that is, to use statistical measures which portray the confidence in the final decision¹².

Likelihood ratios are widely used in DNA profiling¹². Declaring two DNA profiles a match demands that the compared DNA samples be identical at all analyzed loci. An obtained profile at each locus renders a specific statistical value, based on its incidence in the entire population. When using multiple STR loci, population frequency statistics are multiplied for each locus, determining "random match probability" (RMP), probability that a DNA profile is shared

among two unrelated individuals. The estimate that RMP for two complete, unmixed DNA profiles of unrelated individuals is 1 in a billion⁹ illustrates the high discrimination power of DNA profiling. It should be noted that RMP does not represent the probability that the accused is guilty of a crime. Instead, forensic DNA analyst will use RMP in court to describe their certainty for inclusion or exclusion of a person as a DNA match to the questioned DNA sample.

Conclusions

Forensic biometric systems are not without their own flaws. It is well known that the accuracy of results in a biometric system is highly dependent on the quality of input data¹². As a lot of forensic data is not "clean" (for example, mixed DNA profiles from rape cases, noisy voice samples, partial fingerprints), the new research keeps aiming at improving the performance of biometric systems in forensic scenarios (for example, development of better matching algorithms for latent fingerprint matching or mixed DNA profile matching). However, the introduction of biometric methodologies into forensics has undoubtedly advanced the field of forensic science. Nowadays, impressive quantity of data can be maintained in databases in an affordable manner; these large databases can be searched quite rapidly; the obtained results used for personal identification are rather accurate, devoid of human errors and subjectivity as much as possible.

Representation of forensic and biometric identifications in the media has lead to increased, and often unrealistic, expectations of forensic science in the general public. In addition, quite knowledgeable, yet very aggressive, defence layers often misinterpret the evidence presented by forensic experts in courtrooms ("defence attorney fallacy"). Both of these occurrences have contributed to placing the burden on the prosecution, that is, on the proof by forensic evidence. In addition to advancements in forensic science and biometric technology continuously being made, proper education of judges, police officers, as well as general public (serving as jury) is of crucial importance.

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QUALITATIVE AND QUANTITATIVE ANALYSIS OF PATENT PRINTS CONTAMINATED BY HUMAN BLOOD FOCUSING ON 2ND AND 3RD LEVEL DETAIL

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Abstract: Implementing the features from 3rd level details in the process of identification must involve researches concerning the clarity of the patent prints with the special emphasis of the pores in situation when they are contaminated with human blood. Pores are visible, i.e. suitable for identification when regarding to qualitative and quantitative aspect we can analyze their spatial position. There are two types of analyses of the spatial positioning of the pores: one, in the frames of the papillary line where the pores are placed (number of pores from one to another characteristic from the second level detail), and the other in the frames of the working field that is under research where the pores are analyzed independently. In this research paper, we have analyzed the number of characteristics of 2nd and 3rd level detail (pores) and their suitability for identification in situations where the forefinger distal phalange was contaminated with 15, 20, 30, 40 and 60 µl of human blood respectively, and the fingerprint was subsequently deposited on a piece of paper with a density of 0.121 gr/sm². The purpose of this analysis is correct interpretation of the visible bloody patent prints of the scene in terms of the dynamics of their origination, biometric capacity of the characteristics of the second and third levels and amount of human blood, which is deposited on the surface. Taking into account the microstructure of the pores of the skin it is necessary to predict their behavior in terms of contamination with foreign material.

Key words: latent prints, patent prints, poroscopy identification, analysis of pores.

Introduction

Friction ridges must be present for pores to be visible, and those friction ridges would have individualizing value simply by being present and in agreement. Poroscopy will almost always be used in conjunction with other friction ridge formations, or in relation with 2nd level detail.

In addition, taking into consideration the complexity of the microstructure of the characteristics from the third level, and at the same time stressing out the pores, some circumstances shall be considered as follows:

1. The tendency of easy misshaping. The shape and the structural positions of the pores, although a constant category, because of the relief and the porosity of the surface on which they are applied and in general because of the irregular way of

their treatment during visualization, may be subject to mutilation or misshaping.

2. The lack of certain characteristics or the occurrence of new parasite lines or mutilation is also a factor, which the experienced expert shall overpass. This means that the biometric capacity of the structure of the pores must be exactly estimated and, accordingly, their general and individual characteristics are to be analyzed. Difficulties may arise with respect of the orientation during analyses of the structure of the pores.

3. The position of the pores on the papillary lines. It is possible that the pores are spread on the surface of more papillary lines or on the surface of only one papillary line. From this point of view, we can say that they have to be observed also as a whole together with their layout on the surface of the papillary line and as a part of the individual structure on the edges of the papillary lines with which adjoin the pores;

4. The progression and the growth of the pore, which is subject of the further discussion presents a part of the ageing of the papillary lines and with it, also changing and fluctuation of the width of the papillary line;

5. The permanence or transitory nature of the occurred mutilation on the pores and on the papillary lines in general. Because of such specific characteristics there is a special correlation between the characteristics from different levels whereby the approach at the expertise should be solely deductive.

The present study has an intention to solve some of the practical and theoretical issues regarding the challenge to apply the 3rd level detail, according to directions and attitudes of Interpol European Expert Group on Fingerprint Identification. They, among other things, clearly define that: the third level detail are small shapes on the ridge (edgeoscopy), including ridge unit thickness, thinness and relative pore location (poroscopy); the third level detail is always used in agreement with the second level detail. This is the additional aspect that experts are expected to look for.¹ Although in the Republic of Macedonia we still use the numerical standard for identification of latent prints (12 points), we have a tendency to decrease the number of second level detail, concerning the use of objective parameters such as pores and edge shapes. The challenge to apply poroscopy in the process of identification first asks for additional laboratory experiments from the aspect of visualization of latent prints and pores, and second aspect is treating the patent prints, which are obvious or evident, already visible² and which are made with the deposition of different type of matrix such as blood, color, oil etc.

The approach of treating the patent prints implies that a few aspects should be taken into consideration:

1. The analysis of the extension of the papillary lines on the surface in terms of defining the configuration of the fingerprint;

2. The analysis of the microstructure of the surface where the visible papillary lines are deposited, because the porosity directly affects the deformation of the

¹ David R. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology, 1999 CRC Press LLC

² Oklevski Slobodan, [http://www.interpol.int/Public/Forensic/fingerprints/research/Qualitative Quantitative Aspects.pdf](http://www.interpol.int/Public/Forensic/fingerprints/research/Qualitative%20Quantitative%20Aspects.pdf), 2010.

microstructure of the pores and papillary lines in all;

3. The analysis of the level of saturation with the contaminant, regarding the area where patent print is saturated - central or peripheral;

4. The analysis of the saturation of pores with a contaminant. Usually the pores should look like the surface on which patent print is deposited;

In this research, the human blood has been used as a contaminant, where one drop of blood in quantity of 15, 20, 30, 40 and 60 μl on the central part of the distal phalanx of the right forefinger is deposited. After the deposition of blood, the same finger is deposited four times consecutively on paper the density of which is 0.121 gr/sm^2 . This experiment has been made to show that, in practice, bloody patent prints are often detected on the objects with which the crime was committed e.g. (knife, gun etc.). In such cases the identification expert should have appropriate expertise and knowledge about the contamination i.e. saturation of the patent prints.

Materials and methods

1. Quantity of human blood 15, 20, 30, 40 и 60 μl ;
2. Sheet of paper with a density of 0.121 gr/sm^2 ;
3. Method of scanning with application of scanner HP Scan jet Photo Scanner 4370 with resolution of 3600 dpi;
4. Method of dactiloscropy analyses where the prints are analyzed and compared manually with application of stereo microscope and zooming in up to 50 times;
5. Graphic and tabular review of the results from the analysis.

This study has been performed bearing in mind the following aims:

1. An analysis of the spatial positioning in the frames of the papillary line and in general, in respect of the characteristics from the second level present around the pores;
2. Influence of the quantity of the contaminant of human blood regarding visibility of the second and third level detail;
3. Suitability for identification of the third level detail regarding the spatial position.

In addition, contaminated patent prints with human blood are shown:



I II III IV
Fig.1 Patent prints deposited four times successively with an amount of 15 μ l human blood.



I II III IV
Fig.2 Patent prints deposited four times successively with an amount of 20 μ l human blood.



I II III IV
Fig.3 Patent prints deposited four times successively with an amount of 30 μ l human blood.



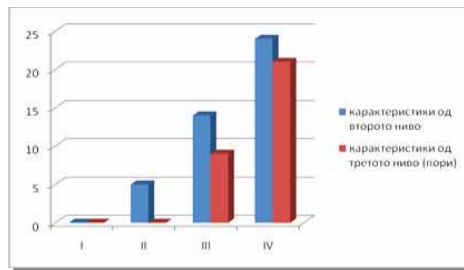
I II III IV
Fig.4 Patent prints deposited four times successively with an amount of 40 μ l human blood.



I II III IV
 Fig.5 Patent prints deposited four times successively with an amount of 60 μ l human blood.

Results and discussions

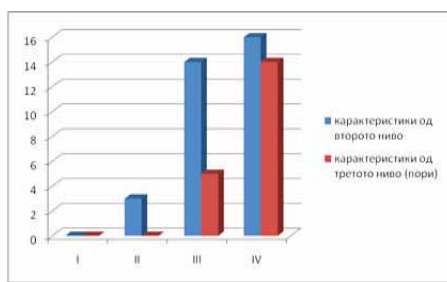
From the initial analysis of the patent prints, we can see that the finger is deposited on the surface at an angle of 90 degrees. The first part of the deposited blood is already absorbed in the paper and because of the saturation of the surface and viscosity of the blood; the rest of the contaminant will be concentrated in the center of the trace.



Graph 1: Representation of the presence of the characteristics of the 2nd level versus the features of the 3rd level where the amount of human blood is 15 μ l

subsequent touching	I	II	III	IV
2nd level detail	0	5	14	24
3rd level detail (pores)	0	0	9	21

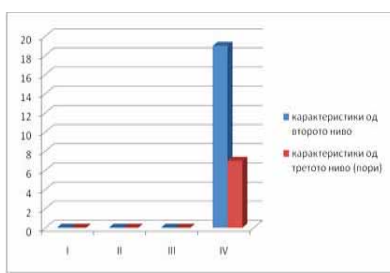
Tab. 1: Number of characteristics of the second and third levels in terms of subsequent touching of the surface with an amount of 15 μ l human blood.



Graph 2: Representation of the presence of the characteristics of the 2nd level versus the features of the 3rd level where the amount of human blood is 20 µl

subsequent touching	I	II	III	IV
2nd level detail	0	3	14	16
3rd level detail (pores)	0	0	5	14

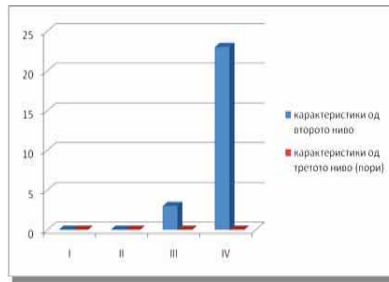
Tab 2 Number of characteristics of the second and third levels in terms of subsequent touching of the surface with an amount of 20µl human blood



Graph 3: Representation of the presence of the characteristics of the 2nd level versus the features of the 3rd level where the amount of human blood is 30 µl

subsequent touching	I	II	III	IV
2nd level detail	0	0	0	19
3rd level detail (pores)	0	0	0	7

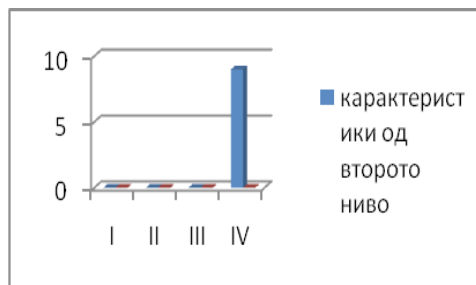
Tab 3: Number of characteristics of the second and third levels in terms of subsequent touching of the surface with an amount of 30µl human blood



Graph 4; Representation of the presence of the characteristics of the 2nd level versus the features of the 3rd level where the amount of human blood is 40 µl

subsequent touching	I	II	III	IV
2nd level detail	0	0	3	23
3rd level detail (pores)	0	0	0	0

Tab 4: Number of characteristics of the second and third levels in terms of subsequent touching of the surface with an amount of 40µl human blood

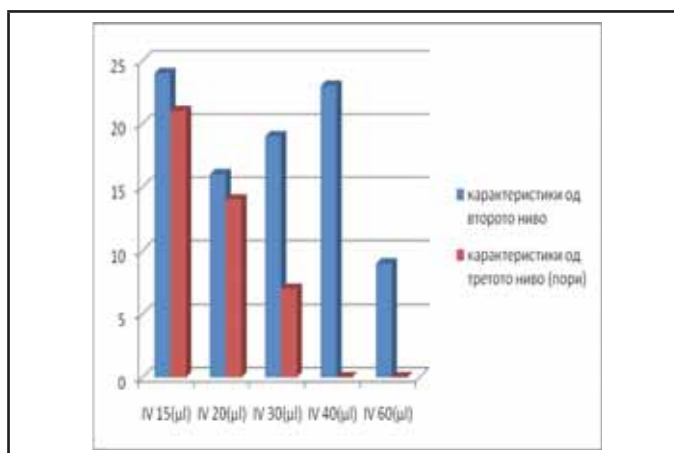


Graph 5: Representation of the presence of the characteristics of the 2nd level versus the features of the 3rd level where the amount of human blood is 60 µl

subsequent touching	I	II	III	IV
2nd level detail	0	0	0	9
3rd level detail (pores)	0	0	0	0

Tab 5: Number of characteristics of the second and third levels in terms of subsequent touching of the surface with an amount of 60µl human blood

From the analysis, we can conclude certain proportionality on the level of features and their number compared to the amount of contaminant present in the distal phalanx of the finger as shown in graph 6.



Graph 6: Number of characteristics of the second level versus the characteristics of the third level regarding the 4th subsequent touching of the surface with an amount of 15 µl, 20 µl, 30 µl, 40 µl and 60 µl human blood

The graph 6 represents a set of features extracted from the traces that are deposited on the surface by the fourth subsequent touching. We can emphasize the inversely proportional rule that quantity of the contaminant has a direct influence on the presence of the features of the third level (pores) where they are most evident when the amount of contaminant is 15 µl. We can indirectly conclude that the features of the third level would be even more prevalent when the amount of contaminant would be even lower. In such a case, the position of the pores, their frequency of placement, edge features of papillary lines and eventually the form of the pores would be clearly visible. Propensity to deflection of pores and their low visibility in the latent and patent prints define them as an additional or secondary parameter for identification.

The volume of a single drop of free-falling blood was studied by MacDonell in 1971, Laber in 1985, and White in 1986. The original experiments conducted by MacDonell measured the average volume of a drop of blood to be approximately 0.05ml (50 µl), which corresponds to a widely accepted standard of 20 drops per milliliter³, and in such a volume of blood deposited on a fingertip we cannot expect quality visible patent prints. Characteristics of the second level show larger stability of their appearance because they are more resistant to deformation than pores. We can conclude that in the case of patent prints which are contaminated with blood, characteristics from the second level are in larger number than those from the third level. However, in the process of dactyloscopic analysis we should take both parameters into account, according to ACE-V methodology. The concentration of the contaminant in the center of the print directly depends of the viscosity and surface tension of the specific contaminant, and because of that, in our experiment, we can analyze only the characteristics in the peripheral or basal part of the fingerprint.

³ Stuart H. James, William G. Eckert, Interpretation Bloodstain Evidence at the Crime Scene, CRC Press, 1999.

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THE IDENTIFICATION OF HUMAN REMAINS EXHUMED IN KOSOVO AND METOHIJA DURING THE PERIOD FROM 2001 TO 2009

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Abstract: After the armed conflicts throughout the nineties of the twentieth century occurred in the former Yugoslavia, the identification of war victims is a challenging task. This paper gives a detailed description of exhumed remains identification process. One of the study objectives has been a comparison between DNA results and traditional forensic identification methods. This paper deals with the identification of human remains that were exhumed in Kosovo and Metohia in the period 2001-2009, belonging to Serbs and other non-Albanian ethnic communities (Montenegrins, Bosniaks, Roma, Gorani, and others), as well as considerably fewer Albanians who were also killed during the war and post-war period. The exhumation and identification of human remains began during the armed conflict, continued with a high intensity immediately after the establishment of the UN administration in the province, and from the end of 2001 among the identified victims dominated those of non-Albanian origin – Serbs, Montenegrins, Roma, and others. The experience of this process and the experience of other countries show that there is a need to organize appropriate services for the identification of human remains in Serbia, capable to react effectively in case of mass disaster.

Key words: identification, exhumation, human remains, Kosovo and Metohia

Introduction

In the last twenty years or so, many unexpected challenges have appeared in the identification of unknown human remains, leading to significant advances in this field. The most famous mass identification campaigns, capable of giving us some lessons to be learned, were those after the attack on World Trade Center (WTC) on 9/11 2001 (USNIJ, 2006), Indian Ocean tsunami in 2004 (Deng et al.,

2005), as well as experiences of human remains identification after the armed conflicts in Croatia and Bosnia and Herzegovina (Huffine et al., 2001; Anđelinović et al., 2005), and in Kosovo and Metohia (Dobričanin et al., 2001; Matejić, 2005).

After the armed conflicts throughout the nineties of the twentieth century occurred in the former Yugoslavia, a special task is the identification of war victims, as well as victims of war and post-war crimes, buried in individual grave sites and in mass graves, bearing in mind that exhumations are usually done many years after their deaths, often dealing with secondary or tertiary graves. During the armed conflict, and especially after the establishment of the UN administration in Kosovo, in the presence of international military and police forces, 1.441 people of Serbian, Montenegrin and other ethnicities, including certain number of Albanians loyal to Serbia disappeared. Available data indicate that most of these people were killed, and their remains were buried in different ways – in hidden and unmarked individual graves or in mass graves.

The fact that Kosovo and Metohia have not been under the jurisdiction of Serbia for more than ten years limits the participation of Serbian institutions in the process of recovering and identifying human remains. Therefore, this paper deals with the identification of human remains that were exhumed in Kosovo and Metohia in the period 2001-2009, belonging to Serbs and other non-Albanian ethnic communities (Montenegrins, Bosniaks, Roma, Gorani, and others), as well as considerably fewer Albanians who were also killed during the war and post-war period. The aim of this paper is to consider certain aspects of the identification of exhumed human remains, which are due to local specificity and a lot of peculiar events. One of the study objectives has been a comparison between DNA results and traditional forensic identification methods.

Material and methods

Happenings connected with the armed conflict in Kosovo and Metohia resulted in lots of people missing: in the period 1998/99 and during the NATO air campaign in 1999 more than 4,000 people belonging to all ethnic groups were missing, while after the establishment of the UN administration, additional one thousand people went away, mainly those of non-Albanian origin. Associations of missing persons' families in Serbia claim about 1.400 people, about two-thirds of whom disappeared after the war.

The process of human remains exhumation and identification practically began during the very armed conflict, but its full extent was reached after the establishment of the UN administration in Kosovo and Metohia. In the beginning, during 1999 and 2000, most identified victims belonged to the Albanian ethnic group, and after that, in fact since spring 2002, the identification of victims who belonged to other ethnic groups, primarily Serbs, has been initiated. To this day, joint teams featured by our experts have exhumed remains of 394 persons, which were then examined along with remains of 51 persons exhumed without attendance of our experts. By the end of 2009, of the total 445 examined sets of exhumed human remains, 309 people were identified, and the remains were returned to their families. By May 1st 2010, the additional three were identified and their remains were returned to their families. Among the identified persons, in nineteen cases DNA analysis was not carried out.

Human remains exhumation included burial sites mapping in the grid using standard archaeological techniques. Position of human remains was

photographed, as well as their orientation and relationship between different people and things, and all the photographs included date and identification number. Team members also photographed and mapped all the accompanying elements of the body (clothing, hair, coffin, bullets, etc.). Human remains were packed in plastic bags, labeled, dated and numbered, and the same was done with supporting elements. The main task of this process was to reconstruct the facts surrounding grave sites and collect all the relevant information that could be useful for determining the cause and manner of death and victim identification (Kirschner and Hannibal, 1994; Matejić, 2005).

Examination of the exhumed human remains was carried out in the Office of Missing Persons and Forensics. This institution was established by the UN Mission in Kosovo (UNMIK) in June 2002, and it ran within that mission under the name UNMIK OMPF up to 12/9 2008 (UNMIK, 2008), when it fell under the jurisdiction of the European Union Rule of Law Mission (EULEX), under the changed name EULEX OMPF. OMPF headquarters and Mortuary Science Facility were established in Orahovac, where most of the autopsies were performed, although greater part of this institution was moved to Priština, so that later autopsies were carried out there. During the postmortem examination of human remains, they were analyzed by specialists in forensic medicine and anthropology. In addition, clothing and personal effects found with human remains were examined, packed and labeled by the same label used to mark the corpse on which, or next to which, they were found. Skeletal remains were also examined in an anthropological manner. The entire procedure was documented by photographs and video recordings. When necessary, radiographic methods were used.

Samples for DNA analysis were collected mostly from long bones, teeth, cranial bones or ribs, and were processed in the laboratories of the International Commission on Missing Persons (ICMP). Ante mortem data (AM data) were collected from families of persons missing in connection with the armed conflict in Kosovo and Metohia, in cooperation with the International Committee of the Red Cross and other organizations. These are data regarding physical characteristics of missing persons, birthmarks, dental status, health status, etc., that may be of importance in the process of human remains identifying. Along with the collection of AM data, blood samples for reference DNA analysis were taken from relatives of missing persons.

The whole procedure of analyzing DNA sampled from unidentified human remains, DNA analysis of reference samples of missing persons' relatives and expert interpretation of the obtained results, was organized by ICMP, and that institution was entirely responsible for the process.

Results and discussion

Since June 1999, exhumations have been performed by ad hoc teams of international experts in forensic medicine, who worked for the International Criminal Tribunal for the Former Yugoslavia (ICTY). Between June and November 1999, 2.108 bodies were exhumed at 195 locations. In the second phase conducted between April and November 2000, ICTY exhumed 1.557 bodies and 285 incomplete remains from 325 locations. On July 17th 2001, the tribunal reported that the total of

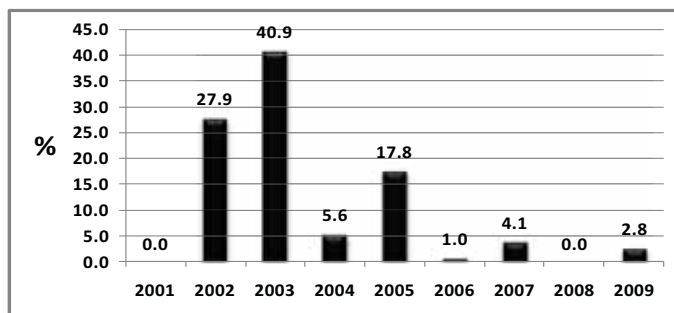
4.392 bodies had been exhumed from 876 graves in Kosovo. Forensic expert teams which worked for ICTY performed postmortem examination and other forms of forensic expertise (anthropology, forensic odontology, etc.) in 3.620 of those human remains, and then successfully identified 2.099 victims, whose remains were returned to their families for burial. Afterwards, approximately 1.500 unidentified bodies were buried in two UNMIK cemeteries and other municipal cemeteries for "later" identification (Amnesty Int., 2009).

When the exhumations discussed in this paper are considered, in 2001 three bodies exhumed earlier had been identified and delivered to their families, so that year is also included in this paper. The number of bodies exhumed per annum is shown in table 1 and graph 1.

Table 1 *Number of exhumed human remains per annum*

Year	Exhumed human remains
2001	0
2002	110
2003	161
2004	22
2005	70
2006	4
2007	16
2008	0
2009	11
Total	394

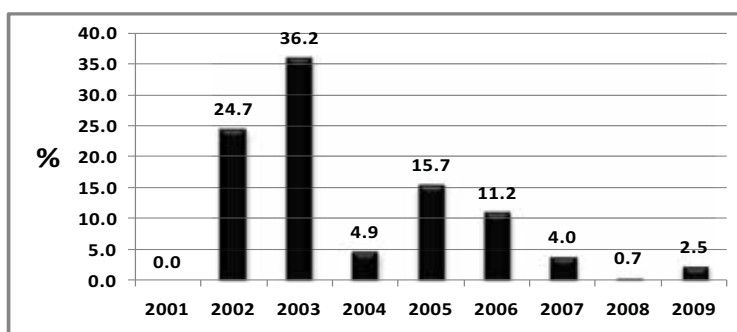
Graph 1 *Percent of exhumed human remains per annum*



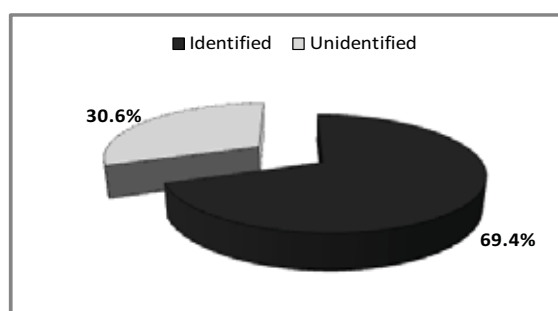
As it can be seen, most of exhumations were performed in 2002 and 2003 (total 271 or 68.78%). Reasons for such an initial "success" are numerous. There was a great political pressure, sufficient amount of (mainly international) money was coming, and information regarding potential group and individual grave locations was more easily available. Since 2004, a significant reduction of international forces has occurred. Also, the process of jurisdiction transfer to temporary administrative bodies progressed from year to year, and culminated in 2007 with unilateral declaration of Kosovo independence, which slowed down the process of identifying primarily non-Albanian victims. The number of postmortem examined human remains (table 2 and graph 2) followed a similar tendency, and 60.90% were autopsied in 2002 and 2003.

Table 2 *Number of postmortem examined human remains per annum*

Year	Postmortem examined human remains
2001	0
2002	110
2003	161
2004	22
2005	70
2006	50
2007	18
2008	3
2009	11
Total	445

Graph 2 *Percent of postmortem examined human remains per annum*

Increase in the number of exhumed and postmortem examined bodies observed in 2005 and 2006 is the result of the discovery of several mass graves, especially those in locations Volujak near Klina and Široko near Suva Reka. The observed dynamics of the identification of exhumed human remains also depended on other factors.

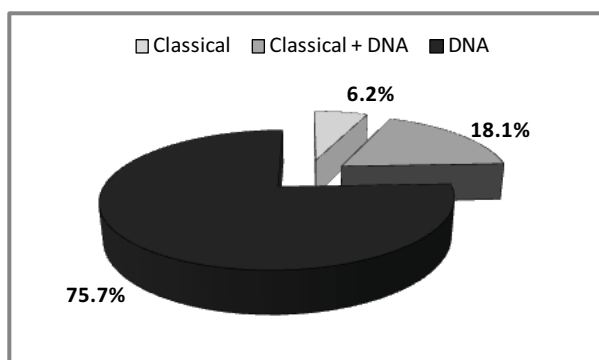
Graph 3 *Share of identified persons in the total number of exhumed human remains*

The total number of postmortem examined human remains was greater than the number of the exhumed ones, because 51 bodies were exhumed without our experts present at exhumation, but involved in other stages of the process. Out of the total number of postmortem examined human remains (445), 309 of them were identified during the studied period, while 136 bodies remained unidentified,

which was nearly one-third of the total body count (graph 3). It should be noted that up to April 2010 three more bodies were identified and delivered to their families. The share of identified persons in the total number of missing persons was much lower, and there are numerous reasons for that. However, the analysis of factors for which it is not possible to find and identify more missing persons, at least for the time being, is a separate subject, so we will not deal with it here.

Identification using traditional forensic methods is difficult due to the state of exhumed human remains and lack of medical and dental records containing detailed information. Classical forensic methods include collection and analysis of ante mortem data and personal effects, as well as anthropological methods. However, having in mind the way those people died, subsequent transfer of human remains, and the fact that a significant period of time usually passed from their death, the identification of exhumed human remains cannot be based solely on these methods. The success rate in the identification of human remains has significantly been improved by applying the latest discoveries in the field of DNA analysis.

Graph 4 *Share of the applied identification methods*



At the very beginning (the first half of 2003), DNA samples were taken and analyzed as an addition to conventional methods when they were not able to assure positive identification, then as the only method when conventional identification was not possible, or at family request for confirmation of identity. Later, the DNA identification was required. Hence, 32 people were identified solely by classical methods, and in 43 persons DNA identification was performed as an addition to classical methods. Afterwards, 13 families requested DNA analysis to confirm identity, so that in the end 19 people were identified only by classical identification, 56 persons by classical and DNA identification combined, while for other 234 persons DNA analysis was the method of choice (graph 4). However, the importance of traditional methods of identification should not be questioned, and they were applied whenever possible. In 14 cases, when the results of the DNA analysis indicated match, but were inconclusive (probability of matching 96-99.9%), the confirmation of identity was accomplished by classical methods.

Conclusion

- The exhumation and identification of human remains began during the armed conflict, continued with a high intensity immediately after the establishment of the UN administration in the province, and from the end of 2001 among the identified victims dominated those of non-Albanian origin – Serbs, Montenegrins, Roma, and others.

- When missing persons predominantly of Serbian ethnic origin are considered, during the period from 2001 up to the end of 2009 human remains of 445 persons were exhumed and examined; these exhumations and subsequent examinations of the remains were carried out by international teams featured by Serbian experts. Every exhumation performed by those teams was followed by an autopsy, and 32 persons were identified using conventional methods. Afterwards, at their families' request, the DNA identification was carried out for 13 of them, which confirmed the findings got by classical methods. Remaining 413 of the exhumed human remains were identified by DNA analysis as a primary method of identification.

- Less than a third of the total number of missing persons was identified (according to some sources less than a quarter).

- DNA analysis is the “gold standard” for identifying human remains of people killed during armed conflicts or in other kinds of mass disasters.

- The process of DNA identification was carried out in laboratories of the International Commission on Missing Persons (ICMP). The whole process was fully controlled by this institution, from receiving samples taken during exhumations and DNA samples taken from victims' family members, through laboratory analyses, to keeping DNA profile databases, match finding, and the final case conclusions. The results of the DNA analyses were delivered in encrypted form, in a completely non-transparent way.

- Based on our experience and the experience of other countries it is clear that there is a need for establishing appropriate agency for identifying human remains of unknown identity in Serbia, in order to ensure an effective reaction in case of mass disaster.

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EFFICIENCY OF HANDGUN USE IN DAY AND NIGHT VISION WITH RESPECT TO GENDER¹

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Abstract: The paper presents a survey aimed at exploring relations between efficiency of CZ 99 9 mm caliber handgun use in two different usage regimens – daytime and night with respect to gender. The sample of 73 subjects, 48 males and 25 females aged $20 + 0.9$ were subjected to measuring handgun use efficiency by shooting in the standing (upright) position from the distances of 7 and 5 metres using 20 bullets. Six variables were used to assess the efficiency of handgun use: the number of shots hitting the target by daylight ($DPUC_{APS}$), the number of shots in the target by night ($NPUC_{APS}$), shooting efficiency at daytime ($DPUC_{EFIC}$), shooting efficiency at nighttime ($NPUC_{EFIC}$), as well as two variables which assessed the efficiency of the duty weapon with respect to visibility conditions, including absolute difference in the number of shots in the target ($M_DPUC_{APS} / NPUC_{APS}$; $F_DPUC_{APS} / NPUC_{APS}$) and the daytime/night vision efficiency ratio ($M_DPUC_{EFIC} / NPUC_{EFIC}$; $F_DPUC_{EFIC} / NPUC_{EFIC}$) for male (M) and female (F) subjects. Crude data were processed by descriptive statistics, while the differences between genders were established by the use of MANOVA. The results obtained indicated the general statistically significant gender-related difference in the efficiency of duty handgun use on the level of Wilks' Lambda 0.0623, $F = 13.92$, $p = 0.000$. On the partial level, statistically significant gender-related differences were found in the number of shots hitting the target by daylight ($DPUC_{APS}$) $F = 40.92$, $p = 0.000$; shooting efficiency at daytime (M_DPUC_{EFIC}) $F = 40.92$, $p = 0.000$; the ration of absolute difference in the number of shots in the target by day / night between male and female subjects $F = 8.63$, $p = 0.004$; and the daytime/night vision efficiency ratio for male and female subjects $F = 5.780$, $p = 0.019$.

The results obtained in this research showed that there was no statistically significant difference with respect to gender in the efficiency of duty weapon use in night vision conditions, whereas in daytime conditions male subjects showed significantly higher level of shooting efficiency up to 22.39 %.

Key Words: *duty handgun, efficiency, reduced visibility, optimal conditions.*

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Introduction

The basic instruction in handling the 9 millimeter duty handgun CZ 99 consists of five programmes carried out in optimal daylight conditions and one programme involving reduced visibility conditions and darkness. The shooting distances in optimal conditions range from 3 to 15 meters, and between 5 and 7 metres in reduced visibility and darkness. Beside the changing distances, most programmes involve shooting practice within limited time spans, both with respect to discharge and manipulation of the firearm (drawing the gun from the holster, replacing the gun in the holster with a bullet in the barrel and repeated drawing of the gun with the hammer in the front position – double action, magazine exchange...)²

This type of instruction is aimed at making the training in weapons handling as similar to the actual situations as possible, because previous research showed that the situations involving the use of firearms took place within intervals of only a few seconds and distances rarely exceeding 7 meters.³ Proper instruction prepared a police officer for a proper reaction with respect to both efficiency and tactical training and perfection, which results in the mental stability of the officer in coping with stressful situations^{4,5,6}.

The purpose of this paper is to explore the gender-related differences in the use of the duty handgun CZ 99 9 mm in two different sets of conditions – during daytime and by night.

Methods applied

The sample

The sample consisted of 73 subjects, 48 males and 25 females aged 20 ± 0.9 . The main descriptive characteristics of the subjects were: for males $BH \pm SD = 1.818 \pm 0.06$ meters, $BM \pm SD = 74.89 \pm 9.8$ kilograms; for girls $BH \pm SD = 1.693 \pm 0.04$ meters, $BM \pm SD = 61.0 \pm 8.1$ kilogrammes.

Efficiency Assessment Method

Six variables were used to assess the efficiency of handgun use: the number of shots hitting the target by daylight (DPUCaps), the number of shots in the target by night (NPUCaps), shooting efficiency at daytime (DPUCefic), shooting efficiency at nighttime (NPUCefic), as well as two variables which assessed the efficiency of the duty weapon with respect to visibility conditions, including absolute difference in the number of shots in the target ($M_DPUCaps / NPUCaps$; $F_DPUCaps / NPUCaps$) and the daytime/night vision efficiency ratio ($M_DPUCefic / NPUCefic$; $F_DPUCefic / NPUCefic$) for male (M) and female (F) subjects.

² Dujkovic, 2003

³ McLoughin, 1988

⁴ White, 2002

⁵ Burke & Mikkelsen, 2004

⁶ Morrison, 2005

Equipment and Realization of Test Shooting

For the purpose of this research, the following equipment was used in carrying out test shooting:

- Duty handgun 9 mm CZ 99
- Duty belt with holster
- 9 mm bullet 40 pcs per subject
- Figure target (thorax) (72 x 52 cm)

Testing

The subjects were required to shoot, on the shooting instructor's mark, 10 bullets each with double action (firing two rounds) from the distance of 5 metres and time restricted to 4 seconds per two rounds, after which the drill was repeated from the distance of 7 metres. Identical drills were repeated in conditions of impaired visibility and darkness. The only difference was that the subjects used torches when shooting from the 7 meter distance in poor visibility conditions, in order to spot the target more easily, whereas no source of light was used when shooting from 5 meters, which means that the subjects had to rely on their sense of direction. In this way the subjects fired 20 rounds each in their daytime exercises and the same number of rounds by night.

Applied Statistical Methods Applied

All analyses were carried out using a laptop computer ASUS N53J 2.4 GHz and the statistics software SPSS Statistics 17.0 (Copyright SPSS Inc., 2005). Statistical analyses were applied in order to calculate basic descriptive statistics: the average value of the variable (MEAN), standard deviation (SD), coefficient of the variable (cV %), standard error (Std. Error), lower and upper bounds of the confidence interval. The gender-related differences were established by using MANOVA. The level of statistical significance was defined at 95% or $p=0.05$.⁷

Results

The results of basic descriptive statistics (Table 1) indicate that the average number of rounds hitting the targets in night conditions was 13.27 among male subjects, with the standard deviation of 3.56. Among girls in the same conditions the average number of rounds was 12.00 with the standard deviation of 3.43 (Table 1). When observing the average number of shots in optimal conditions, it was 18.04 among men, with the standard deviation of 2.15, and among girls it was 14.00 shots, the standard deviation amounting to 3.21 shots (Table 1). Average efficiency in night conditions was 90.21% among male subjects, with the standard deviation of 10.77%, and among females it was 70.00%, the standard deviation being 16.07% (Table 1). When the average value for the variable expressing absolute difference in accurate shots between males and females, it was established to be 23.85%, with the standard deviation of 19.71% among the former and 10.00%, with the standard deviation of 17.91% among the latter. For the variable reflecting the

⁷Hair et al., 1988

ration between daytime and night shooting efficiency, the average value for men was 74.54% with the standard deviation of 21.13%, and for girls it was 88.40% with the standard deviation of 27.26% (Table 1). Variation coefficient, as a relative indicator of the results distribution, was below 30% for all variables, which shows that the subjects presented a rather homogenous group with respect to measured capacities, except the one defining the absolute difference in shooting accuracy by daylight and at night, where the value of cV% was 82.64% among men and as much as 179.10% among females.

Table 1. Basic descriptive indicators of shooting efficiency

Dependent Variable	Gender	MEAN	SD	cV%	Std. Error	95% Confidence Interval		N
						Lower Bound	Upper Bound	
Night_Shooting_Results (N)	M	13.27	3.57	26.90	0.51	12.26	14.28	48
	F	12.00	3.43	28.58	0.70	10.60	13.40	25
Day_Shooting_Results (N)	M	18.04	2.15	11.92	0.37	17.30	18.78	48
	F	14.00	3.21	22.93	0.51	12.98	15.02	25
Night_Effic (%)	M	66.35	17.83	26.87	2.54	61.29	71.48	48
	F	60.00	17.14	28.57	3.52	52.98	67.08	25
Day_Effic (%)	M	90.21	10.77	11.94	1.85	86.52	93.89	48
	F	70.00	16.07	22.96	2.56	64.89	75.11	25
Day_Night_Diff_Aps (%)	M	23.85	19.71	82.64	2.76	18.35	29.36	48
	F	10.00	17.91	179.10	3.82	2.37	17.63	25
Night_Day_Perc_Diff (%)	M	74.54	21.13	28.35	3.38	67.81	81.27	48
	F	88.40	27.15	30.71	4.68	79.08	97.73	25

General gender-related and statistically significant differences were confirmed by Wilks' Lambda at the significance level of $F=13.923$ amounting to 0.000 (Table 2). This practically points out to the fact that the efficiency in the use of duty handgun in day and night conditions on our sample was statistically significant with respect to the subjects' gender.

Table 2. Testing significance of difference between males and females

Multivariate tests ^b						
Effect		Value	f	Hypothesis df	Error df	Sig.
Gender	Wilks' Lambda	.623	13.923 ^a	3.000	69.000	.000

a. Exact statistic

b. Desing: Intercept + Gender

Table 3 shows the results of partial differences between paired variables with respect to gender. The results indicated the existence of statistically significant gender-related differences in the number of shots hitting the target by daylight

M_DPUCaps vs F_DPUCaps of $F = 40.919$, $p = 0.000$; the ratio of absolute difference in the number of shots in the target by day / night between male and female subjects $F = 8.629$, $p = 0.004$; and the daytime/night vision efficiency ratio for male and female subjects of $F = 5.780$, $p = 0.019$.

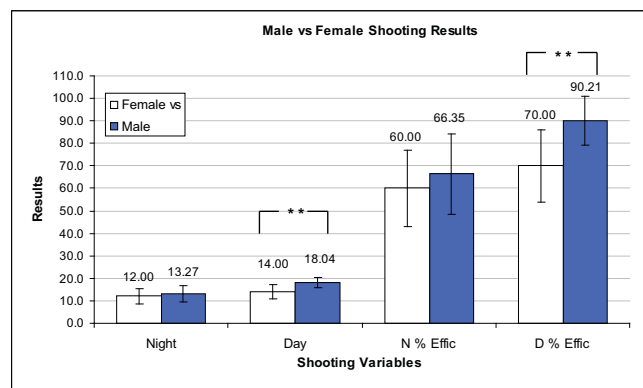
Table 3. Results of partial gender-related differences among paired variables

Tests of Between-Subjects Effects						
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Night_Shooting_Results	26.548	1	26.548	2.143	0.148
	Day_Shooting_Results	268.522	1	268.522	40.919	0.000
	Night_Effic	663.706	1	663.706	2.143	0.148
	Day_Effic	6713.042	1	6713.042	40.919	0.000
	Day_Night_Diff_Aps	3155.144	1	3155.144	8.629	0.004
	Night_Day_Perc_Diff	3160.795	1	3160.795	5.780	0.019

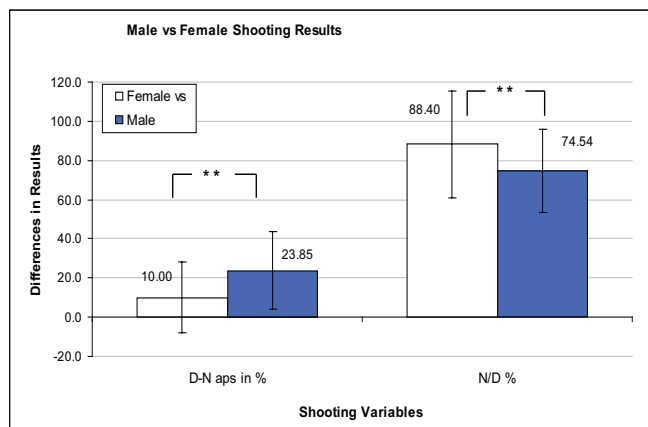
- a. R Squared = .029 (Adjusted R Squared = .016)
- b. R Squared = .366 (Adjusted R Squared = .357)
- c. R Squared = .029 (Adjusted R Squared = .016)
- d. R Squared = .366 (Adjusted R Squared = .357)
- e. R Squared = .108 (Adjusted R Squared = .096)
- f. R Squared = .075 (Adjusted R Squared = .062)

Graph 1 shows the results of basic variables in the research with statistically significant differences.

Graph 1. Average values and standard deviations of basic research variables (shots and efficiency by day and by night)



Graph 2. Average values and standard deviations of derived research variables (shooting and efficiency ratio by day and by night)



Discussion

The results obtained in this research showed that there were statistically significant differences with respect to gender in the efficiency of duty weapon use in daytime conditions, since the male subjects ($M_{DPUC_{APS}} = 18.04 \pm 2.15$) scored significantly better results when shooting from the duty handgun than the female subjects ($F_{DPUC_{APS}} = 14.00 \pm 3.21$) on the level of $F=40.919$, $p=0.000$, ie they were better by 4.04 shots absolutely speaking or 28.86% relatively speaking. Consequently, the shooting efficiency in daytime conditions among men ($M_{DPUC_{EFIC}} = 90.21 \pm 10.77$) was significantly higher in comparison of that shown by the girls ($F_{DPUC_{EFIC}} = 70.00 \pm 16.07$) on the level of $F=40.919$, $p=0.000$, ie higher by 20.21% absolutely or 28.87% relatively.

However, the differences found in the daytime conditions were not confirmed in the conditions of night vision. Although the male subjects had better results in the conditions of darkness and reduced visibility ($M_{NPUC_{APS}} = 13.27 \pm 3.57$ vs $F_{NPUC_{APS}} = 12.00 \pm 3.43$; $M_{NPUC_{EFIC}} = 66.35 \pm 17.83$ vs $F_{NPUC_{EFIC}} = 60.00 \pm 17.14$) the observed difference was not statistically significant when compared to the results achieved by the female subjects.

Due to the above stated, it was logical that the statistically significant difference established among the male subjects with respect to the derived variable, ie the index of difference in efficiency of the duty weapon use, was more substantial than that found among the female subjects, both absolutely ($M_{DPUC_{APS}} / NPUC_{APS} = 23.85 \pm 19.71\%$ vs $F_{DPUC_{APS}} / NPUC_{APS} = 10.00 \pm 17.91\%$, $F=8.629$, $p=0.004$) and relatively ($M_{DPUC_{EFIC}} / NPUC_{EFIC} = 74.54 \pm 21.13\%$ vs $F_{DPUC_{EFIC}} / NPUC_{EFIC} = 88.40 \pm 27.15\%$, $F=5.780$, $p=0.019$). A number of papers reported about similar results.^{8,9,10,11,12}

⁸ Вучковић et al., 2005

⁹ Vučković & Dopsaj, 2007.

¹⁰ Vučković & Dopsaj, 2007.

¹¹ Vučković et al, 2008^a.

¹² Vučković et al, 2008^b.

In other words, based on the obtained results regarding the efficiency of shooting, it appears that men significantly reduce the efficiency of shooting in reduced visibility conditions and darkness, as compared to female subjects. The most probable hypothesis which can account for the obtained results would be that in good visibility conditions males using the duty handgun are likely to rely on the physical aspect of domination of contractile characteristics i.e. the strength of their extremities, pectoral girdle and the thorax *nogu*^{13,14} more than females in the same situation. In this way, the coordination or synergy of the visual system, CNS, and contractile abilities form a prevalent factor of shooting efficiency in daylight.¹⁵ In the given circumstances, it is possible that kinesthetic of adjusting the weapon to the focal point, i.e. the fine technique of shooting is not the dominant factor defining the efficiency of shooting. However, in the conditions of reduced visibility or darkness, where the visual system in itself is not in control, the fine technique of shooting as a kinesthetic position not having been learnt, the males from our sample showed a dramatic decrease in shooting efficiency when compared to the females.

Anyway, future research should check the generated hypothesis on a substantially larger sample.

Conclusion

Relations between efficiency in the use of the CZ 99 service handgun was explored on a sample of 73 subjects, 48 males and 25 females, in the conditions of optimal daylight visibility and reduced night time visibility. The efficiency was assessed on the basis of the following variables: the number of shots hitting the target by daylight, the number of shots in the target by night, shooting efficiency at daytime, shooting efficiency at night time, the absolute difference in the number of shots in the target, and the daytime/night vision efficiency ratio for both male and female subjects.

Based on the obtained results and descriptive statistics, a conclusion was reached that the male population is likely to shoot more accurately (18.04 ± 2.15 ; 90.21 ± 10.77 , respectively) in optimal visibility conditions as compared to the female population (14.00 ± 3.21 ; 70.00 ± 16.07 , respectively). In the conditions of reduced visibility the average values of shooting accuracy in both sets of subjects tend to be similar (M 13.27 ± 3.56 ; 66.35 ± 17.83 , respectively, and F 12.00 ± 3.43 ; 60.00 ± 17.14 , respectively). The average value for efficiency among males was $90.21 \pm 10.77\%$ and among females it was $70.00 \pm 16.07\%$. The absolute difference in accurate shots between males and females was established to be $23.85 \pm 19.71\%$ among the males and $10.00 \pm 17.91\%$ among the females. For the variable reflecting the ration between daytime and night shooting efficiency, the average value for men was $74.54 \pm 21.13\%$, and for girls it was $88.40 \pm 27.26\%$. The variation coefficient indicated that the sample presented a rather homogenous group, except for the one defining the absolute difference in shooting accuracy by daylight and at night in both groups of subjects.

General gender-related and statistically significant differences were confirmed by Wilks' Lambda at the significance level of $F=13.923$ amounting to 0.000.

¹³ Вучковић, 2002.

¹⁴ Dopsaj et al, 2009.

¹⁵ Rossignol et al., 2006.

The results of partial differences between paired variables with respect to gender indicated the existence of statistically significant gender-related differences in the number of shots hitting the target by daylight $M_{DPUC_{APS}}$ vs $F_{DPUC_{APS}}$ OF $F = 40.919$, $p = 0.000$; the ratio of absolute difference in the number of shots in the target by day / night between male and female subjects $F = 8.629$, $p = 0.004$; and the daytime/night vision efficiency ratio for male and female subjects of $F = 5.780$, $p = 0.019$.

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DIGITAL FORENSICS AND COMPUTER CRIME INVESTIGATION

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Abstract: The development of digital age has been producing many new professions and with increasing volume of misuse and percentage of unlawful activity in cyberspace, the need for digital forensics specialists have been noticed. As the application of forensic science techniques to computer-based material, computer forensic refers to the scientific acquisition, analysis, and preservation of data contained in electronic media whose information can be used as evidence before the court of law. A digital forensics examiner might be called upon to perform any of a number of different types of computer forensics investigations in different legal proceedings, but the most common use is in criminal proceeding where computer forensics is used by law enforcement agencies to help them catch perpetrators. Digital evidence extracted from computer as well as distant firewalls, routers, smart hubs, application gateways, wireless devices, cellular components, deployed agents, and intrusion detection systems are becoming more and more vital to investigations. Networked computing, wireless communications and portable electronic devices have expanded the role of digital forensics beyond traditional computer crime investigations. Of increasing importance will be the need for evidence, and the methods and techniques used to uncover it, to be accurate, reliable, and accepted as standard practice in digital forensic analysis. Incorporation of the scientific method is the key to providing forensic evidence or suitable information meant to persuade the courts of law. Therefore the need for standardization of digital forensics techniques should be recognized.

Keywords: computer crime, digital forensic, digital evidence

Digital forensics

One could say that the importance of using specialized knowledge of science in criminal proceedings was noticed long time ago. The examples of forensics events important for criminal justice system may be found throughout history. Francis Galton (1822–1911) made the first recorded study of fingerprints, Leone Lattes (1887–1954) discovered blood groupings (A, B, AB, and O), Calvin Goddard (1891–1955) allowed firearms and bullet comparison for solving many pending court cases, Albert Osborn (1858–1946) developed essential features of document examination, Hans Gross (1847–1915) made use of scientific study to head criminal investigations. Each of them provided the way the forensic information to be recovered, analyzed and accepted in the court of justice.

