

# **Fourth Petnica Students' Science Conference December 8-11, 2005, Petnica**

## **ENGLISH SUMMARY BOOKLET**

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### ORAL PRESENTATIONS

#### **Aureoles of Ore Minerals Spreading in the Rebelj Area**

Ivana Ćirović, Aleksandar Kostić

Rebelj mountain is situated in western Serbia, in the Velika river basin, between Medvednik and Jablanik mountains (Jovanović 1956, Vasović 2003). This area is part of the Ofiolite Melange, known for Cu-Mn mineralisations (Ćirić 1996, Putnik and Purić 1978). Mineral association of Rebelj consists mainly of copper and iron minerals (Janković 1990).

The area of Rebelj mountain is known for a long copper mining tradition (probably since the Roman times) and Rebelj mine is first mentioned in 1865. The exploitation stopped in the beginning of 20th century. The most important researches in this area were conducted in 1951 by Cisaric and in mid and late seventies as a part of a series of researches in western Serbia that were organised by Geoinstitut. Mijajlović (1997) tested the possibilities of using the panning method for finding the mechanical aureoles of copper spreading as a part of a PSC programme. Researches of Terzić and Jovanović (1974) and Putnik and Purić (1978) showed up that Rebelj is not an interesting location in terms of copper exploitation, but none of earlier researches has dealt with the possible existence of other ore minerals in this area.

This research was done using modified panning method in order to check the presence of all ore minerals in the Velika river basin, with a special attention to lower basins of Mala river and Velika river. Results of panning tests are given according to relative concentration of determined minerals – a few grains, present or very present. In total, 16 panning tests were done on Velika river and its tributaries (figure 1). 9 different ore minerals were found – 5 iron minerals (figure 1A), 3 copper minerals (figure 1B) and 1 mercury mineral (figure 1C).

Magnetite was found in each of the 16 samples and its concentration was remarkably increased near the old mine on a tributary of Mala river. Pyrite and limonite were determined in most of the tests, as well as pyrotine. Limonite and pyrotine appeared only in concentration of a few grains, while pyrite's concentration raised to "present" three times. Hematite was found in only two tests, each time only a few grains. Copper minerals are presented by malachite, chalcopyrite and native copper. In general, concentration of copper and iron minerals is rising from tests near the confluence of Velika river towards the test number 15, near the old mine. It can be concluded that the secondary aureole of copper spreading is in the area of eastern and southeastern part of Rebelj mountain. Copper minerals are followed by magnetite and pyrite, while concentrations of other iron minerals were too small to be recognized as important for this research. Magnetite was also very present in other two tests in the upper basin of Mala river, probably due to its presence as an accessory mineral in the gabbro-peridotite rocks of Ofiolite Melange. These results were expected according to results of other authors (Mijajlović 1997, Putnik and Purić 1978).

Cinnabar was found in 7 samples from lower flows of Mala and Velika rivers. There isn't any data about earlier findings of mercury minerals in this area. Concentration of cinnabar in all of these tests

was “a few grains”, which means that aureoles of mercury spreading couldn't be settled. However, there are certain indications that aureole of mercury spreading exist. It is necessary to continue researches on mercury minerals in this area. It will be possible to say whether some mercury deposits exist in this area or not only after another, more detailed research.

### **Preliminary results of excavation on barrow III, Illyrian graveyard site**

Sonja Damnjanović, Smiljana Jošić

The site of Ilirsko groblje is a bronze age necropolis in the Bukovac village. It was first discovered in 2003, and the first archeological excavations on that site were taken the next year, when one of the nine mounds (mound 2) was excavated. In July, 2005, two more mounds were excavated. In the mound 3 were found 3 urns, some bronze jewelry, and round pit-hole, just in the centre of the mound. We think that pit-hole represent some older and recent archaeological excavation.

### **2-D simulation of formation and evolution of planets**

Uroš Delić

The main purpose of this paper is to try to make a model of the existence of extra-solar planets close to the star which have big eccentricities and masses. Using the simulation, the evolution of a proto-planetary disc made out of 20000 particles which are moving around the star in circles was observed. Collision of particles is the only way for two particles to collapse into one. We speeded up the simulation using an algorithm that creates particles one by one. Two special cases of accretion were detailed taken into consideration. In the first case, all bodies have equal masses while eccentricities and semi-major axes were given by certain distributions. In the second case, the values of eccentricity and the semi-major axis were manually given to a single body that had larger mass than the others. All of the other particles, which are added during the simulation, were moving around the star in circles. The semi-major axes of these bodies were given by different distributions.