As cyber activity has become an important part of the everyday lives of the general public, a new space for different type of misuse and even criminal activities has been created – the cyberspace. The characteristics of accidents in such an

environment, which may be referred to as cyber crime scene, posed the need for specialized knowledge and skills in order to properly deal with requirements of investigation. The answer is found in computer/digital forensics.

The development of digital age has been producing many new professions and, with increasing volume of misuse and percentage of unlawful activity in cyberspace, the need for digital forensics specialists has been noticed. The computer forensics process requires a vast knowledge of computer hardware and software in order to avoid the accidental invalidation or destruction of evidence and to preserve the evidence for later analysis. A digital forensics examiner might be called upon to perform any of a number of different types of computer forensics investigations in different legal proceedings, but the most common use is in criminal proceedings for cybercrime, where computer forensics is used by law enforcement agencies to help them catch "virtual" perpetrators.

So the question is, *what is considered as computer/digital forensics?* Computer forensics may be referred to as "the scientific acquisition, analysis, and preservation of data contained in electronic media, whose information can be used as evidence in a court of law"¹. Or, in other words, as the preservation, identification, extraction, interpretation, and documentation of digital evidence, i.e. data contained in electronic media whose information can be used as evidence in court. Digital forensics deals with the acquisition, preservation, examination, analysis and presentation of electronic (digital) evidence. The examination of digital evidence has provided a medium for forensic investigators to focus on after an incident of cyber crime has occurred. Also, it should be considered that nowadays almost every type of crime (not only cyber crime) involves some aspect of digital evidence and networked computing and wireless are expanding even more the role of digital forensics in computer crime investigations.

The ultimate goal of a computer forensic investigator is to determine the nature and events concerning a crime and to locate the perpetrator by following a structured investigative procedure. In doing so, the computer forensics specialist conduct a methodical series of techniques for gathering admissible digital evidence, as electronic data from computing equipment and various storage devices and digital media, that can be presented in a court of law in a coherent and meaningful format. But that goal may be achieved only if some standardized procedure is followed which aim is the providing the objective and precise result.

Standardization of digital forensics

Through the efforts of computer scientists, law enforcement and intelligence officers, network and system administrators, programmers, academics, and hobbyists, the field of digital forensics has evolved and is still evolving into one of the most dynamic and powerful investigative techniques. ² The thing that makes digital forensics so powerful is incorporation of the scientific method which enables forensic examiner to provide accurate evidence relating to an investigation in an objective manner. Being objective and accurate is the goal of digital examiner, which is achieved by gathering facts and forming a hypothesis based on the available evidence. ³ All these procedures should be followed by some principles rather than the application of clearly defined steps or processes

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² J. Wiles, K. Cardwell, A. Reyes, Cybercrime and digital forensics books period, New York 2007, 54.

³ E. Casey, Handbook of digital forensics and investigation, London 2010, 6.

established in statutes. Therefore the need for standardization of digital forensics techniques have been recognized, although it is very hard to create standard operating procedures due to the fact that every investigation has different aspects based on the dataset, objectives, resources etc.

There can be found several attempts for standardization of digital examiners practice.

The “*Good Practice Guide for Computer Based Electronic Evidence*”⁴ published by the Association of Chief Police Officers (United Kingdom) lists four important principles related to the recovery of digital evidence:

- No action taken by law enforcement agencies or their agents should change data held on a computer or storage media which may subsequently be relied upon in court.
- In exceptional circumstances, where a person finds it necessary to access original data held on a computer or on storage media, that person must be competent to do so and be able to give evidence explaining the relevance and the implications of their actions.
- An audit trail or other record of all processes applied to computer based electronic evidence should be created and preserved. An independent third party should be able to examine those processes and achieve the same result.
- The person in charge of the investigation (the case officer) has overall responsibility for ensuring that the law and these principles are adhered to.

Similarly, in the “*Guidelines for best practice in the forensic examination of digital technology*”⁵ of the International Organization on Computer Evidence the following six principles are specified:

- When dealing with digital evidence, all of the general forensic and procedural principles must be applied;
- Upon seizing digital evidence, actions taken should not change that evidence;
- When it is necessary for a person to access original digital evidence, that person should be trained for the purpose;
- All activity relating to the seizure, access, storage or transfer of digital evidence must be fully documented, preserved and available for review;
- An individual is responsible for all actions taken with respect to digital evidence while the digital evidence is in his/her possession;
- Any agency, which is responsible for seizing, accessing, storing or transferring digital evidence, is responsible for compliance with these principles.

The well-known U.S. Department of Justice publication, “*Searching and Seizing Computers and Obtaining Electronic Evidence in Criminal Investigations*”⁶, does not list any principles per se. However, the publication does address many of the points discussed above and provides a comprehensive explanation of the forensic process.

In 1999, R. McKemmish in the paper entitled “What is Forensic Computing?”⁷ specified four rules aimed at maximizing the admissibility of digital forensic processes. These rules, which are similar to the principles described above, are:

- Minimal handling of the original: The application of digital forensic processes during the examination of original data should be kept to an absolute minimum.

⁴ Retrieved from: http://www.7safe.com/electronic_evidence/ACPO_guidelines_computer_evidence.pdf.

⁵ Retrieved from: http://www.ioce.org/fileadmin/user_upload/2002/Guidelines%20for%20Best%20Practices%20in%20Examination%20of%20Digital%20Evid.pdf.

⁶ May be retrieved from: <http://www.justice.gov/criminal/cybercrime/ssmanual/>

⁷ Rodney McKemmish is world recognized specialist in digital forensics. The mentioned paper may be retrieved from: <http://www.aic.gov.au/documents/9/C/A/%7B9CA41AE8-EADB-4BBF-9894-64E0DF87BDF7%7Dt118.pdf>.

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- Account for any change: Where changes occur during a forensic examination, the nature, extent and reason for such changes should be properly documented.
 - Comply with the rules of evidence: The application or development of forensic tools and techniques should be undertaken with regard of the relevant rules of evidence.
 - Do not exceed one's knowledge: A digital forensics specialist should not undertake an examination that is beyond his/her current level of knowledge and skill.

In 2010 E. Casey in "*Handbook of digital forensics and investigation*" advises that forensic examiner should follow the following requirements⁸:

- Gathering information and make observation;
- Forming a hypothesis to explain observations;
- Evaluating the hypothesis;
- Drawing conclusions and communicate findings.

The previously mentioned principles should be incorporated in the very structure of digital forensic analysis process which involves taking factual observations from available evidence, forming and testing possible explanations for what caused the evidence, and developing deeper understanding of a particular item of evidence or crime as whole. All these proposals of standards and principles of digital forensic procedure are aimed to develop the scientific method which will help the investigators reach an objective conclusion.

Digital forensics' procedure

Regarding the described principles and standards, we shall now present in short procedure of digital forensics examiner when investigating the cyber crime scene.

After the accident has occurred, as in any type of investigation, the computer forensic examiner conducts specific procedure. That process begins with the step of assessing the case, asking people questions, and documenting the results in an effort to identify the crime and the location of the evidence. Identification and collection of electronic data that may be used as digital evidence cannot be done without informational interviews (with company IT personal, custodians etc.)

Only after doing that, the investigator is able to proceed to gathering of evidence and building a suitable chain of custody. All these procedures could be divided into *several stages*:

1. Identifying,
2. preserving,
3. collecting,
4. analyzing, and
5. presenting

⁸ E. Casey, *ibid.* 23.

crime scene information which the investigator should follow as thoroughly as possible. Finding the evidence, discovering relevant data, gathering the evidence, and preparing a chain of custody are the recommended processes for collecting data.

In this process, the digital forensics specialists use specific software tools. The International Association of Computer Investigative Specialists (IACIS ⁹) published a list of recommended standards for legally acceptable procedures for using forensic software for law enforcement purposes, according to which the forensics tools should be able to:

- obtain an exact copy of the original magnetic media to be investigated, without altering the original in any way,
- do a query-like search of the copy,
- ensure that the processes and procedures used can stand up to scrutiny by the opposition's legal team. ¹⁰

Most computer forensics tools are for Windows-based platforms, simply because most computers today utilize Windows. The main programs used are the following ones:

- Byte Back by Tech Assist, Inc. ¹¹
- Encase Version 2.08 by Guidance Software, ¹² which is a popular suite of computer forensics products that is reasonably self-contained and complete and has its own graphical user interface
- Expert Witness by ASR Data, initially made for the Macintosh OS. ¹³
- Drivespy by Digital Intelligence. ¹⁴

These tools are used for identification of electronic data which may be significant as digital evidence. A comprehensive and thorough investigation to **identify** the potentially relevant data is of great importance. There are several data storage locations:

- workstation environment (desktop and laptop),
- personal digital assistance (PDA's) as Blackberry,
- removable media, such as CDs, DVDs, removable USB hard drives,
- server environment, including file, e-mail, instant messaging, database application and VOIP servers,
- backup environment, including archival and disaster recovery backups. ¹⁵

Identified data recognized as possible evidence must be preserved in order to maintain its integrity and to protect them against inappropriate alteration or destruction. In doing so, it is important to preserve the chain of custody which is the accurate documentation of the movement and possession of a piece of evidence, from the time it is taken into custody until it is delivered to the court. This documentation helps prevent allegations of evidence tampering. It also proves that the evidence was stored in a legally accepted location, and it documents who is in custody and control of the evidence during the forensic testing phase. ¹⁶ A

⁹ Retrieved from: <http://www.cps.brockport.edu/~shen/cps301/figures/figure1.pdf>.

¹⁰ For an overview of the process, see "Discovery of Computer Data" at <http://wings.buffalo.edu/Complaw/CompLawPapers/printup.html>.

¹¹ <http://www.toolsthatwork.com/>.

¹² <http://www.guidance-software.com/>.

¹³ <http://www.asrdata.com/>.

¹⁴ <http://www.digitalintel.com/>

¹⁵ E. Casey, *ibid.* 78

¹⁶ J. Wiles, K. Cardwell, A. Reyes, *ibid.* 8

chain of evidence should be prepared to know who handled the evidence, and every step taken by the forensic investigator should be documented for inclusion in the final report. 17

The following step is finding and *collection* of evidence. As mentioned, prior to the seizure, one should do preliminary assessment to search for the evidence. After the assessment is concluded, the investigator should collect and seize the equipment used in committing the crime, and also document the items collected, such as floppy disks etc. Volatile data should be preserved first, for example: virtual memory - swap space or paging files; physical disks - the physical hard disks of a system; backups.¹⁸

Faced with sophisticated data encryption, hacking tools, malware existing within the memory, besides preserving the volatile data it is also of a great importance to:

- discover all files on the subject system, which includes existing normal files, deleted yet remaining files, hidden files, password-protected files, and encrypted files;
- recover all (or as much as possible) of discovered deleted files;
- reveal (to the extent possible) the contents of hidden files as well as temporary or swap files used by both the application programs and the operating system;
- access (if possible and if legally appropriate) the contents of protected or encrypted files. 19

After the forensic investigator finds all the relevant data and preserves them against any change, he will *analyze* them. The forensic investigator examines the evidence for proof of a crime, and prepares an investigative report before concluding the investigation. It is recommended to examine original evidence as little as possible. Instead, one should process the duplicate evidence. Analysis should be done on the duplicate copy so that the original evidence can be protected from alteration because the first rule of forensics is to preserve the original evidence. Once a copy is created, the copy should be used for further processes.

It is important to stress the criticality of not modifying the original evidence and creating a verified, bit stream image of the original evidence following standardized operating procedures, including: sanitizing the evidence storage devices; observing and recording the physical characteristics of the digital evidence (location, cabling, peripherals, and status); using trusted software tools to collect volatile information (memory contents, network connections, etc.); disconnect the computer from any network connection (modem, Ethernet, wireless) if possible; powering off the computer by pulling the power cable from the computer; removing the hard drive(s) from the computer and attaching them to a hardware write blocker and connecting them to the imaging computer/device, or attaching a hardware write blocker between the hard drive(s) and the data cable on the subject's computer; attaching the appropriate digital storage device to either the imaging computer/device or the subject's computer; booting the imaging computer/device and obtain physical characteristics from the digital evidence drive controller (capacity, firmware version, geometry, etc.).

There are various techniques to capture an exact forensic copy to copy

¹⁷ It is advised that chain of custody forms should contain (at a minimum) a description of the evidence item; the location, date, and time it was collected; the unique evidence number; from whom the evidence was obtained; the name of the person who first collected it along with the reason for collection; and the names of all subsequent people who signed for the evidence along with the date and reason for their taking possession of the evidence, ending with the final disposition of the evidence.

¹⁸ A. Reyes, K. O'Shea, *ibid.* 228

¹⁹ J. Vacca, *Computer forensics: computer crime scene investigation*, 2nd edition, Hingham 2005, 7.

the evidence disk so you can analyze the data. Analysis can be carried out using various forensic analysis tools. The most commonly used software for making legally acceptable copies of disks on which all analysis is made are:

- Safeback Version 2.0 by NTI (New Technologies Inc.). which is considered a classic in copying disks providing mirror-image backup of hard disks and diskettes;
- Linux “dd” Version 6.1. which is free, but requires considerable skill on the part of the user because of the Unix operating system.

The analysis is the core of digital forensics process because it provides digital evidence which are being critically and objectively assessed in order to gain an understanding of and reach conclusions about cybercrime. After the evidence has been analyzed, the investigator must act as an expert witness and **present the evidence in court**. The result of data processing will be transformation of relevant data into readable mode for example in PDF format delivered with corresponding upload file. That way the investigator becomes the tool which law enforcement uses to track and prosecute cyber criminals. The digital investigator's task to explain and interpret the information contained in their reports in order to provide explanations and interpretation conveys the potential to significantly influence the outcome of a proceeding. As such, digital investigators must take care to ensure that their analysis is both impartial and thoroughly researched. Because every technical expertise, and especially the one in the collection and analysis of digital evidence, is meaningless if no one can read or understand it, there is a need for digital forensics specialists to simplify their reports so that they can be used as adequately in the legal system.

Conclusion

Despite up to date established standards regarding techniques of digital forensics, one should bear in mind that it was easier in the mid-1990s to perform computer forensics with hard drives, floppy disks, CD-ROMS, and so on, but in the Internet Age things are becoming a bit more complicated than that. Now everything and everyone is online and wireless, and as digital evidence may be, beside data kept in computers, used the following: instant messages (IMs) and Short Message Service messages, online storage, including dedicated (Apple's .mac accounts) and unintentional (Google's GMail), multiple e-mail accounts, cell phone video, data, and pictures, Facebook, MySpace, personal Web sites, forum postings, and blogs, iPods, digital video recorders (DVRs), and personal media players (PMPs), USB thumb drives (in all conceivable shapes and sizes), wireless network storage, Internet artifacts (cookies, Internet cache, auto-complete entries, etc.). Digital evidence extracted from computer as well as distant firewalls, routers, smart hubs, application gateways, wireless devices, cellular components, deployed agents, and intrusion detection systems are becoming more and more vital to investigations of crime in cyberspace.

It can be said that networked computing, wireless communications and portable electronic devices have expanded the role of digital forensics beyond traditional computer crime investigations. Nonetheless the process of digital forensics investigation remains fundamentally the same. Therefore, the use of new techniques and procedures which are being developed in order to enable the investigation of computer-related crime should be followed by mentioned principles. Of increasing importance will be the need for evidence, and the methods and techniques used to uncover it, to be accurate, reliable, and accepted

as standard practice in digital forensic analysis. Standardization through scientific method will help digital investigators to reach objective conclusions solidly based on evidence, and incorporation of the scientific method is the key to providing forensic evidence or suitable information meant to persuade in the courts of law.

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THE APPLICATION OF THE COMBINATED FORENSIC METHOD TO THE REAL CASE OF TRAFFIC ACCIDENT WITH UNKNOWN PERPETRATOR

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Abstract: In the situation of the real case traffic accident with an unknown perpetrator and in the aim of discovering and identifying the perpetrator of such criminal act, it was important to apply the combined (trasological-physical-chemical) forensic method. The analytical methods applied in this case are standard forensic methods used all around the world (the method of light stereo microscopy, emission spectrography, infrared spectrophotometry and polarization light microscopy). After the interpretation of the obtained results, in the section of the general characteristics group of data, the identification of the escaped car, that had committed the accident, was performed.

Keywords: forensics, combined methods, traffic accident, escaped perpetrator.

Introduction

The paper shows the forensic method applied on the real case of traffic accident in which the perpetrator escaped from the crime scene. According to the laboratory analysis, results obtained by the application of the combined physical-chemical-trasological method on: suspected vehicle, the traces from the crime scene and also on the other participants of the objected accident – the bicycle, and by the use of general characteristics section, the identification of the escaped car that was the perpetrator of the criminal act was conducted.

The material sampling

After information that the criminal act had happened and that the perpetrator had escaped from the crime scene, forensic expert, one of the authors of this paper, performed the crime scene investigation and detected the following material:

- traces of the plastic in red and silver colour – three parts,

- two peaces of the red plastic,
- two peaces of the yellow plastic and one of the black plastic (probably originating from the suspected bicycle),
- one peel of gray-blue metal paint,
- one black male shoe.

By the observation of the bicycle, the damage in the form of deformation was detected, which is shown in the Figure 1. At that occasion, the following traces were detected:

1. Trace number 1: the trace of the black paint in the back part of the fender,
2. Trace number 2: the trace of the blue paint on the bar between the seat and the steering wheel,
3. Trace number 3: the trace of the blue paint on the slanting bar between steering wheel and pedals,
4. Trace number 4: the trace of the blue paint on the slanting bar between seat and pedals,
5. Trace number 5: the material removed by friction from the bicycle seat.



Fig. 1: The bicycle

After the additional discovering of the suspected car, trademark "Jeep", type "Cherokee", shown in the Figure 2, the specific damage was detected on it, which indicates that the found car may be the perpetrator of the traffic accident. At that occasion, the following material was sampled:



Fig. 2: The suspected car

The evidence number 6: The peace of plastic that is the component part of bumper;

The evidences number 7 and 8: The traces of paint in gray colour, plastic-like, figures 3 and 4,

The evidence number 9: The cracked paint peel in gray-blue metal colour, Figure 4,
 The evidence number 10: The paint damage from which the peel was sampled, figures 5 and 6,
 The evidence number 12: Part of blue fibre spiked in slashes on the bumper, figures 7 and 8.



Fig. 3: Evidence no. 7 – the trace of gray plastic



Fig. 4: The trace and peel of paint, evidences no. 8 and 9



Fig. 5: Evidence no. 10: The cracked peels



Fig. 6: The magnified paint damage



Fig. 7: The damage of bumper – slashes (12)



Fig. 8: Evidence no. 12 – part of blue fibre in slashes on the bumper

The cloth market bag was given to the forensic expert together with the construction axe - the objects that the victim had during the accident. After the observation of the axe blade, the micro trace of the plastic was detected and had a colour nuance very similar to the sample of the plastic from the bumper of the suspected car. During the observation of the bag fibres, the blue fibres were seen and also sampled, since the fibres found on the bumper were similar nuance of colour.

Laboratory analysis of the samples

By the observation conducted by stereo microscope, the conclusion was made that the paint peel from the crime scene was the same nuance of colour, with one layer and with the same concentration of the metal scrapes as the paint peel sampled from the subjected car [1] (traces № 9 and 10).

By comparing the samples from the bicycle seat (sample № 5) with the samples in the form of the rubber-like plastic trace sampled from the car (traces № 7 and 8), the visual similarity was determined. By the observation of the blade of the axe, the trace in the form of gray plastic was seen and was highly similar to the plastic samples found on the bumper of the car [2].

Since the nuance of the colour, constitution and the thickness of fibres were considered, the conclusion was made that detected blue fibres on the slashes of the bumper (trace № 12) had a high level of similarity with the constitutional blue fibres from the bag (figures 9 to 16).



Fig. 9: The fibres sample from the car



Fig. 10: Better magnification of the previous sample with emphasized colour

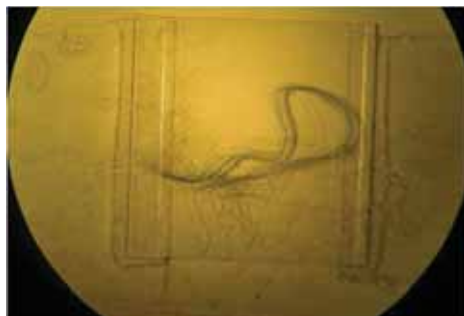


Fig. 11: The fibres sample from the bag



Fig.12: Better magnification of the previous sample with emphasized colour



Fig. 13: The questioned

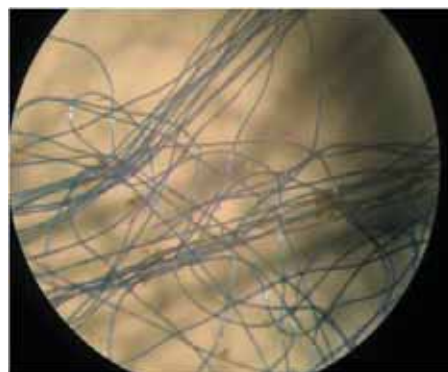


Fig. 14: The fibre from the known source



Fig. 15: The questioned fibre



Fig. 16: The fibre from the known source

The rest of the mentioned traces and samples had the lower value at the Court Process and thus they were not analyzed further, while the above-mentioned traces were examined by standard methods of physical and chemical analyses [3, 4].

For the purpose of the physical-chemical organic analyses, the method of Infrared Spectrophotometry with Fourier Transformation (FT-IR) was used by the device "Thermo Electron Corporation" type "Nexus 670", ATR technique.

For the purpose of the physical-chemical inorganic-elemental analyses, the method of Emission Spectrography was used by instrument "Karl Zeiss Jena" type "PGS-2" [5].

By the analyses of the obtained FT-IR spectrograms from the gray-blue metal paint taken from the crime scene, it was concluded that the spectral lines of its functional groups are on the same wave numbers as the spectral lines of the functional groups of the gray-blue metal paint taken from the car.

By the analyses of the obtained FT-IR spectrograms from the samples of the gray rubber-like plastic traces taken from the car, it was concluded that the spectral lines of its functional groups are on the same wave numbers as the spectral lines of the functional groups of the gray rubber-like plastic from the bicycle seat.

By the analyses of the obtained FT-IR spectrograms from the samples of the blue fibres taken from the car (the questioned fibre), it was concluded that the spectral lines of its functional groups are on the same wave numbers as the spectral lines of the functional groups of the blue fibres samples from the bag (the known source of fibres).

The obtained IR-spectra of the questioned fibre sample and the IR-spectra of the fibres from the known source were compared with the fibres from the database. It was determined that fibre samples – the questioned one and the one from the known source, have the functional groups on the wave numbers as the synthetic fibre – polyester.

In order to go further with the analysis, the comparison of the questioned fibre with the fibre from the known source was performed by using the polarization microscope "Leica CFM 2" [6].

By the application of the polarization light with different angles of the polarized light, it was deduced that questioned samples of blue fibres and the samples of blue fibres from the known source, have the same rotation of the polarization plane and colour their surfaces by interference colours in the same way, which is shown on the figures 17-22.

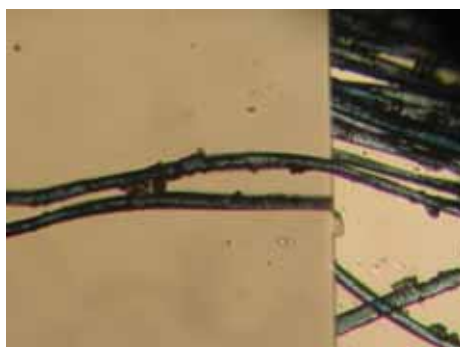


Fig. 17: The comparison of the fibre thickness

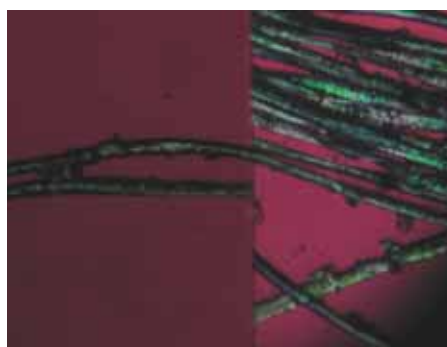


Fig. 18: The fibres under polarization

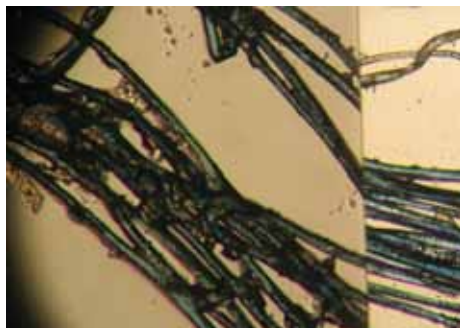


Fig. 19: The comparison of the thickness of the second group

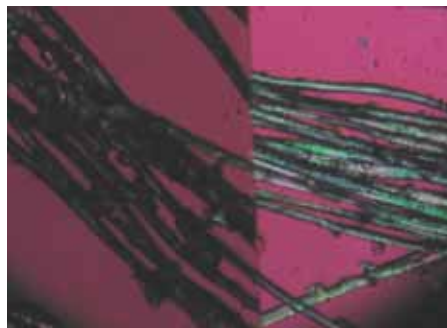


Fig. 20: The second group under polarization

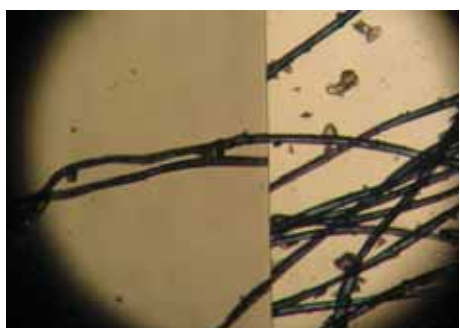


Fig. 21: Comparison of the thickness of the third group



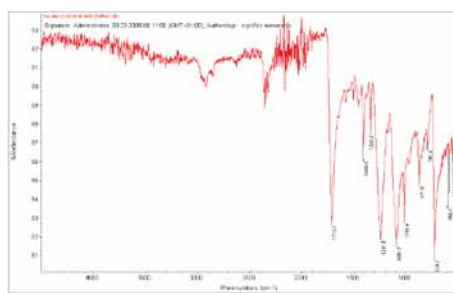
Fig. 23: The third group of fibres under the polarization

Furthermore, the samples of the questioned fibres and fibres from the known samples were dissolved in the mixture of pyridine and water in the ratio 4:3 and after extraction were analyzed by the application of the Thin Layer Chromatography in the mobile phase system of n-hexane:ethyl-acetate:acetone in ratio 5:4:1.

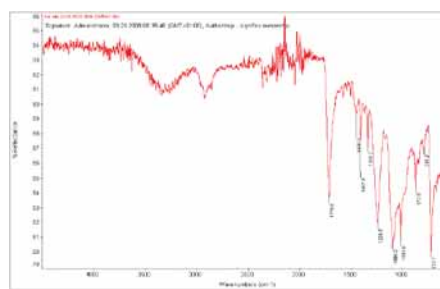
It was deduced that the chromatogram spots were on the same Rf value for both kind of samples – the questioned one and the fibres that came from the known sample. Thus, it was concluded that the dye components in both kind of fibre samples were the same.

By deciphering of the obtained emission spectra of the questioned and known samples of paint and fibres, the same microelemental content was detected respectively: Si, Mg, Mn, Fe, Cu, Al and Ni in traces.

By the examination of the obtained FT-IR spectrograms of the gray plastic taken from the axe blade, it was deduced that the spectral lines of its functional groups are on the same wave numbers as the spectral lines of the functional groups of the gray plastic sample taken from the bumper of the car (shown on the FT-IR spectrograms in the figures no. 24 and 25).



Folija 3: polyester
Fig.24: FT-IR of the questioned sample of plastic



Folija 3: polyester
Fig. 25: FT-IR of the known sample of plastic

Conclusion

By the application of the combined forensic method on to all collected, delivered and detected samples related to the traffic accident with an unknown perpetrator, and according to the explanation of the results obtained from the conducted laboratory analysis such as:

- a) the same organic and inorganic content of the trace found on the crime scene in the form of dark-gray paint peel and of the paint peel from the suspected car,
- b) detected blue fibre on the bumper of the suspected car has completely same organic and inorganic content, the thickness and the nuance of the colour and rotates the polarization plane in the same way as the blue fibre from the objected bag which was carried by the victim in the critical moment,
- c) detected plastic traces on the suspected car have the same organic content as the seat surface layer of the bicycle,
- d) detected micro trace of plastic on the suspected axe, which the victim had with in the critical moment, has the same organic content as the surface layer of the plastic from the bumper of the suspected car,
- e) the identification of the car, which was suspected for committing the objected traffic accident, was done.

Since this was the traffic accident with the hard bodily injury and the perpetrator had been escaped from the crime scene, he was later also accused and sanctioned for not helping the victim (the bicycle driver) in the traffic accident [7].

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CRIMINALISTIC EXAMINATION OF ODOUR TRACES OF PERSONS PRESENT IN THE AREA

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Scientific literature does not offer too much knowledge on the possibilities how to detect and examine odour traces having arisen due to a person's stay in a given environment. We have tried to work out a process, by which it would be possible to detect necessary concentration of odour so that it is detectable by a dog.

The fact is that a dog is able to feel a person's odour in a given environment, but such concentration is not sufficient for criminalistic examination (method of odour preservation). At first, we supposed that a pre-concentration of odour was necessary, but our attempts showed the opposite. What is important is to ensure a careful sampling of odour onto a trace reader.

We have tried several ways, but the most effective and the simplest one was the sampling of atmosphere into a balloon where a trace reader was placed. A reading period has so far been tested for five days but we suppose that it will be possible to shorten this period. It will be a subject of further study.

Key words: odour traces, criminalistic examination

We pay a great attention to forensic examination of odour traces in Slovakia. There is a complete system of production and preparation of specially trained dogs. It is included in the system of police cynology; and it deals with the examination of objects' odour, such as explosives, firearms, corpses, drugs, peoples' movement in an area and similar. All these police cynology areas did not offer a solution required by the criminal practice. There was not a method that could reliably detect and distinguish a person. The method of odour preservation was known, but it has not been sufficiently standardized, and each department has implemented it according to its own idea and technical layout.

Thanks to the development of criminalistic as a science and to its system, the method of odour preservation was recognized as a criminalistic method and the process of its verification in the practice had begun. Currently, the method is fully recognized, precisely defined and an expert examination is needed for its implementation. This method is currently the starting base for exploring the odour of persons in different circumstances. Its value lies on its huge sensitivity and the great reliability.

We found many views on the application of the results of forensic examination, in the foreign literature. The same range of views also occurs in Slovakia. The method was hardly seeking recognition. Today, we can say that the results successfully penetrate into criminalistic practice, and also the judiciary begins to use its results when making the judicial decisions. Examining the movement of persons in an area and following their movement by a trained dog is now standard police practice. Trying to discern the person by odour, which they

leave, was our challenge.

A method of criminalistic examination of odour preservations - method of odour preservation is one of the methods usually critically assessed by experts. The reservations are directed not only towards the results, whilst expressing a certain degree of mistrust towards using a dog as a means of qualitative evaluation, but also towards the ways and technical execution of one's examination.

We decided to use a dog's ability to distinguish a person's odour via a certain modification of an odour preservation method. There are no doubts among experts that dog's ability is used for so-called odour work in terrain and environment. To detect a track of a person's movement is not a problem in most cases. A "platform" for this fact is a dog's ability to feel an existence of odour traces not only on the ground but also in the air despite a certain degree of their dispersion. Doubts about individualization of a person are not stated due to the fact that law enforcement authorities do not accept serious decisions based "only" upon this result. Therefore, it was easier to approve the results. We were solving the situation which, in terms of crime, was less serious, but we considered its technical management as more prospective. We also went to the relatively unknown and unexplored areas.

We decided to use a dog's ability to detect a person's presence in the area in a case when according to a course of action we may suppose that odour is dispersed in the air. As a comparison we used a method of odour preservation which is standardized in the Slovak Republic. The method of odour preservation is based on an examination of the human odour, which is only recognisable by a specially trained police dog. The quality of performance depends on the quality of training, consistency and accuracy of the trainer and the conditions which are created for the dog.

Forensic examination can take place no earlier than 24 hours after taking an odour trace and no earlier than 10 hours after transportation to the professional workplace. These periods are mandatory fixed with respect to the stabilization of odours in the odour traces. Failure to meet these periods does not prevent forensic examination, which often takes place earlier, in case there would be a delay to obtain information needed for the production of forensic versions.

Examination of odour traces usually takes place in one area, even in the case of the possible repetition of forensic examination. The main reason is the possible risk of transmission of odours.

Method of odour preservation is based on a comparison of odour received by a trained dog, with odours stored in place of odour traces. This is usually eight odour traces. Some, particularly foreign offices, prefer to form a circular arrangement of comparative traces. Other countries use the so called magic wall instead of odour traces. There are eight mouths releasing odours from the odour traces, by forced evaporation. Each of these methods has its "advantages", but the principle of all these methods of forensic investigation is the same.

The number of comparative odour traces in a row is connected with logical and mathematical intelligence of a dog, according to which the dog has developed abstract thinking (compared with human's, it is about level of a three years old child). The dog has the ability to solve some practical problems associated with the number of objects or their size, but on the basis of research, it was found that the dog can keep track of five smaller objects. The number of odour traces in a series of comparative traces must not fall below six. The number of eight objects

(odour traces), which is used in Slovakia, is based on a tradition that is established and fully corresponds to the current level of development and need for ongoing forensic examination.

Before commencing any comparison, it is necessary to take control of random interest in the comparative odour traces. This control is made so that the dog can sniff standard trace of human odour. The dog is then passed through a series of comparative odour traces, and if the dog does not identify any of the comparative odour traces, the series of comparative odour traces are considered as uninteresting and therefore suitable for further investigation.

Further on, the attraction to a particular odour trace, which is to be investigated, must be checked. This inspection shall be conducted so that a particular trace is randomly placed in the range of comparative traces, and a practice trace is placed next to it, in the range of comparative odour traces. The dog gets to sniff the same odour as the odour trace contained in a practice odour trace and this instance must be marked. Then the attraction to the odour is negative and the investigations can continue.

In cases where the attraction to a particular group of odours is proved, it is important to exclude these odour traces from the investigation by the given dog! After the test of attraction to a human odour, an examination of comparative traces and examined forensic traces will be launched.

After sniffing the comparative odour of comparative odour trace, the dog passes through a series of comparative odour traces. The odour trace with the comparative odour trace is marked in a rehearsed manner, usually lying down or barking by the given odour trace. The dog passes through a series of comparative odour traces freely, or is kept on a leash. The handler that is conducting the examination **MUST NOT** guide the dog's behaviour. He cannot remain in the visual field of the dog and cannot make any sounds that could affect the performance of the dog.

If the forensic examination uses odour traces with a strong characteristic smell (petrol stations, butcher shops, etc.), it is necessary to give a series of comparative odour traces with a similar odour background. The same procedure is kept with the odour traces of another ethnic group. The same procedure is kept if the examined odour trace is of extremely strong concentration of a human odour. In this case, it is possible to adjust the concentration of the studied traces, or to use similar concentration of comparative traces.

The room, in which the forensic examination is carried out, is permanently organized and the constant temperature, maximum of 18 to 20 °C is kept, relative humidity inside the room ranges from 60 to 70%, and the room is illuminated by lamps. It may not have other stimulants that could affect and draw away the dog's attention, such as other unknown odours, acoustic or optical stimulant, etc. This method has been used as a perfectly mastered standard; it represents a good and well-defined procedure.

A comparative trace was taken by a "classical" manner – when a person was holding a trace reader during a period of 15 minutes in groin area as prescribed in (1). In the first attempt, an odour trace was taken from the area where a person usually resides – where a person lives permanently. A trace reader was hanged in the room where a person occurs most often. Time period of sampling was gradually increasing from 10 minutes to 24 hours. In all cases we failed to prove that a person had been occurring in a given area. It turned out, that the

concentration of odour in the air is not sufficient for the detection by a dog. We tried to increase the concentration of odour in the trace reader. We thought we should have filtered a larger amount of atmosphere through a trace reader. During the next step the atmosphere was drawn through a porous cylinder where a trace reader was mounted in a way that the volume of drawn atmosphere was led via the reader. Nevertheless, such attempt failed as a dog was not able to track a person's odour despite a considerably high volume of drawn air. Thus, we can say, that concentrating odour by a trace reader is not possible by extending the exposure time, but only by increasing the concentration of odour in the atmosphere. Upon assumption that a reason of a temporary failure refers only to a low concentration of odour trace detected onto a trace reader we directed our examination this way.

We supposed that a problem may be arising from an odour sampling. That is why we seized an examined atmosphere in a volume of approx. 50 litres into a balloon and placed a trace reader inside. We imposed a 5 kg weight on the atmosphere-filled balloon, which increased the pressure and improved absorption conditions. We also extended the time of absorption. Time period of reading was five days and the result was positive. In this way, a presence of a person's odour from a room and an examined comparative odour trace of a person were proved.

The conclusions are:

Odour concentration of a person during his/her stay in a room is sufficient to be compared via a method of odour preservation. Our first attempts did not ensure a sufficient absorption of odour onto a trace reader.

It means that for examination of odour of a person present in a standard room of approx. 40 m³ it is not important to concentrate up the odour but only to ensure its careful absorption in a trace reader, taken from the atmosphere, for example by increasing the pressure.

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CRIMINAL INVESTIGATIVE EXPERIMENT (forgotten act in criminal investigation)

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Abstract: Criminal investigative experiment is an informal action that can significantly contribute to operative-criminal and investigative performance. Particularly, its significant contribution is in testing imagined versions of the event developed by the police within preliminary tests of potential versions of the criminal event, searching for traces, objects and other evidence of a criminal act and an offender. Criminal investigative experiment is a suitable method to test other immaterial circumstances of the crime.

Criminal investigative experiment can be used in so called practicing or testing the potential alternatives of the event (what if), which is particularly important in „expected delicts“, so the police can be as ready as possible in facing the future criminal action.

However, criminal investigative experiment somehow disappeared from both literature and practice. Famous Yugoslav criminologist, Professor Vladimir Vodinelić, continuously wrote about power and value of criminal experiment in investigation and evidence, almost succeeding to introduce this action in The Law on Criminal Procedure. Unfortunately, upon his time, the good criminalistic idea simply disappeared from the literature, except its occasional mentioning, while furthermore it lately completely vanished from criminalistic communication and practice.

Therefore, the objective of this work is to reaffirm the content, character, potential and benefits of this investigative action and draw attention of academic and professional criminologists. My wish is to reopen debate, refresh the theory and initiate some forms of experimenting in practice, to contribute and benefit the arsenal of methods in explaining and unveiling crimes and offenders.

Key words: criminal investigative experiment, crime re-enactment, initial crime scene investigation, value of evidence, testing versions of a crime, varying method, modelling crime.

Definition of a Criminal Investigative Experiment

Criminal investigative experiment¹ is a deliberate and planned introduction of new facts during re-enactment of a crime in its structure, aiming to detect their effects. (Васиљевић В, Гавриловић П, Водинелић В, 1970)

„In order to acquaint new evidence, and test or detect relevant facts for explaining the crime, as well as to determine the causes of criminal act, a criminal

¹ This definition was accepted by Prof. Tomislav Marković, PhD, (another famous criminalist of the last century originating from Yugoslav space, along with Prof. Vodinelić)

investigative experiment can be organised introducing new circumstances or actions to a complexity of uncertain facts and performing experiments in conditions brought as close as possible to original criminal act." (Водинелић, 1985).

Professor Vodinelić introduced this definition in the 1980s, wishing to attract attention of professionals and academics in criminalistics and criminal procedure to the possibility of determining crucial facts in criminal matter using alternative methods to those commonly defined in theory of criminal procedure and criminalistic science.

Criminal investigative experiment is a tactical method of testing the evidence during investigation (initial crime scene investigation, presentation and recognition, etc.).

The institute of criminal investigative experiment was initiated in the Soviet Union where criminalists and procedure officials used it while re-enacting the criminal event, however our authors did not fully agree with that. A certain number of Soviet scientists also acknowledged independence of investigative analytical experiment, considering it an action that can test existing and collect new evidence (R. S. Belkin, 1963).

Investigative experiment is a special test, performed to check collected evidence, collect new ones, test and evaluate investigative versions on existence of any fact relevant in the criminal matter. Investigative experiment can also be performed to determine the causes and preconditions that enabled the commitment of criminal offence.²³

However, Professors' wish did not reach the public and the investigative (criminal) experiment stayed in a sphere of potential "informal" application only. Even this is not so poor, since it provided criminalists an opportunity to undertake measures that are not strictly formal and procedural and therefore, they are not considered to have the value of evidence, while they are in charge of a case during the criminal investigation – revelation and explanation of both criminal offence and the offender. This enriches the arsenal of investigative actions and brings potential of revealing new facts, circumstances, useful for closing the specific criminal event⁴.

The criminal investigative experiment is indeed an investigative and analytical method that enables investigators to determine certain facts and circumstances related to the criminal event, using methods and actions that are not characteristic for formal criminal procedure (initial crime scene investigation, reconstruction, expert witnessing) and check and determine specific facts and circumstances related to criminal act and offender. By criminal investigation one intends to find and determine even new facts and circumstances related to all elements of the specific criminal act. Criminal experiment is another alternative to disclose and understand reality.

Famous domestic and foreign criminalists and procedural experts dealt with criminal investigative experiment, some wishing to affirm and introduce it to criminal procedure practice, and others in order to evaluate and understand relevance and value of this investigative action.

Vasiljević T., states that judicial (investigative) experiment consists of

² The experiment is a controlled action focused on an object observed to test the theoretic hypothesis.

³ Determining visibility of a space which the offender used to get to the crime scene, which was of particular importance for the time when the offence was committed.

⁴ Isn't the faith of a polygraph similar, since it never qualified for evidence regardless of the fact that it is used in police practice?

the reconstruction of the event and of the experiment to perform control test of the evidence⁵. Such understanding supports the thesis of significance of the experiment with regards to its possibility to perform control test of collected evidence by repetition of specific actions and circumstances of the criminal act. Such conclusion is very interesting and important, since it opens possibility for the experiment to become a control instrument for evidence collected through other investigative actions⁶. Vasiljević also notes and questions whether such control is allowed, unless it is prescribed by the law. This question should be answered within the context of the final objective of the experiment – its contribution to determination of specific facts and circumstances, through methods of testing existing evidence and circumstances⁷.

We believe experimenting in context of testing the evidence is a form of testing criminalist versions of the event⁸, which is anyway allowed since it cannot harm the investigation of the criminal event, reaching the final truth, but on the contrary.

Similarity and difference between initial crime scene investigation, reconstruction and criminal investigative experiment

Some authors, criminalists, procedural experts even relate the experiment to initial crime scene investigation, considering it a part of initial investigation or a closely related action, Christine Bertel). Strogovich M.S., clearly defines the experiment as a method of testing the evidence. He notes that the experiment is a particular, specific form of investigation in its other (dynamic) stage.

There are some elements of investigative experiment that are characteristic for the initial crime scene investigation, which makes it closer however there are significant differences between these two actions.

According to this famous author, a key difference from the initial crime scene investigation is in exploring the observed object in its reconstructed condition and through testing (Vodinečić, 1985). R. D. Rahunov, D. S. Karev also relate the experiment with initial investigation, calling it a special form of the initial investigation or just its variance.

Contrary to Russian procedural experts and criminalists, Western scientists did not pay attention to this action, either theoretically or practically within investigative actions or collection of evidence.

Our criminalists and procedural experts dealt with criminal experiment mostly while analysing and exploring initial crime scene investigation and re-enactment of the event. However, Prof. Vodinečić and Prof. Marković were of the opinion that criminal re-enactment of the event and investigative experiment are separate and independent actions.

⁵ Our famous criminal procedure expert Grubač, PhD, is of similar opinion, saying the re-enactment is a judicial experiment, Criminal Procedure Law, University Union, 2009, p. 241.

⁶ Item found or a trace of criminal act or offender in a specific location doesn't necessarily mean that it was actually created on that spot, which can be determined in experimenting, testing the other potential alternatives on creation of that trace or item.

⁷ We consider it is fully allowed and acceptable to use this action in criminalist sense, since neither procedural stage is violated or any of the values, while acquainting new information on facts and circumstances related to criminal act is possible.

⁸ Criminalist versions of the event reshape the event, circumstances and facts to reach the higher level of probability or final truth on determination and reliability of a fact or circumstance.

The content of the investigative experiment is essentially testing aiming to determine whether occurrence of a specific event or action is possible in a certain environment and under certain.⁹ The process of checking whether an event could or could not occur, or some facts related to the event, calls for creation of hypothetical situations, model events that can be tested through experiments.

Apart from observation, testing material facts, substrata of criminal event, the criminal investigative experiment makes analysis of immaterial facts and circumstances. Such circumstances do not leave material traces, but various circumstances in a relation to criminal offence or offender (e.g., time of execution of criminal offence, indicative relation between criminal offence and the offender).

The important difference between initial crime scene investigation and experiment is that the initial investigation observes and explores the object, items, traces in their original form and condition, while the experiment observes and explores entirely new phenomenon, event either generally or in its specific segments. Subjects of initial investigative actions aim and are obliged not to bring in any new fact into the event, to preserve its pure authenticity, originality, while the experiment „insists“ on introducing, chaining, testing application of new facts and circumstances to the event. It is understandable that the sole objective of initial investigation is to record the current situation, maximally preserving the „authenticity“ of the event, while the experiment deliberately cause numerous „orchestrated“ changes of facts and circumstances.

Therefore, records on the initial investigation and the experiment differ. It is a well known rule that only factual observations and statements are entered in the record, with no subjective interpretations, assumptions, etc., while the records on the experiment contain many „new“ facts and circumstances, necessary to be noted with the way they appeared or were introduced in the event, as well as with the effects they caused producing new facts and circumstances.¹⁰

It is also necessary to point at similarities between re-enactment of the event and investigative experiment. Followers of the traditional criminalistic tactical school (Vodinečić, 1956), believe the reconstruction of the event and criminal investigative experiment are completely different actions. Reconstruction of the event makes the same original „event renewed in simulated conditions“, while keeping it as authentic as possible. The reconstruction simulates the real event keeping it as authentic as possible which directly reflects on the success of the reconstruction. In criminal investigative experiment „criminalists deliberately interfere“ in the event introducing new facts and circumstances, intending to cause new effect in a form of new facts and circumstances that did not exist before that or were unknown. (Vodinečić, 1956).

Reasons for not Introducing Criminal Investigative Experiment in Criminal Procedural Actions

Reasons for not introducing and affirming the investigative experiment as a criminal procedural actions are various. We should not only refer to classic evidence value of the action. The experiment could not be introduced to the

⁹ In case of deficit in a small shop, an experiment was performed with an objective to determine whether it is possible to have all recorded and listed goods in one room and for the commission to easily work. The experiment showed it is impossible, since the volume of goods is far bigger than the space, which proved „fictitious“ increase in supplies reserve by the salesman who tried to cover a deficit caused by taking money and goods.

¹⁰ There are strong arguments against evidence value of the experiment, since the records cannot be used as evidence as they reflect many facts and circumstances, that are not a results of offender's authentic action, but were introduced by deliberate varying, changing of conditions and circumstances.

“family” of evidence seeking procedures due to its hypothetical nature “what if”. However, in a criminalist modelling of a specific criminal act, post-delict one or a predicted one, a series of facts and circumstances can show the „logical flow“ of criminal actions, which will contribute to creation of a precise version and conclusion about the event. However, as the circumstances and facts are changed during the experiment, deliberately suggesting new circumstances related to the event, causing the new effects, it is impossible to expect that such results have a specific evidence value.

However, there is a question of what the real value of the investigative experiment is, if it has no evidence value in a criminal procedure. The answer is very simple, if we have in mind that experimenting exposes new facts and circumstances. While creating new „tactical situations“, a criminalist has to follow the intention of discovering new results necessary to check the existing evidence and circumstances which are not yet fully revealed.

Why it disappeared from police practice

A question is posed why the criminal investigative experiment disappeared from the rich¹¹ criminalist practice? Most likely, the reasons are various. The fact it was not introduced in formal procedural actions along with its rare application significantly discouraged criminalists to apply this effective method that would enrich the arsenal of informal police actions.

One of the key reasons is lack of creativity in police investigation structures, which abandoned some previously used investigative methods in the last few decades.¹²

Observing the number of re-enactments of the event, as procedural actions, it can be concluded their use is reducing. Such attitude of judiciary and prosecutors to this action in renewed investigations also contributes that the police is reluctant to use or create new methods of criminal and forensic investigation.

The truth is that representatives of criminal police sometimes prepare and implement the investigative criminal experiment (full or partial). Implementation of the experiment mostly happens with no written or detailed preparation and particularly with no records on application and the results.¹³

Finally, it should be noted that the lack of knowledge at some criminal investigators, but also at some responsible managers (unprofessional knowledge), often excused with high costs and low effectiveness of these actions, which pushes this interesting and fruitful investigative action into history.

There is a question how to overcome this vacuum in application of this sometimes appreciated action and undoubtedly useful criminalist method. In order to return criminal investigative experiment into investigative practice, without prejudging its final benefits and evidence related value, we need to convince the investigators in the usefulness of this method.

We also need to insist on initiating reconstructions of the events, which can automatically support initiative for experimenting¹⁴. The criminal investigative

¹² Reconstruction is performed rarely, although there is often a need for such action. Particularly interesting are 3D reconstructions, that can provide new investigative and evidence capacities.

¹³ There are no records on application of the experiment that may be used equally with other informal criminal investigative measures and actions (polygraph, observation, criminalist control, etc).