### **Short-term adaptation of primary and high-order visual areas - psychophysical experiments**

Turi Eszter, Smolin Yoni, Malekan Ilana

Visual adaptation is a known phenomena induced when the visual system is exposed to the same stimulus for a prolonged time. When the stimulus is turned off one of the systems' calibration mechanisms are caught off-guard and visual perception is briefly perturbed. There has been a lot of research done regarding long-term adaptation and its effect but there is little known about short-term adaptation. In our study, we conducted for the first time a psychophysical experiment on short-term adaptation of primary and high-order visual areas. We generated adaptation by re-exposing the subject to the same image over and over. Subjects were instructed to perform a 'one-back-match' task, responding as accurate and as fast as they could by pressing the appropriate yes/no response button for indicating differences in the images shown. Both accuracy and response time aspects were analyzed. Our results indicate that short-term adaptation effect was achieved, and showed a high correlation with the results achieved by previous long-term adaptation experiments.

## **End-homogeneous graphs**

Andreja Ilić, Jovana Nikolov, Uroš Rajković

A structure is called homogeneous if every isomorphism between two finite substructures extends to an automorphism of the structure. The rich theory of homogeneous structures developed by R. Fraïssé in 1953 is one of the most important discoveries of modern mathematics. The classification of finite homogeneous graphs was made in 1976 by Sheehan and Gardiner. Following the ideas of P. Cameron and J. Nešetřil, in this paper we introduce the notion of end-homogeneous graphs and characterize end-homogeneous graphs with no loops. It turns out that a finite graph with no loops is end-homogeneous if and only if it is a disjoint union of complete graphs of the same size. The classification of end-homogeneous graphs with loops is far more complicated. We show that a graph with only one loop is end-homogeneous if and only if either the graph is connected and the vertex with the loop is adjacent to every other vertex, or the vertex with the loop is the only vertex in its connected component, and the rest of the graph is a disjoint union of complete finite graphs of the same size.

## **Flavonic heterozides quantification in samples o meadow honey**

Minja Jovanović

Flavonic heterozides were quantified in samples of meadow honey. Total amount of heterozides was determined, as well as several parameters related to oxidative stress-total antioxidative potential, total antiradical activity and coloration. Results show that honey is not a primary dietary source of antioxidants, but that consumption can contribute to reducing oxidative stress, thus preventing various diseases.

## **Perfect Numbers - an Echo from the Past and a Challenge for the Future**

Yordanka Kovacheva

This paper is devoted to the perfect numbers and their historical development. Perfect number is the number, the sum of whose devisers that are smaller than this number, is equal to the number itself. The paper examines the birth of the theory of perfect numbers in Ancient Greece and presents the proof for the Euclid's Theorem. It considers the development of the theory for the even perfect numbers and focuses on Euler's Theorem. It then discusses the question about the existence of odd perfect numbers.

The author analyses some of the attributes of the even perfect numbers and their link to Pascal's triangle. Then the paper presents the peculiarities of Mersenne numbers and their relation to the even perfect numbers. On this basis some new attributes of the perfect numbers are revealed. Explored are some multitudes of numbers, which include the multitude of perfect numbers and 'friendly' numbers. The paper presents the enunciation and solutions of some interesting problems with perfect numbers. The Appendix contains references to literature where the relevant proofs can be found for the theorems given without proofs in the main text.

## **Use of lentil lectin in detection of glycoproteins on nitrocellulose membrane**

Vladan Martinović

Efficacy of lentil lectin in detecting various glycoproteins on a nitrocellulose membrane was examined, using two variations of the method, with coupled and uncoupled lectins. In both series concentration of lectins was varied. The results confirm the starting hypothesis that lentil lectin is very suitable for glycoprotein detection and that very small concentrations are needed to obtain representative results.

## **Investigation of the possibility of digital photography usage as a mean of detection of single zones in the TLC quantitative analysis**

Ana Mijušković, Vanja Hložan

The possibility of using digital photography as a mean of detection in TLC quantitative analysis was investigated. The photographs of the given chromatograms were made and transformed into matrices of data using MATLAB software. After that, adequate 3D views were generated and the following parameters were used: peak height, peak volume and surface of the peak slice at the zero height. The method was tested at the presence of the potential bias and compared with the standard procedure which uses the TLC scanner for the detection of single zones. The standard deviation of the method was also estimated. Investigation has shown that the usage of peak height is less reliable; surface of the peak slice at the zero height can be used with bigger standard deviation and bias; peak volume gives more accurate and reliable results. The whole method shows a certain bias for which the source can't be identified. Also, there is a statistically important difference between this method and the classical TLC scanner detection. Further investigation and improvement of the method is desirable in the sense of development of a much more simple software package that can be used quickly and reliably for "outdoor and in situ" measurements.

## **The study of the dependence of diffraction efficiency on the way of getting the holographic diffraction grating**

Uglješa Milić, Stojan Djorđević

In this work we studied the dependence of the diffraction efficiency on the parameters within which the diffraction gratings were made. To get the diffraction grating the method of making transmission holograms was used. When the parameters were changed the diffraction grating was made and its' efficiency was determined. From the obtained graphics we determined the parameters within which the diffraction gratings have the maximum efficiency.