¹⁴ During the reconstruction of the event, often new ideas are brought on “some new facts and circumstances” that should be tested in “police setting”, to check certain criminalist versions on facts and circumstances that

experiment must be revived as an additional action to reveal, test existing and still unknown facts and circumstances related to the criminal offence. Questioning and testing these facts and circumstances, no harm can be made for the whole investigation concept¹⁵, on the contrary – it is possible to find new valuable facts, circumstances that do fit into the scenario of the criminal act, which can later be checked through other evidence methods and make procedurally suitable.¹⁶

It is necessary to offer success stories of having applied the criminal investigative experiment to the professional criminalist practice, along with continuous exploration and search for new possibilities of its application in different tactical situations.

It would be important to analyse all cases of criminal investigative experimenting, whether they were successful or not, from criminalist and procedural perspective in order to provide advancement in this field.

Conclusion

It is indisputable that any investigative action that specifically benefits revealing and determining certain facts and circumstances in criminal event is important for the quality of investigation itself.

Criminal investigative experiment is a specific action situated on a crossroads between initial crime scene investigation, re-enactment of the event and expert witnessing, by its content and capacity to lead to evidence. Therefore, in the past it was sometimes present in criminalist practice, sometimes disputed, but also mentioned as a useful criminalist method in revealing the truth.

However in a "flood" of clear procedural actions, without a good reason it lost its position among investigative actions, even in the so called police environment. Therefore, acknowledging its content, real potential in contributing „at least one puzzle“ to the mosaic of the truth, this action should be reintegrated to police practice and allow it a new chance to „prove“ itself.

Finally, each method, action is good to the extent it is applied in practice, to the extent it is studied in theory and critically analysed, with goal to improve its efficiency with continuous refreshment with new achievements of entire, but especially criminalist and forensic science and practice.

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will show there is a need for such analysis.

¹⁵ Some criminalists are not confident in using this method without previous approval by a prosecutor or other police authorities, which shows disharmony in investigative methodology and lack of familiarity with "their own profession".

¹⁶ Application of polygraph has no evidence value, but is used in criminalist investigation and contributes to determination of some facts and circumstances related to the criminal offence or offender.

QUALITY OF UNDISPUTED VOICE RECORDINGS: FORENSIC ASPECTS

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Abstract: The paper discusses the issue of undisputed voice sample quality, its importance in the expertise process and procedures for obtaining recordings of better quality. Many factors affect the recorded samples quality: the cooperation of a defendant or a suspect, technical possibilities and recording conditions, linguistic content, speaker's emotional state, specific features while recording foreign language speakers, etc. Several examples will demonstrate inadequate quality of undisputable samples recordings which can affect the quality of expertise, or at least make it considerably more difficult. The procedures that must be taken into account will be specified, especially these that exist in the technical domain and in particular during the interviews implementation procedures.

Key words: voice as a biometric feature, extra linguistic information, speaker identity, forensic speaker recognition, recordings quality.

Introduction

Voice is a unique characteristic of every person (speaker) and it serves as biometric identifier. In forensic practice, speaker recognition implies identification of a speaker based on his/her voice by comparing samples of undisputed and disputed voice recordings (Jovičić, 2009). In order to carry out this comparison in an appropriate manner, it is necessary that both disputed and undisputed voice samples be of best quality possible, which in reality is difficult to achieve. Namely, the courts usually obtain samples of recordings of disputed utterances from police, from investigative judge or the prosecutor, or on the other hand from the defence lawyer and the injured party. By the nature of its creation the recording is unique and unrepeatable. However, if a person charged with or suspected of a crime is cooperative then the recording of the undisputed utterance is made in the controlled environment. Nevertheless, this often leads to many uncertainties, irregularities, lack of knowledge, and technical failures etc., which may significantly diminish the quality of the undisputed utterance recording. It is not unusual that the experts deal with undisputed utterances which quality is much more diminished than the quality of the disputed recording. All these circumstances certainly put additional burden to the expertise process and eventually may affect the quality of the expertise process and even the formulation of the final expert opinion.

This paper discusses the issue of the quality of undisputed voice recordings, the procedures in making the recordings and recommendations for implementation of recording procedures.

Forensic analysis of voice recordings

Verbal communication is a multidimensional phenomenon. Speech signal in the form of a physical signal recorded by the microphone, as any other acoustic signal, contains all verbal manifestations which the speaker transmits to his/her collocutor during communication. i.e. conversation. The issue of verbal manifestations is a very complex one due to the fact that verbal manifestations are related to intra-speaker's variations, which the speaker consciously or unconsciously "imprints" into his/her speech signal. This mere fact implies that verbal communication transfers not only the linguistic information but also the non-linguistic content, such as: paralinguistic (emotional expression) and extra-linguistic (biometric) information (Jovičić, 2006).

The forensic analysis key markers lie in the extra-linguistic domain, i.e. biometric features built in the speech signal itself (Jovičić, 2008), and in the linguistic domain, which carries features related to the individual type, manner and style of speech (Kašić, Đorđević, 2009b). Paralinguistic information provides markers of less importance, such as: the speaker is perhaps more or less expressive, nervous or calm, and the like. A considerable problem arises when the expert deals with disputable recording in which the person is irritated, angry, is threatening, has just woken up, has a hangover, can barely speak, is cheerful, speaks through smiling, and which should be compared with undisputable recording, in which person is under stress due to the fact that s/he is being interviewed by the investigative judge. These health and emotional variations in speech expressions may become so grave (for instance in a situation when an upset person raises his/her voice and shifts to entirely different voice register) that in the process of comparisons of disputed and undisputed utterances some key markers fail to be identified.

However, given the fact that the voice gets recorded by a microphone which captures all acoustic signals from the environment, the expert has to focus on the effects of the ambient noise as well. The experts may face the following situations: disputed voice recording masked with the noise from the running car or from the pub, has to be compared with the undisputed voice recorded in a quiet room. Generally speaking, various forms of interferences and background noise may not only mask certain features of speech signal but can also affect changes in the overall speech characteristics.

The aforesaid facts indicate it is necessary to ensure the quality of recordings as well as to try to bring disputable and undisputable voice recordings to the similar "sphere". Is that possible? Hardly, since the undisputable voice recording is unique and unrepeatably. Furthermore, it is not realistic to expect that, while making the undisputable recording, the speaker in question may be brought to the same emotional state as the speaker in disputable recording. In the best-case scenario, experts shall seek to obtain undisputable recording of solid technical quality with natural spontaneous speech of a person subject to forensic expertise.

Quality of speech samples

When it comes to forensic analysis of voice, a distinction shall be between *speech quality* (intelligibility, naturalness of voice, speaker recognition, listener's comfort, masking features) and the *quality of forensic recording* of disputed and/or undisputed voices. Additional features of the quality of forensic recording are as follows: the length of the recording, linguistic content, health and emotional state of a speaker and potential voice manipulation (simulation, imitation). These features make the process of undisputed utterance recording significantly complex, especially from the interviewer perspective.

Methodology for conducting the interviews

When conducting interviews for the purpose of obtaining the undisputed voice sample, experts have to comply with the set of procedural requirements in order to obtain the undisputed voice recording of appropriate quality considering that it is customary that any speaker, even the most cooperative one, may turn into the uncooperative one, especially if the recording procedure is repeated. As a rule, a forensic expert shall not lead the interview and shall not establish direct contact with the suspect. In fact, this is a part of the principle of autonomy of experts and their expertise.

The following requirements in the process of recording the undisputed voice sample are of primary importance:

- While recording besides the person conducting the interview (normally a judge), the person having the undisputed utterance taken from and the technical staff who performs recording, it is necessary to ensure formal presence of the prosecutor and the defence. Recording minutes is mandatory.

- Prior to recording, the technical personnel shall troubleshoot the recording equipment and test the quality of the recording.

- Since the disputed recordings mainly consist of the spontaneous dialogue (telephone conversations), the interview shall be conducted in the same manner, that is, including dialogue between a judge and the person giving the undisputed voice sample. Prior text preparation and text reading is not recommended (except in cases when part of the undisputed recording includes reading of disputed sample transcript). This is due to the fact that the difference between the read and spontaneous speech may become huge and may impose considerable obstacles in the procedure of forensic speech comparisons.

- During the interview, attention should be paid in order to avoid speech overlap as much as possible, that is, allow the undisputed speaker to express completely his/her thoughts. Namely, segments with speech overlap are considered invalid in forensic analysis and they get removed through the process of segmentation (disputed and undisputed recording).

- During the interview, experts shall monitor the undisputed speaker and in case they notice poor, incorrect, silent speech or potential masking which may affect the recording quality, they should require the observed irregularities to be corrected and, if needed, repeat identified dialogue segments.

- Experts shall make sure the recording conditions required for linguistic analysis are in place (more on this below).

- Health and emotional state of the speaker shall be ensured prior to procedure (more on this below).

- Technical recording conditions shall be under complete control of the technical person in charge of recording and it is important this person receives adequate training for this type of recording, considering that these recordings may be conducted in different conditions (more on this below).

Linguistic content of the undisputed utterances

Adhering to the recommendation of the International Association for Forensic Phonetics and Acoustics the speaker identification shall not be conducted if at least 30 seconds of voiced speech sample is available, while other practices do not recommend making comparisons of speech samples, which do not contain substantial number of identical words. However, in our local practice and in the practices of forensic centres from abroad, the circumstances often do not allow experts to adhere to this rule. Hence Gfroerer (2003) lists the problems that the experts from the Bundeskriminalamt (BKA) (Wiesbaden, Germany) face in forensic speech identification and provides estimates of their occurrence – a) no text identity (frequent), b) foreign language (occasionally), c) insufficient/inadequate speech samples – less than 20 seconds “net” speech and different speech situations (frequent), d) uncooperative speakers; 15%-90% of speakers use natural or electronic means of voice disguise/masking. In the existing non-ideal circumstances of the speaker’s “co-operation” and the obvious lack of co-operation that the forensic speech identification experts face in the process of taking speech samples, they often make use of the already existing voice samples and based on their phonetic, acoustics and linguistic analyses express opinions about speaker’s identify or non-identity.

If a suspect is cooperative then it is likely that the voice recording will be made. The advisory role of the forensic expert is of vital importance in this process since the expert will assure obtaining recording of undisputed utterance of better quality.

For instance, it is possible to make a written transcript of the unknown speaker utterances and request the suspect to repeat the content of the entire transcript or its segments. In this way, the issue of text identity is tackled while this process may even become helpful in other forensic actions - such as the measurement of vocal formants (Jessen, 2008). However, text identity shall not be considered to be a prerequisite for speaker comparisons since reading or repeating the content may achieve unnatural prosody, which may create new challenges for experts. Thus, it is essential that the undisputed utterance contain the spontaneous speech samples since, as it has already been explained, the disputed utterances most often contain the samples of spontaneous speech which feature individual markers and whose comparison is possible only if the undisputed utterances contain spontaneous speech as well.

The spontaneous speech sample is necessary since the co-operative speakers, that is those who have given their consent to have their speech sample taken, most often become uncooperative and try to mask (disguise) their voice in an obvious or sophisticated manner (speak quietly, slowly, without any variations in intonation, using standard language, they may speak in ekavian dialect although they belong to ijekavian one, repeat the memorized statement of their defence lawyer etc). The examples from practice have shown that in spontaneous situations while masking his/her speech, a speaker may focus only on two key features of speech, for instance syllable rhythm and a specific pronunciation of a specific voice while the prosody features of the syllable accent and tempo remain under individual articulation basis automaticity.

While taking undisputed speech sample (co-operative or uncooperative suspect), it is of crucial importance to obtain speech sample of sufficient duration so as to allow the speaker to express full range of his/her individual verbal automaticity features. Besides being of sufficient duration, the speech sample shall contain as many different words as possible to allow the expression of *voice and prosody patterns*, which help speaker's identification. In addition to expressing *individual verbal automaticity features*, speech sample of sufficient duration and of rich diversity of distinctive words and matching patterns allow for the analysis of the linguistic features related to the *regional specificities* and *sociolect*. These are of great importance when it comes to the recognition of forensic makers in speaker identification. The undisputed speech sample shall contain the words which speaker frequently enunciates and which result from speaker's *pronunciation automaticity*, such as: fillers, numbers, names, addresses etc. The engagement of the speaker identification expert in creating the interview procedure is obviously expected given the identified fundamental features of the undisputed speech sample.

If a suspect is uncooperative and if s/he is objecting to having voice recorded, then depending on the legal system in the state and the circumstances surrounding the event, it is possible to use the recordings made on earlier occasions, such as tapped telephone conversations or recorded police interviews (Jessen, 2008). In majority of cases, experts face with this type of undisputed voice samples. When both disputed and undisputed voice utterances are in the same language and if that language is an expert's mother tongue then a very successful expertise can be expected.

Situations when disputed and undisputed voice utterances are not in the same language pose a significant challenge to forensic speech analysis. Regardless of what a suspect's mother tongue is, due to the impact of the *articulation basis automaticity* (Kašić, Đorđević, 2009a), *it is not possible to carry out either adequate acoustic (computerized) or auditory comparisons of these samples*. It is extremely complex to obtain undisputed voice utterance in a foreign language (which is not official language either of the investigative and judiciary institutions or an expert's mother tongue). Hence, Varošanec-Škarić (2008) report about the case in which there was a speaker whose mother tongue was Albanian while Croatian was a second acquired language. The task of the experts' team was to lead the suspect into the situation where s/he would speak in both Croatian and Albanian since tapped landline and mobile telephone conversations included samples in both languages. Given that the use of mother tongue and the second language (non-native language) is becoming more frequent phenomenon in incriminating situations, future challenges for forensic experts lie in developing this type of procedures.

Health and emotional state of the speaker

In structuring the samples of undisputed utterances it should be assumed that the suspect is a healthy person, that is to say, that s/he is not under the influence of psychoactive substances (drugs, alcohol) and that s/he is not in the obvious state of stress. This is of extreme importance since the health state (drugs, alcohol) can lead to significant distortion of voice features and the comparison of such a sample with the disputed sample may lead to forensic misconceptions. In addition, the vocal expression of emotions may lead to a specific type of "distortion", that is, to the significant changes of the acoustic features (Jovičić, Kašić, 2004).

Figure 1 provides an example of two types of pronunciation of the same speaker. What we have here is both the disputed and undisputed voice utterance. The top of the graph shows the waveforms of the speech signal while the lower part shows intonation contours, which present the variations of pitch (fundamental frequency of voice). Figure 1a corresponds to the neutral speech where the fundamental voice frequency average is around 130Hz, while Figure 1b shows characteristics of the highly emotional speech. In emotional speech, voice intensity is significantly increased, and the pitch is raised for the entire register. The mean value of fundamental voice frequency is approx 185Hz, and the speaker is constantly in the affective state thus the pitch almost never gets to its neutral level. In this case, it is not possible to compare pitch levels in these two recordings while identification of other markers may be located in some other fields of forensic expertise, and this is the reason why the expert needs a set of combined forensic markers in order to form an opinion (Kašić, Đorđević, 2009b).

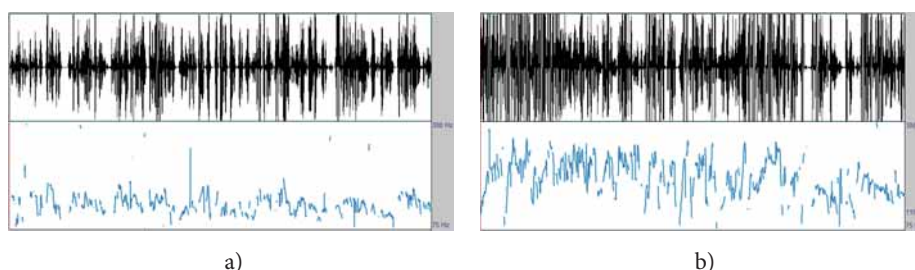


Figure 1. Example of the waveform speech (top) and intonation contours (bottom) of one speaker in a) neutral speech and b) highly emotional speech.

Technical conditions for recording

The quality of the recorded speech signal depends on several factors; some of them are as follows: the quality of technical equipment, the use of microphone and recording ambient conditions. The major problem occurring in practice of many courts is the lack of technical equipment and trained technical personnel. Therefore, these services may be outsourced and hired persons shall become familiar with the procedures related to the recording of the undisputed utterances. Taking into consideration digital recording and contemporary technology, computer technology in particular, the quality of digital recording shall not be of our concern. However, most often the weakest component in recording is a microphone. That is why the following is recommended:

- Prior to making any recording the microphone and the entire system shall be checked for malfunctions by making a test recording and by making control check of its quality.

Another important issue is the type of microphone, and the manner of its use. There are three most common types of microphones: desktop microphone (on stand or on flexible neck), a miniature microphone (clipped to clothing under the chin of a speaker) and head-worn miniature microphone. The use of a miniature microphone is recommended since it is applied at a fixed distance from the speaker's mouth. The most common and most significant problem with desktop microphones is the distance between the microphone and the speaker. As a rule, this distance should not be more than 30cm.

However, most often the undisputed voice utterance is recorded during the main hearing in the court. The courts usually have fixed table microphones and in cases when the speaker is tall, if s/he speaks quietly and if s/he stands one meter or more in distance from the microphone, voice recording becomes challenging. In such a case, besides the speaker's voice, microphone captures all sounds in the room, which may present a huge obstacle and may have a masking effect. Figure 2 shows several typical recordings with degraded ambient characteristics. The top halves of the four graphs below show waveform recordings of speech signals including ambient signals (interference), while the lower parts present the corresponding spectrograms.

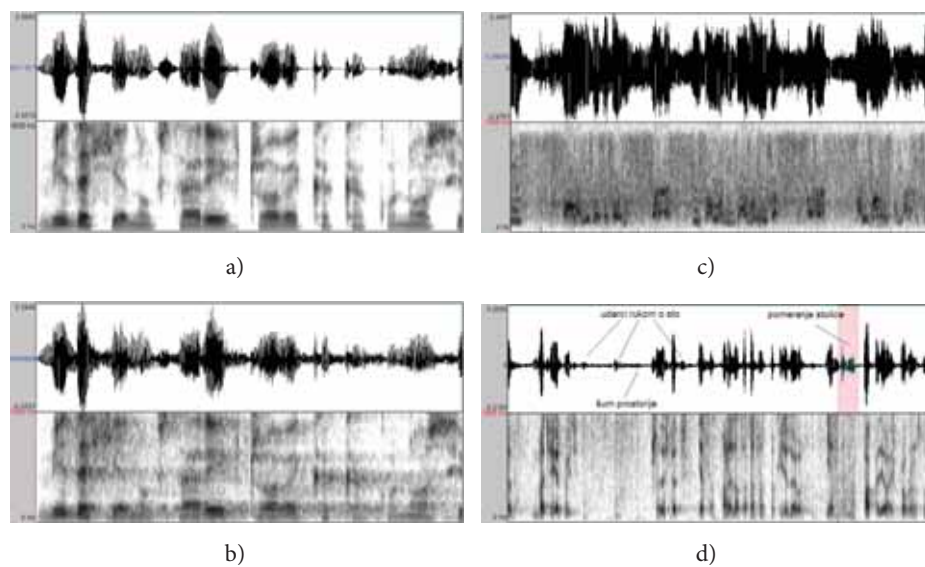


Figure2. An example of different quality speech signal recording (waveforms and spectrograms): a) clean speech signal, b) speech signal masked by the effect of reverberation, c) speech masked by the intense noise and d) the silent speech (significantly enhanced in order to make details visible).

Figure 2a represents a high quality voice recording sequence; the quality of recording is reflected in clear pauses between speech segments as well as in spectrogram. Figure 2b represents the same speech sequence as in figure 2a with added masking effect coming from the room reverberation. Reverberation implies the reflection of sound waves against walls and objects in the room. Since the speaker is a source of a sound signal, the sound waves are spread from his/her head in different directions in the room; they travel different paths and at different times and reflect off different surfaces (objects). The surfaces (objects) they encounter absorb a part of their energy and this reflection causes sound waves to reach the microphone and gather on its membrane with different time delays, different intensity and with different spectral characteristics (depending upon the absorption properties of reflecting surfaces). The final effect of reverberation is shown in figure 2b where the speech signal is substantially "smeared" due to huge number of its reflections. Therefore, there are no more visible pauses among speech segments and the amplitude and spectral distortions get extremely large (compare figures 2a and 2b). The effect of reverberation is present in every room, the larger the room the larger the reverberation. Lower reverberations do not impair auditory intelligibility of speech. However, they might significantly and sharply degrade the scope of software algorithm analysis of speech signal. Thus

the computerized possibilities for the detection of important markers are limited, primarily in spectral domain at the phonetic level.

Additional forms of sound interference may appear in the room while conducting recording and they may contribute to speech signal masking and may be captured by the microphone, for instance: noise from computers, air conditioners, or noise coming from the street if the windows are opened. Figure 2c shows the intense noise coming from a computer located in a close proximity to the microphone. The spectrogram reflects total masking of fine spectral details of speech signal. This can be of great importance in spotting the identification markers.

Finally, figure 2d shows the undisputed speech utterance recorded during the main trial in the courtroom. The various forms of interference are marked on recording: noise from the room, hands hitting the table, movement of chairs, as well as other frequent interferences, such as turning sheets of paper over, moving of different objects, silent speech, sound of computer keyboard typing (sometimes even typing on a typewriter), coughing, etc. All the examples given above emphasize the most crucial point: microphone captures all the sounds in the room and therefore while recording one should ensure as silent ambient as possible. This means that person dealing with recording shall have knowledge about possible recording obstacles and therefore carefully plan recording procedure. In summary the following recommendations are offered:

- The use of miniature microphone, clipped to the clothing under the chin of a speaker, is desirable (like in TV shows); this may not be feasible in every situation but microphone shall be placed as close to the speaker's mouth as possible, however, not directly in front of the mouth (to avoid blowing into it), it should rather be placed on the side facing the speaker's cheeks.

- If this recommendation is followed then the majority of other requirements pertaining to the reduction of ambient noise will be met due to the fact that the speech signal will automatically be placed in the foreground. However, one should ensure quiet ambient and should remove all potential sources of noise.

Conculision

Forensic speaker identification experts have encountered a significant number of problems related to taking undisputed voice utterances. Generally, the courts in our country do not have sufficient information and awareness about this type of expertise and this is where all other problems emerge. Firstly, in most cases the courts lack proper recording equipment and consequently have no experience in applying the appropriate technique of recording high-quality samples of undisputed voice utterances. Secondly, the lack of knowledge regarding the purpose of this expertise and the proper method does not allow them to carry out interview procedure with the undisputed speaker in an appropriate manner.

This paper offers explanations to various uncertainties, irregularities, lack of information and technical failures, which are common in daily practice, and provides general guidelines for proper application of procedures for recording undisputed voice samples. However, the main message this paper conveys is that prior to every recording it is of crucial importance to consult the expert because every case has its own specificities, which may not be included under the standard recommendation framework.

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CRIMINALISTIC ASPECTS OF APPLICATION OF COMPUTER MATCHING AND DATA MINING IN DETECTING AND PROVING CRIMINAL OFFENCES¹

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Abstract: Legally established collection of information about citizens and their storage in an electronic database is a reality of modern society. In this paper authors suggest the possibility of using this data for effective implementation of criminal investigation. Specifically, using methods of computer search and comparison of data creates the preconditions for the identification of persons, things or facts relevant to criminal investigation. The very success of their automatic search and comparison within criminal investigations depends to a large extent on the availability and characteristics of data (features, raster) which refer to persons, objects or events. An effective and legally-based application of these methods creates new opportunities for their use in crime investigation, which saving valuable time and makes resources properly allocated.

Key words: crime, crime investigation, data search and comparison, data mining, computer matching and data surveillance.

Introductory remarks

Organization of human society involves collecting and managing the most various data related to their members. Functioning of the government machinery and non-governmental sector requires the existence of many information registers about individuals and legal entities, their lives and work related to a specific field or problems because of which such registers and data bases are kept. The very development of computer technology (computerization) has largely increased the possibility of receiving, processing and monitoring such data, even for the purpose of surveillance of individuals and their behavior. The essential importance of computer processing and storing of information is not only in the speed of carrying out various operations, but primarily in the possibility to access the integrated mutually linked elementary data which come from different sources. The state-of-the art information technology make it possible to get these data in the matter of seconds or parts of a second, by networking data bases within large state and social areas, such as public administration, economy or science.

Collecting relevant information on citizens out of various (naturally legal

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and legitimate) needs and for the most various purposes as well as their storing into appropriate bases represents the reality of the contemporary society, in the same way as it is the realistic (and necessary) fact that the persons these data refer to cannot have the absolute power over them. However, they have the right to feel secure from possible misuses of these data. This is why the issue of the protection of citizens' data today is highlighted even more, particularly being prominent in functioning and performing the activities of state administration institutions and judiciary, including police. Accordingly, with regards to the availability of citizen-related data, they must have certain limitations for the general interest in the same or similar way as when their other freedoms and rights are limited. The task of the legal science, law-makers and legal practice is to define standard foundations for collection and management of the most versatile data, ie the conditions under which they can be used for socially justified purposes. On the other hand, the actual (primarily technical) possibilities are increasing from day to day for more comprehensive, complex and sophisticated exploiting of data on man and its activities in all fields of life and work. Among other things, the exploiting of such data can yield good results in fighting crime as well.

The explosive growth of quantity of data and bases where they are stored has exceeded man's power to process and analyze such huge quantities of data by traditional means, requiring new and different techniques and means of automatic analysis in the available bases. Automatic data search and comparison, regardless of the purpose they are used for, is based, on the one hand, on the bases where certain data are stored, and on the other hand, on the application of computers (understood as hardware) and related programs (software) used for the search, comparison and analysis of these data.

Surveillance may be defined as a systematic investigation or monitoring of movements or communications of one or more persons in order to collect information on them, their activities and connections. For a long time the surveillance has been implemented by direct physical observation, as well as by various devices used for support, including telescopes, cameras, directed microphones, telephone bugs, etc. The conventional surveillance forms require hard work, cost much and last long (Marinkovic, 2010).

In the course of the 20th century the work of public administration has increasingly included the intensive use of personal data. The expansion of network traffic and flow of information has additionally contributed to the huge amounts of data interchanged to be widely available. Personal surveillance through personal data has become easily achievable, and at the same time much more inexpensive and simpler than conventional techniques of physical or electronic surveillance. As a result, data surveillance has started developing. This is a method of surveillance of a large number of people by comparing and pairing of data referring to them which have been collected from a large number of sources. Ever since it started being applied, the data surveillance has become a topic of numerous government publications and its effects and influences have been discussed by many sociologists and some lawyers. It is usual that in Anglo-Saxon literature this phenomenon is referred to as *dataveillance* while it essentially represents the control, comparison and analysis of systemized data on persons in investigations or monitoring of their activities. There are two essential models of personal surveillance through data, and these are: 1) *personal dataveillance*, such as checking or proving the veracity of concrete, extraordinary or extra works and transaction, which are contrary to internal regulations of a certain service or organization, and 2) the surveillance of a large, usually unidentified number

of persons (*mass dataveillance*), such as checking and proving of veracity of all transactions which are contrary to internal regulations of a certain organization. In addition to two above mentioned models, there are also facilitative and support techniques, such as techniques for integration of data stored in various databases. In comparison to conventional forms of surveillance, dataveillance is automated, and therefore cheaper and more reliable. This is why its application during the last 30 years has flourished, in the beginning in wealthy societies with the developed and sophisticated information technologies, but recently also in the developing countries, among which there is a significant number of them having legislation problems due to insufficiently developed mechanisms of civil rights protection.

Various models of computer data search and comparison

We are of the opinion that there should be a terminological difference between the concepts of (computer) data search and comparison. The search includes reviewing and analysis of data contained in certain data bases in order to find information that are not visible at first sight and refer to a certain person, action or process. Defined in such a way, the computer data search is mostly contained in data mining techniques. On the other hand, comparison implies to have a certain amount of data or features in advance, which is then entered and compared with other data from a certain data base in order to find common characteristics between them which connect them and make them similar or the same (pairing). The procedure of computer comparison is almost entirely made equal with the procedure of computer matching.

In various fields of research (primarily statistics and artificial intelligence) the procedures of automated analysis have been developed that reveal hidden contents within large sets of data. The process used to achieve this is usually called data mining.² It marks the automated analytic process shaped for the effective and efficient exploration in large data sets in order to reveal and use valuable, "hidden" information which refer to hitherto unknown facts and relations. In other words, data mining can be understood as finding the previously unknown and potentially useful information or knowledge from large data sets. The basic principle is to create computer programs which scan such data sets and automatically search for certain, previously defined patterns. The potential data mining technology depends much on the nature of the available data sets and it is successfully applied in various professional fields, for instance in the remote resource management, biometrics, speech recognition or business and marketing. The data mining procedure uses algorithms in order to find the important hidden contents in large sets, the interpretation and understanding of which enables better diagnostics of state of affairs, better predictions and finally better decision-making.

The basic functions of data mining are: 1) classification, ie exploring of entity features and their sorting into previously determined classes; 2) clustering, ie segmenting of a heterogeneous set of entities into homogeneous sub-groups, clusters; 3) evaluation, ie predicting of unknown values of continuous variables; 4) detection of changes and deviations of data from previously measured or standard values; 5) detecting associations and finding items in transaction which imply the presence of other items in the same transaction, etc. Some authors (Berry, Linoff, 2000) classify data mining functions into two sets – the first one is directed

² This is a metaphoric term used to present this process comparing it with ore mining. In the same way as ore mining is rather difficult and uncertain job, when you search for a certain precious ore in the depths of the Earth, during this procedure you dig, in other words search the vast amount of data looking for those that are useful.

analysis, based on supervised learning, including classification, evaluation and prediction, and the second one is undirected analysis, based on unsupervised learning, including grouping, association rules, description and visualization. The dominant view of the nature of data mining is that it helps reveal just the hypotheses of complex facts and their relations (Fayyad et al., 1996).

One of the mass surveillance techniques is computer matching. Computer matching, also referred to as data matching, record linkage, computer cross-checking, data searching, joint running, cross matching, and a variety of other terms, has been defined in all manner of ways by different jurisdictions. This technique is called computer matching in the USA, or data matching in Australia and Canada. However, at its most basic, computer matching generally involves the computerized comparison of two or more automated systems of records or files. To achieve this comparison, the computer is instructed to search the database(s) and locate specific information or data elements (eg name, address, occupation, etc.). The computer then examines this data according to pre-determined selection criteria (ie is the information within the data element identical, similar or contradictory). The information which meets the criteria and is selected by the match is referred to as a "hit". If the information is unverified, it is known as a "raw hit" (Wright, 1991) Some of the forerunners of computer matching could be found in so-called Income Matching Programs, which were long used by the USA IRS, or by the system for parental help, approved by the USA Congress by the amendment on the Social Security Act in 1974. Its original goal was to find parents who have violated the agreements related to their child support and makes them competent to honour and implement such agreements (Clarke, 1994).³

Computer matching technique is used for various purposes, the majority of which refer to social control and efficient work of state administration (traffic, police, health insurance, and similar), while its goals can generally be divided into primary and secondary ones. Some of primary goals would be: 1) to discover errors in programs of administration institutions (for instance, faulty estimate of certain profit, issuing bills several times, etc.); 2) to verify whether the conditions required for further use of certain benefits have been fulfilled; 3) to discover unlawful conduct of tax-payers, users of certain benefits, government officials, and similar (false or multiple claims, undeclared income or property, inappropriate conduct, conflict of interests); 4) monitoring regularity of procedure for allocation of grants or concluding agreements); 5) finding the addresses of persons that the government agencies have certain claims from; 6) identification of those who have the right to certain profit but do not exercise this right at the moment; 7) control of data validity, and 8) updating the data stored in one set of records based on the data from another database. Out of secondary goals of computer matching application, we would point out the following: 1) support to actions with favorable financial effects, such as ceasing cooperation with irregular payers, reduction of excessive payoffs, allowances for false payments to agencies, unpaid taxes or arrears due, collecting allowances in favor of other government agencies, avoiding future irregular or excessive payoffs, intimidating and adverting future unlawful behavior; and 2) establishing and maintaining of database for the purpose of

³ It is stated in the literature that the first computer program intended for comparing and matching of data was the so-called Project Match, implemented in 1977 in the USA by the then Department of Health, Education and Welfare. Project Match compared the data of approximately 78% of the total number of families that received child support, with the data from salary lists of about 3 million federal officers. 33000 raw matches were reported, the number then being reduced to 7100, which resulted in 638 cases of internal investigations and 55 charges. It is estimated that until 1982 about 200 programs for organizing and comparing of data were routinely carried out by the state and federal agencies in the USA. Congress' Office of Technology Assessment estimated that the number of applications of computer matching method in the period from 1980 to 1984 increased three times, while Laudon pointed out that the number was 500 by 1986. Quoted according to Clarke R., 1994.

social control, research and statistics, improvement of strategic programs, and procedures and control mechanisms.

In addition to computer matching, there are other closely related techniques used for the support of surveillance of wide layers of population using data. One of them is data-linkage, the purpose of which is to store individual records into one personal file through which it is possible to identify one or more other files, which enable fast and reliable interrelation between the data in the future. The second technique, known as data concentration includes linking and joining of databases and creation of new ones for the requirements of support to numerous functions of state administration and economic subjects. The third technique includes the use of common multipurpose identifiers, which has aroused many debates on the creation of wide national programs intended for the personal identification, such as bases with social security numbers in the USA and Canada.

It is not rare that a person wants to acquire a certain profit in a fraudulent manner, for instance to receive a bigger pension cheque by giving false data about his family state or to pay lower taxes because the tax authorities do not have true knowledge about his income; or get a loan although he does not fulfill the conditions because the creditor is not acquainted with the fact that the loaner has already outstanding debts which are due. Under such circumstances, the organizations will probably require the confirmation of accuracy and completeness of the data enclosed by the interested persons. In order to protect their interests, they carry out the verification procedure, in other words they check if the presented data are true. The term verification is used as a common term for these purposes, but considering that it implies higher standards of proving and accuracy than it is possible to determine in these cases (without the court procedure), the term cross-checking is naturally more appropriate.

The large part of processing of and manipulating data is internal and is carried out for the needs of one organization. However, cross-checking in general implies the use, or discovering and disclosing of data in specific cases, which were collected earlier and processed for other functions and/or within other organizations. Cross-checking can be carried out in *ad hoc* situations, as required, or according to previously regulated agreements between certain organizations. They can be carried out with or without the knowledge and/or consent of the individual, as well as with or without an explicit legal authorization. Many cross-checking activities start on the occasions when certain individuals apply for a job, pension or loan, in which case it is usual to call them front-end verification. Reverse or inverse arrangement includes the agreement between organizations, which implies automatic cross-informing in case there are changes of certain data, for instance of the address. Such a procedure could be marked as front-end notification. Front-end verification and front-end notification are the models of data surveillance, as a set of techniques by which one or many individuals are controlled but not directly, by physical surveillance, but using data. The previously mentioned cases, where the monitoring is actually a specific identification of persons resulting from the transactions which include the data related to these persons represent the forms of personal dataveillance. The person subject to such a manner of surveillance can be marked as digital persona.

Cross-checking can be undertaken even without the initiative by the subject who should carry out the transaction related to a certain person. The reasons for this may be contained in lifting the suspicion of the honesty of a client and the belief in their inclination to frauds, as well as validation of the data related to persons with whom the organization cooperates in order to avoid potential damaging

consequences. In addition to assistance in the implementation of personal dataveillance, cross-checking may give large support to the implementation of mass dataveillance, which may be undertaken because it is not possible to identify in advance those persons who can be put in the category of the suspicious ones, or those inclined to embezzlement.

It is important to highlight that there is a difference between the methods of fraud detection used in the past and data matching. Traditional investigation is triggered by some evidence of a wrong doing by an individual, such as tax evasion or bogus benefit claims. Data matching is not targeted at individuals but at entire categories of people. It is initiated not by the suspicion concerning an individual but because the profile of a particular group is of interest (Shattuck, 1984). This leads to three issues of concern (Rogerson, 1997):

- *Privacy* - Data matching is likely to involve matching personal records compiled for unrelated purposes. Surely an individual has a right to control personal information and prevent its use without consent for purposes unrelated to those for which it was collected.

- *Due process of the law* - Once a match has been undertaken it will result in a number of hits. All those identified are in jeopardy of being found guilty of a wrong doing. It is unlikely that these individuals are given any notice of their situation, since doing so might affect the investigation, or an opportunity to contest the results of the match at an early stage. For these reasons their right to due process of law is curtailed.

- *Presumption of innocence* - The presumption of innocence is intended to protect people against having to prove that they are free from guilt whenever they are investigated. Data matching can reverse this to a presumption of guilt. This is because the technology of data matching is so plausible and the detection of fraud is much applauded. These powerful influences will weigh heavy in favour of the notion that those identified must be guilty.

Some aspects of data mining and computer matching in crime investigation

Computer search, analysis and comparing of data for crime-investigation purposes may be versatile, with various expectations and results of application. In the same manner as the large number of data stored in appropriate databases serves to the efficient performance of public administration, administration or banking, it can be very useful in crime investigation. From the point of view of the crime suppression activities, databases can be divided into primary and secondary. Primary databases are those created and maintained primarily for the requirements of crime investigations and subjects working on them, while the secondary ones are those organized and managed for the requirements of state administration, economy or health, but in certain cases they can be used for crime investigation purposes. This means that primary databases include for instance fingerprints data bases or criminal DNA profile databases,⁴ while the secondary

⁴The Interpol's automatic fingerprint database (AFIS) contains about 90,000 fingerprints belonging to offenders, as well as fingerprints lifted from 1,600 crime scenes. DNA databases contain DNA profiles which are classified into reference profiles (the profiles of offenders, victims, aggrieved...) and trace profiles (profiles obtained from biological traces). There are now several DNA databases in existence around the world. Some are private, but most of the largest databases are government controlled. The United States maintains the largest DNA database, with the Combined DNA Index System, holding over 5 million records as of 2007. The United Kingdom maintains the National DNA Database (NDNAD), which is of similar size, despite the UK's smaller population. According to INTEPOL's data, in 2008 the forensic DNA analysis was carried out in the majority of Interpol

would include the databases of money transactions carried out by certain banks or bases of tax payers.

The factors helping in the evaluation of relevance of data mining techniques application in crime suppression range from the activities from which the databases result to their quality (the degree of insecurity, precision and completeness). Police agencies and forensic laboratories collect large quantities of various data, which result from the processing of many criminal activities. Thus within the forensic crime scene investigation the group of data are obtained which consist of the information referring to collected material of physical origin (for instance, biological traces, traces of tools, fingerprints, shoeprints, illegal drugs seizures). This kind of data may be presented numerically and may be subject to categorization. The features extracted from these materials are often imprecise (in principle because of the instruments used for analysis and measurements), incomplete (fragmentary) and insecure.

The discovered and processed material samples are usually categorized into three groups: 1) useless samples (for instance, the obvious clarity of the contents without any calculations or they are irrelevant for the problem observed), 2) useful samples, which provide direct important information that can be worked with, and 3) patterns that require interpretation, and which can be classified into two previous categories, because of which it must be studied by the experts in the given field (Terrettaz-Zufferey et al, 2006).

The researchers have developed various automated data mining techniques for the requirements of crime suppression, both in the field of local police work and at the national level. Thus the entity extraction technique identifies the patterns from databases such as texts, images or audio materials. It is used for the automatic identification of faces, addresses, vehicles or personal characteristics from narrative police reports. This technique provides for the basic data for crime analysis, but its achievements depend to a large extent on the availability of large quantity of pure input data. Cluster techniques systematize data into groups of similar characteristics, in order to maximize or minimize the similarity of the data within a certain group – for instance, for identification of the suspects who commit crimes in the similar manner or to differentiate between criminal groups belonging to different gangs. Association rule discovery finds the groups of data that appear often in one database and the patterns of their appearance are defined as regularities. This technique is often used to trace computer network hacking so that the certain rules of association could be deduced from the history of interaction among the users. The researchers can also use this technique for profiling of hackers so that they could help in detecting possible attacks on the network.

Sequence pattern detection (or string pattern detection) finds sequences that appear often in one set of transactions that occurred at various times. Pointing to the hidden patterns is useful for crime analysis, but in order to obtain meaningful results a rich and highly structured database is required. Deviation detection uses certain measures for the study of data which noticeably differ from other data. The researchers may use this technique to detect frauds, hacking into network systems and other crime analyses. However, such activities may sometimes

member-countries, 53 countries have DNA database, while it is being created in 29 countries. Legal regulations in the Interpol member-countries are various, ranging from Belgium where the DNA databases contain only the profiles of those convicted for major crimes, to the Great Britain where the databases contain the profiles of both the suspects and convicts for all crimes and the majority of delicts, as well as the profiles of volunteers. Quoted according to National DNA database (Internet: http://en.wikipedia.org/wiki/National_DNA_database) and INTERPOL – Forensic.

seem usual at first sight, which makes identification of deviating data more difficult. Classification finds common features among various criminal entities and organizes them into previously defined classes. This technique is used for the identification of so called spam e-mail messages, based on linguistic patterns and structural features of the sender. Often used for prediction of crime trends, classification may reduce time required for identification of criminal entities.

Comparative data mining techniques compare pairs of textual fields in databases and calculate similarities between records. These techniques may discover false information such as names, addresses and social security numbers. The investigators may use comparison for the analysis of textual data, but these techniques often require intensive calculations. Social network analysis describes the role and interactions between nod points within one conceptual network. This technique may be used in case the networks which illustrate the roles of certain criminals, the flow of material and immaterial goods and information, as well as connections between these entities are created. Further analysis may reveal critical roles and sub-groups, as well as vulnerability, ie weaknesses within the network (Chen et al, 2004).⁵

One of the aspects of data mining techniques application in crime-investigating purposes is the analysis of seized drugs in order to define as complete as possible the status of drug market (Ratle et al., 2006). In this case the methods of recognizing drug samples are systematically tested on the multitude of samples of seized heroine and cocaine in order to find possible regularities which could provide information related to the scope and development of illegal trafficking. Classic algorithms, such as the analysis of main components and various grouping and classifying algorithms, can successfully be applied on heroine databases. Basically, the process of diluting and cutting heroine happens at various levels of illegal trafficking, but it is most often carried out at the end of the distribution process so that the quantity of pure heroine is as small as possible, in other words the profit is as large as possible. This is why the substances for cutting heroine are of special importance for easier understanding of local trafficking network. The presence or absence of these substances is systematically detected by laboratory techniques of chemical analysis. One sample of the seized heroine can contain various substances at the same time (sugar, milk, pudding, or cocoa powder, flour, paracetamol and similar), and the certain combination of the ingredients and their ratio can be the indicator of various levels in the chain of distribution. This is why the dynamics of appearance of these combinations may be a good indicator of the condition and development of local market, with the possibility of presenting by means of combining analysis and graph theory. Database created for these purposes should contain the following variables (Terrettaz-Zufferey et al, 2006): location and time of seizure; presence/absence of cutting substances and combination of cutting substances.

When we talk about the application of computer data matching methods in crime investigation, the starting basis is made of the available features of a certain person or things or kind of events (criminal act, misdemeanor, the procedure of determining ownership, and similar) because of which the matching is carried out in the first place.

Based on them databases are determined where it is expected to find complementary data referring to that person(s), things or events. Personal features or characteristics may be related to his personality, taken in psycho-

⁵ The offenders often develop criminal associations – networks within which they make groups or teams in order to commit various illegal activities. The application of data mining techniques in these cases consists of identification of sub-groups and key members in these networks, as well as of the study of patterns of interaction in order to develop efficacious strategies for neutralizing of these networks. More in Chen H. et al., 2004.

physical (sex, age, fingerprint, DNA profile, diseases, etc.) or social sense (nationality, citizenship, political orientation, bank account, marital status, membership in some organization, etc.). Also, the features can be such as to be characteristic for only one person, so that when they are connected the identity of the person is determined undoubtedly, or they can be common for a big or small group of people, which are then after search and matching selected from the database and processed further. Therefore, there are two kinds of computer data matching:

1. comparing the data the result of which is to determine the identity of a person (for instance, by searching DNA blood samples from crime scenes through the criminal DNA profile database or by running the dead John Doe's fingerprints through the database of identity cards of the citizens);

2. searching the data the result of which is to determine the circle, or a group of people (for instance, by running through the database containing the data on vehicles registered in a certain area in order to select vehicles of a certain brand, type and color, or the owners of such vehicles, because of a car accident).

Nowadays the police forces all over the world use the Automatic Fingerprint Identification Systems (AFIS). In these cases, we talk about the primary databases, considering the fact that such registers are made for crime-investigation purposes. However, such fingerprint bases or the bases containing other biometrical features which include the wide range of population are starting to be created, without any specific criterion except for instance the age or entry to the territory of a certain country.⁶ In the first case the motive is to issue such identification documents to citizens (identity card, passport) that would contain, among other things, some biometrical characteristics, most often the photograph of the person and his/her signature,⁷ and in the second it is the business, tourist or any other entry in the country that requires a certain procedure.

From the crime-investigation aspect, special significance is given to data matching in cases when there are material features available which are found in crime scenes or some other places and which are (or it is assumed that they are) connected to a crime, with the material features of that kind taken from the suspects for the comparing purposes. In this way, in case all features match, their connection is determined by quite a simple procedure, or in case they do not match, persons are eliminated as suspects.

It can be said that the success of computer data matching in criminal investigations depends crucially on the availability of characteristics (raster, features) of the persons and their features. Accordingly, if a small number of characteristics are available, less is the probability that the search will be successful. On the other hand, if the characteristics are too general, a large number of persons will result from the matching process and they should be processed further, which increases the costs of investigation to a large extent. This is why some authors are questioning sincerely the very efficiency of this evidence procedure.⁸

⁶ For instance the US-VISIT (United States Visitor and Immigrant Status Indicator Technology) program requires all the USA visitors to be photographed and their fingerprint taken prior to entering the country. These data are used not only for verifying the visitors when entering the USA, but they are connected with more than 20 other databases of the USA government. The goal is to prevent to a significant extent the entry of the wanted or dangerous person who use false identities to enter the country. Similar to US-VISIT, Japan uses J-VIS program. More in: Homeland Security: Fact Sheet – Expansion of US-VISIT Procedures to Additional Travelers; United States Visitor and Immigrant Status Indicator Technology.

⁷ This is the situation present in the Republic of Serbia also, following the passing of the Law on identity card, according to which this basic identification document contains, among other things, the photograph of a person, signature and a fingerprint. In this way the Ministry of the Interior would in the course of issuing new identity cards create such a database where biometrical features of all Serbian citizens older than 16 (exceptionally some younger ones, too) will be stored.

⁸ In Germany in 2004 the fact was made public that the search of as many as 8.3 million data resulted in only one investigation, which strongly supported the arguments of critics that the search raster is actually a pure failure.

Conclusion

The great challenge all police and intelligence agencies are facing is an accurate and efficient analysis of the data on crime, the scope of which is constantly increasing. For instance, complex criminal conspiracies are often hard to reveal because the information on suspects may be geographically scattered and may include large number of people. Disclosing computer crimes can also be difficult because the extensive network traffic and frequent online transactions create a huge quantity of data out of which only a small portion refers to illegal actions. Police agencies and forensic laboratories collect large quantities of various data, which result from processing many criminal activities. It can be said that the automatic data searching and matching techniques have been insufficiently used so far in this field, although it could contribute significantly, particularly in discovering these crimes which are a part of dark numbers or are difficult to anticipate and prevent. Extenuating circumstance in their application is, among other things, huge versatility of data that should be processed and considered.

Those involved in criminal investigations who have years of experience can often precisely analyze crime trends, but since the frequency and complexity of criminal acts increases, human errors also appear, the time required for analysis increases as well, and the offenders have more time to destroy evidence and avoid being arrested. Automatic data search and matching is a powerful tool which enables the crime investigators, who may not be skilled for analysts, the fast and efficient searching of large databases. Computers can process thousands of instructions in just a few seconds, saving time. In addition to this, installing and using of software often costs less than hiring or training of the staff. Computers are also less prone to errors than people, especially those investigators who work many hours both at day and night.

Special understanding of the relationship between the possibilities of the analysis and the characteristics of a certain type of crime can help investigators to apply these techniques more efficiently in order to identify trends and patterns, locate problem area, and even predict a crime.

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COMBATING AND PREVENTION OF FEMALE JUVENILE DELINQUENCY IN MONTENEGRO

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Abstract: Female juvenile delinquency in the countries in the region as a significant social phenomena and individual behavior of female juveniles in the criminological literature and researches is observed mainly in the terms of general juvenile delinquency, with an extremely rare highlighting of some gender specificities.

Discriminatory perception of this criminological phenomenon is usually explained by a much smaller volume of delinquency of female juveniles in relation to delinquency of male juveniles. However, quantitative criteria can not be the main reason why the delinquency of female juveniles - was not to this date been given sufficient attention.

Montenegro given its cultural, its traditional and historical characteristic, is similar to other states of the former state, even in some elements even more patriarchal with all modern aspirations of ever stronger opening to the European modernism. This kind of sudden europeanization process changes all the general patriarchal social picture .

This criminological phenomenon, if it is implemented in the region, it mainly had for the research sample girls, that are in conflict with the law, that have a criminal record and against whom criminal charges were prosecuted, though this time, including this sample, it was used and the research sample of female juveniles that were not coming so far in interference with the law (weren't legally criminally recorded), but did show the aspirations and preferences to a juvenile delinquency in the future.

Research conducted for the purpose of this scientific meeting, had showed the significant results. The number of juveniles who were in adolescence using alcohol, drugs or hazardous games and arbitrary left from home is steadily increasing. The necessity of investing resources in the modern family is of great importance in the future, because the "dark figure" of these violations is ever higher. Cause and effect relations that these offenses have on delinquency in the future deserve the attention of all the general social forces.

KEY WORDS: Female juveniles, Family, Delinquency.

Introduction

Numerous features of the society in which we live in, are still transitional, rapid and unpredictable changes. As a result of this situation, there are significant socio - pathological phenomena. Evident manifestation of social, moral and economic crisis in Montenegro, had resulted in the emergence and increasing

prevalence of many socio - pathological phenomena, such as substance abuse, delinquency, suicide, family disintegration, gambling, etc..