## **Heuristics for solving NP-complete problems on scale-free networks**

Rajko Nenadov

This paper describes construction of heuristics for solving two NP-complete problems on scale-free networks. Those two are problems of Hamilton cycle and clique. Considering the Hamilton cycle problem, the goal was to find some regularity in the characteristics of the nodes that form the cycle, while the focus of the max clique problem was in finding the nodes that may be members of the solution, and then consider only them. Based on this results, two "branch-and-bound" heuristics were made. First (Humilton) can be used for smaller networks, about 35 nodes, while the other, for finding maximum cliques, is applicable to much bigger networks (4000 nodes).

## **Connection between physical characteristics of abstract visual patterns and their phonological structure**

Ivana Pedović, Goran Rujević, Jovana Stošić

Continuing the line of previous research, this paper extends the „takete-maluma“ phenomenon to specifically explain which physical characteristics of an object influence the phonological structure of names that are mapped onto it. The characteristics used to determine this were sharpness, brightness, regularity, compactness and complexity. These characteristics were varied systematically so that each of them had two opposite levels (sharp-oval, light-dark, regular-irregular, compact-disperse, simple-complex). In accordance with these characteristics, 32 abstract visual stimuli were generated. The participants of the experiment were instructed to name each of these stimuli in the form of pseudo-words they found appropriate. The results show that certain phonemes are more frequent with stimuli that possess certain level of the characteristics than those possessing the opposite one. Furthermore, characteristics that share the same phonemes are found not to interact with each other, therefore influencing the phonological structure of names independently. Taken together, these results point out that the «takete» category can be easily defined using two of the characteristics used in the research, whilst «maluma» category is more complex, and requires further research in order to be successfully determined. In addition, the results show precisely which characteristic induces which phoneme in the phonological structure of the name of an abstract visual object, which can prove invaluable in further studies of this and similar topics.

## **Oxidation hydroquinone with potassium-chlorate like new kinetic method for determination of microamount of vanadium**

Miloš Pešić, Marko Drakulović

By realization of this research it's been observed possibility the use of oxidation hydroquinone with potassium-chlorate in presence of microamount of vanadium as accelerant, like new kinetic method for determination of microamount of vanadium. The results show that vanadium can be determinate with relative error from 2% to 15%. By folowing the results it is not approved dependence of the relative error of concentration of vanadium. On the fruge 1 it's shown dependence of coefficient of direction and concentration of vanadium. Also it's observed effect of the other ions ( iron,

chromium, silver, mercury, manganese, copper, titanium, cobalt, cerium ) on reaction and the conclusion is that iron accelerate this reaction, so vanadium cant be determinate in presence of iron. Vanadium cant be determinate in presence of titanium which lag the reaction. Attendance of silver create sediment of silver-sulphate, so determination of vanadium is disabled. Other ions have not influence on the reaction.

### **Antic minery in area of Timacum Minus**

Jovana Plavša

Locality nearby village of Ravna, for it had been assumed that it were Roman Timacum Minus , in the beginning of it existance in the first century AD was a fortress of eastern cohorts, and with time have became a centre of mining area, whose boarders on the west are not known until today. The purpose of our research was to ascertain was it or it was not western area of Timacum Minus included within its mining- district boarders. With this purpose we have taken a field survey in the region western to Ravna, which did not give any find concerning exploitation of metal ores.

### **Dynamical stability in a modified Solow-Swan model of economic growth**

Djordje Radičević

Three extensions of the Solow-Swan economic growth model are presented in this paper. The existing model has been expanded to include the exchange of human capital between countries proportional to the logarithm of the national gross domestic product per effective labor (GDP per capita). In addition, stochastic fluctuations of the parameters of the model are introduced as well as a model of endogenous technological growth. All of the modifications have been tested by numerical simulations employing real economic data. The obtained results show that the flow of human capital (at its current rate) doesn't have a significant long-term effect on the national economic growth. It has also been concluded that in the deterministic modification the equilibrium BDP per capita is not related to its initial value, while the other two modifications present a power-law dependence of these two variables regardless of the country's economic development.

### **Parameters and Substructures of Scale-free Networks**

Marina Radulaški

This paper investigates global and local properties of scale-free networks generated by the Barabasi-Albert model. Small world coefficient and clustering coefficient dependences on network size have been expanded to dependences on parameter  $m$ . Dependence of size three network substructure occurrences on network size and parameter  $m$  has been discovered. Counting of size three substructures occurrences for random and preferentially chosen subset of nodes was investigated as a heuristic for grading same values on the level of the whole network. Random pick is found to be simpler, but less precise method. Formulas and coefficients for preferential pick are introduced and can be used for estimating the number of size three network substructures for  $1 \leq m \leq 8$ .