Underage girls are becoming more frequent carriers of socio - pathological phenomena such as drug abuse, juvenile delinquency, suicide. Family crisis and the crisis of society, was mediated to occurrence and manifestations of these socio - pathological phenomena. Underage girls can often become violent, and many of them become victims of bullying. Each of these socio - pathological phenomena is a complex social phenomenon that is not enough scientifically and professionally investigated.

Dark figure of female juvenile delinquency in such societies is very highlighted. It is for this reason, it is very difficult, due to the specifics which are following underage females in conflict with the law (psychological theories, biological theories, sociological theories) to conduct such a survey. Researches so far have shown that female juveniles in conflict with the law are often limited to family status, broken families, bad habits, living conditions, gender bias and the like.

It is very delicate to talk about occurrences of deviant behavior among female juveniles, as underage girls. Mostly because of the family relationship to this phenomenon, shame and condemnation of the community towards underage girls, patriarchy of the Montenegrin family, etc.

This is why the subject of this research paper is focused on the focus of certain risk factors that precede a female juvenile delinquency, or the result of socio - pathological phenomena that characterize this type of delinquency during the period of growing up and measures to prevent it. Juvenile justice is primarily characterized by the gradual introduction of specific criminal sanctions for juveniles in conflict with the law in the judicial system, by which the society is responsible for the suppression of risk factors (juvenile's gambling, serving alcoholic beverages to juveniles, prevention of drugs smuggling and narcotics and other socially harmful phenomenon), that young people are exposed in modern life today.

The aim of this paper is on emphasizing certain characteristics of some risk factors (gambling, alcohol, drugs, running away from home, etc.), through the generally well known phrase of the difference of legal and penal status of juvenile perpetrators from criminal offenses of adult offenders, which adversely affect the formation of personality, social status of juveniles and their families and other circumstances.

Given that so far, in a significant number of research papers in Montenegro and it surrounding countries, has been or is still present, a trend of research of juvenile delinquency without dividing the gender structure and focus on specific phenomenological, etiological, biological, psychological, sociological and theoretical approaches to delinquency, the work preliminary only deals with some of these theoretical approaches with a focus on empirical research samples or specific things, or risk factors explained by the methodology of the survey sample of female juveniles.

And even considering the fact that the research of the consequences is less popular than the studying the causes which leads to juvenile delinquency, the paper is still in a significant part of the empirical approach dealing with the consequences in order to emphasize the need for control and prevention of these socially unacceptable practices, that do substantially form part of the period of adolescence of juveniles and the basis for the creation of modern forms of delinquency, children in conflict with the law.

Loss or weakening of emotional support and trust between parents and children is often a base from which a number of disorders of personality and behavior of juveniles arise.

In the paper a basic survey instrument, is a unstandardized questionnaire, which is designed exclusively for the purposes of this study. In a sample of 75 respondents, that we tentatively called the control group, it is seeking to implement the research sample. 1

Also, in places where there are Gipsy or Egyptian population categories, among others, in practice, it was shown a high intensity of the phenomenon of underage girls leaving from home, underage marriage and the like. And even if that characteristic is attributed to the customs of this category of population, it is not and can not be a basic condition for very poor studies of this phenomenon and its elimination on the basis of this fact. 25. underage female Gipsies and Egyptians are included in the research sample. Also, the appearance of arbitrary leaving from home more often is recorded beyond this population.

And even if adolescence is a period or phase of the transition period from childhood to adulthood, it is very important and interesting phase segmented research during period of female juvenile growth proces. However, even if that continuity of the person development started from childhood is extremely complex and dynamic period, and it is characterized by a series of biological, psychological and social changes. And even if this stage of personality development is extremely important, in it is still possible to correct the deficiencies of previous developmental stages (...).2

And even if juvenile delinquency is very complex, dynamic and specific socially negative phenomenon that engages with its universal interest of many scientific disciplines and international legislation, these aspects of perception of delinquency in this paper will not be significantly summarized, but will be referred only to the extent necessary for completeness of paper and preliminary introduction to the subject matter within the scope of the paper.

Juvenile delinquency is the subject of interest of many sciences and scientific disciplines of sociology, psychology, pedagogy and jurisprudence, however, despite of the existence of significant theories of delinquency, such as for example theories of deviant behavior, social disorganization, social problems, psychoanalytic theory, the paper in it core also does not addresses in the significant volume to these elements.

Methodology of the study of female juvenile delinquency in the paper

Results of numerous studies show that pathogen educational influences in the family, are in the cause-effect relation with psycho-social disorders of adolescents.3

In Montenegro traditionally more attention and control has been given to the female children with aspirations to control the movement and spending of leisure time. In cases where female children were coming in conflict with the law, it was

¹ Research is supported by: SOS Hotline for Women and Children Victims of Violence Niksic (Nada Koprivica), Center for gipsy initiatives, which conducted the researches in Berane, Podgorica, Bar and Ulcinj (Fana Delija), Centre for Social Labour in Niksic (Ljubica Durutović), Centre for children and youth Ljubovic - Podgorica (Dragan Pajovic).

² Ljiljana, Krkeljic, "Adolescencija" (eng. "Adolescence"), journal „Sigmost“ no. 1-2, Podgorica, 1997, p. 147

³ Tatjana, Vujovic, "Od žrtve do delinkventa" (eng. "From victim to delinquent"), Faculty of philosophy Niksic, 2009 p. 65

considered a greater shame than if that act was done by male children. According to the current opinions, Juvenile Justice has been much more lenient towards female children and many conflicts have been solved without legal proceedings.

Lower participation of women in the committing criminal acts were often explained by personal characteristics of women, thus emphasizing her weaker physical structure and strength, timidity and more reserved character, however such a conclusion was still accepted with reserves which still emphasizes social and psycho-social elements (...). (Milutinovic 1989:172).

Given the many difficulties, which represent or limit research, for the purposes of this study, due to actual or real volume of registered female juveniles delinquency it is necessary to determine appropriate research sample. According to MONSTAT's data⁴ in the period since 2001. year by 2009. in Montenegro it was reported 108 female juveniles, and the charges are raised against 55 female juveniles, as well as 2222 male juvenile delinquency cases. The judicial authorities in the same period, under the applicable laws of the state, imposed the 46 measures in relation to female juveniles, while in relation to the 9 female juveniles criminal proceedings were suspended.

The subject of our research is juvenile delinquency, but given the extent of registered female juvenile crime, and not very significant number of female juveniles registered in the last three years in Montenegro, and the fact that previously were not done similar researches, research sample had to be shifted in the direction of even those juveniles who are prone to these risk factors, and are located in the records of the Centers of Labour and Social Welfare, NG organizations that deal with this problem and other state institutions in order to verify methodologically the assumption that more female juvenile than those registered as criminal offenders of serious offenses, are exhibited to contemporary threats and potential danger to begin to commit criminal acts and serious violations in the period of early childhood, but also measures of the bodies of State to prevent and suppress these socially damaging phenomenon.

Gambling of juveniles is a serious social problem, the practice of law enforcement agencies showed that young people are losing significant monetary values on poker machines, casinos, sports betting, and in other ways, which is why they are constantly trying to cope with the psychological defeat, which is where they continue to exhibit to major hazards that these hazard games bring, in order to regain the lost money, which often resorts to the execution of criminal acts, running away from home, animosity in the family, suicidal actions due to the inability of return of money previously lost.

Furthermore, these pathologies are by themselves causing the excessive consumption of alcohol under certain biological, psychological and social problems, that are characteristic of adolescence of the female juveniles, which is how they resort to the use of lighter drugs and arbitrary expulsion from home, committing criminal acts and often become victims of adult criminals, victims of solicitation of prostitution and the like.

The paper in a methodological sense, as noted above, uses unstandardized questionnaire aimed to verify the control group of female juveniles from the different areas of the state, the extent to which the participants were exposed to these risk factors, not taking into account many other factors, which are not subject of this paper, which also significantly contribute to a female juvenile delinquency (peer groups, family, molestation and neglecting, etc.).

⁴ Central Bureau of Statistics of Montenegro - Podgorica.

Empirical aspects of the research of control group of female juveniles

Female juvenile delinquency in literature wasn't devoted the necessary attention as well as in theoretical explanations but also in empirical research. And even if these types of delinquency have certain peculiarities in the phenomenology and etiology, they are objectively and separately from juvenile delinquency not given enough attention.

The volume of female juvenile delinquency is usually determined by the number of complaints filed by the competent authorities, brought charges in the pre-trial proceedings, and imposed criminal sanctions. This delinquency is characterized by a significantly lower prevalence than male juvenile delinquency, both in respect of all crimes and by individual species of the same. In an effort to determine the exact scope of a female juvenile delinquency numerous problems are faced: the diversity of methodological approaches to this problem, different criteria in determining the statistical unit of observation, the lack of uniform statistical data in this area and a common statistical recording of juveniles delinquency of both genders.

In the elements of an empirical insight in this paper, as it was already noted, certain risk factors are determined that are to provide an overview and that can stimulate the underage girls to perform criminal acts. So in order to observe the general data in the tables presented, next to the age of respondents it is indicated the data on their school attendance, family status, arrival in the place where they live, marital status of their parents, the sequence in order of birth in the family and so on. General data is intended for general subjects and structuring of respondents and acquisition of the visions of where they come from, whether they are attending school, whether they live in the family or extended family, etc.

Table. no. 1. - General information on the respondents age

Cities:	Up to 14. y. o.	From 14-16	From 16-18	From 18-21	TOTAL
Podgorica	4	12	4	0	20
Niksic	2	11	4	3	20
Berane	3	8	4	0	15
Bar or Ulcinj	3	10	2	0	15
Other :	0	4	1	0	5
Total	12	50	12	3	75

Table no. 2. - Data on school attendance

Cities:	Regularly	Parttime students	Not attending	TOTAL
Podgorica	10	8	2	20
Niksic	11	6	3	20
Berane	8	2	5	15
Bar or Ulcinj	9	3	3	15
Other :	4	0	1	5
Total	42	19	14	75

Table no. 3. - Family status data

Cities:	With parents	With one of the parents	With tutor	TOTAL
Podgorica	15	5	0	20
Niksic	13	5	0	20
Berane	10	6	1	15
Bar or Ulcinj	11	3	1	15
Other :	4	1	0	5
Total	53	20	2	75

Table no. 4. - Data on residence, arrival from urban or rural region

Cities:	Living here since birth	Arrived from the village	Arrived from the city	Changing places of residence	TOTAL
Podgorica	18	1	1	0	20
Niksic	12	4	3	1	20
Berane	6	0	4	5	15
Bar or Ulcinj	5	5	1	4	15
Other :	4	0	0	1	5
Total	45	10	9	11	75

Table no. 5. - Data on marital status of parents or tutors

Cities:	Family union	Cohabitation	Live divorced	One of the parents died	Other	TOTAL
Podgorica	15	2	2	1	0	20
Niksic	14	4	2	0	0	20
Berane	7	4	1	3	0	15
Bar or Ulcinj	8	4	0	3	0	15
Other :	4	1	0	0	0	5
Total	48	15	5	7	0	75

Table no. 6. - Financial status of the families according to respondents

Cities:	Good	Very good	Bad	Very bad	Medium	Total
Podgorica	11	7	2	0	0	20
Niksic	4	5	3	4	4	20
Berane	5	3	2	1	4	15
Bar or Ulcinj	7	3	2	1	2	15
Other :	3	1	1	0	0	5
Total	30	19	10	6	10	75

Results of the research of socio-demographic characteristics of respondents

Previous researches have shown that the sociological risk factors, are important additional factors of the origination and development of behaviors that result in leading female juveniles in conflict with the law.

The study included 75 respondents. All the patients were from 13 to 18 years old, except three respondents who were over 18 years old but, were taken as the research sample because they are at the Center for Social Work in Niksic registered as children in conflict with the law, because of frequent running away from home. However, they were only a few months older, the oldest respondent was 18 years and 4 months old.

The sample, however, given the scope of research can be tentatively called control sample of female juvenile's socially acceptable behavior.

Basic research instrument - the questionnaire, which is designed exclusively for the purposes of this scientific symposium, provided three phases of issues.

In the first phase of the research questionnaire, some questions are designed that contained offered answers of general type that the respondents could choose.

The second phase of questions contained in Annex 1 of this questionnaire is intended to verify the family circumstances in terms of acceptance-rejection by their parents, without any special dubious issues, as well as the presence of a disease, alcoholism and substance abuse in the family. The third and the most important phase of questions for respondents consists of 10 specific outstanding issues of particular importance for this paper. At this stage you get the answer to the hypothesis based assumptions of risk factors, which are the focus of research.

Unlike some other studies of female juvenile delinquency, it is shown that the majority of patients, for which there are data on the financial condition of the family, come from families with good financial condition.

The largest number of underage girls and that is 66% of respondents, is in the age of 14 to 16, which can be considered very useful for research. Also, 16% of respondents are in the age up to 14 years old, and 16% of women are aged from 16 to 18, 2% of the respondents are in the age of 18 to 21. This inequality in the study sample, in our case, may be justified to some extent with the poor interest of other age groups for this kind of research.

A very interesting finding is that 70% of respondents are living in a family community with parents, while 26% of respondents are living with one parent,

and 4% of respondents with the tutor. This relationship can be considered more than realistic for the research of this type. Of the total research sample, 20% of respondents are living in the extended family community, 0.09% of the respondents to the survey stated that one of their parents died, and 0.06% that their parents are divorced.

All the respondents belong to the category of students, which can be explained by the fact that this age, coincides with the period of schooling. In total, 56% of respondents is in the regular educational system, while 25% of them are part-time students, and 19% of patients do not attend school. As a prominent practice in part of the research of Gipsy and Egyptian population of female juveniles, which is, as stated previously included in the scope of research, it is noticed a that 14% of the respondents who are not attending school, which is what fundamentally changes the equivalent of research and represents 5% of the respondents of other research categories that are not attending school.

Financial status of families, under the subjective opinion of respondents is basically good, which confirms some previous researches, that basically didn't always have only female juveniles. Thus, 40% of those respondents said that the status and financial situation of their family is good, 25% said that their families have very good financial situation, 13% of the respondent's families have middle and poor family status, and 9% confirmed about very poor financial status of the family. The largest number of children in conflict with the law are firstborn. According to research of Vujovic T. (2009) in Montenegro, 44, 34% of respondents, regardless of gender structure of the firstborn children. Number of respondents in this study is also in favor of firstborn female juveniles and they make 30% of the total number, 29% are the second-born and 21% third-born child and so on.

Results of the research of delinquent female juveniles conduct

Empirical researches (Singer, Jasovic, Miksaj-Todorovic, Vujovic T., Konstantinovic-Vilic, Djurdjic, Miladinovic) have shown that female delinquency in size is much smaller than the male delinquency, some of these authors believe that the delinquency is solely a male deviation. Explanation for the relatively lower participation of female juveniles in conflict with the law should be sought in their different socio-cultural treatment, and certain differences of bio-psychological characteristics, weaker physical development and less tendencies for use of psychoactive materies, and drugs.

In some studies with the experimental sample, ie. sample of female juveniles in conflict with the law with socially unacceptable behavior, which have been carried out in Montenegro, it is included much larger number of questions regarding the educational attainment of parents, the perceived behavior of parents, parents occupation and the like, however, given the time necessary for the research, material resources and the actual volume of female juveniles delinquency, this is not the case in this study.

The research results of the control group of female juveniles, are not in principle different from other research results of the same type of papers. In essence, the goal of paper is to clearly show the socio - demographic characteristics of the study, therefore these features are displayed in tables, and though the given extent of these other results of the risk factors must be presented in a condensed version.

Annex 1 of this Questionnaire contains questions relating to family circumstances in terms of acceptance-rejection by parents, physical punishment by parents and the like.

30% of total number of respondents claimed to have some of the following issues (poverty, chronic disease, violence and fighting, etc.) present in the family. Also, 33% of respondents stated that they are physically punished in the family, 3% that is often punished, and 64% that they were never physically punished. Of the total number of female juveniles who were punished in the family, 75% said that they were physically punished the mother, and 15% by the father. The respondents were in 10% of the cases, punished by teachers in school or other family members.

The research has shown, that the greatest attention to the growing adolescent was paid by the mother in 88% of the cases, in 7% of the cases, it was father and in 5% - both parents. Among other offered solutions there were no chosen responses (attention wasn't pay by other family member, someone from the institutions). Also, the research lead to results, that fathers in the family often consumed alcohol - in 21% of cases, mothers in 3% of the cases, brothers in 0.09% cases, while in 75% of cases no one from the family used drugs or alcohol. Underage girls in two cases declared, that there were a family members who used drugs.

In Appendix no. 2 of the research survey there are questions that are in the focus of our research. The results are due to the volume of paper shown in tables.

Table no. 7 - Results of the research of appendix no. 2

Cities:	Running away from home		Using alcohol		Using drugs		Using gambling devices		Is it enabled to gamble in casinos?		Are other juveniles gambling	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Podgorica	1	19	6	14	1	19	9	11	13	7	15	5
Niksic	4	16	8	12	3	17	11	9	11	9	16	4
Berane	5	10	6	9	2	13	9	6	10	5	13	2
Bar or Ulcinj	2	13	7	8	0	15	6	9	5	10	14	1
Other:	1	4	2	3	0	5	1	4	2	3	5	0
Total	13	62	29	46	6	69	36	39	41	34	63	12

Of the total number of respondents (75-13) respondents sometimes arbitrarily left away from home without their parents' knowledge. As the reason why they left home, respondents in 6 cases stated, that they did so persuaded by their friends, 5 respondents because of the fear of punishment for poor grades, 2 respondents because of the juvenile marriage. Also, the study found that of the total number of respondents - 29 used alcohol, four of respondents stated that it happened more than once.

Respondents that stated they used drugs in 6 cases, have said that they used only soft drugs (such as marijuana).

Gambling is a serious social problem, in relation to the investigation of this phenomenon at female juveniles, this occurrence is present in a significant number of female juveniles (sports betting, roulette, casinos...). From the total number of respondents (75), 36 of them have already been gambling, for the

purpose of attaining material gain, while the 41 of the respondents answered, that they were allowed gambling in gambling establishments.

A large number of respondents (63) subjectively stated, that juveniles are gambling in sports bettings without any problem.

Conclusion

The deviant behavior of juveniles, its causes and consequences, are very significant and very complex social problem. Therefore, in its prevention, a coordinated action of all social subjects must be taken. The results of the research showed, that the risk factors for a delinquency of female juveniles are widespread. Delinquency is not and need not be solely a male phenomenon. Social entities that will eventually take preventive measures, must take into account that the social evils, are prerequisite of significant scale of delinquency occurrence. To that extent, especially negative phenomenon is female juveniles delinquency. Many studies have shown, as well as this one, that in the family in our society, important role in raising children has mother, and, as the matter of fact, children included in the research will be mothers in future, which throws the doubt on the matter of future generations reared.

Recidivism is insignificant in cases of female juveniles, in criminally-legal terms. In criminological terms, the recidivism is much more common, when female juveniles are committing criminal offenses, but the procedure against them isn't started and criminal measures aren't imposed.

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FAMILY AS RISK FACTOR OF YOUTH VIOLENCE – PSYCHOLOGICAL APPROACH

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Abstrakt: The spread of youth aggressive and violent behavior, for the last years gains wide proportions.

Youth aggression and violence is a multidetermined phenomenon which appears as a result of interaction of different risk factors. A variety of studies shows that important part of interpersonal violence is interaction between person and his socio-psychological environment. Family is generally recognized to be a primary arena for socialization, where parents are central characters. This article deals with risk factors in family as the important etiological factor.

Family as risk factor of youth violence encompasses following risk factors: family structure, single parent families, teen pregnancy, parental factors, family conflict, the structure of family systems.

It has been given a short theoretical explanation of these problems, which is also added with clinical example of adolescent family with offences, like robbery with a physical altercation.

Family as risk factor of youth violence: psychological approach

Foreword

There is general agreement that behavior, including aggressive and violent behavior, is the result of a complex interplay of individual biological, genetic, and environmental (social and physical) factors, starting during fetal development and continuing throughout life (Bock, Goode, 1996).

Risk factors have been broadly defined as “those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected from the general population, will develop a disorder” (Mrazek and Haggerty, 1994). Risk factor predicts an increased probability of later offending.

Psychologists Coie and colleagues (1993) noted the following regarding risk factors:

- Dysfunction has a complicated relationship with risk factors;
- Rarely is one risk factor associated with a particular disorder;
- The impact of risk factors may vary with the developmental state of the individual;
- Exposure to multiple risk factors has a cumulative effect;

- Many disorders share fundamental risk factors.

Family as risk factor

Youth aggression and violence is a multidetermined phenomenon which appears as a result of interaction of different risk factors: individual, family, school, peer group and factors related to the social environment. A variety of studies shows that important part of interpersonal violence is interaction between person and his socio-psychological environment. Family is generally recognized to be a primary arena for socialization, where parents are central characters. This article deals with risk factors in family as the important etiological factor of youth violence. Families are the strongest socializing forces of life. They teach children to eschew unacceptable behaviour, to delay gratification and to respect the right of others. Conversely, families can teach children aggressive, anti-social, and violent behaviours. Also, children who are rejected by their parents, who grow up in homes with considerable conflicts, or who are inadequately supervised are at the greatest risk of becoming delinquent.

Adolescence is a time of expanding vulnerabilities and opportunities that accompany the widening social and geographical exposure to life beyond the school or family, but it starts with the family.

Family as risk factor of youth violence encompasses following risk factors: family structure, single parent families, teen pregnancy, parental factors, family conflict, the structure of family systems.

Family Structure

Family structure is usually rendered in terms of a broken/intact dichotomy. These categories are so conceptually amorphous that they are only crudely meaningful, masking more variations than they reveal.

West and Farrington (1973) found that boys from homes broken by divorce or desertion were more likely to become delinquent than boys from intact homes, but boys from homes broken by death were not. Homes broken by divorce/separation are more likely to result in delinquency than homes broken by death.

It may not be the family structure itself that increases the risk of aggression and violence, but some other factor that explains why that structure is present. Alternatively, a certain family structure may increase the risk of aggression and violence, but only as an added stressor in a series. It may be the number, rather than the specific nature, of the stressors that is harmful. Although research has found an association between separation or divorce and violence and aggression, there is considerable debate about the meaning of the association. (Farrington, 1999). Longitudinal studies have found that children of divorcing parents demonstrate an increased level of aggression before the divorce took place, (Cherlin & Furstenberg, 1991), and that disruptive parenting practices and antisocial personality of the parent(s) accounted for the apparent effects of divorce and remarriage. (Capaldi, Patterson, 1991). Thus, it is likely that the increased risk of aggression experienced among children of broken homes is related to the family conflict prior to the divorce or separation, rather than to family breakup itself (Rutter, 1998). The results from our recent research indicate that mental health of adolescents

with divorce parents depends on quality of the relations between parents, as well as on family functionality, i.e. family process, not on family structure (Batic, 2010).

When spousal alignment is disrupted by serious conflict, children are deprived of positive adult role models they need as they formulate their own notions about appropriate adult respect, intimacy, and problem resolution. When alignment in parenting is disrupted by spousal turmoil, children are at increased risk of experiencing insecurity in their relationships to angry, distracted parents (Garber, 2004).

Parental conflict and separation do not automatically lead to psychological and emotional damage to children. However, unless parents can maintain a primary, collaborative, and consistent presence in their children's lives during the course and aftermath of conflict and separation (often a formidable task), the potential for damage is clear (Garber, 2004).

Single-Parent Families

Being born into a single-parent family has also been associated with increased risk of aggression and violence. Research that considers the socioeconomic conditions of single-parent households and other risks, including disciplinary styles and problems in supervising and monitoring children, shows that these other factors account for the differential outcomes in these families. Nevertheless, children in single-parent families are more likely to be exposed to other risk factors for aggressive/violent influences, such as frequent changes in the resident father figure (Johnson, 1987), difficulty in securing assistance, and difficulty in providing supervision for their children (Dornbush, 1985).

Teen Pregnancy

Children born to teen mothers are more likely to be aggressive, chronically delinquent, and caught up in a cycle of poverty (Farrington, 1999). A teenager who becomes pregnant is at an increased risk of being poor, receiving welfare, having curtailed her education, and delivering a low-birthweight baby. Separately or together, these correlates of teenage parenthood increase the risk of aggression and violence (Rutter, 1998).

Parental Factors

Parental criminality (violent criminal acts) (Farrington 1989). Three separable dimensions of parent-child relations have been identified as predictors of aggression and violent crime: poor family management practices, poor involvement and interaction of the parent with the child/adolescent, and, poor bonding to the family. Research has consistently shown that parental failure to set clear expectations for children's behavior, poor parental monitoring and supervision of children, and excessively severe and inconsistent parental discipline of children represent a constellation of family management practices that predicts later aggression, violence, and substance abuse (Capaldi, Patterson, 1991). Beyond the strategies parents use to manage their children, the degree to which parents interact with their children and are involved in their lives appears to contribute to

a risk for future violence. According to social control theory, bonding to the family in a prosocial fashion (with prosocial family members) inhibits aggression and violent behavior. There is evidence from studies on teen substance use that parental attitudes predict antisocial behaviors among adolescents (Widom, 1989). Evidence also suggests that residential mobility is a predictor of violent behavior. Frequent moves may be reflective of other family factors such as poverty and family instability or may inhibit the development of children's bonds in school and neighborhood and contribute to the risk of violence independently (Akers, 1998). However, further research is needed to assess the independent contribution of residential mobility to violent behavior.

There is also evidence that disruptions of the parent-child relationship (separation from parents and leaving home at an early age) are predictive of later violent behavior in children and adolescents (Farrington, 1989).

Family conflict

Family factors which may affect the development of juvenile delinquency include intense and relentless family conflict. Such conflict could be characterized by domestic violence, dysfunctional family cohesiveness, child abuse and neglect, parental inability to express appropriate affection toward a child, lack of adequate supervision of a child and rigid and non-democratic child rearing practices.

Research indicates that inside virtually every dangerously violent youth is an untreated traumatized child, a child with experiences of violent victimization, and that there is substantial cross-generational continuity in violence within families (Garbarino, 2002).

The Structure of Family Systems

For several decades, family systems theories have provided unique insight into interpersonal influences on child and adolescent psychological and behavioral problems. Drawing from the tenets of general systems theory in the physical sciences, family systems theories have moved away from the view of a child as the primary source of the problems or as the singular focus of treatment and identified ways that children's struggles rest within the larger environment and within the network or "system" of family relationships (Nichols & Schwartz, 2006). Various clinical applications of family systems theory have been developed that provide specific methodology and terminology for assessing and responding to the complex familial and contextual influences on children's psychological, emotional, and behavioral problems. Tenets from one such application, Structural Family Therapy (SFT), seem to have particular utility as a framework for organizing our understanding of the systemic antecedents of the problem of violence among children.

SFT is one of the theoretical frameworks most commonly used for conceptualizing and addressing family system dynamics (Walsh & McGraw, 2002).

Hierarchy of Power

Power within a family is defined as the level of influence that each family member has on family function and decision-making. Ideally, family power is organized within a generational hierarchy in which parents or other adults with primary responsibility for child rearing (the two groups to be used synonymously hereafter) share the most power in making family decisions and establishing rules for children.

Boundaries

Family boundaries are defined as unspoken rules that determine who participates in the various family functions and how they do so. They regulate the amount of communication among family members and between a family and the outside world, including the school system. Optimal family boundaries are “clear”; that is, they are permeable enough to permit new information to flow among individual entities within the system and between the system and its environment, yet substantial enough to maintain the autonomy of each entity and the system as a whole. When parent-child boundaries are clear, parental influence on children is explicit and ever-present, but not so overbearing that it stifles children’s development of personal competency and self-confidence.

Alignments

Alignments refer to bonds formed between two or more members in a family in order to combine individual power and exert greater collective influence within the family as a whole. They result in the creation of various subgroups or “subsystems” within a family that are often necessary to the achievement of basic family tasks. The parental subsystem has primary responsibility for the tasks of instructing, protecting, and setting behavioral limits for children. Through secure alignment with parents who are present, responsible, and complementary in these tasks, children build positive self-esteem, learn to accept authority and handle power responsibly, and safely develop capacities for independent decision-making and self-direction.

Dysfunctional Family Structure and Child Aggression

From a structural perspective, a dysfunctional family system exists when problems in one or more of the hierarchical, boundary or alignment elements of its structure have impaired its resources for coping with and adapting effectively to contextual stressors (Goldenberg & Goldenberg, 2004).

Dysfunctional Hierarchy

A dysfunctional hierarchy is said to exist when parents fail to exercise their leadership responsibility in a family. The reasons for parents’ failure to assume leadership in a family are numerous; however, substance abuse, mental illness,

youthfulness, marital discord, work-related fatigue, and lack of parenting skills are often part of the source. Regardless of the reason, faulty parental leadership in a family can predispose aggression in children, especially if it includes neglect or abuse or if, through modeling of aggression in the spousal or parental relationship, children come to incorporate aggression into their relationships with others (James, 1995).

Neglect

Children of neglectful parents are denied the structure and/or nurturance that they need in order to feel safe and competent. Without consistent parental direction in their day-to-day tasks, children are likely to experience frequent and repeated failures that will ultimately contribute to a self-image of inadequacy and incompetence. Without appropriate parental modeling, support, and comforting in the face of defeat, they cannot develop the ability to contain their emotions and "self-soothe" in times of emotional stress. Lacking the skills and confidence needed to succeed in their lives as well as the self-control needed to deal with the pain and frustration of repeated failure, children of neglectful parents are understandably at increased risk of excessive (including violent) responses to real and perceived life challenges.

Abuse

Abuse of parental power has been defined as parents' use of punishment as a means to express their own anger and resentment rather than as an instrument for appropriately altering their children's behavior (Patterson, 1982). When parental behavior threatens children's safety and well being, children suffer a confusing collapse of behavioral strategy, in that there are simultaneous impulses to approach parents as a haven of safety and to flee from them as a source of alarm. Unable to control the conditions under which they can safely gain proximity to their primary caregiver, abused children may react in a disorganized, disoriented manner, including attempts to compensate for their loss of control by exerting physical, sometimes violent, control over the immediate environment (McAdams & Foster, 1999).

Negative role modeling

As noted previously, it is through interaction with the parental subsystem that children in a family learn to accept authority and, ultimately, to appropriately manage greater measures of personal responsibility and power. However, through that same interaction they can also learn to abuse power when abuse of power is the preeminent model provided by their primary caregivers. Abusive behavior patterns as well as stereotypical power disparities based on gender and racial prejudice are conveyed from parent to child through the process of social learning. The evidence is clear that witnessing parental discord is associated with aggression in children, especially in boys. Children who witness threats and acts of violence by their parents and between their parents are the most likely to become violent themselves (Erdiller, 2003; James, 1995).

Dysfunctional Boundaries

The functionality of family boundaries is determined by their degrees of permeability and flexibility (i.e., their clarity)—not by their degree of alignment with some preferred or optimal configuration (Nichols & Schwartz, 2006). Provided that their boundaries are clear, families of virtually limitless configurations can achieve a functional balance of autonomy and connection among their individual members and subsystems and with their immediate environment. However, excessively rigid (“disengaged”) or diffuse (“enmeshed”) boundaries within a family or between a family and its environment can be detrimental to effective system function—especially to its support of developing children (Minuchin, 1982).

Disengagement

Families with disengaged boundaries between their members and subsystems are at increased risk of depriving children of the adult involvement they need for healthy psychological and emotional development. In such families, communication of guidance and support from parents to children will be limited, as will be opportunity for mutual exchange of affection. For over 30 years, research has indicated that affectional deprivation plays critical role in the development of aggressive disorders in youth (Bandura & Walters, 1966; Field, 2002). If parents fail to volunteer support and emotional involvement with children, children have no recourse but to force their involvement through disruptive (including violent) behavior that demands immediate and intense parental intervention. Whereas children in families with clear boundaries need to do little to receive parental attention and involvement, those in disengaged families may come to learn that the parental connection afforded them in response to their violent behavior is preferable to no parental connection at all.

Enmeshment

Families with enmeshed boundaries between members and subsystems tend to lack a clear generational hierarchy. As a result, children and adults can easily exchange roles, and parental control often becomes ineffective (Goldenberg & Goldenberg, 2004). Parents with ineffective control are less likely to discipline children’s deviant behavior or to follow through with disciplinary measures when they are taken. The risk of physical violence in a family is increased whenever threats of discipline without corresponding action deflate the value of what James (1995) has referred to as the family’s “disciplinary currency.” When threatened disciplinary action is not carried out, its potency as a deterrent for future misbehavior (i.e., its currency value) is diminished, and the seriousness of misbehavior that goes unpunished is redefined to a higher level. Escalation in the severity of future discipline then becomes necessary to appropriately match increasingly serious behaviors.

Dysfunctional Alignment

Interruptions in the security of spousal, parental, and parent-child alignments in a family are interrelated and detrimental to productive family function and the healthy development of children. Their aggressive behavior is more likely to be intentional, calculated, and self-serving and not necessarily in direct response to an immediate challenge or threat.

Instead of conclusion

When in the family there are several risk factors, there is a larger probability that there will be an aggressive behavior from the miner.

Example

The miner, N.N. at the age of 15, who has been sent to Juvenile detention center by the Center for social work because of robbery with a physical altercation. She is the first born in her family with a younger brother. The reason her parents are divorced is the physical and psychological abuse from her father. After the divorce she was living with her mother brother at her grandmother's place alongside her grandmother. N.N. rarely had contact with her father who was hospitalized in a psychiatric clinic and was imprisoned twice for theft. Family relationships are dysfunctional. There are no clear boundaries between the family members. N.N. takes the part of an adult in regard of making decisions, but not the responsibilities. She begins to manifest rebellion and aggression, and her mother's authority decreases in matter forcing N.N. to live with her father who has returned from prison. The family situation influences N.N. for her own vulnerability, insecurity and powerlessness to compensate with stubbornness and aggression which results in making a felony.

There are plenty of existing risk factors: the divorce, one parent family, her father's crimes and psychological disorder, family violence, which lead to the dysfunctional family.

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DETECTION OF SUBSTANCES IN URINE AND OTHER BODY SAMPLES

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Abstract: Young people are increasingly using synthetic drugs that provide numerous health, family and social consequences. The authors give a classification of synthetic - designer drugs and some information about their production, distribution and effects. Early detection of substances in the body is of huge importance for prevention and treatment. The methods and techniques of determining the presence of substances in urine and other body samples are described (blood, sweat, saliva, hair, nails). Authors provided data concerning the validity of certain tests and the possibility of false positive and negative test results. Authors also presented detection periods for some substances in different body samples.

Key words: synthetic drugs, detection

Introduction

Substance abuse - non-infectious epidemic of the twentieth century, stepped into the twenty-first century. Many drug addicts of the twentieth and twenty-first century are no longer alive, because drugs are becoming more powerful and deadlier. It seems that a new age of drugs started. There are new substances - synthetic drugs that together with the known and deadly substances simply flood the streets and squares, cities and villages. The whole world is organizing against drugs, but the outcome is still uncertain. Researches indicate that people try drugs younger than ever before, and there are even children drug addicts. It is believed that the acquisition of knowledge about substances and their action results is significant factor in preventing substance abuse. ⁽¹⁾

Synthetic drugs

Synthetic or designer drugs are synthetic preparations obtained by modifying known drug molecules. They are produced with the aim to cause similar effects like natural substances. Theoretically, the number of designed drugs is unlimited. They are synthesized by under-educated people, so called kitchen chemists, who work in illegal laboratories ("cook joints") placed in abandoned buildings, garages, flats and underground facilities where the risk of contamination is extremely high. Designer drugs are not manufactured for medical purposes. The effects of these substances are aimed, clearly defined and more potent pharmacodynamic properties than those of the conventional drugs. They are produced in the form of powder, tablet, capsule or solution. They have either a stimulatory or depressant effects, and are consumed orally, sniffed (powder), injected, etc. However, the designer drugs have very dangerous adverse effects, potentially lethal. The most common physical manifestations are drowsiness, tremor, speech disorder, blurred vision, dizziness and permanent damage to the CNS. The most common psychological manifestations are euphoria, confusion, irritability, anxiety, extreme emotional sensitivity, hallucinations, depression, delusional content, the tendency of aggressive attacks. They are sold under very attractive names in order to attract the attention of potential consumers, especially children. By the term "designer drugs" some authors mean a group of illegal drugs that structurally resemble a controlled substance, but which have not been officially declared to be illegal substances. ^(1,2)

Synthetic drugs are classified according to their structure or predominant pharmacological effect. Chemical classification is quite simple, while the pharmacological classification is more complex, primarily because there are many effects of these drugs registered in over a thousand synthetic substances. The following table lists the most common representatives of all categories of synthetic drugs. In parentheses the presumed number of substances from different categories is indicated.

Table 1: Synthetic drugs classification

1. Psychotomimetic phenethylamines (100)
<ul style="list-style-type: none"> - MDMA (synonyms: Ecstasy , Adam, XTC) - derivatives of MDMA: MDEA (synonyme: Eve), MDA (synonymes: Zen, Love drug), MDAOH - substitutes of MDMA: MDBA, MDBB, 4-Ema i sl. - other Psychotomimetic phenethylamines (STP , DOM) etc...
2. Stimulants of CNS (100)
Mephedrone (CA T), ephedrone (Jeff, CA T), N,N- Dimethylamphetamine (Speed), Crystal, etc..
3. Synthetic opioids (500-4000)
<ul style="list-style-type: none"> - meperidine analogues: MPPP , MPTP , PEP AP - phentanyl analogues: 4-piperindol (synthetic heroin, new heroin), propamide (China, White, Mexican brown, China town, Poison, T ango & Cash)
4. LSD and his analogues (10)
morpholine derivative (LSM), ethylprophylamine, etc;
5. Psychotomimetic indol-alkyle-amines (250-300)
N, N-dimethyltryptamine (DMT), 5-methoxy-N, N-dimethyltryptamine (5-MeO-DMT), DPT , DIPT , DA T; psilocin, psilocibin
6. Synthetic Cannabinoids (10)

Δ^3 THC, Δ^9 THC (“superhash”), Δ^8 THC etc..
7. Phencyclidine (PCP) and his analogues (50)
Cyclohexanone derivatives – Ketamine/Ketalar (Green, Purple, K, Special K, Super acid), Phencyclidine (Angel dust, Hog, PCP, Cadillac, Crystal), Rolicyclidine (Angel dust, PHP)
8. GHB – Gama- Hydroxybutyrate (liquid Ecstasy, G), Liquid
9. Methaqualone and his analogues (Sopors, Heroin for Lovers, Lude)
10. Delirants (10) 1-methyl-3-piperidyl benzilate (JB-336), phenyl glycolate (JB-840)

MDMA (ecstasy)

MDMA is a drug that is primarily consumed by teens, especially fans of techno music and rave parties. Commonly found in the form of tablets or capsules at a dose of 50-150 mg, with effects that usually last 4-6 hours. Content pills that are sold in the street are unreliable, because they usually contain other substances such as caffeine, ephedrine, and amphetamine. That is why the testers for MDMA that can check the content of a tablet are produced. MDMA increases dopamine levels, besides that it affects serotonin system by increasing level of serotonin. It is considered that this is the way of obtaining hallucinogenic properties. ⁽³⁾

Effects:

Psychic manifestations are hallucinations, depression, delusions, violent and irrational behavior, anxiety, and paranoia, loss of appetite, depersonalization, and hostility. **Physical manifestations** are talkativeness, increased alertness and energy, nausea, vomiting, blurred vision, tremors, convulsions, involuntary movements. **Signs of overdose** are seizures, agitation, cardiac arrhythmias, heart attack, hyperthermia, dehydration, muscle spasms, increased blood pressure, cerebral edema, death.

Synthetic opiates

Synthetic opiates are very large and important class of substances. About four thousand analogues were synthesized in order to find the perfect potent analgesic that does not create addiction.

Derivatives of meperidine. Meperidine is known under the brand name Demerol. During the 1990s, illegal production and distribution of products has increased significantly. Among the analogs of meperidine, that recently appeared at the illegal market, there are 1-methyl-4-fenfl-4-propionoxypiperidin (MPPP) and 1 - [2 - phenylethyl]-4-acetiloxypiperdin (PEP AP). It is usually supplied by the street name “new heroin”. MPPP (synthetic heroin, new heroin) is a powerful painkiller, which was synthesized in 1947 but never entered into clinical practice. MPPP is popular among drug addicts because in parenteral administration it causes euphoria similar to heroin.

Analogues of fentanyl. In the early eighties the production of piperidine – fentanyl in illegal laboratories began, primarily because of the pharmacological

similarity to heroin and morphine. Out of 1400 potential analogs, the literature describes 220 analogues of fentanyl that have 80 to 1,000 times stronger effect than heroin, or 200 times more potent than morphine.

Effects:

Psychic manifestations are euphoria, disturbance, insensitivity to pain, reduced anxiety, reduced libido. **Physical manifestations are** myosis, nausea, vomiting, respiratory depression, orthostatic hypertension, convulsions, impaired motility of the digestive tract. **Signs of overdose are** respiratory depression, myosis, bradycardia, coma, low blood pressure

Amphetamine

It belongs, as well as cocaine, to a group of psycho-stimulants. It causes psychoactive effects by blocking re-uptake of dopamine and nor-epinephrine, which increases their concentration in CNS. Because of that psycho-stimulation, energizing and improving mood effects are reported.

Effects:

Psychic manifestations are euphoria, talkativeness, restlessness, confusion, aggression, agitation, paranoia. **Physical manifestations are** increased reflexes, increased blood pressure, cardiovascular disorders, intense physical sensations, reduction of appetite, shortness of breath, involuntary movements, insomnia, tremor, sweating, hyper-sexuality. **Signs of overdose are** seizures, agitation, irregular heart rate, arrhythmia at breathing, dilated pupils, dry mouth, stroke, delusions, hallucinations, impotence.

Hallucinogens

Those are the substances that cause disorders of perception - hallucinations, thought disorders and mood. This group includes diethylamid lisergic acid (LSD), another indol-alkyl-amines (psilocybin, dimethyltryptamine - DMT) and fenyl-alkyl-amines (mescaline and dimetoksimetilamfetamin - DOM or STP)

They act as agonists of 5-HT₂ receptors and that is how they increase the level of serotonin in CNS. It is believed that this is the caused hallucinogenic effects of these substances. Psychological effect is developed 2 hours after ingestion, and it lasts from 8 to 14 hours.

Effects:

Psychic manifestations are hallucinations, paranoia, delusions, insomnia, suicidal ideas, sudden mood changes, opposite emotions at the same time, uncontrolled laughter or crying. **Physical manifestations are** fever, tachycardia, high blood pressure, difficulty of speaking, loss of appetite, nausea, sweating, tremors, dry mouth. **Signs of overdose are** depersonalization, delusions, illusions, panic attacks, fear of insanity and death. (3)

Psychomimetic indole-alkyl-amines

Indole derivatives are chemically similar to serotonin (5-HT), so it is assumed that their action is related to the action of the amines serotonin and other transmitters. They produce psychological effects very similar to the effects of LSD, such as derealization, depersonalization, illusions, hallucinations, changes in perception of body scheme, color, sound, space and time. In addition, these drugs can cause the physiological side effects such as increased heart rate, dilated pupils, ataxia, tremor, increased reflexes, nausea, high blood pressure and occasional increase in body temperature. This group includes N, N-dimethyltryptamine (DMT), 5-methoxy-N, N-dimethyltryptamine (5-MeO-DMT), 4-hydroxy-N, N-dimethyltryptamine (psilocin) and O-fosforilpsilocin (psilocybin). Many substances of this group are found naturally in many plants.

Effects:

Psychic manifestations are depersonalization, derealization, illusions, a sense of timelessness, euphoria, irritability. **Physical manifestations are** tachycardia, mydriasis, ataxia, tremor, increased reflexes, nausea, and high blood pressure.

Synthetic cannabinoids

Synthetic cannabinoids include kanabinole, carboxylic acids and their metabolites. They are not interesting for the illegal production because the market is overwhelmed with large quantities of available natural tetrahydrocannabinol (THC). Some of them (Marinol) are available as prescription drugs for the control of nausea after chemotherapy and as a stimulator of appetite in patients suffering from AIDS.

Effects:

Psychic manifestations are increased perception, passivity, impaired memory, mood swings, mild euphoria, uncontrolled laughter, depression, drowsiness. **Physical manifestations are** tachycardia, hypotension, dilatation of blood vessels of the eye, hormone disbalance, low immunity, airway dilatation, increased appetite, muscular weakness, and tremors.

Phencyclidine

Depending on the dose and mode of administration, phencyclidine (PCP) acts as psycho-stimulator, psycho-depressor, hallucinogen or painkiller. It can be consumed orally, intravenously or by smoking. PCP is widely used in the U.S.

Effects:

Psychic manifestations are derealization, disorientation, intoxication, amnesia, illusions and delusions, hostility, violent behavior, a sense that everything can be, neurotic and psychotic decompensation, fear of death. **Physical manifestations are** muscle stiffness, involuntary movements, nystagmus, high blood pressure, general paralysis, cramps, kidney failure, comatose state, respiratory depression.

Deliriants

Deliriants contain active anticholinergic substances that produce a condition resembling delirium in humans, with visual and auditory hallucinations, which are described as very unpleasant. That is why they are often abused. It is known that abusing of benactazine, small tranquilizer, the usual dosage of which is 1x3 mg, but at a dose of 50 mg it may cause delirium syndrome. Substances in this class are not considered synthetic drugs in the strictest sense because there are no data on the incidence of illegal production.

Effects:

Psychic manifestations are delirium, unpleasant visual and auditory hallucinations, agitation, amnesia. **Physical manifestations** are catatonia, tachycardia, dilated pupils.

Ketamine

Ketamine is a dissociative anesthetic, commercially available as a liquid (mixed with vitamin B12, and water and injected), and is easily processed into a powder that can be sniffed. In slang it is also known as the Green, Purple, K, Special K, Special la coke, super acid, super C. The person under the influence of ketamine is commonly said to be "in the K-hole". Ketamine is often consumed in combination with methamphetamine (ecstasy), cocaine, flunitrazepan. Onset of effect depends on the route of administration. It is active when taken orally, but it is much more active if inhaled. That is why smoking of cigarettes made in combination with cannabis, parsley or oregano is the most common form of administration of this substance. Its effects last from one to two hours (so called "short trip").

Detection of substances in urine and other body samples

During the past few years in Serbia, many researches about substance abuse and the level of knowledge were conducted. In 2002, a survey in six districts of Serbia was conducted in the cities Jagodina, Leskovac, Pirot, Šabac, Bajina Bašta. In this study urine testing was done on a sample of 1459 secondary school students. The survey showed that 4.8 percent of students were positive for some of the four tested substances (THC, benzodiazepines, opiates, amphetamines). Of the total number of positive urine tests, 59 percent were positive for amphetamines.⁽⁴⁾ During 2004 and 2005, researches in Belgrade, Petrovac on Mlava, Veliko Gradište, Svilajnac, and Montenegro - Podgorica, Bar, Bijelo Polje were conducted.^(11, 12, 14) Several researches were also conducted by the Ministry of Health during the several past years.⁽¹⁰⁾ In 2010, researches were conducted in Belgrade and Žagubica. In these researches the ESPAD questionnaire (the European School Survey Project on Alcohol and Other Drugs) was used. All researches provided guidelines for preventive activities^(5, 13)

One of the methods for early detection of substances in the body is a test for drugs. The most commonly used is urine test, but samples may be even saliva, secretions from the nose, hair, nails, etc... The first tests to determine the presence of substances in the body appeared more than three decades ago; initially, the

technology was modest and the results unreliable, but they are constantly being improved. First they were used as the exclusive method for testing in the pathology of deaths due to intoxication. Another purpose of the tests is in rehabilitation in order to monitor the success of abstinence in treatment of addicts. Also, urgent toxicological analysis in cases of overdose are necessary when quickly and accurately diagnosing of the types of substances used is required for the purpose of adequate treatment.

Urine tests are applied in the diagnoses, clinical treatment and forensic purposes. In the process of diagnostic, testing it is done to determine substance abuse. Given that addicts generally deny the abuse, it is important to avoid obtaining false negative results. In clinical treatment, there are different requirements for toxicological analysis, such as the rapid determination of substances used in emergency situations of intoxication or overdose, drug rehabilitation and post-mortem analysis of body samples to determine the causes of overdose, etc.... Fast tests results give only answers such as "yes" or "no" to a particular class of substances, but do not determine the amount entered. In rehabilitation process, drug testing is very important. Therapists using the tests get objective information whether the patient is clean or not. Forensics testing includes testing in the workplace, medical (systematic) examination and post mortem fluid analysis. Testing at the workplace is mandatory for government officials in some states, but also for employees in the private sector and other institutions that consider that it is in their interest. Employees are informed about it before coming to work and they are clearly told that substance abuse in the workplace is not tolerated. When the United States began large-scale testing, the best effects were noticed in the military. The first test showed that more than 48% of people used drugs. Three years after the testing was repeated and the results showed significantly reduced rates of substance abuse. Medical (systematic) reviews and post-mortem analysis of body fluids are carried out to identify the cause of death due to the possible presence of drugs in the body or overdose. It is very important to observe strict rules of law that the documentation is complete and that there is a professional opinion for every test result obtained from the drugs.

Performance of detection depends on several factors - the type of sample to be tested, the time elapsed since the last dose taken, type of substance, whether the drug is tested, its metabolite, or both, the main route of excretion. Speed of drug metabolism in the body and its secretion depends on the type of drugs, biological half-time of its dissolution and the length of biotransformation. Intravenous use and smoking provides a very rapid absorption into the bloodstream, and excretion of drugs or metabolites in the urine almost simultaneously. Inhalation or oral intake resulting in slower absorption and excretion in the urine and the substance is usually not immediately detectable. If anyone consumed, for example, cocaine it can be detected by testing urine. Cocaine is rapidly biotransformed, and the detection period in urine is 48-72 hours after the last dose of drug intake. Elimination of cocaine is predominantly controlled by its biotransformation. Heavily low concentration of cocaine can be detected in the first few hours, but its metabolites benzoylecgonine and ecgonine methyl ester (hydrolytic degradation product) persist in the urine in 48 hours detectable concentration. An example is the slow biotransforming drug methaqualone, whose half-life time is 20-60 hours. Therefore it is easily detected in urine after 21 days after you take it at a dose of 300 mg orally, and in the blood 7 days after ingestion.

Table 2: Approximate values for detection periods Sources: Urine drug detection time, www.profos.de Drug test, www.wikipedia.org ⁽⁹⁾

Substance	Street name	Appearance	Way of consuming	Detection period		
				Urine	Hair	Blood / Oral fluid
Alcohol	/	Liquid	Drinking	6-24 hours	to 2 days	12-24 hours
Amphetamines	Speed, Pep pills, Ups, Copilots Hearts	Pills, tablets, capsules	Oral, injection, inhaling	1-5 days	to 90 days	12 hours
Methamphetamine	Crank, Crystal meth, Speed	White powder, tablets, capsules or like substance similar to pieces of paraffin	Oral, injection, inhaling	3-5 days	to 90 days	1-3 days
MDMA (Ecstasy)	Adam, Eve, Zen, Love drug, XTC, MDM, ICE, Euphoria, STP	White powder, capsules, tablets	Oral, injection, inhaling	24 hours	to 90 days	25 hours
Barbiturates				1 day	to 90 days	1-2 days
Phenobarbital				2-3 weeks	to 90 days	4-7 days
Benzodiazepines				Therapeutic use: up to 7 days. Chronic use (over one year): 4-6 weeks	to 90 days	6-48 hours
Cannabis	Grass, Weed, Pot, Dope, Mary Jane, Joint	Like dried parsley with stems and seeds parts	Smoking, chewing	3-7 days, up to >30 days after heavy use	to 90 days	2-3 days in blood, to 2 weeks in blood heavy users. in saliva 2-6 days
Cocaine	Coke, Snow, Flake, White, Big C, Snowbirds	White crystal powder	Snorting, injection	2 to 5 days with exceptions for certain kidney disorders	to 90 days	2-5 days
Codeine				2-3 days	up to 90 d.	2-4 days
Cotinine				2-4 days	to 90 days	1-3 days
Morphine	Pectoral syrup			2-4 days	to 90 days	1-2 days
Heroin	Horse, Mud, Smack, Brown sugar, Junk, Big H	White or brown powder or substance similar to tar	Snorting, injection, smoking	3-4 days	to 90 days	0-3 hours
LSD				24-72 hours	to 3 days	24 hours
Methadone				3 days	to 97 days	1-3 days
PCP	Angel Dust, Hog, Cadillac, Crystal, Love boat	White crystal powder, tablets, capsules, liquid	Oral, injection, smoking	3 to 7 days for single use; to 30 days chronic users	to 90 days	

For routine testing it is usual to test the urine. Urine samples must be properly kept and stored, no more than two days at 2° to 8° C or to freeze at - 20° C. Samples from the refrigerator must be tempered to room temperature prior to testing, the frozen samples thawed and mixed before testing. Almost all substances can be detected using urine samples. The main advantages of saliva testing are that the sample is taken directly and tested immediately, much higher than the presence of drug metabolites, as well as the high concentration of drug in it that can be compared with free drug fractions in blood. One of the limitations of this method is the ability to contaminate the saliva oral drug use or smoking. The concentration of THC in contaminated saliva correlated with the concentration of THC in plasma, and after the last intake it can be determined from 8 to 12 hours. Opiates, cocaine, methamphetamine, ecstasy can be detected in saliva from 2 to 3 days after the last dose entered. With the same precautions, testing saliva is suitable to detect recently taken drug, and it is suitable for example to test drivers after road accidents.

In addition to testing urine and saliva, sweat and hair are frequently tested. Testing the hair is also new. Due to low concentrations of drugs in the hair, the methods used must be very sensitive. That is done with the preliminary radio-immune-test with ultrasensitive antibodies and the results must be confirmed by chromatographic method. The hair cannot register all drugs. It cannot be certainly said that drug reaches the hair because the various drugs are excreted in completely different ways - possibly by diffusion of blood to the hair follicles, sweat glands, which then hydrates the hair follicles and cells, binding to the hair; excretion of fatty decrement in hair follicles and the skin surface, or from the environment. Some studies have proven that hair retains drugs longer, which in addition to applying the test hair for cocaine proved to be true. The literature states that marijuana, hashish, opiates, cocaine, amphetamines, methamphetamine, PCP, ecstasy can be detected in hair up to 90 days after the last dose taken. Henderson et al. concluded that "... currently it is not scientifically proven that hair testing can point to the time of any amount of ingested cocaine." Also, due to environmental pollution various ingredients can be kept in the hair that can contribute to obtaining false positive results. ⁽⁶⁾

In practice, most substances are determined by urine tests. After removing from the original packaging, remove the cap from the test and vertically immerse it in urine for at least 15 second (Figure). Test immersed in urine for up to selected irregular lines. Remove the test and place it on a flat surface, wait for the appearance of lines in color. The results are to be read after 5 minutes.

Negative test result. A colored line in region C and region T. This indicates that the concentration of drug in the urine sample does not exceed the level worked for specific drugs.

Positive test. A colored line in region C, but not in the T region. This indicates that the concentration of drug in the urine sample exceeds a certain level.

Invalid test. Control lines do not appear. Insufficient sample or technically improperly performed tests are generally not valid reasons for the test. In this case, repeat the test on a new test panel.

Drugs are incorporated into nails from the blood stream and remain locked in the nail as it grows. Drugs enter the nail from the base as the keratin is formed and via the nail bed that extends under the full length of nail. The method of screening for drug use in a fingernail test is Enzyme Multiple Immunoassay Test (EMIT). The fingernail is put in a chemical solution to rid the nail of external contaminants and is then liquefied. ⁽⁸⁾

How to pass a urine test?

1. Masking and disabling a urine sample

OTC chemicals are used and they contain nitrates and mask the THC. Some of the products are: Mary Jane Super Clean 13 (liquid soap), THC Free (acid), Klear (nitrite), Terminator Gold, Stealth, Clean-X, Instant Clean... All products can be detected in urine, so that on this basis rigging of results may be suspected.

2. Dilution of the sample

Dilution is adding liquid to reduce the concentration of substances in the urine. In this way, the amount may be reduced to concentrations that test cannot detect. This method also reduces the density and specific gravity of urine, and the level creatinine, so be on the ground that can detect spoofing of results.

3. Internal dilution (flushing)

Many people find that they can fix the result so as to drink plenty of water, which can be very dangerous (poisoning of water). There can be noted that the urine should be colorless and the threshold for detection of substances down. (Standard for the THC 50ng/ml, in this case was reduced to 15ng/ml).

4. Replacement of the sample

The sample can be replaced with urine from another person, or synthetic urine. Synthetic urine is available in two forms, liquid and powder. In the synthetic powder urine you have to add water. Disadvantages of synthetic urine are that there is no smell and no bubbles on the surface. If the sample is taken from another person, then this must be properly stored urine and used within 48 hours. ⁽⁷⁾

Conclusion

Addiction and abuse of substances represents a problem of individuals, families and the society. Besides the known natural substances of abuse nowadays some new, so-called synthetic drugs have emerged in the market. It is believed that there are several thousand of those, and new ones are constantly being developed. In the prevention and treatment process, it is very important to detect the presence of substances in different physical specimens. In this paper we presented a couple of types of synthetic drugs and the possibility of detecting these substances by using laboratory tests and other types of sample tests. Education of young people and their families about individual substances, and ways of their detection, represents a significant step in the prevention of substance abuse.

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EFFICIENCY OF POLYGRAPH TECHNIQUES USING EXPERIMENT IN SERBIA

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The aim of this paper is to examine the validity of polygraph techniques in experimental conditions. The sample of 196 subjects was divided into an experimental and control group. The experimental group was involved in a mock crime situation. The subjects from this group were instructed to commit a simulated theft of money and to conceal the fact in polygraph examination. Global evaluation and judgment of polygrams were made by an experienced polygraphist from the Criminal police. Two standard polygraph techniques were used – *Zone Comparison Test* and *Guilty Knowledge Test*. The percentage of correctly identified truthful and deceptive subjects was 67.9% for the former, and 75.5% for the latter test. The results were satisfying and presented solid empirical evidence for practical value of polygraph examinations that are part of standard investigative work in the Serbian police.

Key words: polygraph, *Zone Comparison Test*, *Guilty Knowledge Test*

Polygraph examinations have been part of everyday work of the criminal police in Serbia for the last four decades. During that time, polygraphy has found its place and earned the trust of detectives working in the field. Investigation lead and support of polygraphists are of great value for the efficient solving of serious crimes of all kinds. Inspectors who are at the same time psychologists have the central role regarding polygraphy in the Serbian police, and they are also responsible for the selection, education and supervision of new polygraphists. They also take part in education of polygraphists in other security services such as army and intelligence.

Serbian polygraphists use two basic polygraph tests in their investigative work: The *Zone Comparison Test* (ZCT) and *Guilty knowledge test* (GKT). ZCT is a variant of a well known *Control Question Test*. It basically consists of relevant questions that relate to a committed crime and control questions that relate to moral aspects of the examinee's past life, for instance whether he has ever done something wrong. It is assumed that truthful examinees will react to this kind of questions, contrary to a guilty subject for whom the reaction to a relevant question is expected (for instance, "Have you robbed the bank yesterday?"). GKT is regarded as a more reliable and efficient test by the vast majority of polygraphists. It consists of important details of crime that are presented to an examinee along with alternative choices. It is expected that a guilty subject will react to details related to the crime and not to false alternatives (for

instance, a victim of the murder wore white shirt, so the question would be: "Did the victim wear a blue, red, white, yellow or black shirt?"). Differences between these two tests are related to important practical implications. In order to apply GKT a suspect must claim that he or she is completely ignorant of every aspect of the crime. Only in such a situation a suspect is considered suitable for that test. If a suspect knows the details of the crime he or she could react because of his/her knowledge that is not the repercussion of the crime itself but the implication of the fact that suspect is informed about crime. In that case, and that is the problem of every polygraphist, (ZCT) should be used as an alternative test. The scientific basis and efficiency of the polygraph still raise many questions. In some countries, like Great Britain for example, the polygraph is not used in police investigations. Moreover, a group of influential scientists from British Psychological Society (Bull et al., 2003) concluded that "research on the polygraph has not progressed over time in the manner of a typical scientific field" and that "error rates in polygraphic deception detection can be high". On the other hand, polygraph examinations in Japan under proper circumstances are accepted as evidence in court (Nakayama, 2002).

There is a large number of field and experimental studies about the efficiency of polygraph examinations. Field studies are very important since those results may have direct implications for further utilization of the method. However, field studies are faced with lack of adequate criteria concerning deception or truthfulness of the subjects. The main reasons for this are the lack of communication between courts and police and a period of time between the investigation and conviction. On the other hand, laboratory studies of deception are very far from real life situations. The worst thing that can happen to an experimental subject caught in a lie is not to accept bonus money if the experiment is paid at all. In other words, experimental subjects will not suffer from any consequences, but a real suspect if caught in a lie can go to prison for a very long time and in some countries he/she may even lose his/her life. A short review of validity of polygraph results was started by Ansley (1990) who analyzed 12 field studies with 2174 polygraph examinations. An average value was 98% of correctly classified subjects. Same authors analyzed 41 experimental studies with 1787 examinations. An average value of correctly classified examinees was 82%.

MacLaren (2001) conducted a meta-analysis of 50 treatment groups drawn from 22 laboratory simulation studies (total N = 1247) in order to provide comprehensive estimation of GKT validity. Total percent of correctly classified subjects from mock crime experiment was 82%.

Since polygraphy has been recognized in the Serbian police so far, there is a need to examine scientifically its efficiency and not to rely solely on growing body of knowledge about it in other countries that use it in the police work. In order to fulfill this task, the cooperation between polygraphists from the Criminal police and the Academy of Criminalistic and Police Studies has been established. The first step in the examination of the efficiency of polygraph methods was the conduction of series of experiments that involved typical "mock crime" situation.

Method

In order to analyze the validity of polygraph examinations, the experiment was conducted at the Academy of Criminalistic and Police Studies. Subjects were divided into experimental and control groups. Experimental subjects were involved in a mock crime situation. Their role was to "steal" money from a bag

from an employee's office. After the polygraph examination, an experienced polygraphist gave his blind assessment of the subject who had stolen the money.

Sample

The sample consisted of 193 (126 males and 67 females) subjects, sophomores from the Academy of Criminalistic and Police Studies in Belgrade. The experimental group consisted of 92 subjects, and the control group consisted of 101 subjects. All the subjects signed a written consent by which they were introduced with the aim of the research.

Instrument:

Lafayette polygraph model LX 3000 was used in the experiment. Polygraph recorded respiration, galvanic skin response (GSR), and cardiovascular activity.

Procedure

The first step was to introduce subjects with the goals of the research. The subjects were individually informed that they were going to participate in a simulated crime situation and that they were going to be questioned by a polygraph examiner. After that they gave their written consents to participate in the experiment. Then they were assigned to either the experimental or control group and given detailed instructions about actions they should perform. The experimental subjects were instructed to go to a certain office in the building and borrow a book from one of the employees (who participated in the research). They were told that the employee would go out of the office for a short time. The experimental subjects were told to "steal" a wallet from the employee's bag during her absence. When the employee came back, the experimental subjects were to take a book and bring it to the instructor along with the "stolen" wallet. Each experimental subject was asked to open the wallet and examine what was in it. They could see that the wallet contained money – 4000 dinars (40 euros) and an aspirin. The experimental subjects were instructed to remember those articles and not to mention them when examined by a polygrapher. In other words, they were instructed to lie in the polygraph situation. They were instructed to tell the truth about going to borrow the book but they were instructed to try to conceal that the wallet was stolen. If they succeeded to "convince" the polygraph examiner in their "innocence", the experimental subjects were promised to get a reward of 10 euros. On the other hand, the control subjects only had to borrow a book. They didn't know that someone else would steal a wallet from the employee's office. They were instructed to tell everything they did in the employee's office, when examined by the polygrapher.

At the end the subjects were scheduled to the polygraph examination that took place a few days after the instruction.

The examinations were conducted by three experienced polygraphers from the Criminal Department of Ministry of Interior of the Republic of Serbia. They had equal number of subjects and conducted the examinations in a uniform way. A complete experimental setting was created to resemble a real polygraph

situation. The polygraph examiners didn't possess any knowledge about whether their subjects were experimental or control subjects. They used standard polygraph tests such as Zone Comparison Test and Guilty Knowledge Test, with two repetitions. The total number of tests was 6 - one ZCT with repetition and two GKTs with repetitions. The details of the simulated theft were the sum of the money and the aspirin. Those details were implemented in tests, together with control and alternative questions. The duration of a single ZCT was 3 minutes and 20 seconds (10 question, 20 seconds per every answer) and the duration of a single Guilty Knowledge Test was 2 minutes and 20 seconds (7 questions, 20 seconds per answer). The total duration of the examination was 35 minutes (in the beginning, an experimental card test that is not part of this work was conducted).

ZCT consisted of the following questions:

- Are you a KPA student?
- Do you intend to lie about any of the following questions?
- Did you make false statements on psychological entry exam?
- Did you take the wallet from the handbag?
- Did you graduate from a highschool?
- Have you ever stolen something from a close person?
- Did you take out the wallet from the office?
- Do you study in Belgade?
- Have you ever wished to steal something valuable?
- Are you involved in the stealing of the wallet?

Relevant questions were 4, 7 and 10. Questions 3, 6 and 9 are control questions. Other questions are considered to be irrelevant.

GKT (amount of money)

Do you know that the wallet contained:

- 500 dinars
- 1500 dinars
- 3000 dinars
- 4000 dinars (relevant)
- 6000 dinars
- 7000 dinars

GKT (object in the wallet)

Do you know that, besides the money, the wallet also contained:

- a gold ring
- a cross
- a key
- an aspirin (relevant)
- a patch
- a flash memory
- a watch

Finally, all polygrams were analyzed by an experienced polygraphist from the Criminal police. A global examination of polygraph charts was used in the

same way as it is conducted in investigative practice. The examiner's task was to determine which subjects had stolen the money (experimental) and which of them were in the control group.

Results

The results from ZCT evaluations are shown in table 1. There were about 15% inconclusive subjects in both tests. More inconclusive subjects were from the experimental group. Both ZCT have shown a higher number of true negatives (45.6% and 46.2%) than true positives (10.9% and 8.7%).

Table 1: Frequencies and percentages (based on the total number of subjects) of blind assessment of both control and experimental groups on the basis of ZCT

Test	Blind assessment	Group	
		Control	Experimental
ZCT	Deceptive	5 2.6%	21 10.9%
	Truthful	88 45.6%	48 24.9%
	Inconclusive	9 4.7%	22 11.4%
ZCT repeated	Deceptive	5 2.6%	17 8.7%
	Truthful	90 46.2%	51 26.2%
	Inconclusive	9 4.6%	23 11.8%

The next step in the analysis was a binary logistic regression where ZCT s were predictive variables and the criterion was a group membership (experimental or control). Chi-square value of model coefficient was 28.353, $df = 4$, $p < 0.001$, so the regression model was statistically significant. In other words, the use of ZCT s provided hit rate indicating who was deceptive and different from the rates expected by chance. However, there was not any b-coefficient that was statistically significant. More important is the classification that is shown in table 2.

Table 2. Classification

Observed	Predicted (Blind assessment)		
	Control	Experimental	Percentage Correct
Control	88	14	86.3
Experimental	48	43	47.3
Overall Percentage			67.9

a. The cut value is 500

Under default cut value of 0.5, an overall percentage of efficient prediction was 67.9. The table also shows weak sensitivity of those tests since there were 47.3 true positives. Contrary to that, the specificity was high – 86.3% of true negatives.

Descriptive statistics of two ZCT tests with their repetitions are shown in the following table. The range of inconclusive subjects is 12 to 14%. It can be seen that those tests were better than previous tests in discovering experimental subjects 20% to 25%).

Table 3 *Frequencies and percentages (based on the total number of subjects) of blind assessment of both control and experimental groups on the basis of GKTs*

Test	Blind assessment	Group	
		Control	Experimental
1. GKT	Deceptive	17	40
		8.7%	20.5%
	Truthful	79	33
		40.5%	16.9%
	Inconclusive	8	18
		4.1%	9.2%
1. GKT repeated	Deceptive	16	49
		8.2%	25.0%
	Truthful	80	23
		40.8%	11.7%
	Inconclusive	8	20
		4.1%	10.2%
2. GKT	Deceptive	17	43
		8.8%	22.2%
	Truthful	78	30
		40.2%	15.5%
	Inconclusive	8	18
		4.1%	9.3%
2. GKT repeated	Deceptive	15	43
		7.7%	22.1%
	Truthful	80	32
		41.0%	16.4%
	Inconclusive	8	17
		4.1%	8.7%

Logistic regression with categories of ZCTs as predictors gave statistically significant model (Chi – square (57.686, df = 8, p<0.001), with no significant b-coefficient. The efficiency of classification is shown in table 4.

Table 4 Classification

Observed	Control	Predicted (Blind assessment)	
		Experimental	Percentage Correct
Control	78	24	76.5
Experimental	23	67	74.4
Overall Percentage			75.5

The cut value is 500

There were 75.5% of correctly classified subjects with equable values of specificity and sensitivity.

Conclusion

The obtained results are in accordance with the earlier findings. An overall efficiency of ZCT with one repetition is 67, 9%. This test has a noticeable specificity which is in accordance with a well known assumption that ZCT is suitable for the detection of innocent subjects. A better detection of truthful subjects with ZCT was also found by Horvath (1977), Podlesny and Truslow (1993) and Honts et al. (1994).

The efficiency of two GKT tests (with repetition) was 75.5%. These tests were better in the detection of deceptive subjects which is also in accordance with theoretical assumptions and experience (for instance, Ben-Shakhar and Elaad, 2002).

The number of inconclusive subjects is also similar with the earlier findings. The experimental detection of deception has its disadvantages. The motivation of subjects to make false statements in artificial conditions is always problematic. In many studies subjects are promised money if they succeed in lying. The question is what sum of money is enough to provide efficient stress situation that would result in noticeable physiological reactions in almost every subject. Moreover, there are inconclusive subjects in a field work. The motivation is just one among many factors that affect human behavior during the examination of deception. Most researches have been directed toward practical aspects of polygraph situations. For instance, the factors of personality, with the exception of psychopathic behaviour haven't been considered in relation to the polygraph. A more complex analysis of form and characteristics of physiological reactions and their relations with personality characteristics are the next step in research efforts of authors of this paper along with thorough field investigations.

This is the first time when the research of validity of polygraph examinations is done and presented in Serbia and the Balkan region. The criminal police departments of these countries have recognized and used the polygraph for several decades. Because of that it is important to evaluate and improve that useful secondary instrument. The adequate evaluation and improvement should bring about more effective field work and education of polygraphists. Future findings should also contribute to the use of polygraph examination of personal screening and security issues.

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LIE AS AN ELEMENT OF DELINQUENCY TACTICS¹

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People use their reason only
to justify its own injustice,
and use words only
as a mask of their thoughts.

Sir Walter Scott

Abstract: During the commission of criminal act, the perpetrators are using certain tactics in their act. In order to avoid criminal responsibility and stay unpunished, they often resort to using lies. Law enforcement authorities have a task to detect a lie ie, to establish the truth which is the goal of any criminalistic process. The road from lies to truth is a challenge for any investigator. In which extent will the criminalist be successful in detecting lies depends on its expertise, the training of police interviewing techniques, personal experience and motivation. The authors of this paper focus on the concept and types of lies, verbal and nonverbal indicators of lies, as well as specific recommendations for better lie detection.

Keywords: lie, truth, delinquency tactics.

Term and types of lies

We live in a world where a lie is a common and almost typical phenomenon. We often do not notice it, because we are not equipped to discover it. Sometimes we lie to ourselves and sometimes to others. But what actually do we want to achieve through lies? Perhaps a better life, social status, friends, material gain, avoiding the criminal responsibility. However, most often a lie conceals desire to achieve certain benefits. Isn't a lie actually one of the defensive mechanisms? It's in a men's nature to protect himself and his family, and he often does so through the spoken lies. Some people² lie more often, others rarely, but really we all do lie. Lie can sometimes be a useful thing, and often very dangerous, leading us

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² The character known for lying was a German Baron Karl Friedrich Jerome Munchausen . He lived during the 18th century, and was considered the biggest liar of the age. The Serbian language has a saying, „lying as Munchausen“ or „lying as baron“. His invented stories about hunting, flying to the moon and his heroism are well known. There is a psychological disorder called Munchausen syndrome in Medicine, which refers to the people who have an incredible urge to exaggerate their real and unreal health problems.

into bias and distorting our sense of reality. We are beginning to believe in a lie because we were fooled, considering it as a true.

Therefore, it is often necessary to question oneself, to observe things from different perspectives. To verify content of the claims that we receive. Sometimes people can see the same event³ in a totally different way.

Despite the existence of countless lies, the police force in its work meets with the lies of suspects⁴, defendants and witnesses. The question arises, whether it is easy to discover a lie? It depends on the situation or the particular case. Professional criminals are surely more adept at it, have a pre-prepared „story“, the version of events which provides them an alibi.

Other persons with less experience are certainly less effective at hiding their lies, so their lies are easier to discover. During the commission of criminal activity, delinquent backgrounds play the great role and have huge importance, so as his need for identification, the role of the profession, and the previous convictions. This implies the presence of certain delinquency tactics and techniques during the commission of criminal acts.

In the professional and scientific literature, delinquency tactics and techniques imply the working methods and means applied by the perpetrators in the preparation, execution (the forms) and concealing the criminal acts (Vodinelić, 1984:4). Changeable nature of criminal groups make difficulties to find delinquents (Radović, 2008:76). Characteristics of crime are essential indicators for planning and organization of police work. Approach to solve every problem, including the problems of crime, requires such choice of tactics that most effectively achieve the goal of crime-treatment (Djurđević, 2007:94).

Since a lie is the method perpetrators using, it is necessary to mention that as such it is expressed most often after the commission of criminal activity, but is also present during the preparation and execution of criminal activities, depending on the particular case. Perpetrator are using lies most often to deny their involvement in criminal activity, so it is equally present in pre-trial and criminal proceedings.

Apart from criminals who often use lies, there are certain occupations in which the lie is an integral part of the job. Among them are lawyers, politicians, diplomats, doctors, journalists, commentators, merchants, actors, vehicle dealers etc. They have become so skilled that they are able to refine their gestures, and we can freely call them the professional liars.

Before presenting the opinion of some authors regarding the concept of lies, we will review the concept of truth as well, cause the truth is the goal to be reached in activity of law enforcement. Establishing the truth, or the full facts of the present, represent the task of each investigator in police practice. The truth is ambiguous term in philosophy, science and everyday life. The usual meaning of truth is compliance with fact or reality (Merriam Websters Dictionary, 2005)

The principle of healthy skepticism in criminal law is related to Decartes's critical approach to the truth. He said: „The first rule of thought is that nothing ever accept as true, until I clearly know it is so. That means I'm most carefully

³ A concept called *rashomniada*“, by the title of the movie *Rashomon*“, directed by Akira Kurosawa, in which several different individuals present a different description of the events they witnessed is known in theory. The term is often used to emphasize the influence of subjective factors on the experience, and description of events witnessed by many persons. Very significant factor in personality evaluation, particularly in those who are in conflict with the law (Vidanović: 2006).

⁴ More about suspect see: Žarković, M. (2009:130-139).

avoiding all jumps in conclusion and unconfirmed decisions, and in my decisions I only include those things that are clear and distinct in my mind, that I have no reason to doubt it." (Bosnjak, 1985:69).

We see numerous terms and types of lies in criminal theory and practice. Aleksić, Škulić and Žarković (2004:168) state that a lie is every statement deliberately presented as false.

Simonović (2004:192) believes that a lie is deliberate and intentional presentation of false testimony by the defendant, in order to mislead the police officer related to certain facts or the complete event.

Rosso (1996:1) defines a lie as „false claim as contrary to the truth, given with the intent to mislead another person.„ This is a deliberate forgery of objective facts and its own thoughts. But, lie is not the same thing as objectively inaccurate statement (false), because the *differentia specifica* is deliberately leading the other person into error.

Specifically, the testimony of a person can also be subjectively true and objectively false, for various reasons. This problem is studied in the psychology of testimony.

Gordon and Fleisher (2002:12), defined a lie as the intentional false statement given to another person, either orally, in writing (e.g. invalid check) or through gesture (e.g. false smile) about something the person making the statement knows or suspects that is not true. A lying person presents or omits information with deliberate intention to deceive or mislead the other person seeking the truth.

How common is a lie? Research conducted by DePaulo and colleagues, reveals that people lie twice a day on average, or in the one fourth of the interaction with others (Vrij, 2000). During the whole week, people have lied in 34% of interactions with others. They lie less to emotionally closer persons.

Considering the types of lies, some authors divide lies in different ways, and use different names for each group or type of lies. For example, Vrij categorised lies as: the lies for myself, the lies for others and the social lies.

The first category consists of lies which are intended to display the liar in a better light, to protect them from embarrassment and disapproval, to increase their power and eliminate penalties and consequences. DePaulo (according to Vrij, 2000) reveals this group of lies includes half of the lies that are told, while approximately 25% of all lies belongs to the group of lies for the others. The third category of lies, the social lies, consists of those told with the purpose of maintaining the social status.

Also, DePaulo (according to Vrij, 2000) divide lies as: complete lies, the exaggeration, and the fine (cunning) lies. Complete lies are those where the presented information is completely different and contrary to the truth. He states that 65% of all lies falls into this category. Exaggeration are those lies where the facts are exaggerated, or the presented information exceeds the truth. Fine (cunning) lies are ones where people speak the truth which literally intend to drive someone in fallacy. This type of lies includes the secrecy of information by avoiding the answers to certain questions, or omitting important details.

In the psychology of behavior we distinguish between three kinds of lies, as follows:
1. White lies that still exist when a person is lying out of ignorance or out of personal error, without intention and hidden motives, meaning there is no bad

motive, and intent to do something "bad" or ugly.

2. Gray lies, exist always when a person is lying in a „good faith“ or belief that in such a way „helps“ to conceal a „bad“ severe, devastating and disastrous facts.

3. Dark lies exist when a person is lying with a purpose and in his own personal advantage, where the needs and motives can be very different, such as: material interests, achieving a certain goal, the satisfaction of subjective interest or due to a bad character or personality.

Psychophysiological basis of the statements

After the execution of criminal acts, the person is in a special mental and physical condition, which is a consequence of his criminal activities. At this point the perpetrator may go through certain emotional conditions that are actually the result of mental effect of criminal activity, influencing the offender. Such a state is usually accompanied with three elements: the awareness of crime act, remorse and fear of punishment, ie. criminal penalties.

If all three elements exist, a liar will be in a strong affective state of anxiety and fear. All of it causes a strong psychomotor agitation, which is observed in gestures, mimic, speaking, and the side effects which purpose is to stop the inner turmoil, and without being aware those forced acts are giving him away (indications of selfbetrayal). The liar is building countless defensive ideas, because the lie entirely preoccupies his mind, so the new ideas are constantly relating with the sense of guilt (Krstić, 2007:171).

Seen from the psychological aspect, giving false testimony is a very complicated and complex activity. Liar must simultaneously perform several operations. He activates the true thoughts and tries to hide it from the interrogator within himself. He then needs to form the fictive (imagine) picture in his mind (imagination) and evaluate whether it is credible

These operations are difficult to fit into each other, and hold the liar in the continuous state of anxiety. Physiologists found that the image of the actual course of events is much more firmly anchored in the mind than the lie. Liar has to keep the false or distorted truth in memory via persistent actualization. During this process, the fainter false image is interfered by the stronger competing truth. At the same time, a struggle between the intention to lie and natural tendency for the truth comes into play (telling the truth is easier than telling a lie). In a free reconstruction of fictive sequence of events, the respondent could find himself in a situation that his lie is not credible enough. This increases the doubt in a offender's mind that he could deceive the interrogator. The difficult position of a liar is even more deepened if he recognise the contradictions in his own testimony, and their incompatibility with other facts (according Simonović: Ratinov, 1967:208).

During the lying, different psychological processes are taking its course in the person's mind. First of all, we mean the emotional and cognitive processes, and attempt to control behavior in order to achieve the certain objective. In attempt to lie, person triggers different emotional processes, i.e different emotional conditions that he could feel, such as guilt, fear or excitement. Which emotions will be present during the lying depends on the person, the type of lie, and overall situation (Vrij, Easton, 2002). It should be noted that all liars, especially in everyday life, won't feel guilt or excitement because most of these lies are actually

the lies of low risk and intensity. By contrast, emotions which are triggered during the presentation of a high risk lie can greatly affect the behavior of person, without being aware of it (Gozna, Vrij, Bull, 2000).

Lying is cognitively more demanding than telling the truth and as such results in particular cognitive load on a lying person. Lier must come up with acceptable answers, must not present contradictory facts; a lie must be in accordance with all the interrogator knows or might know (Vrij, 2004). Person who lies must remember what was said so he could later repeat his story. Granhag and Stromwall assume the lying person to make more mistakes in the speech, with pronounce hesitation and with slower pace, because of the strong focus on the content of its testimony. The cause the retardiness in answering questions is that one must invent a lie before it is spoken, unless the lie is pre-planned (Gozna, Vrij, Bull, 2000).

During the attempt to control self behaviour, the offender will try to calm his gestures and speech, in a imitation of normality.

It is a known fact that a lie produces more lies, because the liar has to coordinate responses to the following questions with a lie that was included in response to former question. Lier must form logical structure based on his false testimony (Simonovic, 2004:197)

Judicial psychologists point out that the intent to hide information has a strong motivational effect. The hidden information is not liquidated information yet. In attempt to suppress some information in his mind, the offender triggers the formation of anxiety core in his psyche. The release of the anxiety is possible by telling the hidden fact. If not possible, one tries to replace the fact which is real and exist in his mind, with others that were invented (by Simonovic, Kosticki: 2000).

At the hearing of the offender, or during the interview with the suspect, operative officers often use the method of verbal and nonverbal behavior observation, in order to discover a lie. How precisely one can estimate or detect a lie depends on several factors.

However, some studies suggest that the human ability to recognize the lies is limited and ranges between 45% and 60% (Vrij, 2000). In practice, it is noted that there are certain groups of professionals who are more successful in detecting the lies of „ordinary“ people, first of all the members of the secret services, clinical and forensic psychologist with experience in interviewing suspects.

The question is how people are not able to evaluate whether another person is telling a lie, or not. One of the reasons cited in the literature for such a failure of people to detect lies is the fact that people are generally false beliefs about how liars behave (Vrij, 2000). The term for the beliefs of lie indicators in the expert literature is subjective lie indicators. However, subjective indicators of a lie are actually stereotypes. Research on subjective beliefs related to lying indicate that people believe liars: will have a highertone of voice, will be more more hesitant in speech, will often make mistakes in speech, waiting longer before answers to the question, frequently using a speech pause, avoid the eye contact, laugh more often, use more illustrations, increase arm and finger movements, ,frequently changing the body positions etc. (Damjanovic, 2006).

Therefore, increasing the number movement according to many surveys is one of the characteristics that people associate with lying the most, when actually, lying more often produces the opposite reactions. The reason is the assumption

that people who lie are nervous so they try to detect the signs of anxiety, ie increase in movements. Police officers share this belief either, and tend to associate lying with anxiety (Vrij, 2000).

Regarding the subjective verbal indicators of lies, it is assumed that particularly short statements, indirect answers that sound incredible, are causing more doubt on assessing the truthfulness of statements (Vrij, 2000). It is often the case that bare silence is a sign of a secrecy. There are many motives that lead the subjects to silence, and some of them are: avoiding the consequences; gaining advantage; negative solidarity, obligation to a secrecy, and hiding the blame (Krstic, 2007).

One of the reasons why people are generally bad at detecting lies is the fact that during the development people gain the ability to lie to the age of five, which has its own evolutionary and adaptive value, which means that people are biologically trained to lie, but not to reveal a lie.

Most researchers agree in a assumption that nonverbal behavior (motor movements or their composites) provides more elements for the assessment if person is the truth or lying, then the analysis of verbal behavior (Damjanovic, Ljubin Golub, 2009:227). However, in assessing nonverbal behavior care should be taken, because the relatively large number of forms of nonverbal behavior gives a small number of those that are specific to a lie, and not the other emotional states.

Numerous studies have shown that the person which is lying, compared with those who speak the truth: has a higher tone of voice; is more hesitant in speech, often make mistakes in speech, and a waits long before giving the answers to the question, use fewer illustrations; reduce the movements of the hands and fingers and reduce the movements of feet and legs.

When it comes to verbal indicators lies, Vrij (2000) states when people lie they present negative statements (statements which show an aversion to someone or something) give short answers, more indirect answers, and more words referring to themselves (eg I, me, mine, etc.). Often the lying person wants to induce an impression of a sincere person, and wants his statement to sound credible. Also, shouldn't be forgotten that lying often requires more effort than telling the truth. It happens that persons who lie bring up more information than necessary or try to deceive us with irrelevant information.

The suspect, as a rule, tends to shape the verbal statement favourably, the intended meaning of certain parts of verbal expression in particular, so that the verbal statement followed by various symptomatic signs becomes the claim, question, request etc. It is most often achieved with the pauses in speech, raising the voice, emphasising the particular words and effects of similar types (Krstić,2007).

A person who is telling the truth is different from the person who lies by the level of expressed emotional engagement, the way of following the conversation and attitude towards the relevant issues, reaction to the facts that point to their guilt and accuracy, the level of alibi detail.

Also the degree of psycho-physiological changes in a person who lies depends on: the suspect's perception of examiners' ability to uncover the truth, the success of a suspect in similar situations in the past in which he lied, the degree of guilt or shame the suspect is feeling related to his act, the degree of guilt or shame t the suspect feels about the examiner lying, and reward or punishment for the suspect or if he fails in his attempt to conceal the truth (Ekman:1992, according to

Gordon and Fleisher: 2002).

Instead of conclusion

In criminal practice, there are many methods and means for determining the lies and truths. It primarily means detecting a lie via polygraphs, RM methods (Reality Monitoring), brain imaging, using voice stress analysis, as well via infrared polygraph. Each of these tools enables determining the truth, ie detecting a lie, in a greater or lesser extent. However, we are safe to say that a man, or investigator, represents unavoidable factor, which means the professional development and advancement of police personnel is very important, so they could tell a lie from truth, in an interview with the suspects.

The results of certain investigations in which police officers have participated indicate that their success in discovering lies would be more successful if they request from the lying person to tell reverse chronological order of the event. (Vrij, Mann, Fisher, Leal, Milne, Bull, 2008:253)

As possible directives for catching a liar by the investigator, the scientific literature recommends to (Vrij, 2004):

- adopt a skeptical and not naive attitude full of good faith, and seek evidence for what the person said;
- ask questions about the topic as long as there is a suspicion that the person is lying;
- do not disclose what is known about the topic, in which case the liar can have "easier job" and greater confidence;
- be well informed, in every detail related to the topic, because this will facilitate detecting a lie;
- ask the person to repeat what has already been said, when a possibility arising that a person comes into contradiction with it or decide to provide only scarce information so as not to enter into contradiction, which leads to deficiency of CBCA⁵ criteria;
- reject the belief in stereotypes, such as „liars avoid the eye contact“ or „a lie can be recognized by the red skin of persons face.“ Instead, it is necessary to approach each case individually and carefully observe how people behave and talk. The signs of a lie are often inhibited movement of the hands and feet and poor emotional mimicry, so it's easier to detect a lie if an examiner is focused to whether the person is thinking too hard. We should always remember that the same behavior can be due to various reasons (for example, person may be nervous because they lie; because it is the usual way of communication, or due to the fact that the person is in the police station for the first time) and therefore, there is a need to analyze each case separately;
- compare this behavior with comparative pattern of behavior in a similar situation: perceiving nonverbal signs of lying is easier if you know the usual behavior of people in similar circumstances (eg, compare the behavior of the person who committed a criminal act with the behavior of a person whom we know is not a perpetrator);
- increase the weight of the interview with the suspect, by presenting him the evidence in the very last phase of interview. This way the suspect will get into a situation to explain what was said earlier, which could be in contradiction with

⁵ CBCA is an empirical test based on a content analysis criteria, by which the likelihood estimate of a written statement is done, and used as evidence in criminal proceedings in a some countries. CBCA test results helps more in determining whether a person is telling the truth but whether a person is lying.

evidence. He must coordinate these two things so they could appear logical, and he must do it in a credible fashion. This kind of situation is very cognitively demanding for the suspect, and therefore facilitate the lie detection, by police officer.

Truth should be sought in a comparative analysis of compliance / contradiction of things said and things manifested. Success actually depends on criminalist performing the testing, ie from his expertise, ability to control his own behavior, ability to register and compares the said (logic and content) and the manifested, and the proper interpretation of the manifested. To achieve this, it is necessary to continually work on educating the criminalist.

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LAW ENFORCEMENT AND NEW TECHNOLOGY

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Abstract: Advances in technology have provided assistance to society in numerous ways. The same is true in the field of law enforcement. Modern-day technology has a significant impact on various aspects of law enforcement organization and work, from police vehicles and dispatch, uniformed officers, detectives and modern-day squads (special forces), through communication, crime analysis, case management, prosecution support, fingerprinting, DNA testing, all of them including the wide-scale use of computers. We can even say that wait-and-respond method of policing is becoming obsolete as modern-day methods have changed to an intelligence-led policy embracing “smart” technology that seeks to predict and prevent crime before it takes place. In this paper we tried to give the insight in the constant advances in technology used in law enforcement, and how it affects the organization of police work. We gave an overview of the technology currently used in law enforcement agencies and used it to gain a greater understanding of how to employ the technology, integrate it into field tactics and investigations, and look at possible weaknesses and future applications.

Key words: police work, new technology, crime analysis, ICT, biometrics

Introduction

In the 21st century all of the technical advances that have made our life more pleasurable, easy, exciting and informed, provide a basis by which technology will take us into a period of prosperity that was unpredictable just fifty years ago. These advances have been seen in every facet of our lives, from transportation, agriculture, industry and communications to health care, entertainment, education and public services. The focus of all of these advances is our ability to communicate with one another in more proficient, expeditious, varied and cost efficient manner. We can say that our lives have been changed for the better and the basis for all of this is the computer. The world of the next generations will be greatly improved from the one that now exists.

With all the good things that science and technology have brought to our civilization, comes growing desire of criminals to take the opportunity and engage those in criminal acts. That is the reason why law enforcement agencies must follow the demands of society to modernize themselves, to be able to fight back those modern-day criminals and to protect our civil society from any threat.

Only thirty years ago, the wide use of the computer in law enforcement was in its infant stage. Officers were provided with the basics of crime scene investigation, securing and preservation of evidence and proper analysis of certain items found at crime scenes. With the advances of the computer and the fact that criminals are now more sophisticated, this need for law enforcement to update their tactics to keep up with the criminals is paramount.

In this paper we tried to give the insight in the constant advances in technology used in law enforcement, and how does it affect the organization of police work. In first Section we gave an overview of current technology used in law enforcement agencies and examples of current technology applied in Serbian Police are given in second Section. Some technologies issues and conclusion are stated in third Section. We are hoping that presented material will be useful in gaining a greater understanding of how to employ the technology, integrate it into field tactics and investigations, and look at possible future applications.

History of technology advances in law enforcement

In global we can say that crime fighting is essentially an information processing task. Law enforcement agents must use the information available at the local and aggregate levels to prevent and solve crimes. Thus, one should expect that advances in information processing technology will have an important impact on the organization of police work. A number of technological impacts in the past four decades, made big changes in police especially in: (a) Records management system, (b) Radio communications, (c) Computer aided dispatch and (d) Mobile devices. Illustrative example for Canadian Police taken from [3] is shown in Figure 1. and can as well serve as example for any modern police in world.

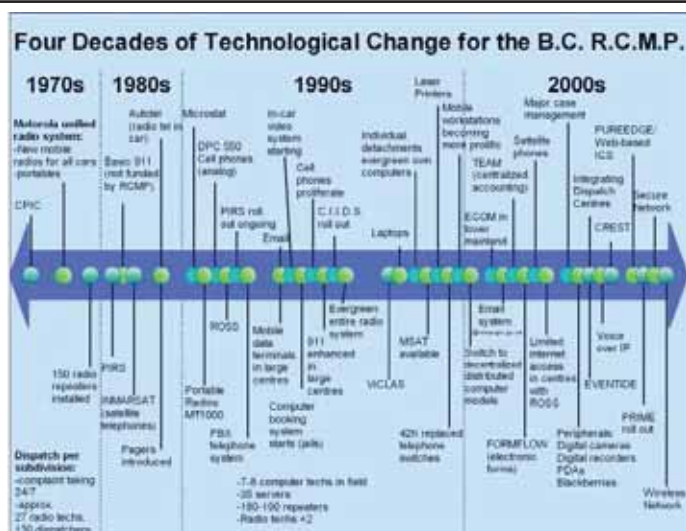


Figure 1. Four decades of Technological change (adapted from [3])

First and we can say the dominant use of computers in law enforcement agencies is for records management system. Possibility of creating large databases from which data can be easily obtained in real time widely opened the door for

computers. Although some argued that it doubled the police work (records were made and kept both in physical form and electronically) soon it was recognized as a very useful tool, and nowadays it is almost unimaginable to picture police work without use of computers and electronic databases.

In the 1970s and 1980s computer applications were limited in number and possibilities and character mode of old DOS (Disc Operating System) ambient where one had to type the command string for a specific operation to be performed was uninviting for most policemen. Not to mention time needed in terms of training and re-training in its use and in terms of connecting with and waiting for technical support when problems develop and glitches occur. In the 1990s we had progress from a DOS like environment to a GUI (Graphical User Interface) environment and that was a major step forward for law enforcement. GUI orientated software enables that operation is performed by simple point and click on appropriate icon on desktop and that greatly improves police work in terms of time reduction for training as well as increased accuracy. With advances in touch screen technology GUI interface is applied in mobile devices which further improve police work¹.

Radio communications and computer aided dispatch are now days a long way from single analog telephone service and radio stations [5]. In most countries today we have one integrated dispatch center taking all emergency calls (number 112) and forwarding to appropriate service (police, fire department, ...). Center can be reached by any communication mean which includes analog and digital systems, public and private network, SMS from mobile phones or over Internet. A new technology VoIP (Voice over IP) and VvoIP (Voice and video over IP) is also employed. Other computer advances include the software which enables remote computer access by using laptops, notebooks or similar mobile device. The aim is for officers to have constant access to the information they need to do their jobs.

That means that mobile devices are no longer considered as gadgets. Nowadays advances in technology have transformed police cruisers into mobile offices where equipment installation is similar to small network in a home or office. Each police agency starts with basic computing requirements and adds peripheral devices, choosing different technology combinations, such as multiple radios, in-car video, laptops, PDAs, iPods etc.

Since the early 1990s, evolving technology has significantly altered the clues criminals leave behind and law enforcement's ability to detect them. Criminals are using not only computers but pagers, cell phones, cordless phones, answering machines, digital cameras and the like to commit criminal acts. Clearly the whole range of electronic communication and information storing, has got to be looked at by law enforcement as a method that can be used by criminals, to exploit as a tool to victimize. Strict procedure² must be followed in order to provide and secure gathered (digital) evidence. The fact that most of electronic devices have the ability to store information, that cell phone signals, debit card and ATM transactions, and ubiquitous surveillance all keep a digital record that parallels a person's location and habits, must be part of the general knowledge in law enforcement forces. Moreover, knowing that you do not have the expertise to access the information is critical.

Acknowledging self limitations obviously is important regard to electronic

¹ For more details see <http://www.police-technology.net/id55.html>

² One example is Electronic Crime Scene Investigation-A Guide for First Responders which step by step explains the basic workings of the computer. It does not try to go into the technical aspects of this medium, but keeps it simple for the layman to understand. More on <http://www.ncjrs.gov/pdffiles1/nij/219941.pdf>.

crime scene investigation, because sometimes a deleted e-mail or Internet bookmark, retrieved by experts from the hard drive is the key to getting a conviction. That leads to a growing demand for officers skilled in computer forensics, the discipline of collecting electronic evidence. The qualifications required for entry level are degrees in computer science and/or information security³. Currently the most widely used forensic software for digital forensic is EnCase⁴, a proprietary Windows program that has been described as "the most court-validated software on earth" [7].

In order to ensure the community is kept safe, police modernization includes new crime-mapping software, reaching out to the community through social media and setting up sophisticated equipment that can save hours off dated methods of investigating crime.

For instance decades ago, a police officer could pull over someone who also happened to be a wanted murderer and not recognized it until is too late. **AFIS** (Automated Fingerprint Identification System) and **FIIS** (Face Image Identification System) changed that. Now portable fingerprint readers as the latest mobile device allow identification in real time (in terms of seconds). Another development is creating of a database of latent⁵ fingerprints which can be later run through AFIS [6].

CODIS (**CO**mbined **DNA** Index System), an electronic database of DNA profiles that can identify suspects, is similar to the AFIS database [11]. Just as fingerprints found at a crime scene can be run through AFIS in search of a suspect or link to another crime scene, DNA profiles from a crime scene can be entered into CODIS⁶. Therefore, law enforcement officers have the ability to identify possible suspects when no prior suspect existed.

Another technology advance applied in police work is video surveillance and **ALPR** (Automatic License Plate Recognition) software. It uses cameras to capture digital images of license plates, then a computer to convert plate image into alphanumeric characters, information that can then be stored in a database and compared to other databases. Appropriate actions can be taken from tracking down the suspect to prosecution charges for traffic violation.

Today many police departments are setting up an e-mail tip line and launching of a Facebook page [1], a social networking medium used by millions worldwide, in which members of the public can connect and share information with police.

One area where science involvement is greater is crime analysis. Larger police agencies now have crime analysis capabilities that include not only simple tabular statistical description but also more sophisticated algorithms for identifying concentrations and patterns of crime, often relying on geographic information systems and spatial statistics. So called "analytics" programs includes maps, charts and timelines. Analytical capabilities are particularly helpful from an investigation point of view especially in determining an MO and the patterns of crimes. A new software program called "**I2**" can automatically input data compiled by detectives, such as cell phone and computer records, and generate connections with victims, suspects, crime scenes and evidence⁷.

³ In America, the FBI manages and funds a growing number of computer forensic labs and is also looking to recruit more personnel. More on http://www.fbi.gov/news/stories/2009/august/rcfls_081809

⁴ For more details see www.guidancesoftware.com

⁵ Marks left on crime scenes by friction ridges on the finger that may not be visible to the eye

⁶ More on <http://www.dna.gov/solving-crimes/cold-cases/howdatabasesaid/codis/>

⁷ More on <http://www.i2group.com/us>

Geographic Information System (GIS technology) is a system of integrated computer-based tools for end-to-end processing (capture, storage, retrieval, analysis, modification, display) of data using location on the earth's surface. Besides locating things, GIS can also describe things because GIS is a map with an associated database. A department can link records and data, dispatch data, and other information using GIS integration. GIS technology can be helpful in matter of surveillance, risk analysis, prediction with numerical models and simulations, strategic planning and decision making [4].

Latest advances include virtual representation of crime scene⁸. Till recently investigators relied on photographic evidence and two-dimensional (2D) drawings as a means to re-evaluate crime scenes. The problem is that it can be difficult to visualize the positional relationships of evidence from a three-dimensional (3D) world with 2D tools. Solution was found in laser scanning useful both for a crime committed indoors and particularly outdoors. A scanner can remotely emits millions of eye-safe bursts of laser light over a 360 degree field of view, measuring millions of points, creating a point cloud. The laser light is reflected off objects in the crime scene and back to a digital sensor and then 3D spatial coordinates of the objects are calculated, stored and used to create a virtual image of any location. An average desktop personal computer can take the data file and project the location onto screen. Not only does it speed up the mapping of very large crime scenes, it also enables the investigators to glean far more detail and perspective change. Another advantage of laser scanning is that it minimizes the possibility of crime scene contamination.