## **Memorizing of the emotionally colored text**

Anja Simanić

The aim of this research was to examine how the information of qualitative different affective valence will be memorized, all included into affectively consistent texts and to examine if the affective information will influence memorizing of the whole text. In the research two texts which were practically the same have been used as stimuluses. The emotional tone of the texts was the only difference between them. To achieve the effect of different emotional tone without destroying the unique structure, only the opposites of the same adjectives were varied through the text (nice-ugly, comfortable-uncomfortable) as well as adverbs (weak-strong), and with certain words, the ones of different meaning were used (gardening-polluting the garden). Great part of the details was the same in both of the texts. The questionnaire used for measuring the memory of the examinees consisted of questions related to details same in both of the texts (neutral details), and of the ones which were varied (emotionally colored details). The sample was made of 44 examinees.

The results of the research show that neither negative nor positive information affected memorizing of the whole text. Neutral information were memorized equally in both of the texts ( $t=-0.9674$ ,  $df=42$ ,  $p>0.05$ ) (scale 1). This may lead us to a conclusion that emotionally colored information do not interfere in the memorizing process of the whole text.

However, according to the results negatively colored information were generally memorized better than the positive ones ( $t=-5.028$ ,  $df=42$ ,  $p<0.0001$ ) (scale 2). It may be that we memorize better negative, painful, dangerous and upsetting information because this kind of information is mostly connected to critical and for organism dangerous situations. Therefore it is important to have an intensive and faster reaction. Better memorizing of this kind of information may allow us to recognize and adjust easier to problematic situations and to solve them easier by richer memories.

## **Relation between self-concept and group acceptance**

Tihomira Stanojević, Ana Marija Trbić, Ivana Papulić, Vladislav Radak

The aim of this research project was to establish relations between self-concept and acceptance in surrounding. Trebješanin define self-concept as total conscience about ourselves as separate individual unique entity, as for some of the aspects and special characteristics.

Our subjects were 39 pupils from RC Petnica, at the age of 16 to 18, and 77 students from Surdulica's secondary school first grade.

For measuring self-concept we used Opačić's test witch contains ten variables: sensitivity- rationality, rigidity, misanthropy, ethics, focus control, global self-esteem, sexual attraction, evolution by others, physical ability and intellectual ability. For measuring social acceptance we used Jacob Moren's sociometrical procedure.

Our hypothesis were based on fact that index of general social acceptance would positively correlate with the factor of morality, sex attraction and physical ability and negatively with factors of misanthropy and rigidity. Also we assumed that index of intellectual acceptance would positively correlate with intellectual ability, but on the other hand, negatively with factors of emotionality, rigidity and locus control.

Our results showed us that people usually chose to work and cooperate with persons who don't see themselves as misanthropes, rigid, emotional, moral, sexually attractive, with inter locus control, and those whose global self respect is very high.

## **Kinetic Analysis of Acetylcholinesterase Inhibition by Green Tea Polyphenols**

Goran Tomić

Kinetic parameters of acetylcholinesterase inhibition ( $K_m$ ,  $V_{max}$  and  $K_i$ ) with polyphenols from green tea extracts were determined using the Elman spectrophotometrical method. Results show that acetylcholinesterase activity decreases with rise of polyphenol concentration in green tea extracts. We concluded that the inhibition is noncompetitive, which is a novel information regarding acetylcholinesterase inhibition.

## **Preliminary results of excavation on barrow I, Illyrian graveyard site**

Stefan Trajković Filipović, Mirko Sabadka

The site of Ilirsko groblje is a bronze age necropolis in the Bukovac village. It was first discovered in 2003, and the first archeological excavations on that site were taken the next year, when one of the nine mounds (mound 2) was excavated. In July, 2005, two more mounds were excavated. The mound 1 was damaged while building the road to the Golubac village, and about half of its size had been preserved. The mound was located in the eastern part of the necropolis, and 5 urns, 2 fire-places, and other metal, flint, ceramic and osteological materials were found in it.

## **The Connection between the Contents of the English Textbooks and Gender Stereotypes in Scholars**

Anđelka Vagić

Man is a social animal (Aristotle) and, as such, needs to acquire certain attitudes, values, roles and customs that grant him acceptance in a society. The process of adopting these characteristics is called social learning or socialization. Socialization is realized through different media, such as family and school. Even though family plays the most important role in social learning, the influence of school should not at any rate be underestimated. For, it is also through school that society tries to instill particular values into children. Most textbooks do not only have an educational purpose, but can also serve as a means of communicating socially favored attitudes to pupils. Moreover, the contents of these textbooks can as well raise role awareness in scholars.

Role is usually defined as the appropriate behavior for members of a group. There are different kinds of roles, one of them being gender role. Gender roles are sets of expectations that define the ways in which the members of each sex should behave. People are expected to act in accordance with their gender roles and are therefore no longer viewed as individuals, but as members of a group. These impressions or schemas of entire groups of people are called gender stereotypes. They are very powerful and dangerous because they involve the false assumption that all members of a group share the same characteristics. For instance, in the western culture women are usually seen as passive, subordinate and sensitive, as opposed to men who are mostly described as active, dominant and independent (Vander Zanden). However, there seems to be no biological basis for such views.



Biology only sets the stage by providing minute differences and socialization exaggerates those differences (Psychology Today).

Although biology has its share in many human features, gender roles are considered to be adopted in the process of socialization, rather than given by birth. These roles are initially learned in one's family and later on at schools. The learning of gender roles at school can be realized either directly - through interaction with other students and school employees, or indirectly - through the contents of textbooks.

Consequently some textbooks may even provide children with many stereotypical gender models. The English language textbook "Say it in English 2" issued by the home publisher (Zavod za udzbenike i nastavna sredstva) seems to be one of these textbooks. It centres on the everyday life of the Gray family, which consists of five members: Mr and Mrs Gray, and their three children. Mr Gray, works as an engineer and provides for his large family.

Being employed, he can afford himself a car, which he washes with his son. Mrs Gray does no such thing, because she has not got a car of her own. The only washing she does is the washing up.

Fortunately, her daughter Jane is always there to help her. These are only some of the stereotypical gender models that can be found in this textbook. As opposed to it, the textbook "Happy Street" published by "Oxford University Press" has a different content, which does not emphasize gender stereotypes. The fact that a husband can find his way to the kitchen and even make a salad there, does not strike the reader as odd. Nor does the fact that his wife has a job.

The aim of this research was to examine whether there is any connection between the contents of these English textbooks and gender stereotypes in scholars. The hypothesis was that the pupils who learn from "Say it in English" textbooks will have more stereotypical views on gender roles than the students who use "The Happy Street" textbooks.

### **The Archaeological map of Smilovačko polje**

Petar Aleksić, Jovan Nikolić

Purpose of this work is detailed location of new and potential archaeological sites on the territory of Smilovačko polje. According to the literature, this section hasn't been properly researched. Therefore, we have included in our work a detailed five days field survey. We've discovered fourteen new sites. Ceramic material has been found and exposed. We have described each new site and provided them with a appropriate photo. On the basis of our field research, we discuss about the possibilities of interpretation of human settlements during the eneolithic, bronze age, iron age and also in antiquity and between XV and XIX century. All of the results should be taken as a start for the new systematical research because of the fact that Smilovačko polje is the part of archaeologically insufficient area of Southeast Serbia.

### **Quality of Gruža Lake Water**

Nevena Andrić, Nikola Koković

This research has been done to determine hydrochemical characteristics of water Gruža's lake. Hydrochemical and hydrological methods were applied in this research which included taking 6 samples on 5 locations during two months. The water belongs to third class. The results of the research show that the water of Gruža's lake is hydro-carbonaceous and calcareous, mostly hard with small mineralization. Quality of water is falling off along the side of the lake. This change of quality is caused by increased concentration of Mn, Fe, NO<sub>2</sub><sup>-</sup>, NH<sub>4</sub><sup>+</sup>, PO<sub>4</sub><sup>3-</sup> and value of BOD<sub>5</sub>. Geological composition of researched area has bad geochemical influence on quality of water, which shows concentration of Mn and Fe. These ions are being unleashed from dissolved rocks. In water they infiltrate by nearby rivers and underground waters (which is in hydraulic connection with the lake). Also origin of these ions can be connected with internal processes inside the lake. High concentration NO<sub>2</sub><sup>-</sup>, NH<sub>4</sub><sup>+</sup>, PO<sub>4</sub><sup>3-</sup> ions and value of BOD<sub>5</sub> are caused by inadequate uses agrotechnical measures in the fields which are located nearby the lake. The results of earlier research are different than ours results, so we have different classes of water now. The water belongs to third class.