Method called HDS (high definition surveying) is used with great results in Scotland Yard where role of HDS is emphasized that it produces evidence and do not interpretation them [12]. Method can be used days and weeks after the investigations are concluded at the actual crime scene, when photographic documentation is used to reengineer the scene. There are other possibilities for employing this technology such as training applications. Using HDS, police officers could be taken into a virtual world to practice their skills (driving, pursuit, use-of-force simulators and tactics in hostage situations). With embracing these new technique, one has to understand that the digital world is an easy one to manipulate and every action has to be taken in order to ensure that there is no intentional or even unintentional falsification of digital data. In case of laser scanning when data is captured it is date stamped and strict protocols are put in place to ensure integrity and continuity of evidence⁹.

We can see from what is mentioned above that law enforcement is open for implementation of new technologies in their field of work and that in return it improves their organization and surely will result in greater efficiency.

Implementation of new technologies in serbian police

We can say that police, who were once considered conservative and resistant to change, have become a model for criminal justice systems experimentation and innovation. We all are aware that efficient implementation of new technologies greatly depends on finance issue. Nevertheless we can say that Serbian police has recognized potentials of modern technologies and have found the way to implement them as much as possible [9]. Some of them will be briefly described.

⁸ See more at <http://www.police-technology.net/id49.html>

⁹ More at http://www.leica-geosystems.us/en/HDS-Laser-Scanners-SW_5570.htm

In order to improve communications within police forces **TETRA** (**TE**rrestrial (**TR**ans **E**uropean) **TR**unking **R**adio) System is implemented. This system enables infrastructure that will be used by multiple users, each of them working in private virtual network, and when needed, dispatcher can connect them for joint work. Digital system provides better signal quality and efficient encryption. Standardized solutions make it possible to acquire equipment from different providers ensuring better price and quality. TETRA is secure network where we have authentication of terminal equipment, encryption with static and dynamic keys, end to end encryption and remote disable of stolen or lost terminals. Terminal programming is centralized removing possibility of cloning. This system enables secure data transfer for various applications as shown in Figure 2.

Through **GSM** (Global System for Mobile Communications) and **TETRA** system WAP, SMS, WEB, GPS and SDS services are provided:

- **SMS** (Short Messaging Service) **992 searches** – up to 160 characters are sent as database query. Currently is available database for missing vehicles and service is available 24/7

- **SDS** (Short Data Service) service is based on simple database query by using key words. Result is also shown in SDS format. Currently available searches are based on: given JMBG number and given vehicle license plate number.

- **WAP** service – One device is used for voice and data transmission (there is no need for extern devices). Approach is simple with user-friendly application interface. Authentication is based on username and password and is meant for operative work. Everyone who has permission for WEB operative search can also use WAP service from official mobile telephone.

Since 2009 a new technology VoIP (Voice over IP) and VvoIP (Voice and video over IP) is enabled on MUP Intranet network with intention of having one multimedia network called NGN (Next Generation Network) in the future. Advantages of this architecture are numerous: it is scalable system which can easily be upgraded, we have high security protection level (encryption link), administration is centralized and easy and maintenance cost is low (free calls in MUP Intranet network).



Figure 2. TETRA system and applications

In order to ensure secure Internet services protected encrypted **e-mail** system based on IBM Lotus Domino platform is implemented. Numerous security functions are included such as: local encryption, digital signatures, SPAM-control and protection. For secure communication among different government agencies and business partners implementation of **Extranet** network segment is proposed. Extranet is protected network based on Internet protocols. It is substitution for public and private networks which enables simple exchange of information for low cost. Through this network segment police will make it possible for everyone, who apply legal and security rules, to use data they need efficiently and in real time. One of the first companies who took the opportunity is PTT Serbia where it is used for accessing the data from register of births, marriages and deaths, but many other subjects like banks, agencies and citizens themselves can find the interest to access information through MUP Extranet segment.

We are among the first countries in Europe who provide biometric passport and ID cards to the citizens. Border control police units are connected to MUP Intranet network and have all the equipment needed for reading and controlling biometric documents. Communication is naturally encrypted. Border control units will be places for implementation of other new technologies. Mobile ePassport and eVisa documents reader will be provided, extranet segment will enable access to Interpol databases and IP video surveillance (IP cameras and sensors) will be implemented along with system for License Plate Recognition (LPR/ANPR).

Video surveillance will also be implemented on hot spots at cities and highways. In Belgrade we have command center where a video beam of 8 segments is placed with possibility of simultaneously monitoring up to 20 cameras. GIS software is also implemented [10]. Combination of video surveillance and mobile devices in cars is used for detecting traffic violations, license plate recognition and automatic processing. System in use, VASCAR 5000SB, is intended for determine and recording traffic violations both stationary and in move. As shown in Figure 3(a) it can be used as prove in court providing all information needed for prosecution.

LPR or the **ANPR** (Automatic Number Plate Recognition) system enables automatic evidence of vehicles that passes by control point. Immediate spot of stolen vehicles is possible as well as monitoring of suspicious ones as shown in Figure 3(b). In future in case of traffic violation an automatic prosecution procedure will be possible. Mobile video surveillance is also implemented in Special Forces vehicles in order to monitor their position and record their activity if any as shown in Figure 3(c). By doing so, control and analyze of intervention procedure is improved. Recordings prevent frivolous law suits, corroborate and add credibility to officer's testimony, and can exonerate an officer accused of using excessive force or other misconduct.

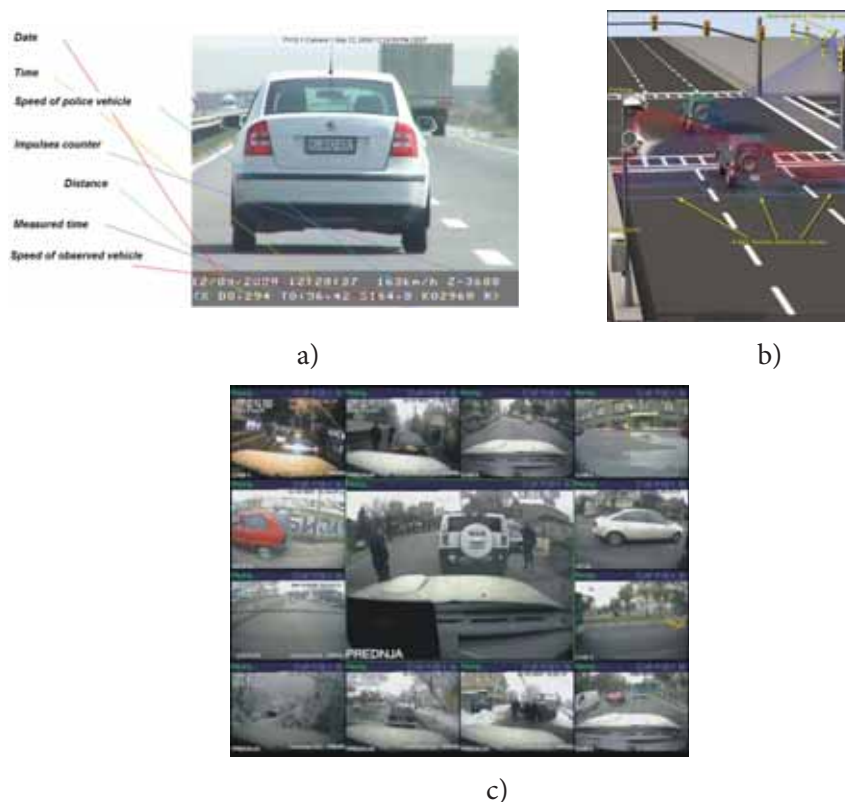


Figure 3. (a) Image from VASCAR system, (b) sensors for video surveillance and LPR, (c) images from video cameras situated in police vehicle

EGovernment¹⁰ is designed for providing access to information and public services not only by classical communication ways, but electronically through Internet. In order to do so previously electronic signature, digital certificates and PKI infrastructure were implemented. Project, when finished, will provide multiple services.

Technological issue

New technology provides new and better systems for communication, dispatch, crime analysis, case management and force administration and management. But there are some issues to consider. New technology makes demands on members' time in terms of training and re-training in its use. The increased technology provides the potential improving the availability of information, but for most has an associated increase in administrative work [3]. Some researchers who were studying the impact of computerization on productivity and organization using a panel of police departments¹¹, argued that IT adoption and skill are complementary: departments that adopt IT increase

¹⁰ More on www.euprava.gov.rs

¹¹ Study covers the time period from 1987-2003 and analyzes the organizational change and information technology adoption over time.

police training and introduce college requirements for new recruits and become more highly skilled but their organization in many ways more complex [2]. They also argued that IT can increase police effectiveness, but that (1) its impact is obscured by large increases in recorded crime, and (2) the increase in effectiveness only takes place when IT is introduced in conjunction with certain organizational practices oriented to take advantage of new data availability. There is another problem as well. New technical tools can be seductive, inviting members to spend more time working with the technology (creating better looking documents for instance) rather than working cases or implementing special projects.

Another problem with technology is the potential for it to become so invasive that it tramples on people's constitutional rights. Referring to GPS-tracking systems, the influx of cameras and even radio-frequency identification chips implanted in new biometric ID documents which have tracking capabilities, the government is infringing on citizens' rights using "the guise of protecting them" [8]. There is also a major downside in the current growth in digital evidence gathering that with the prevalence of spam and pop-ups more people are being falsely charged than before¹².

Another problem is that the adoption of technology by police agencies has been a type of "black box" - police have accepted such technologies but have generally not assessed or evaluated them. They bring in new equipment or new technologies because they work in theory but know little about how to use such technologies so that they work best. The law enforcement have often been reactive to the technologies that are brought to them and have seldom played a role in developing those technologies to enhance the effectiveness and efficiency of policing and that is something that has to be changed.

In conclusion we can say that police have obviously embraced the trend of modernization. The police have crafted new strategies of crime control, introducing problem-oriented policing, hot spots policing, including the introduction of new technologies such as automatic number/license plate reading, automatic fingerprinting systems and DNA testing. The police also have experimented with new management methods in programs, and have integrated the new technologies into crime prevention and control through innovative crime analysis approaches through use of advanced statistical and analytic tools and with new methods of describing data such as computerized crime mapping. In their efforts to innovate and change the police have often enlisted the help of academics and researchers. Cooperation between academics and law enforcement will surely further improve police work and efficiency.

Acknowledgments

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¹² According to statement of computer forensic analyst who has worked closely with the LA computer crimes division of the FBI, a client was charged with possessing child pornography on his computer, but expert was able to determine the images came from spam and pop-ups and not through any intentional effort on the part of the defendant. Not to mention false Nastic case of child abuse.

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SPECIAL CHARACTERISTICS OF FINANCIAL INVESTIGATIONS IN SERBIA¹

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Abstract: The confiscation of criminally acquired assets, as an anti-crime measure has found full recognition in the legislations of most developed European countries in the last decade of the 20th century, as an effective mean for struggle against organized crime. In Serbian praxis this institute is relatively new; it was recently introduced, by the relevant normative-legal framework effective for almost two years now. The mentioned framework set up a special investigating entity, the Financial Investigation Unit (FIU), as the organizational unit of the Ministry of Internal Affairs, which, under the formal command of public prosecutor is taking a wide range of measures and actions aimed at establishing the existence of "criminal assets". Within the powers available to the FIU there are mostly earlier traditional and already known police powers, but somewhat adapted to the specific financial research, designed to gather evidence or taking actions that are of importance only for criminal procedure and evidence. Subject of research here are adapted measures, including primarily criminal checks, comprising of a complex set of actions which are confirming (or denying) the initial findings of the existence of property derived from crime assets. The authors are analyzing the initial sources of knowledge about the criminal origin of property, and then they are trying to point to the specifics of this checks in financial investigations, both in form and content, and in terms of standards that are established in this area, which marked the previous work of this investigation subject (FIU).

Key words: seizure of assets derived from crime (confiscation of criminal profits), Financial Investigation Unit, Financial Investigation Unit, criminal checks.

Introduction

Economic crime as a form of illegal activity presents one of the basic activities of organized crime in Europe, and in terms of realized profits and caused material damage it is considered the most important activity in the field of organized crime². At the same time, the damage that was caused in Serbia due to

¹ This paper is the result of the realisation of the Scientific Research Project entitled „Development of Institutional Capacities, Standards and Procedures for Fighting Organized Crime and Terrorism in Climate of International Integrations“. The Project is financed by the Ministry of Science and Technological Development of the Republic of Serbia (No 179045), and carried out by the Academy of Criminalistic and Police Studies in Belgrade (2011–2014). The leader of the Project is Associate Professor Saša Mijalković, PhD.

² Council of Europe, Organised crime situation report 2005 – Focus on the threat of economic crime, Strasbourg:

this type of crime in the recent year of 2003 was estimated at 300 to 500 million €, with a particular problem – financial crimes, including money laundering and corruption³. On the other hand, a number of firms and within them legally responsible persons were indicted for economic felonies in the period from 2003 to 2007. The number ranged from 2688 to 3579 per year for legal and an average of about 3130 annually for the responsible persons⁴. If we bear in mind that the above mentioned value of damage is largely recast in the pockets of individuals, offenders, and to the detriment of businesses or the community, and the fact that economic crime is only one aspect of crime which, in addition to organized forms of drug trade, "sex industry" and corruption, generate the largest sources of profit⁵, then it is clear that the economic organization or the state budget each year are being deprived of very large amounts of money.

The available data indicate that criminal enterprises in the developed countries achieve even greater profit. According to estimates published in the journal "Economy", criminal organizations in Italy have made in the same 2003, the turnover of 85 billion €, while their assets are estimated at around 100 billion €, which is 7% of Italian gross domestic product. The value of proceeds of crime in the UK in one year is estimated at around 2 billion pounds sterling, with a further £ 3.3 billion of revenue that was sent abroad, of which the British service in 2006/07 regained only 125 million pounds, or slightly more than 5%⁶. The value of transactions related only to drug trafficking in the UK reaches 1% of GDP, or 8.5 billion pounds a year⁷.

As it can be seen the damage caused, or criminal revenues generated are huge, whether it is a developing or highly developed country. However, the damage caused by crime and further proliferation of assets and values on the criminal illegal market does not affect the societies of different states in the same way. Although crime is a significant problem in the wealthier European countries, it is considered that in such societies, it still cannot threaten the stability of economic and social system. The situation is different in economically less developed countries of Central and South Eastern Europe, where especially economic crime leads to a significant reduction in public revenues, undermines development, stability and functioning of market economies and has the negative impact on direct foreign investment⁸. There is no doubt that our country is to be underlined here as young democracy, which undoubtedly belongs to second previously mentioned group, and to prevent the departure of each CSD in criminal profit, or keep it in the legal financial flows, has a great significance. Even more importance could be given to returning illegally acquired profits into the fold of the state, not primarily because of the economic effects (which, incidentally, might not indicate as negligible), but primarily because of construction, and then maintaining a system of social values in which the general public would be sent a clear message about the certainty of realization of the principle of deprivation of enrichment by crime act, which would be implemented through appropriate legal instruments, primarily financial

Council of Europe, 2005, p. 6.

³ Council of Europe, op. cit. pp. 12, 64.

⁴ Republican Statistical Agency, Statistical yearbook of Serbia 2009, p. 439.

⁵ According to the FBI studies cited in Manning, throughout nineties of the last century 95% of all cases in the USA were violent crimes and white collar crimes took only 5%. Nevertheless, economic crime is responsible for 95% inflicted damage (Manning, G. A., Financial Investigation and Forensic Accounting. Boca Raton: CRC Press, Taylor & Francis Group, 2005, p. VII).

⁶ Prichard, S., A suggested methodology for estimating the value of criminal assets available for seizure, Organised crime: revenues, economic and social costs, and criminal assets available for seizure. Home Office Online Report 14/07. London: Home Office, 2007, pp. 54, 73.

⁷ Northern Ireland Assembly, Proceeds of Crime, Northern Ireland Assembly – Research and Library Services, 2001, p. 2. Last time accessed 29.06.2010. at: <http://www.niassembly.gov.uk/10/research/0301.pdf>

⁸ Council of Europe, op. cit. p. 13.

investigation and confiscation of proceeds of crime.

However, as Levi noted, the property acquired by crime acts seldom reaches the courts originally, and it is likely that it will never be revealed through financial intelligence or other authorized entities and that they may never be found, given the difficulties in the reconstruction of criminal profits flow after a long period of time. In cases of absence of financial research it is even less likely that such profits will be identified and confiscated⁹. Therefore, the eminent criminologist emphasizes the importance of having appropriate stages in the process of investigation of criminal profits, which always start with financial investigations conducted by the respective parties at the national or international level.¹⁰ Importance of financial research is undoubtedly enormous, and existence of specialized investigative subjects, is an imperative. Moreover, nowadays one might say that the existence of special investigative entities within the police, or its criminal investigation department, with the appropriate range of powers set out in the direction of identification and seizure of proceeds from crime, is standard in this area. According to sources, FATF, before the decade and a half, approximately half of the members of this organization had a financial investigative unit within the police or other law enforcement agencies with the jurisdiction of researching the financial aspects of criminal acts, including the identification of goods and track their origin in order to seizure¹¹. In our country, an appropriate legal framework created by the Law of the seizure of assets derived from crime¹², which, among others, instituted a separate entity within the Ministry of Internal Affairs, whose primary responsibility is researching the streams of criminal profit - Financial Investigation Unit (FIU). In the following the activities of this subject during the criminal check will be discussed, which are in this paper regarded as an important segment of the process of researching the flow of proceeds of crime.

Initial information about assets - proceeding from crime

In order to initiate the process of financial check or investigation, it is necessary that there is some kind of information about the alleged criminal origin of property. The starting point for launching a financial investigation is represented in pre-trial or trial criminal proceedings by an established fact that a person has committed an offense and gained illegal profits. The certainty of possession of goods – proceeds of crime (acquired by crime) is supported, therefore, with some degree of probability backing up the facts set forth in (pre) criminal proceedings. Domestic regulatory framework for implementation of financial investigation provides financial investigation to be run solely against the owner, when there are reasonable grounds to hold substantial assets resulting from criminal acts (Article 15 paragraph 1. ZOIPKD). Initial information about the owner of the property for which it is suspected that it may have been gained from a crime can be found in wide range of sources. In this regard Bozović differs: a) police sources (e.g., criminal investigation, informants, collaborators, etc.), b) the application of physical and law entity (firm), c) application of the Directorate for Money Laundering Prevention (suspicious transactions on the basis of indicators such as large or is structured amounts and the like), g) application of

⁹ Levi, M., Reversal of the burden of proof in confiscation of the proceeds of crime: a Council of Europe Best Practice Survey. Strasbourg: Council of Europe – European Committee of Crime Problems (CDPC), 2000, p. 6.

¹⁰ Levi, M., op. cit. p. 7.

¹¹ Financial Action Task Force (1997). Evaluation of Laws and Systems in FATF Members dealing with Asset Confiscation and Provisional Measures, 1997, p. 6. 02. July 2010. <http://www.oecd.org/fatf/evaluati.htm>

¹² Law on on confiscation proceeds of crime (ZOIPKD), the Official Gazette of RS, No. 97/08

other state agencies (tax police, customs, foreign exchange inspectorate, etc.), d) information obtained through international cooperation (through Interpol or through bilateral cooperation) or f) information obtained in other ways, such as information obtained through the Internet, newspapers, electronic media, etc.¹³

In addition to the above mentioned, of the interest for the financial investigation may be the data that can be reached by the economic survey of business entities and related individuals, such as: a) the investigation of large criminal networks and corruption, b) reports on the audits of bankers, accountants and other regulatory bodies, and c) the bankruptcy of companies or enterprises that generate information about the illegal participation of an intermediary¹⁴. Information on the criminal origin of money can also come from seemingly trivial information, as evidenced by an example that Bell brings. Specifically, the assets acquired by crime are based mainly on cash, in order to avoid the banking system. If the money is found in their original form, where it is suspected that it was earned by selling drugs, this very fact may be suitable for the evidence. Electron microscopy revealed that banknote fibers are the perfect medium for capturing small crystals of drugs, such as, for example, cocaine. In this way, it evidence can be found that clearly indicates that the money derived from drug trafficking.¹⁵

However, in most cases there is plenty of accurate information on the assets held by the perpetrators of these crimes. It is therefore essential that financial investigators know what and where can be found. In this regard it is important to consider the "business" biographies of persons from the criminal milieu who present themselves as successful business people, and under the legal standards to use all available tactical and technical measures to determine the origin of property, whenever it is suspected that he obtained illegally. The living standard and other events in life of individuals from the criminal milieu and related entities, as well as doubts about the existence of criminal act, present only the initial indications, and persistent hard work by appropriate law enforcement resources in financial investigation are a powerful tool that contributes their reproduction and gaining evidence suitable for use in the process of confiscation of assets derived from crime.

Criminal check in general

The essence of the future of policing in financial investigation, regardless of the quantity and quality of initial information on the person and the potential property suspected to be proceeds from crime, is grounded to different types of criminal checks. This category is defined as an activity that aims at establishing clarified new facts (confirm, modify or refute) the existing knowledge relevant to decision making and action in matters of prevention and combating of crime¹⁶. This is a direct police activity, which, translated into the practical plane, implies that the initial knowledge of the alleged assets acquired by crime, checks to

¹³ Božović, V., *Finansijska istraga*. Material from seminar titled: "Oduzimanje imovine proistekle iz krivičnog dela", held at Subotica 16 & 17 April 2010, organized by the OSCE – Mission to Serbia; the US Department of Justice OPDAT & the US Embassy of Belgrade, 2010, p. 18.

¹⁴ The Council of Europe, *op. cit.* p. 96.

¹⁵ Bell, R.E., *Proving the Criminal Origin of Property in Money-Laundering Prosecutions*, *Journal of Money Laundering Control*, 4(1), 2000, p. 20.

¹⁶ Žarković, M., *Kriminalistička taktika*, Beograd: Kriminalističko-policijska akademija, 2009, str. 101.

confirm it and to support appropriate evidence, or deny or dismiss it as untrue. While performing checking the quality of professional training of financial investigators, their level of general culture and intelligence, the ability to apply logic and the power of creative thinking and action¹⁷ have to become prominent. These are the assumptions necessary for the process of crime-reconstructing as intellectual-intuitive process that develops an investigator in an effort to use their own knowledge, based on all information obtained on the basis of practical experience, insights of all relationships and connections in the cause-and-effect chain of events, for their complete clarification.¹⁸

Initial information is compared to the status that the subject person has in terms of revenue, and if it encounters illogical, criminal checks are started to determine any possible criminal activities of that person, and then a wide range of actions are initiated from the arsenal of measures in financial investigations. Besides persons suspected to have acquired substantial assets by crime, criminal procedure checks must include all of their close relatives, because the person who illegally raise revenue in order to cause at least minimal doubt, wanting to make money or property arising from a criminal works appear as assets belonging to people who are closest to them with no connection to the crime¹⁹. Hence, criminals very often transfer money into accounts belonging to a spouse or persons of trust, or engage in buying real estate on behalf of these entities. Attempts to conceal the money earned by placing financial gain at the bank account of a family member is one of the simplest forms of money laundering, and is revealed worldwide²⁰. It is necessary to pay attention to the lifestyle of an individual which is inadequate to the legal income and to identify indications of possession of goods acquired by crime. This circumstance is important because persons who appear as fictionalized property owners usually have no direct connection points to criminal activity and as such in the regular course of things would never attract the attention of authorities involved in detecting crime, or could not become the subject of interest.

Levi and Osofsky stated that the financial investigators often deal with property over which individuals or defendants who are under investigation have ownership or other right. Study of financial investigations and confiscation of criminal benefits which was carried out in England and Wales by these authors in mid-last decade of the last century shows that this process is mainly composed of collecting data from banks, building societies, cadastre, registries of mortgages and other documents testifying of the real property of the immobile assets, and also the data associated with the acquisition or ownership of vehicles, household items and items such as jewellery and the like²¹. The study conducted for the purposes of this study supports the fact that the essence of financial investigations are generally not changed, and what was said then is still true today. In the following we will give a brief overview of the form and content of criminal checks that are conducted by the FIU.

¹⁷ Aleksić & Škulić explain that those characteristics should be born any law enforcement officer in order to make possible qualitative acting, and among other, they enumerate: good memory and character capabilities are of special significance in some cases (Aleksić, Z., Škulić, M., *Kriminalistika*, Beograd: Pravni fakultet, JP "Službeni glasnik", 2009, str. 43).

¹⁸ Aleksić, Z., Škulić, M., op. cit. str. 43.

¹⁹ Colombo, G. *Monitoring the Assets and Lifestyles of Public Decision-Makers: Can It Be Made To Work?* Paper presented at the 8th International Anti-corruption Conference (Transparency International), 1997, p. 3. http://www1.transparency.org/iacc/8th_iacc/papers/colombo.html, last time accessed 22. 09. 2010.

²⁰ Bell, R.E., op. cit. p. 19.

²¹ Levi, M., Osofsky, L., *Investigating, seizing and confiscating the proceeds of crime*, London: Home Office Police Department, 1995, pp. 32-33.

Inspection of documents and check in of passive entities in financial investigations²² (through official correspondence)

A special form of law enforcement checks conducted during the financial investigation is reviewing of documentation. As one of the most important law enforcement activities, it is mentioned in the Article 225, paragraph 2, of the Criminal Procedure Code (CPC)²³, which lists the measures and actions that the police are obliged to take when there are grounds for suspicion that a crime which is prosecuted *ex officio*, occurred. This action is taken by direct analyzing of the situation in the books, and testing (formal, computational and substantive) of financial records which were used for making business records²⁴. The importance of these actions for the process of financial investigations is undoubted, so whenever it is necessary to check the essential facts in the records of government bodies, and in the cases of need to inspect the documentation enterprises, shops, banking and financial organizations and other legal persons they will be conducted.

In addition to criminal checks, as well as general criminal actions, and inspection of documents, as a special form of criminal checks, it could be sorted out another of their special form, which is distinguished by the indirect method of taking, and consists in correspondence with the appropriate government agency. Unlike the criminal checks and inspection of documents that are carried out directly by police officers, ie. financial investigators, this type of gathering information involves formal addressing written by a state authority, institution or other legal entity that has some kind of information about interesting facts in terms of financial investigations, for their submission and subsequent use in the process of investigation and confiscation of criminal profits. Authorization of the Financial Investigation Unit for the collection of information through access and inspection of documents and other government agencies, organizations and public services, or to obtain the requested information in writing, provided in Art. 19. st. 2. ZOIPKD. According to the explicit legal provisions, the passive subjects of financial investigations are required to provide to the Unit insight and provide data²⁵, documents and other items to prove the facts of property, legitimate income, living expenses, inheritance and compensation by which the property is transferred to a third party. The mentioned legal provision is, in fact, a sort of a set of provisions relating to measure of documentation inspection and measure of securing evidence – seizure of the things. Of interest is the fact that the inspection and submission of required data can not be denied with referencing to the obligations of obeying a business, official, state or military secrets (Article 19, paragraph 3. ZOIPKD).

The issue of written correspondence is closely related to the confidentiality of information²⁶. The initial informations collected by the police officers

²² Levi, M., Osofsky, L., Investigating, seizing and confiscating the proceeds of crime, London: Home Office Police Department, 1995, pp. 32-33.

²³ Criminal Procedure Code (CPC), the Official Gazzete of the Federal Republic of Yugoslavia, No. 70/01 and 68/02 & the Official Gazette of the Republic Serbia, No. 58/04, 85/05, 115/05, 49/07 and 72/09.

²⁴ Banović, B., Obezbeđenje dokaza u kriminalističkoj obradi krivičnih dela privrednog kriminaliteta. Beograd: Viša škola unutrašnjih poslova, 2002, p. 230.

²⁵ It depends on the financial investigator whether it is going to be direct inspection of documents or demand for written report. In most cases it is the latter, mostly for reasons of suitability.

²⁶ Lawmaker did not forget to issue information confidentiality in creating legislative environment for confiscation of proceedings of crime. Art.16, paragraph 2 of ZOIPKD stipulates confidentiality of information connected with financial investigation and proclaims them as official secret. This obligation is stipulated for law enforcement officers, but also for other subjects who access that information during the investigation. Circumventing that information represents criminal act – revealing official secrets, and if the subject of circumventing is a subject who is not an official, then it is about criminal act – procedure confidentiality breach. (Ilić, Majić, Komentar Zakona o oduzimanju imovine proistekle iz krivičnog dela. U: G. P. Ilić, B. Nikolić, M. Majić, Đ. Melilo, Komentar Zakona o oduzimanju imovine proistekle iz krivičnog dela sa pregledom relevantnih međunarodnih dokumenata, uporednopravnih rešenja i prakse ESLJP, 42-171. Beograd: Organizacija za evropsku bezbednost

are usually informal, and their verification requires good cooperation with government bodies and agencies, the financial sector and regulatory bodies who have information about the possession of the property, and any lawful income from financial transactions. However, it is well known that members of organized criminal groups and individuals involved in criminal activities in the sphere of economic and financial management, seek for obtaining positions in those same subjects, in order to be alerted to the fact that drew the attention of law enforcement agencies²⁷. That is why any action in financial investigations, striving to be successful in the initial stages must be accompanied by a dose of confidence and must rely on own sources of information, whether they are from local police officers or positions within the passive subjects of financial investigations that have requested information. Official correspondence in some cases could prove counterproductive, depending on the specific circumstances of each case.

In connection with the relevant passive subjects' correspondence in financial investigations there are two very important issues. The first relates to its duration, or obtaining of the requested information in the desired timeframe. In fact, observance of the process of gathering information in this way, from the perspective of the Deputy Public Prosecutor for Organized Crime, as well as direct users of these data, Jekić-Bradajić indicates that the actions of state and other agencies and organizations, and public services for submissions to FIU are unsatisfactory in terms of length of duration of the check and the time of delivering the answers, which are pointed as inappropriately long.²⁸ This issue is generally defined by Article 16, paragraph 1 of ZOIPKD, which states that it is the duty of all authorities and persons involved in financial investigation to proceed with particular urgency; but, it seems that in practice the treatment is inconsistent with the proclaimed legal standards. Therefore, the afore mentioned author advocates for the binding of these entities by precise time dues that should be the law in order to avoid unnecessary waste of time and contribute to the effectiveness of financial investigation. The second important issue relates to the form and content of information obtained from passive subjects of financial investigations. By analyzing past work in the field of confiscation of assets derived from crime, or in financial investigations, the author recognizes that in many cases the responses submitted by competent authorities and services are unintelligible data, reports using a narrow technical terms, and that it is not uncommon that the data presented in the form of tables are not intelligible to persons who are not specialized in this area. Consequently, as early as the beginning of financial investigations additional expertises²⁹ are required, which do not contribute to the efficiency of this phase of seizure of assets derived from crime.

Problems presented clearly indicate that the practical treatment of financial investigators should be oriented towards a precise definition of requirements to employees of a passive subject of financial investigation to know what to focus on and thus avoid unnecessary loading of response with irrelevant data. On the other hand, it would be useful to prescribe the obligations for passive subjects of financial investigations for delivering precise and clear, analytically processed data. It is likely that the prediction of such obligations under the provisions ZOIPKD can be an excessive burden of regulation standards, but some sort of enacted norms that would regulate these and similar questions certainly would be helpful.

i saradnju, Misija u Srbiji, 2009, 87-88).

²⁷ Banović, B., Lajić, O., Uloga policije u postupku utvrđivanja imovinske koristi stečene izvršenjem krivičnih dela. *Revija za kriminologiju i krivično pravo*, Beograd 46(2), 2008, p.83.

²⁸ Jekić-Bradajić, G., *Primena Zakona o oduzimanju imovine proistekle iz krivičnog dela: pozitivna i negativna iskustva*. Materials from seminar: „Oduzimanje imovine proistekle iz krivičnog dela“, held at Subotica 16. i 17. april 2010. godine, under patronate of the OSCE – Mission to Serbia; the US Department of Justice OPDAT & the US Embassy of Belgrade, 2010, p.7.

²⁹ Jekić-Bradajić, G., *ibidem*

Specificity in the procedure for fiu in criminal check

The financial investigations almost always bear a question how far to go in implementing the steps in order not to unnecessarily squander time and other resources when results can no longer be expected in commensurate effort. In practice, deciding on the issue usually boils down to personal feeling of investigators, with the prior exhaustion of the standard arsenal of tests. This complex includes checking criminal activities in the following subjects: a) electrical company b) of the company for payment of housing and utilities services, c) the Central Securities Depository, d) Administration for the Prevention of Money Laundering, e) local (city or municipal) internal revenue services, f) the Privatization Agency, g) the Agency for Business Registers, h) of the Republic Geodetic Authority, i) public companies for the fixed and mobile telephony, j) Pension and Disability Insurance, k) Tax Administration and l) operating and records of administrative internal affairs under the Ministry of Internal Affairs.

In the praxis of domestic financial investigation units for checking to be carried out by these entities in order to obtain general data on the ownership of immovable and movable property, the rightful income, cost of living, the inheritance and the amount of compensation for which there is transfer of ownership, are the so-called "first round of checks". The very name indicates their great significance, and it is worth noting that their significance stems from the high degree of probability that at least some of the data you want to find in the records of at least one of the previously mentioned subjects. It also can be that the negative facts or lack of certain people in some of the records may represent the information proving the circumstances which are relevant to the goal of financial investigations. Initial sources of knowledge, enriched by results from the so-called "first round" checks represent solid grounds for the public prosecutor to set up action towards confiscation. However, the existing data are usually present supplement for the information that is available in the so-called "second round checking". In this round checks are included which are to be carried out in all other potential sources of information.

These checks should distinguish two kinds of facts, which determine the further processing of financial investigators. When it comes to facts relating to the legitimate income, sources are not numerous. This is a limited circle of relevant official sources from which such information is derived. JFI, that is, collecting available information on the legitimate income, and if it happens that the job is not done well and some of the legitimate sources of income are left out, this does not present a great deal, because the person against whom the process of property seizure thereby is not prevented to present additional information that can be substantiated by relevant documents. In contrast, in the case of checks relating to ownership of property, the situation is diametrically opposite. Persons from the criminal milieu are in no manner limited to the purchase of mobiliaria and real estate for the entire country. Specifically, they can acquire possession of real estate abroad, also if there are bilateral treaties governing this area. In addition, unlike legitimate income, these individuals have no interest for presenting information to the Unit and District Attorney on property they own, since they have become well known that it can be revoked if it is proven that there exists a disproportion with legitimate income. Checks on the territory of the Republic of Serbia, in the absence of a centralized electronic database of land and real property, could last even several months, and then there is a real risk of seizure of thwarting the disposition of the property traced. This fact clearly indicates the existence of the need for integrating

information resources of various state bodies and public services. Exploring this issue in financial investigations in the United Kingdom more than fifteen years ago, Levi and Osofsky stated that if it is necessary to manually perform the checks every time someone becomes a subject of interest for the relevant services, time is lost on something that should be a routine check³⁰. It must be noted regretfully the fact that the level of IT equipment in state bodies and public services that are relevant for the realization of financial investigations in Serbia is low, and in this regard it is significantly behind the developed countries of Western Europe.

In the praxis of the FIU over time, we can find optimal practice which aims at the same time at avoiding excessive length of procedure of investigating the property and fails in noting the absence of finding valuable property in the possession of the owner. The established practice is going in the direction of research and collection of evidence of ownership of real estate in the usual place of movement of the person subject to financial investigation, and at locations that are popular as a tourist destination of regional importance, such as Zlatibor, Kopaonik, and the like. Previously conducted financial investigations have shown that Belgrade and Novi Sad are also popular destinations for the purchase of real estate assets by the means gained through crime. As in the case of buying real estate outside the place of residence or temporary residence, there is a relevant criterion by which it is safe to be able to determine the future direction of search, financial investigators are doing check through the records of PC "Telekom Serbia" and five companies for electricity distribution, which are dealing with the electricity supply in the territory of the Republic of Serbia. Investigators are conducting checking with a very simple principle that is based on the assumption that today no one lives in the facilities which do not have electricity, regardless of whether it is a flat, cottage, office space or building with some other purpose. In cases of establishing the subscription, electric power distribution companies must be presented a proof of ownership of the property, which includes information on the identity of the person who owns the property, as well as detailed information about the property (address, floor, apartment number, etc.), which, consequently, allows for precise identification of the real estate complete status. Also, the ownership change can relatively quickly be updated in the records of these companies, given that the previous owner usually does not want to bear the financial obligations arising from that fact. Similar treatment was validated by the company for providing fixed and mobile telephony. In this way the excessive length of proceedings is avoided, and financial research, at the same time, makes it possible to focus investigative resources on those territories, or those properties with respect to which the research results will justify the invested time and effort.

Conclusion

Initial information about the owner of the property suspected that may be gained from a crime has very wide range of sources. However, in most cases there is not plenty of accurate information about the property owned by people who have committed violent crimes, and the essence of police work that follows the financial investigation consists mainly of various types of criminal checks. As a special form of law enforcement checks, one could be distinguished – correspondence with the competent national authorities, which differs from previous indirect way of undertaking. This type of measure and its finding relevant information includes

³⁰ Levi, M., Osofsky, L., op. cit. 49.

the official remarks in writing state agency, institution or other entity that has some information about interesting facts in terms of financial investigations, for their submission and subsequent use in the process of investigation and confiscation of criminal profits. The issue of written correspondence is closely related to the confidentiality of information.

The analysis of the current work in financial investigations can lead to the conclusion that in many cases to obtain information in the previously described manner provided answers to relevant authorities and agencies which are unclear, and that strictly professional terms are used in the answers, and it is not rare that the information are presented in the form of Excel tables, which are not understandable to persons who do not have specialist expertise. Problems presented clearly indicate that the practical treatment of financial investigators should be oriented towards a precise definition of requirements, to the workers of a passive subject of financial investigation to know what to focus and thus avoid unnecessary loading of response with irrelevant data. It would be useful to prescribe the obligations of passive subjects of financial investigations for delivering precise and clear, analytically processed data.

The financial investigation should distinguish between two kinds of facts that are often the *thema probandi*, determining the further processing financial investigators. When it comes to the facts relating to the legitimate income, it is about limited circle of relevant official sources from which to derive such information. In contrast, in the case of checks relating to ownership of property, it should be noted that persons from the criminal milieu are in no manner limited in the purchase of movable goods and real estate for the entire country or even abroad, if there are bilateral treaties governing the area. Unlike legitimate income, these individuals have no interest in presenting information on property they own to the Unit and the District Attorney. As for the records of ownership of the property for which there are central state registries, the situation is relatively favorable. However, checks on the territory of the Republic of Serbia, in the absence of a centralized electronic database of land and real estate, might take too long.

In the FIU practice over time, we can find best practice which strives at the same time at avoiding excessive length of proceedings research the real property and avoiding failure to note the absence of finding valuable property in the possession of the owner. The established practice of the FIU goes towards research and collection of evidence of ownership of real estate in the usual place of movement of the person subject to financial investigation, and at locations that are popular as a tourist destination of regional significance. These checks start in the records of public companies which provide different types of housing and communal services, primarily for power distribution companies and enterprises of telephone traffic.

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FORENSIC IMPORTANCE OF BIOENGINEERING AND GENETIC IDENTIFICATION

Danijela Ristić¹

Summary: Forensic Bioengineering is a relatively new branch of biology, which performs serological and DNA analysis of individuals, animals or microorganisms. The metabolic activity of microorganisms was used for centuries, but Bioengineering has rapidly evolved in recent years, especially with new methods of DNA analysis and better understanding of our genome. After the Human Genome Project, Genetic Engineering enables us to move genes between species.

DNA is an information molecule carrying instructions in the sequence of building block nucleotides that determine the development and functioning of all living things. DNA analysis is used in forensic science to link suspects to samples of blood, hair, saliva or semen. This analysis may also be used to determine innocence of a previously convicted person, as well as in different situations requiring the identification of human remains, paternity, haplotype matching organ donor and recipient, etc.

Key words: bioengineering, genetic engineering, Southern blotting, DNA sequencing, DNA chips, molecular cloning.

Introduction

Bioengineering is the application of biological activity to obtain and modify useful products and processes. It has been practiced for centuries in beer, wine, chesses and other foods analyses relying on natural mutations and recombination. Unlike the traditional modern bioengineering, it is based on the manipulation of DNA, where certain genes are modified and inserted in various organs.

Isolation and application of DNA technology in molecular cloning

It makes it possible to get multiple copies of the desired gene, as well as larger quantities of its product, based on DNA recombination, which is the essence of genetic engineering

It takes place in four steps:

1. cutting the desired fragment of DNA from the donor DNA with specific enzyme restriction and nuclease
2. connecting of DNA fragments obtained with a small molecule of DNA that

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is capable of replication (cloning vector). Hybrid DNA created by merging with vector DNA fragments, joining fragments of DNA from the vector is done using, the enzyme DNA ligase.

3. insertion of recombinant DNA molecule in a host cell enzymes which provide his replication.

4. identification of host cells containing the tested DNA fragment and its isolation (Campbell, N. 2005)².

The first step in making the isolation of ²recombinant DNA donor can be either nuclear or genomic DNA of eucaryotes is a major genomic DNA of procaryotes. As usual vectors are used plasmids of bacteria that must be purified from bacterial genomic DNA with centrifugation. Bacteriophag can also be used as vectors for loning.

DNA analysis begins with extraction of DNA in a sample of blood, saliva or other suitable body fluids of tissues. Isolation of DNA is a very simple procedure, a complication occurs because of poor quality and small quantities of sample. One of the main problems of sampling is the possibility of contamination. This situation is common in cases of rape or physical conflicts. The application of special procedures and careful analysis of the samples can be separated in more than one person, but the se results are often insufficient for drawing conclusions. That will execute the procedure out identification using DNA analysis if is necessary to identify the reference. DNA mostly for personal items (toothbrushes, razors), the stored samples (blood, semen), blood relatives of the previously identified residues post mortem or directly from. These suspect, from a sample of the oral mucosa. (Gniffiths. A. J. S., et.al. 2000)

Recombinant DNA³ technology would be impossible without the discovery of restriction enzymes. They are products of bacteria and act as defense of bacteria bacteriophages enzymes act like scissors and cut phage DNA and thus inactivated. Restriction enzymes do not intersect at random, but the specific target DNA sequences, which is one of the key features that make it suitable for DNA manipulation. This places the DNA palindromes (sequences of nucleotides) in DNA double – stranded are identical when read in the direction 5' - 3'. Some restriction enzymes cut double stranded DNA so that the ends of the obtained fragments remain flat.

However, most of these enzymes cut the two strands at a distance of two to four nucleotides so that the ends of the obtained fragments remain sticky ends of the standard. Such restriction enzymes are used in genetic engineering because two different fragments of DNA (the donor and vector) can be easily connected with complementary sticky ends. Donor and vector DNA is cut with the same restriction enzyme that produces sticky ends. In order to sticky ends donor DNK mated with sticky ends of vectors DNA, and educate the recombinant DNA molecules must be mistaken in the test tube, then add DNA ligase to create fosfodistarske connection (definitely bind the ends).

1. The next step is providing the recombinant DNA in bacteria that have a mutation,

2. Plasmids used as vectors for cloning are often modified to consist of replication beginning at test one gene that provides resistance in a host cell,

3. Lac Z gen encoding β – galactosidase in lac Z gene and the endonuclease

¹ Rekombinant DNA is a DNA molecule whose parts obtained from various organisms artificially fused

³ Gniffiths A. J.F., Miller J. H., Suyuki D. T., Lewontin R.C., Analysis, 7thed. New York. W.H. Freemanand Company, 2000.

restriction site.

All bacterial cells in which plasmids were found with built – in DNA fragments will be transformed. Recognition and selection of bacteria that are transformed done on the basis of their resistance he carries the gene built in plasmid, one of which has not entered a plasmid will be killed (do not have the gene for resistance) located on the plasmid (Gniffiths, A. J. F. et.al. 2000).⁴

When cutting the donor DNA endonuclease produced thousands of fragments that are built into plasmids, but only a few plasmids carry a fragment of the gene of interest. To identify the colony with the gene as a test using a radioactive single stranded DNA that is complementary to the required gene.

The genetic identification, genetic testing and genetic profile of the technique by which the identification is done between individuals of the same species using only samples the sometime their DNA genetic material.

Application of basic techniques of forensic engineering in the analysis of DNA in the genetic identification

Two people mostly have a large majority of common DNA sequences. Genetic identification of microsatellites is served sequences that are repetitive and have high degree of variation. Two people who are not related with different numbers of microsatellites at a given locus. Using ²PCR to determine the degree of repeat sequences at several loci can be found the same sequence, which in normal circum – stances could never be established by pure chance ⁵(Kiely, T. F.2001).

Forensic DNA analysis can determine who belongs to the trace of biological significance. The method is specific and sensitive, a DNA profile is obtained with small amounts of biological material. Any type of biological material of human origin can serve as DNA analysis. Traces that are usually analyzed are blood stains, saliva, cigarette butts, used as cups, gum, swabs, discarded, condoms, underwear, bedding. Identification is based on a comparison of DNA profiles obtained from biological traces, with the DNA profiles of persons suspected that left the track.

Genetic identification of the begins to DNA completely removed from the cells that can be causes of blood, saliva, semen on any other type of tissue. The most common method is the swab from the throat.

Then RFLP (restriction fragment length polimorphism) analysis, to cut the chain of DNA using restriction enzyme in shot fragments that are easily separated in electrophoresis in the agarose gelatin. DNA is negatively charged and the electrophoresis range from negative to positive anode cathode. Fragments separated on gelatin seen as short horizontal line that is using a technique called. Southen Blott transfer with gelatin to a nylon membrane. This DNA sample is tested with a DNA sample which was marked by the radioactive background material that binds to the predetermined DNA sequence. Superfluous radioactive DNA sample is washed away. X – ray film is placed under the nylon membrane and thus captures the overall pattern is clearly apparent that part of the DNA molecule that has been marked with radioactive DNA molecule. The final product is a film with a clearly visible horizontal line called the DNA profile. Recently new techniques for the genetic identification of AFLP (amplified fragment length polymorphism) have been introduced. These new techniques are similar to RFLP

⁴ Kiely, T.F., Forensic evidence science and the criminal law. RCR Press LLC.2001.

⁵ AFLP/technique tele-DNA sample.

(restriction fragment length polymorphism) analysis, but the news is that there are two additional amplification processes, i.e. magnification of DNA sample.⁶ AFLP analysis is highly mechanical process and provides an easy way to obtain genetic tree with which to carry out a comparison sample of one person to another.

One of the most modern and commonly used methods for obtaining DNA profiles in the judicial process is polynucleotide chain reaction ⁴PCR. Polynucleotide chain reaction is increased pre – specified regions of DNA that is advance of certain DNA sequences that are known to have a high degree of variation between people. This amplification process allows to start the search, with very modest samples and final products that guarantee a connection between the given samples at a rate of one in a billion PCR is the most widely used method for presenting DNA evidence in court expertise (Guun, A.2006).

PCR7 (polymerase chain reaction) is a technique that is used for copying a segment or the entire DNA molecule. PCR is widely used in medical and biological laboratories and for gene sequencing and diagnosis of inherited disorder, detection and diagnosis of infections diseases, the creation of transgenic organisms and creation of a DNA profile.

DNA is heated to a temperature at which there is a helix unraveling after which the cooling of molecules related primers, shorts DNA fragments that are designed to limit part of the molecule that we want to amplify. Tag polymerase enzymes at higher temperatures lead to incorporation of free nucleotides in the complementary chain between the primers, creating a new chain of DNA. After the completed reaction, the cycle is repeated. After 25 – 30 cycles, there is sufficient quantity of DNA for analysis. PCR allows analysis of genetic material from a single cell. DNA cell electrophoresis⁸ is a technique that allows separation of DNA molecules from the mixture based on size. Under the influence of electric field of DNA molecules are less tangle – free and travel on, while the larger fragments move slower. After staining the gel, fragments can be identified. Isolated DNA sample is placed in the PCR machine after reaction amplification, the resulting products are amplified. The main problem of DNA lies in the fact that there are over 99% identical sequences between any two people. In order to overcome this problem we need to look at – so – called analysis, waste does not contain DNA regions that do not encode proteins, which makes up 95% of DNA. Within this DNA there is a large number of sequences of different size, origin, position, etc. Forensic experts from the so – called interest, tandem repetitive sequences, and among them (shot tandem repeats). An example is the sequence where ATTCGATTTCGATTTCG repeated three times. STR between individual differs in the presence or absence of certain STR loci as the number of repetitions within a specified locus. STR is a combination of inherited genetic elements of both parents. Blood relatives have a similar but not the same profile. The only case when the STR DNA profile of two individuals in the case of identical twins. Comparing a certain number of STR loci and counting repetitions within specific sequences can create a unique genetic profile of an individual. DNA fingerprinting technique to distinguish individuals of the same species. Used sequences that are high variable in the number of repetitions in a block.

Blok can be amplification PCR – and compared CoDiS is a database that is based on sequence alignment. The chance that two people have the same arrangement of tissues, i.e. that they match the length of blocks is small.

Presently used forensic STR of the four nucleotides for suitable properties

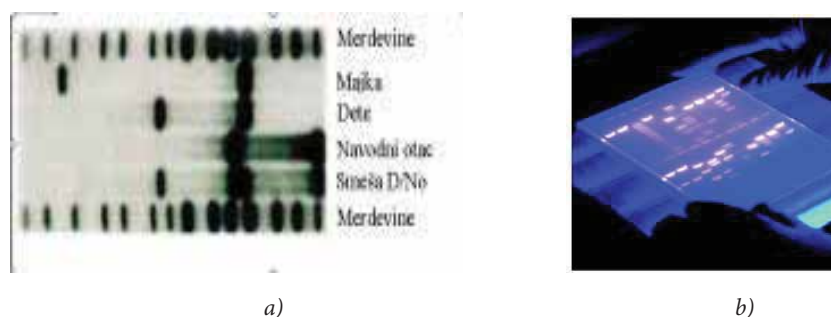
⁶ PCR-polymerase chain reaction DNA.