### **Criteria of paintings similarity grouping: style or theme?**

Aleksandra Branković, Ivana Kalabić, Dragana Perišić

This study is concerned with the problem of similarity judgments of paintings. We tried to specify which criterion of similarity grouping prevails, a style (e.g. two expressionist paintings would be judged as similar regardless of the thematic content) or a theme (e.g. two portraits would be judged as similar regardless of the artistic style or expression form). In experiment the 29 students of PSC participated as subjects. The stimuli were 50 combinations of 3 paintings reproductions: two paintings were similar by style and two by theme. Subjects were asked to eliminate one of the

paintings so that the other two satisfy a similarity criterion either style or theme. T-test has shown no difference between style and theme preferences. Additional analysis indicated three clusters of subjects. The first cluster included the subjects which preferred theme over the style, the subjects in second cluster preferred style over the theme, and the third cluster included the subjects which had no preference of either theme or

## **PrologAPI**

Robert Čordaš

PrologAPI consists of the Prolog interpreter and the application interface which enables using Prolog constructs from C++. It is possible to call Prolog queries from C++ as functions, and call C++ functions from Prolog. Prolog source code is transferred as plain text. Arguments that are passed could be of type String, Integer, Boolean, Real, Array and Record. The whole Prolog interpreter is compiled into one DLL (for Microsoft Windows) or one .so (shared object - for Linux) file and it is possible to use it from any C++ compiler. The interpreter is completely implemented in Object Pascal (Delphi, Kylix, FPC) while the interface is implemented in C++.

## **Objects of Ancient Egyptian Provenience in Serbia**

Ana Djuričić

In Serbia, there are 682 antiquities of ancient Egyptian provenience. Objects are situated in six museums: the National Museum in Užice, the Jewish Historical Museum in Belgrade, the National Museum in Belgrade, the Museum "25. maj" in Belgrade, the City Museum in Sombor and the City Museum in Vršac. All the antiquities are either gifts or donations, with the exception of the scarab form archeological site Trnjaci-Pilatovići, near city of Užice. The biggest collection is the one of the City Museum in Vršac.

In this essay, all the objects from museums of Serbia are catalogued and described. Forms of objects in museums are: amulets, shabti figurines, scarabs, scaraboids, jewelry items, statuettes, vessels, fragments of inscription, coffins, a mummy and a canopic jar stopper.

## **The Use of Slang Words in Teenage Magazines Compared to those in Teenagers' Everyday Speech**

Dunja Djurović

This project deals with the comparison of slang words in teenage magazines and the everyday speech of teenagers. It was expected that a striking difference would appear between the slang words in magazines and in speech, and in the meaning of the slang words as well, depending on the context. However, significant differences are noticed only in the number of repetitions of those slang words. It is assumed that this difference is caused by the different choice of conversational topics, or magazine articles.

## **Romanisms in Recipes in the Region of Boka Kotorska**

Jovana Kaluđerović

Romanisms in recipes, in the region of Boka Kotorska, are studied in this project, collected by the inhabitants from that region. The results of the research confirm the basic assumption that, as a consequence of certain historical events, romanisms have been kept in larger extent in the southeastern part, than in the northwestern part of Boka Kotorska. However, larger conclusions could not be drawn, owing to the volume of the collected material.

## **Research for optimal condition of electrochemical preparation of iodoform and determination of reaction yields**

Slavica Koprivica, Ivan Stambolić

Iodoform is very important product. It is used in medicine, as an antyseptic; in chemistry as reagent in many organic synthesis, etc.

One of several ways of iodoform preparation is electrochemical method. In this research were tested the most optimal compositions between 4 electrolytes and nickel, bismutes, carbon and led catodes were changed in order to find the best combination. It was found that the best results are shown by use of «Electrolyte 3» and catode made of nickel. By use of this combination the prepared iodoform was the most purest and of the best quality. Yeald of this reaction was 94.2% per mass of used reagents, and purity of prepared iodoform was 95.5%. This is very important, because this method can be used in industrial purposes without furdur rectification, which causes lower cost of iodoform and its preparation.

## **Ecotouristic value of the geological, hydrological and ethnographical characteristics of the artificial lake "Barje"**

Srđan Kostić, Dejan Nešković

The artificial lake "Barje" is located in the southern Serbia, 30 km southwesterly from Leskovac. In average, the lake is 5,5 km long and 400 m high. The purpose of the exploration was to determine the ecotoutistic value of the geological, hydrological and ethnographical characteristics of the artificial lake "Barje". During the exploration it was used geological mapping method combined with standard hydrological and hydro-chemical methods, where the following particles were determined:  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{NH}_4^+$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$ . Also, the ethnographical characteristics were determined according to the interview with local people and recordings. Regarding geological structure, the explored area is mostly composed of crystal shale, gneiss, and amphiboles. There are also sand and clay in the field near the village of Barje. Based on the previous research, the water of the lake is I and II class, which means that it can be used for drinking. The exploration was done in two parts-field and cabinetnetwork. The results show that there are six rocks, which could be interesting for possible tourists ("the rock of Kraljevic Marko", "the smooth rock", "the Girl's rock", "Zelaj's rock", a rock near a household and a rock at the beginning of the lake).

The most interesting things about these rocks are their position, size and many legends about their names and shape. Furthermore, the results show that the water of the lake and five springs around it belongs to I and II class, which means that it can be used for drinking. There also many legends, which are connected with the names of the springs ("Tair's spring", "Ajdar's spring", "Death spring", "Saint Nikola's spring" and spring from the household). As for the ethnographical characteristics, several objects were determined, as the most suitable for developing the ecotourism:

- 1) the church devote to Saint Kozma and Damjan-Vracevi,
- 2) the church devoted to Saint archangel Gavril,
- 3) the house of Zivkovic Stojan, which dates back from XIX century,
- 4) authentic meals ("tarana", "poparenice", "jalova čorba", "ljutić", "buza") and drinks ("hlebovača"),
- 5) specific handcraft,
- 6) authentic pottery ("crepulje", "vrčve", "grna", "okanica", "ibrik", "testija", "obramka", "gasarče"),
- 7) genuine national garb.

Concerning all the researched natural resources, it can be concluded that this field gives a great opportunity for developing adventurous and picnic ecotourism. In order to achieve more complex information about the natural resources, it has to be done some biological research, which will also show the qualities of this lake. Moreover, the explored field could also be widen, because the area called "Porecje" also has great resources for developing tourism, especially ecotourism.

### **Effect of peroxynitrite on MnSOD:tyrosine nitration and enzyme inactivation**

Nemanja Marjanović

This paper examines the effects of peroxynitrite on structure and activity of MnSOD. The results show that ONOO<sup>-</sup> causes MnSOD inactivation through specific tyrosin residue nitration and oxidation. Nitration reaction shows a saturation kinetics, indicating that reaction is more complex, presumably catalyzed by manganese at the active site of the enzyme. Glutathione shows protective effects on MnSOD inactivation, even at concentration levels lower than physiological. Cysteine exhibits moderate protective effects, while vitamin C enhances nitrotyrosine formation. This may be due to its reaction with peroxynitrite which leads to different products formation that may be sources of reactive nitrogen species. The results shed a new light on nitration mechanisms in vivo and open a possibility of further research on their elucidation.

### **Pit-grave culture in Serbia and Montenegro**

Uroš Matić

The Pit-grave or Yamnaya culture is a great cultural complex that consists from large number of cultural groups with same characteristics. They were all situated in their home territory in western Asian steppes as in steppes of Ukraine and Russia. Yamnaya culture is late eneolithic and early bronze age culture dating from 3600-2300 B.C but some archaeologists like Marija Gimbutas date it in an earlier period. The culture was predominantly nomadic, with some agriculture practiced near rivers and a few hillforts. Domestication of the horse, cattle, sheep and goat, use of plough and carts is attested. The burials are mostly with inhumated deceased but there are some examples of cremation. Both burial ways are burials under tumuli which are in this area called kurgans. These

tumuli are very monumental in their dimension which go from 10-50 meters in diameter and they are in their height from 10 to even 80m high. Burials under tumuli in Yamnaya culture are burials in shafts or pits with right angles which are dug in flat ground and look like chambers. The deceased were placed on the matress in supine position with bent knees and covered with ochre which symbolises life, its prolongation and blood birth. Multiple graves have been found in these kurgans, often as later insertions. The Yamnaya culture is identified with the late Proto-Indo-Europeans in the Kurgan hypothesis of Marija Gimbutas.

The early cultural movements in southeastern Europe are noted by coming of nomads from the steppes of western Asia, Ukraine and Russia. Archaeological evidences of Yamnaya culture in Serbia and Montenegro are only few but they are very important for investigation of connections with domestic late Neolithic and early Bronze Age cultures. The late Neolithic and early Bronze Age cultures in Serbia and Montenegro are Kostolacka, Vucedolska, Bubanj – Hum III, Vinkovacka, Moriska, Verbićoara, Pančevo-omoljicka i kulturna grupa Belotić-Bela Crkva. The lines in which the Yamnaya culture made an influence on these cultures are seen in the burial way, for the first time in some of these cultures are tracked burials under tumuli with body of the dead in position with bent knees. The Yamnaya culture influence is also seen in the disappearing of some of these cultures from prehistorical scene of Serbia and Montenegro. In this work are also mentioned and discussed the migrations of nomadic people carrying Yamnaya culture and their movements and actions in Serbia and Montenegro. With their migration comes their influence and reconstruction of prehistorical events involving Yamnaya and the cultures in Serbia and Montenegro.

## **Typological and functional analyses of Neolithic figurines from Vitkovo site**

Tamara Mladenović

The author analyzed Vinča figurines from the archaeological site of Vitkovo near Aleksandrovac, Serbia. Analyses were based on documentation about figurines from archaeological investigation - campaign of year 2001, which had been given to the author by National museum in Kruševac. The typological analyses of figurines considered their assignment in some of the periods of Vinča culture, based on the already assigned figurines from other Vinča sites, for which was made special form during the researches. Also, the functional analyses of the figurines were done in this work, which considered the explanations of what could the figurines present to their creators, and it was based on different archaeological theories. The aim of doing this kind of analyses was to find out something more about the people who lived in Vitkovo in the Neolithic period.