⁷ Gel electrophoresis-a technique that allows separation of DNA molecules from the mixture based on size.

⁸ STR-tandem repetitive sequences.

in the PCR reaction. The number of alleles presently the population is sufficient to provide a high degree of discrimination between individuals. In analysis of DNA uses a 10 – 15 loci, with the probability that two individuals have the same profile of about one in a billion. Police European countries and the, United States and Interpol have defined loci that are relevant to the analysis and that the standard question for forensic analysis.(Gniffiths. A. J. F. 2000).

Example: DNA fingerprinting is used to determine paternity. The child inherits the combination of 7STR both parents, for the gel electrophoresis is applied to samples of PCR products of mother child and alleged father and the so – called DNA ladder, which serve as an internal standard analysis. After completed electrophoresis, the gel colored fluorescent dye AND viewed under UV light, child and mother have joint tape (STR loci) and if the alleged father does not have a common strip, then that person is not the biological father of the child.



Picture: 1. Samples of the PCR product of parents and children and b) observing the gel under UV light

Ethical questions

In recent years, human rights activists have been protesting against the use of DNA analysis, and against the creation of databases of DNA profiles for solving crimes. The use of the DNA analysis raises a number of ethical problems. The most serious problem is the use of sampling for other purposes. Besides the identification, DNA contains information about possible health problems - physical and mental, that can be misused.

In addition to these problems, there is also the question of error. If the discrimination methods of DNA profiled about one in one billion using the database of a hundred million people this accuracy does not look great, because for that hypothetical database means error of 1% of cases.

Another problem in the application of the database is the partial overlap of DNA profiles of criminals who are serving sentences with new samples from the scene of the crime. In this case, is not the same perpetrator, but statistic very likely that a family member convicts. Ethical problem is that if you commit a crime prisoner waived his right to privacy (in which his DNA sample deposited in the database), whether the state has the right to request DNA samples of members of his immediate or extended family and thus threaten their rights.

Determination and expertise of DNA fingerprints provide fascinating

opportunities for exploring the unknown perpetrators while also arguably the elimination of some suspects as the perpetrators. Besides, the use in criminal proceedings, this method is used in partner disputes paternity, as well as in the identification of missing persons during the trial – medical expertise and also in the field of interest to security services. (Guun, A. 2006)⁹.

Introducing expertise biological traces in our case law opens up new possibility, and affects on reducing the costs of criminal proceedings, which has great importance in solving some crimes.

In order to get usable results after completion of biological expertise is necessary and training of all officials who act in crime science investigation in order to evaluate the importance of the detected biological materials during the investigation and its application for expert evidence.

Conclusion

Technology of genetically identical cells from one cell is unknown, it is clear that the imminent cloning of human beings. Cloning will have a different meaning if the result of genetic engineering interventions in the structure of genes, i.e. recombination structure of genes.

The possibility of forming gene has tremendous depth and breadth of impact on human lives and living matter in general. It is hard to imagine any kind of processes in living matter and that they are not able to affects genetic engineering. The benefits of these interventions are vast cheap manufacturing will be included in pharmacotherapy. Substance (to expensive growth hormones, drugs), and these jobs would be performed in the micro - organisms whose genome would be inserted, or other human genes, genetic mistakes, rectifiers are boom and un boom, there will be an opportunity to offspring is chosen by gender, hair color, eye color, body height and so on.

Genetic engineering carries well but also can bring harm and because advances in molecular genetic in strength can be compared with the knowledge of nuclear energy in atomic physics.

Suppose you have created micro – organisms, that are resistant to all drugs and their resistance to block cellular respiration, destroy the body defenses, causing malignant tumors, and so on. And like a bad dream appeared to be the possibility of cloning human beings of whom would be taking vital organs for transplantation and the old rich, on the creation of living things tremendous strength and a low IQ and who carry out dangerous work.

From the genome of an individual can be read to its special characteristics susceptibility to malignant diseases, schizophrenia, suicide, drug addiction. There will be technical possibilities for the development of each individual gene cards, which will itself circumstances type of employment the amount of health insurance in the near future instead of ID cards, look for genetic cards. The question is how to protect there personalities that is own genome, where and when you make available (Mueller, F. F. et.al.2001).

Absolute protection of the structure of the genome of an individual will be impossible, because already today there are real possibilities a complete analysis of the human genome, on the basis of a cell that contains the nucleus, and we left on

⁹ Guun A. *Essential Forensic Biology*. John Wiley & Sons, Ltd. 2006.

cigarette butts cigarettes, postage stamps, chewing gum and everywhere.

This is not the end of the dilemmas concerning genetic engineering as a product of the human mind, a mind that you will be in such amount and be able to stop the game without limits or he will falter and become a threat to himself.

Experience has shown that mind control is often not there. Remains faith and hope that it will still be mind control that it will go in the direction of protecting the values of civilization and that Timog genes still have ethical, social and legal framework worthy of the most advanced civilizations.

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AGENT PROVOCATEUR – YES OR NO?

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Abstract: Detection and verification of many, especially serious crimes falling within the organized crime requires the use of special investigative techniques, atypical for the regular criminal proceedings. They are characterized by efficiency, but often at the expense of restrictions on fundamental human rights and freedoms. One of the particularly controversial technique is the use of undercover agent, and agent provocateur, in comparatively view. While Anglo-American law recognizes an agent provocateur, who is by law given the power to incite a crime, in German law and numerous Balkan countries institute a undercover agent is expressly prohibited of provoking crimes. The author deals with the definition of undercover agent, and the demarcation of an agent provocateur, the analysis of the legal requirements for the implementation of these measures, the various theoretical viewpoints on the agent provocateur and the case law on incitement to commit criminal acts. In the final part, there is a proposal for revision of positive solutions in terms of introducing an agent provocateur in our law, to their application in the practice of applying these measures and effective use in the fight against organized crime.

Key words: special investigative techniques, undercover agent, agent provocateur

Preface: On 13th June 2010 In Serbian media appeared the news on the arrest of 10 members of two organized crime groups that operated on the territory of Belgrade and Novi Sad in the operation called “Walker” for crimes of abuse of office and money laundering¹. Service arrested for Combating department Organized Crime of the Ministry of Internal Affairs of the Republic of Serbia announced that in order to identify these groups, for the first time measures of execution of simulated legal transactions with the use of the Institute of undercover agent were used by the Criminal Procedure² (hereinafter CCP).

Undercover investigator - a police officer has registered several companies by the order of the investigating judge of the Special Department for Organized Crime of the High Court in Belgrade, on whose bank accounts, by orders of the organizers of the criminal group, the payments were and the was raised from the accounts, with business records of false content.

The Action of prosecution and the police was called “historical” and it reopened the dilemma, which has been previously discussed in legal theory, the question of whether to legalize the possibility that the undercover agents while working on the detection, prevention and detection of crimes incite persons who are suspected of carrying or are preparing to execute them. This crime tactical method is called in theory the provocation to commit a criminal offense.

¹ Text available on the website: <http://www.srbijanet.rs/vesti/hronika/56246-istorijska-akcija-srpske-policije-prvi-put-korisceni-dokazi-prikrivenog-isednika.html>

² “Sl. list SRJ”, nr. 70/2001 i 68/2002 and “Sl. glasnik RS”, nr. 58/2004, 85/2005, 115/2005, 85/2005 - other, 49/2007, 20/2009 – other, and 72/2009.

Legislative framework

Provisions of Chapter XXIX of the CPC as the "Special Provisions on Procedures for the crimes of organized crime, corruption and other very serious crimes," prescribes the use of specific evidence gathering: monitoring and recording of telephone conversations or other communications (Article 504e CPC), providing simulated business services and providing simulated legal affairs (Article 504i CPA), controlled deliveries (Article 504l CPA), an automatic computer search of personal and other data associated with them (Art. 504lj CPC), a cooperative witness (Article 504o CPC) and undercover agent (Art. 504m CPA). They are divided into the measures of infiltration and the observation measures³. Infiltration measures provide simulated business services and they also provide simulated legal transactions and the use of undercover investigators, while the other measures are those of observation. There is the possibility of applying these measures to the crimes of organized crime, corruption and other very serious crimes. The listed group of offenses, among other things include: abuse of office (Article 359 of the Criminal Code⁴), bribery (Article 367 CC), bribery (Article 368 CC), extortion (Article 214, paragraph 3 and 4 CC), money laundering (Article 231 para. 1 to 4 of the Criminal Code), illicit production and trafficking of narcotic drugs (Article 246 para. 1 and 3 CC), criminal acts against constitutional order and security of the Republic of Serbia (Article 305 to 321st CC), illegal manufacture, carrying, possession and trade in weapons and explosives (Article 348, paragraph 3 of the CC) and others.

From the above provisions of the CPC it is indicated that our law recognizes the institute of undercover agent. In theory, it is the most often conceptually defined as a police officer, who was assigned to a changed identity (legend), at a certain period of time, to act secretly in contact with certain criminal circles collect information used for the detection, explanation and prevention of criminal acts, primarily those related to organized crime⁵. However, the above definition is considered imprecise and too narrow. The undercover agent, especially, may be not only a police officer, but also a person employed in other government agencies (intelligence agencies)⁶. Second, his primary role is forgotten, it is to collect physical evidence already made or crimes whose enforcement was prepared. His work is certainly wider than the collection of information. Finally, in criminal proceedings he appears as one of the participants, as a secondary, specific, sui generis criminal procedure subject. Bearing in mind the basic characteristics of the concept of an undercover agent, it could be determined as follows: he is a specially trained, by the decision of the competent state bodies engaged official or other person who is under the changed identity and infiltrates a criminal organization in order to collect evidence of crimes and criminal actions whose execution is being prepared, as well as of the very members of criminal groups, who can be heard in criminal proceedings as a witness.

In addition to other legal provisions relating to the use of undercover agents, which are not relevant to the subject of our work, it is especially important that one according to which in the course of the task entrusted to him he is explicitly forbidden to incite another person to commit a criminal offense (Article 504n.

³ Tatjana Lukić, Undercoocer agent, Glasnik advokatske komore Vojvodine, nr. 10, 2005, str. 505- 522.

⁴ Criminal Code, "Sl. glasnik RS", br. 85/05, 88/05, 107/05, 72/09, hereinafter CC.

⁵ G. Koriath, Verdeckte Ermittler- Ein europaweit taugliches Instrument, Kriminalistik, No. 8-9/96, Heidelberg 1996, str. 535, specified by: Milan Skulić, Undercover agent- legal decisions and some issues, Security, nr. 3, 2005., pp. 373- 397.

⁶ According to Art. 504m. par. 5 of the CPC, "Undercover agent, as a rule, authorized official law enforcement agency, the Security Intelligence Service and Military Security Agency, and if you require special circumstances of the case and another trained person who, under the condition of reciprocity, can be a non- native citizen".

Paragraph 5 of the CPC). This means that the undercover agent in the case of incitement to commit a criminal offense is criminally responsible as executor, when incitement is a separate offense, or as an accomplice, if the offense that was incited was committed, or failed incitement, if incited to commit any offense which carries a sentence of 5 years if a more severe punishment. On the other hand, our law still allows the conclusion of simulated legal transactions and providing simulated legal services (Article 504i. CPC) in whose substance is some form of provocation or incitement to commit a criminal offense. As a difference to the undercover agent, the article of the CPC, which refers to this special investigation technique does not provide for the prohibition of incitement, which means that the legal provisions are in a kind of collision.

As the opposite to the of undercover agent known in continental legal system, and our law, as well in the common law countries - it appears a "secret agent" (undercover agent). The meaning of his existence is the same as in Europe and his work he uses similar methods. The main difference relates to the possibility that in the case of ad hoc engagement of an undercover agent, a person who comes from the criminal milieu, may appear which is expressly excluded when it comes to the undercover agent. He may, under certain conditions be allowed the execution of the crime. In order to capture in flagrante and arrest perpetrators, the undercover agent may also encourage other persons to commit criminal acts, that is why he is frequently called the agent provocateur (*fr. agent provocateur*).

Term and compatibility of agent provocateur

An agent provocateur in theory is an official who incites another person to commit a criminal act or to assists him in carrying out the crime, in order to catch him in the execution- *in flagrante*. The concept of agent provocateurs is deeply connected to the work of the police in fighting crime, but also is associated to the abuse in a police state in which it was used to fight against political enemies.

The dominant characteristic of modern crime is dynamic . The state, through the apparatus of force at its disposal, must be respond adequately to the challenges in the form of organized crime, terrorism, money laundering, corruption, drug offenses. These types of crimes are characterized by secrecy and proactivity. All the preparation work and post commitment acts are performed in greatest conspiracy. The only public thing is committing an offense. On the other hand, they are characterized by initiative, in terms of searching for new victims and beneficiaries. Detection, evidence and suppression of this type of crime is further made more difficult by the fact it is often based on an agreement between the suspect and the victim (consensual crime), and the dark figure of crime offenses for PAs is very high. However these criminal acts are carried out by well organized, compact, hierarchically structured criminal groups. Therefore, traditional methods of investigating these crimes are ineffective. It is necessary to keep pace with criminal practice. Therefore, new investigative techniques are introduced adapted to the phenomenology of modern crime.

An agent provocateur, in legal systems in which it has been accepted, represents a legally allowed form of incitement, which was acquitted. It has been accepted, especially in the U.S., where it is used for detection and investigation of drug crimes, smuggling and the sale and purchase of weapons. This method is especially present in the work of the DEA (Drug Enforcement Administration), the American service, which deals with at fighting the illegal sale of psychoactive

substances. DEA agents are engaged in drug trafficking, buying small quantities, and at the suitable time they arrest offenders and seize larger quantities. People engaged trade are offered a kind of "bait" to prove their criminal activity. Although in general, an agent provocateur does not exist in England, the Act of Terrorism Prevention allows some forms of incitement to combat these serious forms of crime⁷. The laws of Belgium, the Netherlands and Denmark also allow provocation to commit a criminal offense. The unlawfulness of the agent provocateur's work is excluded if he has received the approval of the public prosecutor or the investigating judge⁸. In Germany, the incitement by the undercover agent is allowed, if it gets approval from the Federal Criminal Police Office.

The number of countries where the legal standard explicitly prohibits incitement to commit criminal acts of an official is larger. This was the view of the criminal procedural codes of the former Yugoslavia. Article 504n. Paragraph 5. of the CPC expressly provided: "It is forbidden and punishable for the undercover agent to incite another person to commit a criminal act. ". Croatian⁹, Montenegrin¹⁰ and Bosnian¹¹ lawmakers acted in a similar manner while the Code of Criminal Procedure of Bosnia and Herzegovina, provided that the activities person incited by the undercover agent is released from liability. In some jurisdictions the issue of responsibility of the undercover agent is deal with in the main source of substantive criminal law. The Criminal Code of Greece provides for criminal liability of, "the one who has intentionally incited somebody else to commit a crime with the intent to surprise the performer in the attempt or at the beginning of the crime, in order to arrest him before he completes a crime ..."¹². The punishment for the crime to which the commitment was encited by the undercover agent, is reduced to half. The responsibility of the undercover agent for illegal acts is presented in the Criminal Code of Poland in 1969. year¹³.

Provocation is the guidance, encouragement, incitement of somebody to commit a criminal offense. This action coincides with incitement as a form of complicity in the commitment of the offense. According to the criminal-law theory, incitement is an intentional stirring of another person to commit a criminal offense. It is the action taken in order to create another person strengthen the decision to take action which will cause an unlawful result¹⁴. Incitement can be accomplished by various activities: stirring, asking, deception and maintaining deception, threat, etc.. It is essential that the one inciting must have the intention (awareness of the characteristics of the offense and the desire that his activities cause somebody's decision to carry out some criminal acts, or the awareness of the possibility of a prohibited consequences and his acceptance of it).

Theoretical views

The theory considers if the incitement, understood in the criminal sense, is the same thing as the provocation of the offense by the undercover agent, and

⁷ Sasa Knezevic, , The role of an undercover agent in combatinf of terrorism, u: Terrorism and human freedoms, Tara 2010., p. 286.

⁸ Ibid.

⁹ See: art. 332. par 7. Criminal Procedure Code of Croatia , Narodne Novine nr. 152/08 i 76/09

¹⁰ See: art. 157. par 4. Criminal Procedure Code of Montenegro, Sluzbeni list CG, nr. 57/2010

¹¹ See: art. 116. par. 5. Criminal procedure Code of Bosnia and Herzegovina, Sluzbeni glasnik Bi H, nr. 36/2003.

¹² Ljubisa Jovanovic, The views and opinions about complicity, Coollection of papers of the Faculty of Law in Nis, 1974, p. 86.

¹³ Criminal Code of Poland from 1969, translation of mr Ivica Kramaric, Sisak 1978., specified by: Nedeljko Jovancevic, Agent provocateur, Legal life, nr. 9, 2006, p. 1051- 1063.

¹⁴ Dragan Jovasevic, Criminal Law- the general part, Belgrade 2010, p. 173.

the impact of those actions on the possible responsibility of the agent provocateur. Numerous ideas of theorists could be divided into two groups, on one side are those who believe that in the case of agent provocateurs we can not talk about incitement because they lack the intent to complete the crime, it is a procedure in accordance with official authority, and that his aim and motive are not directed to commit the crime. On the other side there are views that the activities of agents provocateurs equals incitement and that he is a subject to criminal liability.

The issue of criminal liability of an agent provocateur in our theory was dealt with in the first half of the 20th century. At that time the prevailing view was that there is no crime in the case of provocation by the secret agent, because his activity was directed to attempting the crime¹⁵. The point is that agents provocateurs intence is not focused on the crime but to begin enforcement actions in order to capture the offender and surrender him to the authorities. According to this view, an agent provocateur is not criminally responsible because there is no incitement, and hence no crime. This conception is dominant in German legal theory¹⁶. It is believed that agent provocateur is not responsible, whether a crime is only attempted, or committed¹⁷. There are similar concepts that he is not criminally responsible because he acts in accordance with his duty, and the opinion that the motive and the objective of the agent provocateur are not a criminal, but quite the opposite the - detention¹⁸.

Concepts according to which the agent provocateur is criminally responsible¹⁹ as the inciter is based on the fact that the motives, intentions and goals are not relevant to punishment. Although they stress that this is a special situation since it is about the officers working on crime reduction, they consider an agent provocateur responsible for stirring the perpetrator attempted or completed crime. They point out that the motives are taken into account only during sentencing. This attitude is prevalent in our theory of criminal law. The understanding that an agent provocateur can be punished was accepted by the Swiss and Italian legal theories.

There is also an eclectic view according to which provocation of the offense, depending on its characteristics properties can be punished and not allowed, but it also allows it as a legitimate tool in detecting and prosecuting some of the worst forms of crimes²⁰. For the same purpose there is a theory supporting the introduction of legal options for agent provocateur acting, particularly in combating drug crimes, arms trafficking, corruption, organized crime and terrorism²¹. It considers that the use of agents provocateurs is necessary the possibility of abuse must be prevented, by laying strict conditions that would form an adequate legal framework for its effective application²². The eclectic view includes the, and understanding according to which provocation might be allowed if it was aimed at making concrete already made general decisions about committing crimes by the person who incites them²³.

¹⁵ Toma Zivanovic, *Fundamentals of Criminal Law of the Kingdom of Yugoslavia- the general part*, the first book, Belgrade 1935, pp. 183. Also: Dolenc-Maklecov, *The entire criminal justice system of the Kingdom of Yugoslavia*, Belgrade 1935, pp. 85, Frank S., *The theory of criminal law, general part*, Zagreb 1955, pp. 86. Quoted from: Nedeljko Jovancevic, op.cit.

¹⁶ Haft, F., *Strafrecht, Allgemeiner Teil*, 8 Auflage, München 1998, str. 214., Also: Ebert, U., *Strafrecht, Allgemeiner Teil*, 2. Auflage, Heidelberg 1993, pp. 193.

¹⁷ Maurach, Gossel, Zipf, *Strafrecht, Allgemeiner Teil, Teilband 2*, 6 Auflage, Heidelberg 1984, pp. 286

¹⁸ Trajnin, *Learning about the complicity*, Belgrade 1949, pp. 94.

¹⁹ Frank, S., *The theory of Criminal Law*, Zagreb 1955, pp. 186, also: Zlataric, B., *Complicity (script with lectures)*, Zagreb 1966, pp. 87, Stojanovic, Z., *Criminal Law, General part*, Belgrade 2006, pp. 245th, Cejović, B., *Criminal Law, General Part*, 1987, pp. 335.

²⁰ Darko Marinkovic, *Theoretical and practical aspects of the criminal act of provocation*, Security, no. 2, 2005, pp. 217 - 236th.

²¹ Milan Skulic, op. cit.

²² Tatjana Lukic, op. cit.

²³ Vladimir Vodinelic, *Issue of criminal-tactical institute-informant, informants and undercover police scout in*

The concept according to which an agent provocateur may be engaged in clearing up some of the crimes, where it not possible that the crime was committed under only the exclusive influence of the undercover agent. According to this view, the following criteria which allow their use are: 1) a reasonable doubt of the previously performed actions and the likelihood that they will be continually to be made 2) the modalities and intensity of the influence on the suspect must be not include force and threat, and 3) it is about a particularly difficult, or difficult to be proved type of crime²⁴.

In theory, considering the intensity of the influence of the agent provocateur has a crime, a distinction between "constituent" and "noting" influence is made²⁵. Constitutive influence, is considered to be inadmissible, if an agent provocateur provokes the decision made by the perpetrator. However, the noting influence is present if his activity is reduced to the detection of criminal acts that would be made in any case. There is also a similar division of active and passive provocation. Active provocation exists if the undercover agent is directly involved in committing the offense crime. The obvious example is a simulated purchase or sale of narcotics, which is however permitted by the express provisions of the CPC? Passive provocation exists if the undercover agents is involved in the creation of favorable conditions to carry out criminal acts, but he himself does not participate in the execution of activities.

Case law

In the U.S. case law began to deal with the issue of the crime incited the undercover agent in the second half of the nineteenth century. The courts initially ignored the importance of *entrapment*²⁶ by claiming that it could not be ground for exemption from liability of the defendant²⁷. However, the first case of liberation from liability occurred, in 1879²⁸. Supreme Court (Supreme Court) in its decision in the case *Sorells against the United States*²⁹ in 1932 acquitted the defendant of liability due to the fact that he committed the crime after having been drawn into a trap by the undercover agent. This created a precedent in the form of objection that the defendant can make, and which is called "*defense of entrapment*".

Later on the courts practice developed in to three directions, so that today there are three concepts: subjective, objective, and mixed. According to the subjective view it is necessary, to determine whether the defendant's criminal predisposition for a criminal offense existed, ie. that he would have committed the crime in any case and that there was no encouragement by the undercover agent. While doing so, the action of undercover agents must not contain the elements of force, threats or blackmail. In order to determine the predisposition of the defendant, the court found the following factors: past behaviour of the defendant (whether he was previously convicted), a reaction to incitement, the defendant's conduct after the crime, the defendant's reputation in the community where he lives and his capability, ability, to commit a crime. However, the theory has pointed the weakness of this concept, and particularly because the evidence in determining predisposition were mainly based on hindsight.

a democracy, Security, no. 1, 2, 3 and 4, 1994, pp. 296.

²⁴ Wiczorek, E., Ultima ratio: Der agent provocateur, Kriminallistik, br. 6- 7, 1985, str. 290. Specified by: Darko Marinkovic, op. cit. , pp. 226.

²⁵ Roduner, E., Verdict Ermittlungen, Kriminallistik, br. 11, 1987, str. 621. Specified by: ibid.

²⁶ The term used to refer to "Guidance on the trap" by the undercover agent.

²⁷ Board of Comm' rs v. Backus, 29 How. Pr. 33 (1864). Specified by: Istvan Fejes, Responsibility of undercover agent and his victim, Collected papers of the Law Faculty in Novi Sad, nr. 2, 2006, pp. 405 - 430

²⁸ O' Brian v. State, 1879. 6 Tex. App. 665

²⁹ Sorells v. United States, 287 US 435.

The objectively view is based on determining the actions of the undercover agent. It examines whether an average man can make somebody commit a crime about which the defendant had not decided yet³⁰. If the existence of entrapment is proved, it makes an absolute obstacle for the punishment of the defendant. The mixed view is based on a combination of subjective and objective views. This means that the defendant has to prove that he committed a crime under the influence of the undercover agent and / or that in him there is no predisposition to commit crimes.

Although the court practice in the U.S. found that “the trick to trap” does not offend any of the rights guaranteed by the constitution, in some cases, defendants were released because the court found that the conduct of the undercover agent violated due process of law³¹. Law on Police and Criminal Evidence of Great Britain from 1984 also forbids the use of the evidence obtained by using traps in the process as they represent a violation of the right to a fair trial. The defense of the accused based on the assertion that the defendant committed the crime under the influence of incitement by the undercover agent, in the case law of Great Britain, does not relieve him of responsibility, but can only be taken into account when sentencing³². Several members of the House of Lords which adopted the law quoted that the defense based on defendant’s objection that he acted at the urge of the undercover agent seemed to be “Eve’s excuse” because he tries to switch responsibility to a “snake” that he was persuaded by³³.

German courts believe that the undercover agent is not criminally responsible if he doesn’t inspire be not a new decision to commit a criminal with act the defendant, but only accomplishes the existing, general decision³⁴. Crime Bureau of the Federal Republic of Germany, allows the engagement of agents provocateurs, particularly in combating serious forms of crime. In German law illegal incitement is called *lockspitzel*. Federal Supreme Court in 1975. issued guidelines according to which the undercover agents must not exceed the limit of their actions. However, if the agent exceeds allowed activities, there is no separation of evidence in the process as restricted, but this situation can only serve as a basis for mitigation of sentence.

European Court of Human Rights dealt with the offense committed under the influence of incitement to. In the case of *Teixeira de Castro v Portugal*³⁵ The court found that the police exceeded its powers, and that due to the actions of an agent provocateur, without court order the right to a fair trial under Article 6 Paragraph 1 European Convention on Human Rights and Fundamental Freedoms³⁶ was violated. In its decision, among other things, the court determines the limits of the permissible activities of the undercover agent. In his work he must be limited to passive collection of facts, and his behavior mustn’t lead to the creation of a decision to commit a criminal offense³⁷.

Since the institution of an undercover agent has been recently institutionalized in the procedural codes of the countries of former Yugoslavia, there is some experience of the courts in these countries. The Supreme Court of Croatia in one of his decisions stated that incitement (which is prohibited

³⁰ People v. Barraza, 591 P. 2d 947, 955 (Cal. 1979).

³¹ See: Raley v. Ohio (1959), Cox v. Louisiana (1976), Hampton v. US (1974).

³² See: R. v. Sang (1980) AC 402.

³³ Zeljko Karas, Stimulation by undercover investigators, Police security, no. 3, 2010, pp. 366.

³⁴ BgH GA; 1975., specified by Vladimir Vodinelic, op. cit.

³⁵ Teixeira De Castro v. Portugal, 9.4. 1998 nr. 25829/94.

³⁶ Sluzbeni list SCG- medjunarodni ugovori, nr. 9/ 2003.

³⁷ Momcilo Grubac, Special powers of criminal prosecution and constitutional rights and freedoms of citizens, in: Democratic oversight over the implementation of special powers, Belgrade 2008, pp. 90.

by Article 180 para. 5 CPC RH) would exist if the undercover agent created or strengthened a decision of the defendant persistent incitement to commit the crime³⁸. The court found that it is not an incitement when the undercover agent only expressed his desire to buy heroin. It is a simulated purchase of drugs in which the undercover agent was engaged in. The decisions of the courts it is indicated that the undercover agents must move within the already formed and firm decisions of a perpetrator. If the perpetrator has already made a strong decision, to commit criminal acts, without hesitating, if the enforcement is only a matter of time there can be no incitement by an official³⁹.

It should be emphasized that in practice agent provocateur are rarely punished. It is considered that his conduct justifies the action while performing official duties. Most cases ended by moral condemnation of unfair behavior of an agent. Undercover agent cannot be required to be absolutely passiv, because it would paralyze the fulfillment of the task entrusted to him. Incitement by the undercover agent does not exist, but the defendant must prove it. The emphasis is on the voluntary element that immediately preceded the criminal act, whether it was created or made concrete by the activities of police officers⁴⁰.

Concluding remarks

From the provisions of our CPC it is obvious that the undercover agent can not act as agent provocateurs. In practice, however, during the disclosure of some offenses, for example. receiving and giving bribes, law allows the use of so-called. "bait". A police officer appears as the provider of bribe money, with marked bills and ends up with the arrest ment of perpetrators in the act. In later instituted criminal proceedings police officer appears as a potential witness. Besides the crimes of corruption, similar practices exist in cases of crimes of drug trafficking, where the police officer appears as a customer in. Rare situations during the criminal proceedings when he appears as a witness, his name is not mentioned as the buyer or it is stated that he escaped . Hence it follows that in the police practice there are certain types of provocation to a crime, or some methods that are at the boundary between the permissible and the prohibited actions.

As previously mentioned, having introduced the possibility of providing simulated services and simulated legal activities the legislator created a legal framework for certain types of provocation and, incitement to commit criminal acts. Although, due to the lack of appropriate legal provisions for the activities in the cases of simulated services, some general provisions of the Criminal Code on incitement can be applied, it appears that the intention of lawmakers concerning in the use of special investigative techniques was to legalize provocation to commit a criminal offense. It is supported by, the fact that the undercover agent is explicitly prohibited to incite (Article 504n. Paragraph 5 of the CPC) anyone to criminal acts.

We agree with and support the opinion of some authors who advocate the introduction of the Institute of agents provocateurs in to our criminal procedure law. We consider acceptable a pragmatic solution that was suggested in our legal theory according to which in the case of incitement to commit a criminal offense by an undercover agent the attorney would act in accordance with appreciated the

³⁸ Supreme Court of Croatia, I Kž- 429/03 from 2. april 2003.

³⁹ Court of Bosnia and Herzegovina nr. X- Kž- 07/329 from 10.07.2008.

⁴⁰ Supreme Court of Serbian Republic nr. 118- 0- Kžž- 07-000 105 from 26.06. 2007.

principle of opportunity while prosecuting it⁴¹. A clear boundary should be made between the permissible and impermissible provocation to commit a criminal offense. By limiting tying the undercover agent in terms of his initiatives in the course of carrying out the task entrusted to him he is deprived of the necessary efficiency. For fighting against crime this discourages state officers servants to accept the role of undercover agents because of the fear they could very easily be prosecuted for their activities. It is necessary for by-laws to allowed elaborate provocation of the offense in more detail, with a strict system of control of police officers (the approval of the investigative judge, public prosecutor or possibly his superior' s law enforcement agencies in emergency cases). The degree of doubt should also be taken into account, we consider necessary the existence of reasonable doubt that a particular person has already committed criminal acts or has decided to commit them. The most important criteria for imposing the limits of the activities of the agent provocateur is the accomplishment of the already made general decision to commit criminal acts and it should be a clearly expressed by a potential offender. Besides, the person who is observed should have an unambiguous predisposition to commit a criminal offence. We think that the introduction of an agent provocateur under strictly specified conditions would increase the efficiency of the fight against crime, since it is constantly increasing , taking into account the necessary level of protection of fundamental human rights and freedoms.

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⁴¹ Istvan Fejes, op. cit.

METHODOLOGY OF DISCLOSURE OF CLANDESTINE LABORATORIES FOR PRODUCING SYNTHETIC DRUGS

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Summary: The offer of various synthetic drugs, according to all indicators, was increased in last few years in the Republic of Serbia. This resulted in increasing consumption of these drugs, especially among young people. An interesting phenomenon is that the production and trafficking of synthetic drugs and precursors is going in the opposite direction of traditional trade of natural drugs. EU is a traditional importer if we consider heroin but with synthetic drugs EU is the exporter.

The number of discovered clandestine laboratories and the amount of detected synthetic drugs and precursors exceed all previous seizures in our country, but despite this important fact, these kinds of drugs are still not receiving the appropriate attention, when compared to “natural” drugs. It is necessary to know the methodology of detection and dismantling clandestine laboratories producing drugs as well as to standardize security measures in processing the crime scene, both from the aspect of criminology and in terms of safety and environmental protection. The locations of clandestine laboratories producing drugs can be very hazardous areas when we consider the presence of various chemicals that are often toxic and flammable. Therefore, officers who are not trained in the detection and dismantling of clandestine laboratories and who are not wearing protective equipment should not enter the site which is an alleged location of such a laboratory. Different kinds of fumes can cause serious damage to eyes, skin, the nervous and respiratory systems, and while some chemicals react with air other chemicals can cause explosions. For successfully detecting an illegal production site of synthetic drugs it is very important to monitor the flow of precursors, equipment that can be used for illegal laboratories and indicators that suggest their presence.

Key words: *production, synthetic drugs, clandestine laboratories, precursors, equipment.*

Introduction

Many studies show that the interest of young people in drugs is constantly increasing. Dozens of new medical records on drug abuse are documented daily at the Institute for Treating Addiction in Belgrade, and this fact explains the extent of drug abuse in Serbia.

However, the real and reliable data on the number of drug addicts in our

country are impossible to get, since many drug addicts are not registered, and the so-called dark figure is large.

Market supply of drugs responds to the enormous demand, and this opens the space for new synthetic drugs which are a novelty that attracts many consumers, especially young ones. New drugs such as crack, ecstasy, fentanyl or ketamine, have become a major problem in our society that was unprepared to take adequate measures in the field of prevention, treatment and rehabilitation. "Creators" of these drugs are mostly pharmacists and chemists, who often slightly change the chemical composition of the known drug and in that way, produce a new drug, analogous to heroin, cocaine, and amphetamines. In recent years, organized criminal groups have focused on the production of synthetic drugs, particularly the ecstasy. The illegal drug market is blooming, large quantities of these drugs are consumed and profit is enormous. Thanks to the progress of technology, production and distribution are much simpler and cheaper, which affects the prices on the illegal market.

The first secret laboratories producing synthetic drugs were discovered in the mid-eighties in Germany, Holland, Belgium, Denmark, Luxembourg, and more recently similar laboratories were discovered in our country and in our immediate vicinity. Experts say that exactly these drugs will be dominant in the 21st century, the reason being their low cost and easy availability. Their production, distribution and sales are a lucrative business and one of the main parts of the machinery of organized crime. If we add the fact that the first ones who try new drugs are young people, social danger is even greater.

In order to suppress unauthorized production and sale of these drugs, it is necessary to establish control of productive entities (raw materials, technology), research institutions (raw materials and laboratory equipment), import, export and trade of precursors and equipment used in their manufacture. The National Strategy provides guidance and directs specific attention to the international trade of these substances, with the cooperation of authorized state bodies and manufacturers, and merchants and transporters to prevent the attempted illegal use of precursors. It emphasized the need for carrying out intensive cooperation with the ministries that have jurisdiction in the production and trade of precursors, and taking appropriate records on trans-border trade of precursors (Milošević, 2010:122).

Demand for specialized officers in this area

Nowadays professional specialization is the imperative of the time, especially when we consider the profession of criminologist. It is demanded by the development of science and technology, scientific evidence and contemporary forms of crime. Today there is no longer need for criminologists who know little about many things, but for those who know a lot about a certain area (Otašević, 2008:84). Since criminals are more professional and better organized, it emphasizes the need for the police and other state authorities to be professionally qualified. Importance of specialization in combating contemporary forms of crime is indicated in some international conventions. Among others, the Criminal Law Convention on Corruption (Službeni list SRJ, 2002) adopted in Strasbourg

in 1999; in Article 20 on the specialized agencies, it says that every party shall adopt such measures which are necessary to ensure that persons or entities are specialized to fight corruption, and to provide adequate training and financial resources to the staff of such entities to perform their tasks.

Specialists for the narcotics should be the top-level operatives. They should have good basic police training and complete knowledge and experience in operational work. Only after the police officer reaches this level he can acquire additional skills and knowledge necessary to combat the illegal production of synthetic drugs. In addition, such a police officer must be adequately equipped, politically supported and confident on a fair and prompt court trial. He must be able, not only to prove committed criminal acts, but to study criminals with patience and through extended periods of time, to understand their organization and their working methods. This requires detailed specialist knowledge, systematic collecting and analyzing of data and application of professional knowledge in an organized manner. Since the problem of drug abuse is larger and more complex there is a greater need for specialized personnel and specialized organizational units within the Ministry of Internal Affairs.

Organized crime groups produce different types of drugs in the clandestine laboratories, but methamphetamines constitute 80% to 90% of total production. Thus, the problem of clandestine drug laboratories is closely related to the abuse of methamphetamine. Disclosure of clandestine laboratories requires extremely high level of expertise. Those who are responsible have to understand the chemical processes of illegal production of drugs, and in the case of disassembling of such laboratories, in order to prevent risks from explosions, fires, chemical burns and toxic fumes, they have to know how to handle, store and dispose of waste materials and how to medically treat people who are exposed to chemicals. Representatives of the police, prosecution, courts, and ministries of health have to know in detail the regulations which pertain to the manufacture and distribution of precursors, and other chemicals, safety and protection of natural environment. They have to cooperate with firefighters, hazardous materials experts, chemists, health and social workers, environmentalists and others.

In the U.S. there is specialized training for a period of several weeks, in which the police officers are trained for the detection and disassembling of the clandestine laboratories where drugs are produced. This training necessarily includes the periodic testing to make sure that police officers were not exposed to the toxic effects. Women police officers are at particular risk, since the effect of chemicals may have an adverse effect on fetal development (Donnell, 2004:15).

Training of police officers, customs officers, prosecutors, judges and others involved in the discovery of clandestine laboratories is very important. Police, firefighters, medical personnel and others who enter the private properties should be trained to recognize indicators of clandestine drugs laboratories in order to promptly initiate an effective investigation. This measure is very important in societies which do not currently have a number of detected laboratories, such as our society, since early recognition and response to the problem is significant, in order to prevent organized groups from settling in any area. Of course, it is inconceivable that the police officers shall identify indicators of clandestine laboratories without a special training.

Ways of acquiring knowledge and indicators that point to the clandestine laboratory

Within each country, there are at least two institutions (i.e. police and customs) which fight against illegal trade in drugs and precursors. If they want to successfully confront this type of crime, they have to centralize and share information regarding the drug crimes. These organs must have a common database, with software for analysis through various criteria and modern technical equipment. This way of work allows data to be easily used, both, for preparing reports and for operational use, which excludes double record keeping and facilitates the exchange of information. It is important that this mutual cooperation and exchange of information should be legally regulated, as well as the way of communication with other state agencies and organizations.

However, one should bear in mind that any information submitted to the police serves as a statement, possibly as an indication, but not necessarily as evidence. Information is the way to the evidence (objects, traces, individual statements). Therefore, the meaning of the information is exhausted through the requiring of the evidence. At the same time, it is its greatest value, since the future charges are based on the evidence that have been obtained by the information and not on the information itself. Information as a subsidiary mean in criminology could be very useful in the hands of good criminologists.

Ways of finding out on the existence of illegal laboratories producing drugs depend on the specific acts of execution. In our country the most common mode of acquiring information is the operational activities of special services, the Criminal Police. However, the very important information can be obtained by uniformed police officers, from the citizens whose nature of work requires them to be in contact with various categories of persons (employed in bars, night clubs, restaurants, hotels, taxi drivers, workers at the gas stations, car washers, parking keepers, night guards, etc.) intravenous drug addicts, informers, imprisoned persons, undercover agents, etc. (Marinković, 2010: 381). Sources of information could be seized drugs, and many modern police in the world have a practice of purchasing the important information.

Workers with regular entrance in private villas, such as postmen, garbage collectors and technical staff are able to notice suspicious fragrances, objects or activities which indicate existence of the clandestine laboratories. Hotel staff, especially receptionists and maids may notice suspicious indicators of laboratories that can be found in hotel rooms (An Evaluation of the COPS Office Methamphetamine Initiative, 2000). According to the Europol data 80 to 90 secret laboratories are discovered in Europe every year - 30 to 35% of those only after a fire or explosion, 30 to 35% after a routine control by the police or citizens complaints, while the rest is found through the criminal-intelligence work (Europol Drugs, 2006).

The most common indicator that reveals the presence of illegal laboratories for producing drugs in a particular area is intense odor of chemicals used in production of drugs. Some of them can be described as the smell of acetic acid, gasoline, diluents, acetone, iodine, ammonia, alcohol and many other substances used in their manufacture. Normally, they cause irritation of nose, eyes and throat. Indicators that could reveal the existence of illegal laboratories for producing synthetic drugs were high and uneven electrical energy consumption in different periods of time, the acquisition of laboratory dishes and chemicals used in

production, the presence of a person of the chemical technology, pharmaceutical or medical profession in certain facilities in which they are not expected to be, etc. Major indicators can also be empty boxes of tablets, and certain quantities of the tablets in the direct vicinity of the laboratories, a large number of coffee filters with remains of white crystals, gas cylinders as a source of energy, packaging for lithium batteries, red phosphorus powder, gloves, etc.

Many people are not familiar with the signs that indicate the presence of clandestine laboratories. In some countries there are regular trainings, where citizens learn about the indicators, and very interesting are campaigns in which they are encouraged to report suspicious laboratories to the police. In the U.S. billboards, posters, "hot lines", websites, and other public campaigns were set up at the public places in order to encourage reporting (*An Evaluation of the COPS Office Methamphetamine Initiative, 2000*). Training courses for "sellers" of precursors in order to teach them how to notice and report suspicious purchases of chemicals and equipment are also very interesting.

Employees of the wholesales (companies for the purchase of chemicals, pharmaceutical companies) can be trained to notice and report on the purchase of large quantities of substances that are commonly used for the manufacture of legal medications, such as medicines for colds and allergy that contain ephedrine and pseudo-ephedrine. In such stores, there is printed material placed next to the cashier to remind sellers what to look for (*An Evaluation of the COPS Office Methamphetamine Initiative, 2000*).

The importance of problem analysis

Discovering the clandestine drug laboratories is the culmination of police work, which requires a multidisciplinary approach and involvement of experts of various specialties. However, today there are no standardized methods of detection of clandestine drug laboratories and providing evidence for the successful conduct of criminal proceedings, there are only experiences and impressions of police officers who were involved in activities against illicit production of synthetic drugs. All strategies to combat this type of drug-related crime resulted from different police investigations and police reports. Some of the foreign experiences can be applied in our community as well. It is essential that certain operational and investigative measures and actions could be adapted to particular circumstances and be applied based on reliable analysis.

It is important to determine which type of illegal laboratories is most commonly detected in our country, and in the immediate environment; then the type and the amount of drugs produced and the production capacity of laboratories detected. For further dealing with this problem it is necessary to collect information on:

- what number of laboratories is detected;
- whether they are detected by the operational work of police, during routine police activities or after the explosion;
- whether the chemical methods are used;
- was primitive or sophisticated equipment being used;
- whether the laboratories were discovered in the village, the peripheral parts of the city or urban area;

- in what kind of facility was the laboratory located in - in the open air, in a house, apartment, rented warehouse spaces, farms;
- did all phases of production take place at the same location;
- whether the production and sale took place in the same country;
- to what extent the laboratories were profitable;
- whether there was resistance during the arrest;
- whether there have been set "traps", encountered by police officers during the raid and so on?

Careful study of the problem before reacting to it, can assist in developing appropriate strategies to work. Uncritically accepting the problem answer that the others are using should be avoided. What is true in one place may not be true in another, what works in one place may not be effective in another. When it comes to use of foreign experience, we need to be cautious and careful in making selection of the country or countries whose experiences will be used. Automatic download any foreign model, without taking into account its own specific characteristics, can lead to the creation of an ideal, but still only a theoretical model, which in practice would not have a great chance of success. In a world that is becoming increasingly interconnected, it is important that police is aware of the investigation and successful practices beyond the borders of their country.

We believe that all countries should build up effective measures to control production and trade of precursors¹. Otherwise, the strategy for the fight against narcotics will be condemned to failure. National regimes must provide funds for the multilateral exchange of information, and also must respect the legitimate interests of business. Proper control involves verifying that the substance and the quantity that was ordered are in accordance with customer requirements. It is necessary to identify countries with excessive imports, or imports with occasional jumps to suggest the misuse of precursors. With this information one could intervene in the countries in which these abuses occur and excessive imports would be stopped. States that are targeted by drug dealers generally have not built the mechanisms that would register these illegal transactions. Although, drug dealers instead of substances regulated by the UN Convention of 1988, are often using illegal substitution, especially in the production of "designer drugs" (Službeni list SFRJ, 1990).

Detecting and securing evidence

When the police come to the knowledge of the existence of a clandestine drug laboratory, it is necessary to take measures for its detection and disassembling, in order to prevent further production of drugs, to clean up the site, and in order to discover and deprive of liberty all persons who participated in the illegal process of production. The disassembling process involves a large number of people, and because of the relatively small number of cases of disassembling, no official method has been developed into formal scientific experience. Criminal investigation involves team work and good organization. Each individual in the team has its share of the work that must be able to do, for the sake of the team's success. Foreign experience show that the detection and disassembling of

¹ Precursor is a substance defined by the List of precursors, as a mixture of substances or natural products containing precursor, which are used for illegal manufacture of narcotic drugs and psychotropic substances other than medicines and other products that contain precursors which are so united that there cannot be easy, simple and a cost-effective way to recycle and use them, (Article 2, paragraph 1 of the substances used in illicit production of narcotic drugs and psychotropic substances, Službeni glasnik, br. 107/09.)

the clandestine drug laboratories was most successful when it involved a small, specialized, well-trained teams, who are each well coordinated.

At the beginning of the investigation is necessary to observe the object in which the clandestine drug laboratory is located, and to register all persons who reside in it, to which their secret surveillance and tracking is connected. In this way we can get to all persons engaged in producing and selling drugs, including the organizers of these activities. At this stage it is necessary to gather as much information about:

- the site of clandestine drug laboratories (factories, apartment, house, basement);
- the level of violence that can be expected (weapons, chemical traps, explosions);
- possible ways of entering and leaving the clandestine drug laboratories;
- laboratory's production capacity;
- if all stages of production take place at the same location;
- precautionary measures taken by the criminals (if they set traps, cameras, doors live, armed guards, acoustic devices, etc..).

When possible, it is important to gather information and the situation inside the laboratory in order to plan the secure intrusion. It is significant to determine what type of drug is produced, which production method is used and what amount of chemicals is present inside the laboratory. When the information on the type of drugs and methods applied are obtained, the experts for the detection and disassembling of the clandestine drug laboratories can easily determine which chemicals and equipment can be expected during the incursion. For the safe planning of intrusion it is important to come to know the number and arrangement of rooms within the laboratory and the number of persons who might be found in the laboratory.

Intrusion into the lab and the cessation of its work is best done at the time when the suspect and tracked persons are in the laboratory and at the time when it is assumed that some production takes place in the laboratory. Intrusion into an empty (no human) lab or when no production is being done, can be counterproductive in certain cases. In such cases, it can be more complex to prove what was produced in the lab.

Upon entering the laboratory, the facility has to be secured in order to prevent the escape of persons present. Blocking the building should be invisible, that is not to prevent persons in the attempt to enter the lab, with the aim of the secrecy of the measures taken.

When the police have the possibility to choose where to arrest the suspects, inside or outside the laboratory, they should always choose the latter. In this case, the risks of injuring police officers and destruction of evidence are much smaller than if it is to be done within the laboratory. If the arrest cannot be done out of clandestine drug laboratories, then the raid and detention of all persons present should be undertaken. Raid and arrest is the most dangerous and exciting stage in the process of stopping the work of a secret laboratory. The possibility that something goes wrong in the whole action is particularly strong during the incursion and in the minutes that follow.

If the laboratory is in the process of work at the time of intrusion, the work should be physically stopped in order to stop the chemical processes that are ongoing. If it is a larger and more complex apparatus, it is not certain that the chemist - criminologist, who goes with a team that is breaking in, will always

know how to find the control panel quickly and to figure out what each command means. Therefore it is necessary that people who are caught working in the illegal laboratory remain under strict control and in their positions. They can provide necessary information on how to turn off the device and to stop the process, since they themselves are interested in their personal security. As a rule, if the adverse events related to chemicals and chemical equipment do not occur in the first 5 to 10 minutes after the raid in the laboratory, there is a strong possibility that later nothing will go wrong and then arrested persons can be taken to a safe place.

The scene in the process of disassembling clandestine drug laboratories is a unique combination of crime scene and the risk of incidents involving dangerous substances, which are present. Therefore, attention should be paid to both factors present, and to their proper balance in the course of action. It is essential to preserve the structure of the scene, in order to prevent the damage of the evidence relevant to criminal proceedings. Interested citizens should be removed from the scene and the movement in the controlled zone should be reduced to the lowest possible rate. Each entry in the lab and getting out must be recorded. It is necessary to prevent access to the media and strictly prohibit viewing of the site (O'Donnell, 2004: 37).

Another thing that one should remember is to minimize the exposure to harmful materials. When it comes to secret laboratories producing drugs, the scene itself can be a very risky place, given that there are various chemicals present, which are often toxic and flammable. Therefore, officers who are trained in the detection and dismantling of the secret laboratories and who are not wearing the means of protection should not enter the premises for which it is suspected that there is such a laboratory. Miscellaneous fumes can cause damage to eyes, skin, the nervous and respiratory systems. Some chemicals may cause fire or explosion when come in reaction with air or other chemicals.

Upon entering the laboratory it is necessary to provide air flow, to reduce the risk of possible explosions. Substances that are found on the site may be unmarked, and there are frequent cases of intentional placing of toxic or explosive substances, "traps" for the purpose of injuring police officers. Any closed boxes, cans, food and drink, found on the site, should not be touched because it can be chemically contaminated and, upon entering, electrical installation must not be activated, in order to avoid possible explosions.

Because of the possible consequences when disassembling the clandestine drug laboratories, police officers should never:

- spend a long time in the laboratory,
- touch or examine equipment or substances in the laboratory,
- smell the objects and chemicals,
- turn on and off switches and use equipment that can be found on the spot,
- smoke, eat and drink on site,
- use cameras with flash or any type of flash,
- use the radio inside the building.

Depending on the specific situation, it is necessary to establish identity and to check the persons present, followed by a detailed search of the building and persons in it, and the search of homes and other premises where found persons have lived. All persons caught should be kept and interviewed in details by the police in order to find out all circumstances related to the production and traffic

of illegal drugs found. It is very important to find out, in this interview, who is the organizer of production, who owns the laboratory, which drugs were produced in the laboratory, how the laboratory supplied the necessary raw materials and chemicals, where the drug is delivered, how and at what price.

Persons who appear in criminal proceedings as witnesses are mostly indifferent or afraid, and are in a dependant position in relation to persons against whom a procedure is taken. Therefore physical evidence is really important, given that the personal testimonies are rare and unreliable. Those are, mainly, the found and seized drugs, which must be proven by a specific expertise. Therefore, the sample of drugs, chemicals, waste and packaging materials must be taken from the scene. Samples are taken from the connections for water, soil, waste, empty containers, used equipment and clothing of suspects too. In addition to drugs and chemicals found, it is necessary to take away complete documents found at the scene, notes, notebooks, phone books, faxes, recipes for the manufacturing, chemical manuals, invoices, chemicals' orders and laboratory equipment, computers, video tapes and the like, without neglecting the fact that there can be traces of ridges found (Otašević, 2009:53).

Any evidence from the scene must be labeled with a corresponding numbered tag. Documenting is the key issue in ensuring the integrity of physical evidence, because most of the evidence should be eliminated fast due to the danger it poses. Documenting refers to a qualitative production of the minutes of the incident, which should be followed by a sketch of the scene, making photo documentation and video recordings. The apparatus and equipment in the laboratory must be photographed before being disassembled, and when creating video record, the auditory record or the interpretation of the person who recorded should be avoided, in order to avoid subjective attitude of the individual for the sake of the presentation in the court.

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FACIAL RECONSTRUCTION FROM THE SKULL IN CRIMINALISTIC PRACTICE

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Abstract: Reconstruction of face from the skull is the process of creation of face appearance based on skull morphology. Facial reconstruction might have the two-dimensional (2D) or three-dimensional (3D) forms and there may be used traditional methods of reconstruction or computer graphics. It can be used in forensic and criminalistic practice as an aid when other forms of identification are very difficult or impossible.

Key words: forensic anthropology, facial reconstruction from the skull, 2D/3D facial reconstruction

Introduction

Identification of human remains has been a major problem for the medico-legal system. Detailed examination of recovered unknown skeletal remains provided by forensic anthropologists answers the questions about basic characteristics such as sex, age, ethnicity and overcome traumas. It is mostly the only way to find out more information about individual characteristics, which could lead to identification of potential victim. Results of examination make up mosaic of deceased's life, individual characteristics and death. If there is no clue for potential identity, even the most precise comparative techniques fail, because of impossibility to compare questioned remains with possible familiar material. In those cases one of the last chances is an effort to recreate ante mortem appearance by face reconstruction from the skull. Publication of the reconstructed appearance can trigger recognition by relatives and allow further comparative analysis to be carried out for establishing identity.

Reconstruction of face from the skull is the process of creation of face appearance based on skull morphology. It is actually based on relationship between structure of skull and soft tissues of face. In praxis it is impossible to obtain exact appearance, because some of the features cannot be predicted only from skull. The practitioner can only approximate to the real appearance. That is the reason why the term facial approximation is also used by some of the authors¹,

¹ STEPHAN, C.N. – ARTHUR, R.S. 2006. Assessing facial approximation accuracy: How do resemblance ratings of disparate faces compare to recognition tests? In *Forensic Science International*, vol. 159S, p. S159-S163.

², instead of facial reconstruction.

In forensic cases facial reconstruction serves as an aid in the identification of unknown human skeletonised remains (in conjunction with other information and characteristics, which could be used after recognition process (dental records, radiographs, DNA, etc.). While in historical anthropology it gives us information about the physical appearance of ancient people.

Methods

Reconstruction of face might have the three-dimensional (3D) or two-dimensional (2D) form and there may be used traditional methods of reconstruction (plastic or drawn reconstruction) or computer graphics (again 2D or 3D). More recently, 3D computer graphics have been employed to produce facial reconstruction.

Whichever technique is chosen, facial reconstruction requires a detailed analysis of the skull and the whole skeleton. The analysis should include the following:

Osteological examination. Morphological and anthropometrical examination of the skeleton yield information about the age, sex, ethnicity, body size of the victim, ante mortem health as well as peculiarities of the skull and face such as asymmetry, pathological lesions, trauma, cultural modification of the head and face, and individual habits. These can later be incorporated in the final reconstructed face.

What should be done next is to choose *soft tissue thickness* appropriately for a particular case. Average soft tissue depth at specified skull landmarks is known for many populations. Currently, facial reconstructions are based on the application of average tissue depths at 20 to 30 landmark sites on the skull collected from cadavers or, more recently, from living individuals using ultrasound, CT or MRI.

Facial reconstruction rendering a two-dimensional (2D) view of a face can be accomplished by sketching on paper as well as on a computer. The easiest approach is to take a picture (full and/or profile view) of the skull at the Frankfort horizontal plane and enlarge it to its original size. Facial tissue thickness can be marked at known landmarks and these marked dots can be connected with each other to make a general outline of the face. Forensic artists usually work under the supervision of a forensic anthropologist who has already analysed the remains and its identifying skeletal characteristics, i.e. age, sex, ethnicity, body size, anomalies, trauma, pathological lesions, ante mortem health status, and other unique features. The anthropologists should be able to describe where the eyes, ears, nose and mouth should be drawn in relation to the bony face.

Facial reconstruction producing a three-dimensional (3D) result can be viewed in all aspects, rather than just a full face or profile view. The most traditional 3D approach is the manual build-up of the skull with a clay-like substance. When performing the 3D method, it is also necessary to assess skull morphology and metric characteristics, as was done for the two-dimensional analysis. In starting the reconstruction, marks are placed on precise anthropological points where the average tissue depths are known for the specific age and sex of the given population. The space between these points is filled with clay or a similar substance. In the

² STEPHAN, C.N. – CICOLINI, J. 2008. Measuring the accuracy of facial approximations: A comparative study of resemblance rating and face array method. In *Journal of Forensic Sciences*, vol. 53, no. 1, p. 58-64.

end, areas such as the ears, eyes, nose, mouth and lips are placed.

More recently, computerised methods for 3D facial reconstruction have been developed and used in practice. There has been a gradual development of a number of semi or fully automated computer systems to reconstruct the facial image on the basis of the skull³. With the recent rapid advances in medical imaging techniques and computer technology, the systems are increasingly more sophisticated and achieve more reliable and objective results.

The advantages of computerized methods are numerous because of the speed and the possibility of rapidly editing several versions of the reconstruction. Characteristics such as obese versus emaciated face can be easily altered or age changes can be made for an older person. The image can be rotated in three dimensions.

Research

It will probably never be possible to describe and predict all the huge amount of face variations. Nevertheless, it is necessary to study relationships between cranial and facial features. Inseparable part of these surveys should also be the study of facial soft tissue thickness and prediction guidance.

The values of soft tissue thickness are widely used for manual reconstruction methods, autonomy computer reconstruction, but also during evaluation of superimposition.

Nowadays the number of surveys about facial soft tissue thickness is increasing^{4, 5, 6}. They differ from each other in the selection of imaging technique and levels of statistic evaluation. Differences can be found also in the number of landmarks, their position, as well as sample size. The medical imaging techniques usually involved in study of facial soft tissue thickness are RTG - Roentgen graphs; MRI – Magnetic Resonance Imaging; CT – Computerised Tomography and US – Ultrasound.

In view of the lack of knowledge of average facial soft tissue depths of the Slovak population we realised the study which included 160 CT of living persons (80 females and 80 males) They were divided according to gender and age to subgroups ($x < 30$; 31 - 50; 51 - 60; 61 < x). Facial soft tissue thickness was measured in 14 defined facial landmarks (**Figure 1**). Subjects were scanned for diagnostic purposes but the pathologic cases were excluded from the study. Because of elimination of radiation, scans were centralised on paranasal sinuses. Due to this, we were unable to measure the depth on landmarks on lower jaw (**Figure 2**).

Tables with the average thickness values for each landmark, as well as minimum and maximum values for each landmark were reported⁷.

³ CLEMENT, J.G. – MARKS, M.K. 2005. Computer-graphic facial reconstruction. Boston : Academic Press. 390 pp. ISBN 0-12-473051-5.

⁴ EL-MEHALLAWI, I.H., SOLIMAN, E. M., 2001: Ultrasonic Assessment of Facial Soft Tissue Thicknesses in Adult Egyptians. In Forensic Sci Int, vol. 117, no. 1-2, p.99-107.

⁵ De GREEF, S., CLAES, P., VANDERMEULEN, D., MOLLEMANS, W., SUETENS, P., WILLEMS, G., 2006: Large-scale in-vivo Caucasian facial soft tissue thickness database for craniofacial reconstruction. In Forensic Sci Int. vol.159, p.126 – 146.

⁶ UTSUNO, H., KAGEYAMA, T., DEGUGHI, T., YOSHINO, M., MIYAZAWA, H., INOUE, K., 2005: Facial Soft Tissue Thickness in Japanese Female Children. In Forensic Sci Int. vol. 152, no. 1, p.101-107.

⁷ PANENKOVÁ, P., BENUŠ, R., MASNICOVÁ, S., 2008: Forezná rekonštrukcia tváre : Hrúbky mäkkých tkanív tváre slovenskej populácie. In Pokroky v kriminalistike, Bratislava : Akadémia PZ, p. 133-140

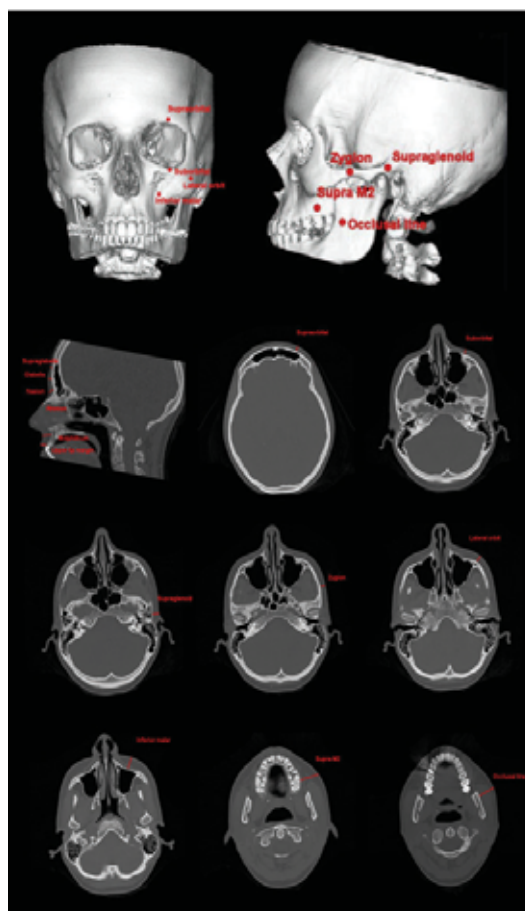


Figure 1 Anthropometric landmark locations on the skull and face

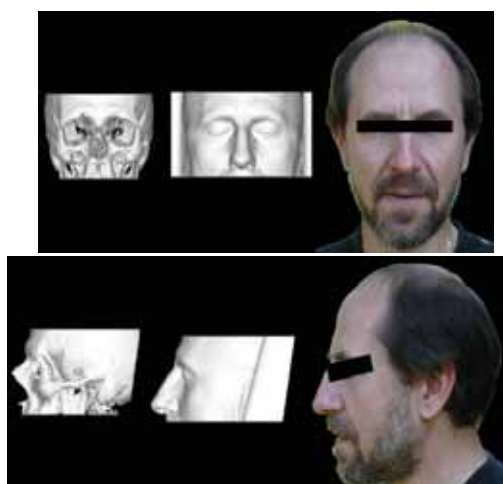


Figure 2 CT scans and photographs of proband's face

There were observed significant sex differences between the facial depths of men and women. In the majority of landmarks males had thicker soft tissues than females. Despite significant differences, data of both sexes were widely overlapped. This fact indicates that while male and female means at craniofacial landmarks differ slightly, and even at statistically significant levels, individual male and female soft tissue depths are often the same or very similar⁸. It also suggests that sex-specific means previously reported in the literature can be combined, so the sample size would be increased.

This study is the first of this kind in Slovakia. It would be an asset to continue this study with a larger sample size based on voluntaries. In this way it could be possible to obtain information about body stature in form of BMI as well. Although the age has influence on facial soft tissue thickness, it is likely that weight would have bigger influence. Published data should be applicable for forensic facial reconstruction. The expert - practitioner can choose not only the mean values, but also maximum, or minimum values, based on conclusions of the osteology survey and constitution of skeletal remains.

Practical case examples

Case 1

The first case is the case of skeletal remains which remained unidentified for a long time. In 2007 we were asked to analyse them and to perform the facial reconstruction from the skull. Anthropological analysis revealed that skeletal remains belonged to a male individual 35-45 years old. Although information about skeletal remains having been found were repeatedly published in mass media (regional and/or nationwide), investigation was not successful and did not lead to identification. According to an investigator, after presentation of reconstructed face in one of Slovak TV programmes focused on unsolved cases, several witnesses contacted police. In the case of one of them, using comparative identification methods (especially DNA analysis) led to a successful result. With the help of the reconstructed face as visual stimuli, it could be recognised by relatives, and finally, using other identification methods, skeletal remains could be identified. (*Figure 3*).

Case 2

In the second case drawn facial reconstruction method was applied in the case of famous historic figure of Slovak history, member of Ugrian family of Thurzo – palatine George Thurzo. As there were few Thurzo's contemporary portraits known, a superprojection of sketched reconstruction and one of these portraits was performed to verify accuracy of reconstruction.

Palatine George Thurzo as well as his nearest relatives was originally buried in the family tomb of Orava Castle (north Slovakia). However, opening the crypt at the turn of 19th and 20th century revealed their skeletons having been thrown out

⁸ STEPHAN, C.N., NORRIS, R.M., HENNEBERG, M., 2005: Does Sexual Dimorphism in Facial Soft Tissue Depths Justify Sex Distinction in Craniofacial Identification? In *Journal of Forensic Sciences*, vol. 50, no. 3, p. 513–518.

from their coffins and accumulated in disarticulated and confused status in piles. For these reasons the aim of following osteological analysis was the identification of particular family members.

An anthropological analysis of skeletal remains, which most probably belonged to palatine Thurzo (skeleton N1), revealed that they probably belonged to a male individual (there were weakly marked sexual-diagnostic traits on the skeleton). He was cca 167-169 cm tall (over medium stature) and died in older adult age (40-50 years, with meant the skeletal age of 46.5 years)^{9, 10, 11, 12}. According to the historical sources, palatine Thurzo died at the age of 49.

Facial reconstruction of the skull was performed without knowing the identity of individual (the same way as it is done in forensic cases) (**Figure 4**).

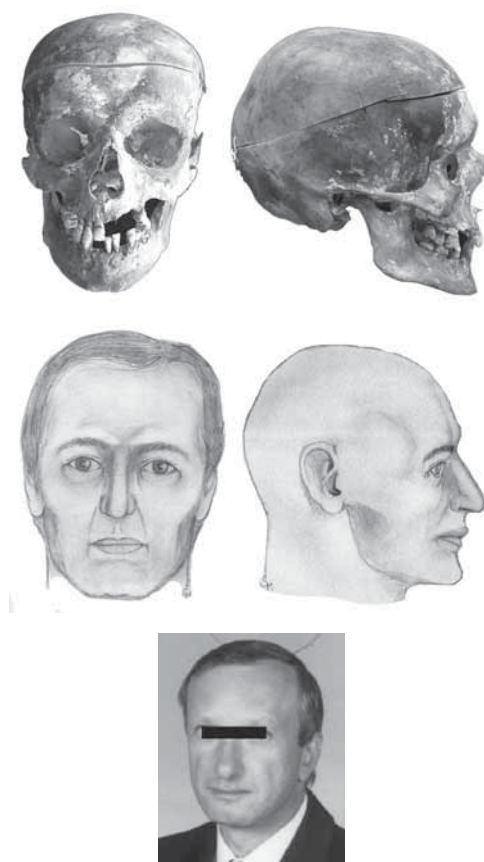


Figure 3 Facial reconstruction from the skull of a male individual leading to successful identification

⁹ THURZO, M., SIVÁKOVÁ, D., SELECKÁ, P., 2000: Pokus o paleoserologickú identifikáciu kostrových pozostatkov členov rodiny palatína Juraja Thurzu. In Bulletin Slovenskej Antropologickej Spoločnosti, no. 3, p.67-74.

¹⁰ THURZO, M., LIETAVA, J., LENGYELOVÁ, T., ZELLER, M., BENUŠ, R., 2001: Kostrové pozostatky Anny Szunyogovej (rod. Thurzovej) – dcéry Juraja Thurzu a Alžbety Czoborovej. Antropologicko-historická a paleopatologická analýza. In Acta rerum naturalium Musei Nationalis Slovaci, no. 47, p.95-131.

¹¹ THURZO, M., LENGYELOVÁ, T., LIETAVA, J., BENUŠ, R., MASNICOVÁ, S., 2003: Palatín Juraj Thurzo (1567-1616) - antropologicko-historická a paleopatologická analýza telesných pozostatkov. In Acta rerum naturalium Musei Nationalis Slovaci, no. 49, p.129-155.

¹² THURZO, M., BENUŠ, R., 2004: Palatine George Thurzo and his family: Skeletal pathologies. In Slovenská antropológia, no. 6, p.155-162.

The result of comparison of the photograph (showing face from epitaph) and drawn reconstruction by method of superprojection is shown in *Figure 5*. Differences in the shape of ears caused mostly by different width could be seen. Difference, which could be seen in the shape of mandible and lower lip (mandibular protrusion) in reconstructed face against the photograph, was dictated by bony structures (see the right lateral view of the skull in *Figure 4*). Artistic idealisation might play its role in this case. Difference in width of faces which might be seen comparing portraits from anterior point of view was caused by slight rotation of face to the right on the photograph. Despite the mentioned differences, concordance in proportionality and placement of particular facial structures is undisputed.

It is not always possible to verify result of facial reconstruction based on the skeletal remains from archaeological excavations. Anyway, it can be used to gain the idea what ancient people could have looked like. In forensic cases, the method of facial reconstruction helps to identify skeletal remains and, furthermore, in case of successful identification it is confronted with the “real portrait”. This allows us to verify correctness and to uncover limitations of the method. Reconstruction of the face of palatine George Thurzo is similar to the forensic reconstruction as it could be compared with the contemporary portrait. The concordance in the most characteristics on both portraits supports previous results of skeletal remains identification.

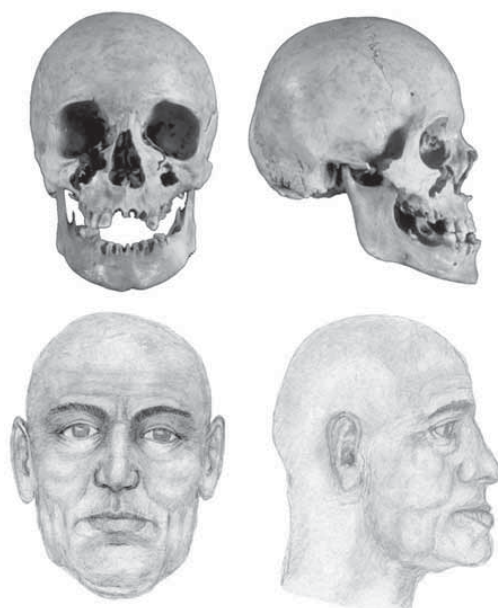


Figure 4 The skull and drawn reconstructions of palatine George Thurzo's head from the skull

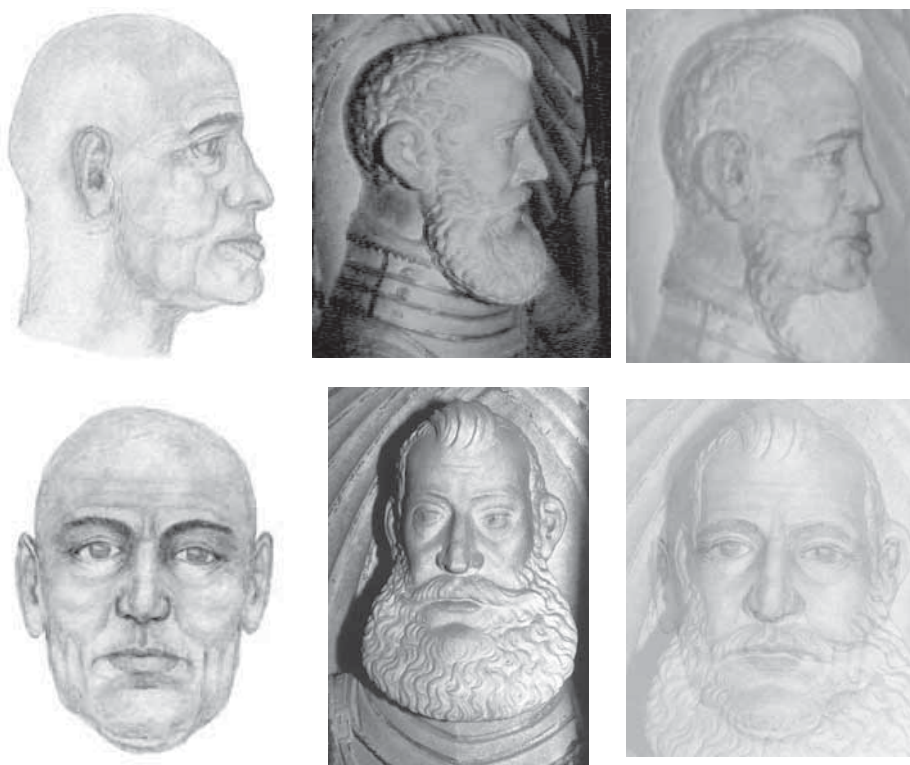


Figure 5 Comparison of drawn facial reconstructions and photographs of the George Thurzo's head from contemporary epitaph by the method of superprojection

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GPS – GLOBAL POSITIONING SYSTEM AND ITS APPLICATION IN POLICING

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Abstract: Global Positioning System facilities with all their characteristics and applications represent a simple technical system that enables safe and quick positioning and orientation, massive collection of data for GIS projects, tracking moving objects (suitcases, large boxes, containers, cars, trains, ships, aircraft, etc.), monitoring during controlled delivery, monitoring its own composition of the complex action where one unit provides assistance to another and so on. The upcoming text aims to make work easier for police officers, scientific and professional community, and the broadest range of people who are not involved in the application of special technical systems when using modern Global Positioning System for organizing and conducting regular and special security tasks, as well as for various human needs. The paper will present the following facilities: description of the system, its function, possibilities and manner of administration in the police investigations.

Key words: global positioning systems, satellite, services, applications, police.

Introduction

GPS system - global positioning system - was developed and implemented by the U.S. Department of Defense (American Department of Defense (DOD) and initially it was conceived on the basis of 24 operational satellites (21 satellites are required and 3 satellites are in reserve). Today, 30 active satellites are orbiting the Earth at a distance of 20,200 km, making a constellation of this Global Positioning System. GPS satellites broadcast signals that allow unambiguous positioning of the GPS receiver on the surface of the Earth, the Earth's atmosphere or in low orbits. At the beginning of exploitation, GPS was mostly used in aviation, nautical navigation and a variety of applications where there is a need for positioning. In the next stage of usage, the GPS system is used for land application and other applications where exact positioning is required. GPS system services can be used without any reimbursement by the owners of GPS receivers. The only condition is the visibility of satellites, at least three, and for better and more precise positioning, visibility is required with some other satellite into the GPS satellite constellation. The availability of the GPS technology and various services has made this system quite widespread for the use by a wide range of users. Among them the initial users were security services: the army, the police, the security agencies and others. The work is designed

so that it gives an overview of the constellation of GPS (Global Positioning System) through historical development, system architecture, cosmic segment, earthly and users. It also describes the way in which the systematic positioning of an object on the ground is being done and the possibilities and ways of applying of GPS applications in police work.

Development history of NAVSTAR GPS system

General orientations of the U.S. Department of Defense for so-called joint programs of various aspects of the armed forces of the 1970s are marked by two successful projects: Joint Tactical Information Digital System (JTIDS) and global satellite navigation system launched by the Directorate of the Joint Program Office in 1973. The real name of the GPS system is the NAVSTAR (Navigation System for Timing and Ranging), but it is mostly known and used under the name of GPS (Global Positioning System).

A constellation of GPS system

GPS has a variety of applications: on land, at sea and in the air. Essentially, the GPS enables recording the positions of points on Earth and helping you navigate to these points. GPS can be used anywhere except in places where it cannot reach the signal, and these are places inside the buildings, in tunnels, caves, underground garages and other locations, and under water. Most common use in air includes navigation coverage in aviation, while at sea the usual use of GPS is for navigation and recreational boaters and fishermen enthusiasts. Applications on land are various. Scientists often use GPS because of its ability to accurately measure time. Surveyors use it to be more efficient in their work, because it reduces the time required for their measurement.¹ GPS can be used in all recreational sports such as hiking, biking, hunting, etc. We see them in cars as navigation systems, then on ships and planes. GPS is increasingly becoming a common accessory in your car, for example, calling for assistance on the road. More sophisticated systems can show the position of vehicles on an electronic map, giving drivers the possibility to mark their positions and look for an address, for example, a street, a restaurant, a hotel or something else. Some can even automatically create a route and give instructions for each turn to the wanted place. GPS system can be presented with three main segments, what will be described in the text^{2, 3}: the space segment (satellite constellation), control segment (control cells) and the user segment (GPS receivers).

Cosmic segment

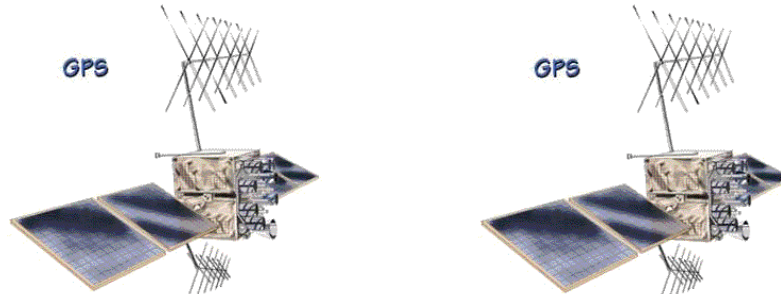
Cosmic segment of the GPS system consists of a constellation of 24 satellites in 6 orbits. The first satellite was launched into orbit in 1978. Over the years, satellites are becoming more sophisticated and technically better equipped so that, for now, we have several types of satellite blocks (Block I, Block II, Block IIA, Block IIR and Block IIF). Since 1978 to 1985, 11 Block I satellites were launched from California, each had a weight of 845 kg. None of these satellites is not in use today. Their life expectancy is about 4.5 years and all of them are still

¹ Milojkovic, B., (2009). Police Topography, Police Academy, Belgrade, p. 210.

² Markovic, V. (2001.), Satellite Communication Systems, Belgrade, Thesis: Faculty of Transport, p. 27.

³ Prastalo, R. (2006), Satellite Communications, Banja Luka: Faculty of Electrical Engineering, p.56.

working for almost five more years.



Picture 1: A layout of GPS satellites

The earliest satellite, originally designed as prototype for testing, was in operation for 13 years. All signals from the Block I satellite were available in the civil sector. Solar panels were being supplied by the system power of 400 W. During the passing of a satellite through the Earth's shadow, Ni-Cd batteries are used for alternative power supply. Management system works with hydrazine. Each of the Block I satellite has on it a cesium and two rubidium atomic clocks. The last satellite of this generation was launched on October 9, 1985.

Block II satellites tend to weight slightly more than 1,500 kg, which is twice that of the Block I satellites. The first of these satellites was launched in 1998. Their ranges of solar cells are from 5.1m and they are designed for the life time of 7.5 years. Total 9 satellites of Block II and Block IIA have been successfully launched by September 1996. The satellites are arranged in six different orbits, each one has its own unique angle in relation to the equator. Block IIA satellites have always strictly different constellation in the universe. In 1990, the first Block IIA satellite (A as the "advanced") was launched. In September 2005, the first new-generation satellite (IIR-M, re-installed, upgraded) was successfully launched. These types of satellites contain equipment to implement the second civil signal (L2C) and new signal for military applications (M-code on L1M and L2M)⁴. Satellites weigh about 2 tons and cost about \$ 75 million dollars.

Block II and Block IIA satellites are equipped with two rubidium and two cesium atomic clocks, their accuracy being 10^{-13} s. From the basic frequency of atomic clock (10.23 MHz), all other parts of the equipment of GPS satellites are supplied by stabilized frequency. Recent satellites Block IIR and IIR-M are equipped with three rubidium atomic clocks. Their extreme precision of ± 1 second in 1 million years is absolutely necessary for the functioning of the system. The beginning of working of the new Block IIR satellites, called the broadcast signal C/A signal (Coarse/Acquisition) that is available to the civilian sector. Power supply and propulsion of the systems are the same as in Block I satellites. Also, solar panels have a higher capacity of 750 W. Block IIR satellites generation may be launched in groups of three into orbit with the space shuttles. But after the Challenger disaster in 1986, it was decided to launch satellites into orbit in a pair of Delta rockets. Block II satellites have a few more advanced options that are not directly related to the GPS system. They are equipped with sensors for early detection of nuclear explosions (L3-signal). Last of Block IIA satellite launched pretty far, was ejected into space on January 30, 2001 from Cape Canaveral base.

The next generation of Block IIF satellites was planned to become

⁴ Djukanović, S. (2006.), Some specific reconnaissance satellite links in L band, TELFOR, electronic edition

a provider of third-generation system for civilian users (L5), allowing the positioning with high precision. These Block IIF satellites will be equipped with hydrogen clock which is an integral part of the atomic clocks, providing even greater precision. EIRP signal from the satellite is about 50 W. For example: television satellite of ASTRA satellite system broadcast power of 100 watts, but with a focus on Europe (Europe beam, multibeam), and the "Network" antenna of 50cm in diameter, provides a good reception, while the GPS antenna is a typical size of an inch. It is known that television satellites have much more bandwidth than the GPS satellites. Because of the high-frequency (L-band), GPS signals cannot be spread through the rocks and water. Even the dense vegetation (leaved trees) can influence on weakening of the GPS signal at the reception. However, the GPS works in any weather conditions including spreading through thick clouds. The problem can arise in case of a large snow cover.⁵ The main feature of the new generation of satellites is increased autonomy in relation to the ground control station, redundant atomic clocks, the higher life expectancy and increased resistance to radiation originating outside the GPS system, compared to the original satellite. Satellites from generation Block II have autonomy of 14 days, provided that after the specified period, an error caused by the control and space segment is 161 m (to communicate daily error is 5.5 m). Block IIR satellites generation have autonomy of 180 days, with the aforementioned error, after the specified period is 7.4 m.

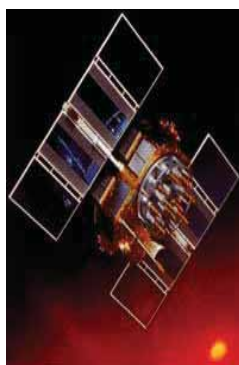


Figure 2: Layout Block II satellites Satellite orbit

Satellites orbit above the Earth at a speed of 3.9 km per second and have a circulation time of 12 hours, sidereal time, more precisely 11 hours and 58 minutes of ground time. This means that the same satellite reaches the same position 4 minutes earlier than the previous day. Middle distance of the satellite from the center of the Earth is 26,560 km. With the radius of Earth of 6360 km, the height of the satellite orbit is 20,200 km. Orbits at this altitude tend to MEO (Medium Earth Orbit). Compared with geostationary satellites like ASTRA or Meteosat (satellites orbit at a distance of 42,300 km) GPS satellites are almost twice as close to the Earth. The satellites are arranged in six planes, each of them divided into 4 sections in which the satellites are arranged in equidistant distances.

⁵ Stojanović, I. (1977), Fundamentals of Telecommunications, Belgrade: Gradjevinska knjiga



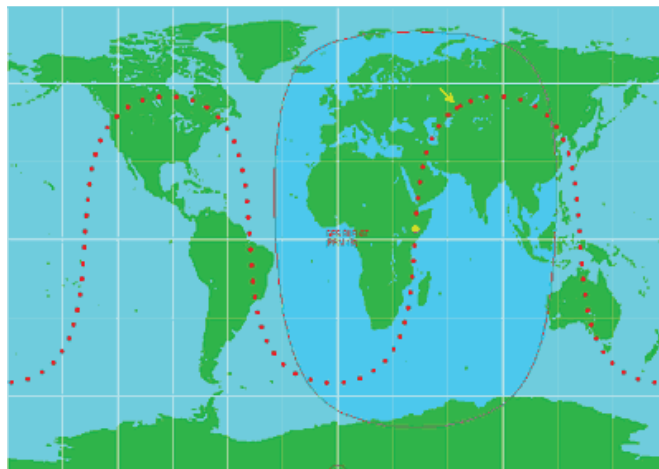
Figure 3: Display of orbits of GPS systems

Today, more than 24 satellites are in orbit, with an aim to improve system availability. The inclinational angle of the orbital plane comparing to the equator is 55° . Orbital planes are rotated in the equatorial plane, each at 60° compared to the other. This means that they are distributed in a range of 55° north to 55° degrees south. Block I satellites were inclined 63° to the equator.

This arrangement of satellite orbits was rejected because many satellites were often located above the Polar Regions (this is the case with the Transit system in which the satellites worked in polar orbits) which are much smaller system users compared to other areas of the country. The number and constellation of satellites guarantee reception of signals from at least four satellites at any time and any position on Earth. When receiving signals from the L band which are broadcast from satellites, in this case the GPS satellites can use the feature so-called wave reflection of a relatively small flat smooth surface. This feature allows receiving the reflected signal in places where there is no line of sight with the open sky and the ability to receive direct signals. In order to use this feature, GPS receivers must be maximally sensitive and reception to such places depends solely on the manufacturing quality of GPS receiver and associated antenna. Satellite transmitters with a power of 50 W and antenna gain of 9 dB need GPS receiver sensitivity to be about -170dBm/-200dBW.⁶

Yellow arrow shows 0:00pm, the point at which the satellite is found. If you look at it into more detail, it can be seen that the orbital time shifted about 4 minutes in 24 h. Yellow dot indicates the position of satellite at 09:30 h am. The satellite is positioned above Ethiopia. Zone coverage, that is zone of visibility of satellites, is shown in light blue which represents the area where signal reception is possible from the specified satellite.

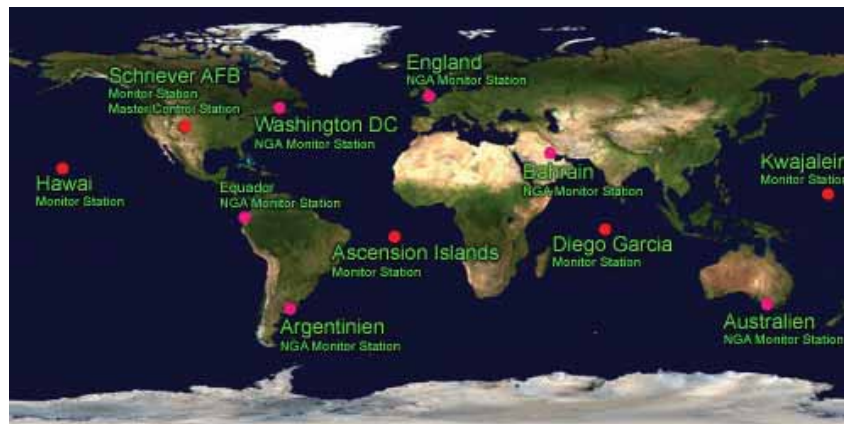
⁶ Tulin, E.M. (1981), Wireless communication via satellite, Belgrade, Yugoslav Army General Staff Department connections, p.123



Picture 4 shows the image of a path (trajectory) of GPS satellites in the Earth in 24 hours, BIIR-07 (PRN 18) of 2001-10-18, 00:00 h to 2001-10-19, and 00:00 h

The control segment of GPS system

The control segment performs: monitoring functions, necessary calculations, supplying of satellite data and monitoring functions of satellites. The control segment includes: the main control station (Master Control Station MCS), the communication station (Station-Upload ULS) and the monitor station (Monitor Station-MS). MCS on the basis of data obtained from monitoring stations performs the necessary calculations (prediction) to determine the satellite ephemeris and error correction of satellite atomic clocks and navigation message form (Almanac). The master control station - Schriever AFB (Air Force Base - U.S. Army air base, 20km south of Colorado Springs) and four auxiliary communication stations for monitoring of: Hawaii, Ascension Island, Diego Garcia and Kwajalein make a constellation of five ground control stations - NCS (Network Control Station). During August and September 2005, six more stations were added to ground control network by the National Agency for geo research - NGA (National Geospatial-Intelligence Agency). Now, each satellite from the constellation of the system can be seen by at least two NCS. This allows precise calculation of the position of satellites in orbit and its ephemeris, which means more precise positioning for end users. In the near future, five more ground control stations of the NGA system will be added to the constellation of the GPS ground control system. This means that each satellite at any time and at any orbital position will be able to receive signals from three ground control stations. This constellation of ground control station provides overall system monitoring satellites. Passive earth stations are the GPS receivers that receive data from all satellites paths, their orbits and collect data on satellite signals. The "raw" data is sent to the master control station for processing. Stations on Ascension Island, Diego Garcia and Kwajalein are transmitting stations which carry out corrections in the system of orbits and satellites. "50th Space Wing's 2nd Space Operations Squadron" is responsible for the operating of GPS.



Picture 5: The positions of ground stations for monitoring and control of the GPS system

GPS receivers and their use in police work

Users segment represent GPS receivers which receive and process signals broadcast from satellites, i.e. to provide information on: position, velocity and time. Modern GPS receivers can be in compact form and in a very simple way may incorporate the most modern equipment, even in a wrist watch. Most commercially available devices are the size of a regular mobile phone. GPS receivers are now commercially available devices around the world. They can be bought for the price of a few hundred Euros. Today, the GPS system services are used in a wide range of applications, land, sea, air and even low orbital⁷. The receivers of the new generation are even 12-channel receivers, which mean that at some point they can receive signals from 12 different satellites and to process them parallel. Earlier models were single-channel receivers, and they performed the processing of the “raw” data serially, which caused a certain delay between the moment of receiving the data from almanac satellites, signals from the satellites and the position of the print object in the user application. In the common hand-held GPS devices that have installed software for the application that performs display of GPS position on the appropriate map, all the processing is occurring in the very device. In these devices it is necessary to provide appropriate map format and resolution of the specific area of interest⁸ and to link them into the software to start using the device. One of the devices from that opus is shown in picture 6, where you can see: the device, installed applications, maps, and position of the object on the map. Devices that use another network to transfer data from GPS receivers in an application to display the position of a given device at a remote location have certain problems that need to be removed so that the whole system would function. GPS device that is placed on an object should be, depending on the used type of GPS receiver, set to the place where to receive a signal from at least three satellites, means that the GPS receiver antenna must have line of sight to open sky in older types of equipment (GPS Receivers company CERTUS, picture 7), while the newer sensitive multichannel receiver antenna can be placed even below the object. In this case the reflected waves from the satellite are

⁷ Djukanovic, S. (2006.), Electronic surveillance of commercial satellite communications, security, 48 (1), p. 110.

⁸ Milojkovic, B., (2007). Contemporary geo topography materials for the police - the characteristics and usage, Security, 49 (4), p. 108.,

being done. With operational point of view, this type of use of GPS receivers for undercover surveillance of moving objects is much better because of easier and faster placing at the object of tracking.⁹



Picture 6: Look of one of the hand held devices



Picture 7: Appearance, components and description of Auto track device of the company CERTUS

It is sufficient to just check the material on which the device is put, for it to be metal, so the casing in which the tracking device is placed is fixed with small strong magnets so that it would not fall off the object due to running into an obstacle or hitting a hole on the road. At the monitoring system CERTUS, the object of tracking must come into possession of a professional team to set the device in a vehicle for at least 2-3hours, while the newer generation vehicles need even more time in order not to noticeably place the object of secret surveillance.

⁹ Milojkovic, B., Marinkovic, D., (2007). Global positioning systems and their importance in the identification and detection of crimes, Science-Security-Police, 12 (2), p. 41.

Network for transmission of GPS signals and the information on the position of the object is transmitted through the GSM Network to some of the available technologies (GSM, GPRS, 3G), the devices shown in picture 8. For the system to fully function, it is necessary to ensure that the GPS receiver is covered by GSM signal because there is the GSM antenna for reception and transmission of data over the GSM network. Some GPS devices enable remote programming of the GPS receiver via a GSM network. On the location of the installed application for reception and display the position of the object, it is also necessary to provide GSM reception. It is most commonly carried out by applying GSM module for the transformation of GPS in GSM protocol format for transmission of data over the GSM network in this way and that either party is assigned a fixed IP address, to a transmitting and receiving part of the system in the GPS device. Transfer data between two different IP addresses is carried out over IP. On the receiving side (mobile or fixed) PC receives data packets over the Internet (by downloading data from a fixed IP address) or GSM network (GSM modem with fixed IP address connected to a PC).

Some famous brands of commercial GPS receivers are Garmin, Tom Tom, Magellan, Lawrence, Rakon Mio and Via Michelin. At this point, and certainly in the future, as the main navigation system and also the system time reference, a global satellite navigation system (Global Positioning System - GPS) will be used. The GPS system applies the principle of TOA (Time of Arrival) measurement of distance in determining position. To determine the position in three dimensions, it is necessary to measure the distance from four satellites whose position is known.



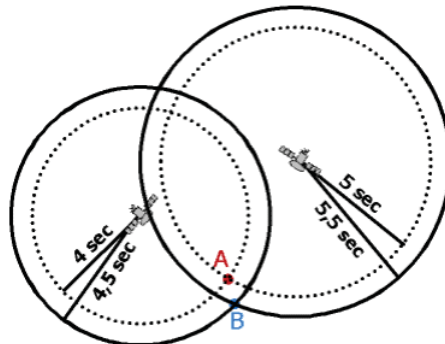
Picture 8: GPS operational tool

Determination of position of GPS receiver

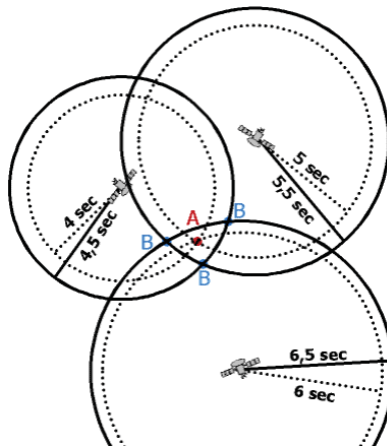
Namely, each satellite in the constellation of GPS transmits signals in the following format: I am satellite X, my position is Y and this information is sent to Z at a point in time. It is now his previous position. Each satellite also sends information about the positions of other satellites. Orbital data (ephemeris and almanac) is stored in the GPS receiver for further processing. To determine the position on Earth, GPS receiver compares the time point when the signal is transmitted from the satellite with the time moment when the receiver receives the same signal, the difference of these times is calculated and with the known distance between the satellite-receiver, the distance between receivers from the satellite is

calculated. Taking into account the data from other satellites, the receiver position can be calculated by measuring the distance from three different satellites. This means that the position of the GPS receivers on the ground surface is determined by knowing meaning, receiving data from the last three satellites, from which the receiver received the signal. Calculating the position by using three satellites 2D positioning receiver is obtained. In this case we get two points in space at which receiver can be, but one is on the surface of the Earth and the other is inside or somewhere in the atmosphere. For 3D positioning receiver needs to receive signals from four or more satellites. 3D positioning obtains the elevation of the receiver. By constantly calculating its own position, the GPS receiver can further determine its own speed and direction of the movement. Another possibility to measure its own receiver speed is using the Doppler Effect shift in the signal reception. The next few pictures describe the process of determining the position of the GPS receiver on Earth. For example, it takes time for the signal from two satellites to reach the receiver on the ground in 4s, (in the real case this time is much less because the signal travels at the speed of light (299,792,458.0 m / s) and time range for receiving satellite is about 0.07 s.). Based on these data, we can describe a circle around the satellite at a calculated distance; it is the left circle in picture 8. The receiver can be located anywhere on the intersection of the Earth and the described circle around the satellite. If we do the same procedure with other satellite (right circle), we get two points of intersection. One of these two points is positioned on the Earth while the other has a position that does not correspond to the real (it is much below the Earth or somewhere in the atmosphere). Now for positioning of the receiver, we use two satellites. The process for determining the position is called triangulation, not biangulation. The question is whether we need a third satellite. We can use a third satellite, but we need to take into account that the receiver is somewhere on the Earth's surface, not deep inside the Earth or in the atmosphere. Based on the previous point we can reject the point B and conclude that the receiver is to be found at point A.

For precise and unambiguous obtaining of the third dimension of the GPS receiver (above sea level) the visibility is needed with the third satellite. The problem is the precise timing necessary for the signal to cross the road satellite receiver. As already mentioned, the satellite inserts weather sorted pulses (modulated) in each broadcast data packet. We know that all the clocks on the satellite are highly precise (atomic clocks). The problem is with the clocks in our GPS receivers. GPS receivers are much cheaper comparing to atomic clocks and are based on quartz clocks that are relatively inaccurate. What does this mean in practice? Let us move on to our example and assume that the clock in our receiver indicates 0.5 s earlier time than the clock on the satellite. This means that the signal propagation time of 0.5 s is longer than it actually is, meaning that our receiver is not at point B but at point A (we replaced point B with the point A). Circuit that we described about the point B is called pseudo range (pseudo-fake or virtual) and it is the consequence of synchronization errors of two clocks: the satellite and the GPS receiver.



Picture 9: 2D positioning with 2 satellites and a clock error.



Picture 10 : 2D positioning with 3 satellites and removed clock error

Maintaining the accuracy of GPS receivers under these circumstances, i.e. with the presence of synchronization errors a particular position, will be more or less inaccurate. For practical application in the GPS positioning process, it means that position obtained by processing data in the GPS receiver may be out of service because the travel time of signals from the satellites is very short. Error in the clock has a large influence on the result in the determination of such position, for example, clock error from 1/100s of GPS navigation can cause an error of 3,000km. For accuracy of 10 meters in determining the position, the time the signal reaches the receiver is 0.00000003 seconds. The option of placing atomic clocks in GPS receiver is not profitable, so the problem is solved in another way. If you take a third satellite in the process of calculating the position of the object, two points of intersection of circles are received. In the event that all the clocks are absolutely precise, that is synchronized, point A is obtained as a result of the determination of GPS receivers, while the second point of intersection is unrealistic. In the event that we had anticipated, and that is that the clock in the GPS receiver is absolutely in sync with the clock from the satellite, the time is set to 0.5 s ahead of time on the satellite clock, we get the three points of B as points of intersection of three circles. In this case the error is calculated by the GPS receiver clock. If we move the time of GPS receiver's clock so that the three B points are translating at one

A point, we will manually or by computer calibration of GPS receivers carry out a clock error correction. Then the earth clocks are synchronized to an atomic clock on the satellite. Clock in the GPS receiver can now be considered as an atomic clock. The distance to the satellite can formally be considered as pseudo-distance, as is now the real distance between these two correspondents. In the real case where we need extra dimensions, we need the visibility of four satellites. In practice, for the 2D positioning receiver, three satellites are required. The position of the receiver is guaranteed on the Earth's surface. But here we should point to the link between the architecture of the used GPS receivers (the number of input "channels" for processing the input data) and the time needed for processing the data received directly from the satellite almanac to the moment of appearance of GPS position indicators on the application. When the original GPS receivers were single channel, it was necessary to wait on average between 10 to 20 minutes until the indications of GPS receivers on the map and at modern multi-channel receiver, that time is reduced to the maximum 1 minute. The augmentation of this time delay is also affected by the fact that when the constellation of GPS receivers-application was used in one geographical area and ended their use there, and the next time the system starts in another geographical area the internal memory of the receiver and the application of the appropriate map stays the same as on the previous constellation of satellites (almanac). Only after you load enough data in the new location, the new almanac, there is a data processing, transmission via GSM network and display the receiver position on the map. In fact, the GSM network in GPS applications is the transporting network.

Conclusion

GPS global positioning system has great possibilities in everyday needs of a modern man, which certainly include the needs of defense, security and protection. GPS - global positioning system - entered the front door to the Ministry of Internal Affairs of the Republic of Serbia through the TETRA radio communications system. Its use at both hand and car stations allows the dispatcher station system to monitor the movement of mobile terminals on the digital map, to direct them and to regroup according to the required task. Recently, such application system was used to support the implementation of the action VIND 2010, where there were successfully presented the possibilities of using TETRA system with GPS applications. That type of use TETRA cells has so far been used in emergency units, traffic police¹⁰, special-purpose units (UKP, SAJ, PTJ, Gendarmerie, IJP, etc.). It is also particularly important that it is possible to use GPS in the implementation of special investigative methods and in providing support for the controlled delivery of drugs. From the above, it can be concluded that GPS is becoming common in everyday work and actions of the Serbian police.

¹⁰ Milojkovic, B., Aleksic, V., Jovanovic, M., (2010). The application of GPS technology in the construction of dedicated GIS in the function of prevention of road traffic accidents. In Proceedings of X International Symposium "Prevention of Road Traffic Accidents in 2010, Novi Sad, 21-22 October 2010, p.

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