## **BIM - Bluetooth Instant Messenger**

Dušan Panić

The basic purpose of the BIM protocol is free of charge communication - messaging using Bluetooth wireless technology. BIM implements creating of an ad-hoc wireless network, and creating active and passive scatternets. The advantage of BIM protocol over other similar protocols is the possibility of point-to-multipoint communication instead of peer-to-peer. BIM has two working modes. The first one is freeride, where clients randomly create piconets and exchange messages. The other one is the group mode where all nodes work as a group. In the group mode nodes have a master node which coordinates the group. The main goal of this project is implementation of client-transparent ad-hoc Bluetooth networks for data exchange (messages, pictures, sound, video etc.).

## **The Effects of Different Ligands on Dinitrosyl Iron Complex (DNIC) - assisted NO dismutation**

Vladimir Prokopović

Nitric oxide (NO) is considered to be very important inter/intracellular messenger regulating numerous physiological processes. Some of the effects that are connected with NO are actually result of the action of his congeners: nitrosonium (NO<sup>+</sup>) and nitroxyl (NO<sup>-</sup>) species. Free iron, which is loosely bound to the low molecular-weight ligands and proteins in human organism, reacts with NO to give DNIC (dinitrosyl iron complex). It has been shown that these complexes can disproportionate NO. This paper examines the effects of different ligands (cysteine, glutathione and bovine serum albumine) on stability and formation of DNIC as well as on DNIC-mediated NO dismutation. Hydroxylamine production was detected in all samples after first bolus addition of NO. The greatest amount of total hydroxylamine was found in DNIC made from BSA, while those made from cysteine produced the lowest hydroxylamine amount. Independently on the ligand type, dismutation kinetics shows a saturation plateau which corresponds to the disappearance of free SH groups. Experiments done in 50 mM HEPES buffer gave higher amount of total hydroxylamine and more stabile DNIC's than those done in potassium phosphate buffer. SDS PAGE analysis of the samples containing BSA showed protein aggregation as a consequence of peroxyxynitrite formation. The extent in which peroxyxynitrite is formed in this reaction remains to be solved, giving us a clear picture of the preferential (protective or destructive) effects of DNIC-mediated NO dismutation.

## **Influence of dimethyl-sulphoxide on signal conduction in nerve cells**

Marija Raković

Normal functioning of the nerve cell is very important for normal functioning of the whole organism. Many different factors affect nerve transmission. Recent studies suppose analgetic characteristics of dimetyl-sulfoxyde (DMSO). This study investigated effects of DMSO on nerve transmission through observing neurophysiological changes in peripheral nerves. Velocity and amplitude of the action potential were measured by oscilloscope using frog sciatic nerve as the model system. Samples were treated with 0.1%, 0.3%, 0.5%, 0.7%, 0.9% and 1.1% DMSO. The results show dose-dependant particular or total inhibitor effects of DMSO to nerve transmission and some neurophysiological changes. Concentration higher than 0,9% induce conductive blockade. Presumably, DMSO interacts with potassium channels, thus lowering the nerve conductance.

## **The Characteristics of Scale-free Networks Generated According to the Barabaši-Albert Model**

Miloš Srećković

A large number of phenomena from everyday life can be described using models of networks. It used to be considered that real networks are best described using random networks, however, major differences were noticed when their characteristics were compared. It turned out that most real

networks behave similarly to scale-free networks. In this paper the properties of scale-free networks generated according to the Barabaši-Albert (BA) model were examined. The dependence of the values of the clustering coefficient and the small-world coefficient from the initial parameters connected to the BA model was checked, and it was noticed that the initial parameters influence the graph of the number of nodes in respect of their number of links. Because of that, the time interval after which the initial parameters lose all significance was examined afterwards.

## **Determination of proteolytic activity of bromelain on fibrin, gelatin, albumin and hemoglobin**

Iva Šabović

Effect of bromelain on various human proteins was examined by microscopy and spectrophotometry. This study was conducted on several important proteins - fibrin, gelatin, albumin, hemoglobin. Results show that bromelain degrades all of the examined proteins. Depending on the state of the organism use of bromelain-based remedies and capsules can have serious side-effects. Due to broadness of its effects and insufficient knowledge of this enzyme further investigations regarding bromelain ought to be performed.

## **Zeolite – modified solid carbon paste electrodes**

Saša Šorgić

In this work were examined zeolite – modified solid carbon paste electrodes. Electrodes were modified from the work: Walcarius A., Mariaulle P., Lamberts L. 2003, Zeolite – modified solid carbon paste electrodes. *J Solid State Electrochem*, 7: 671 - 677. Electrodes were made from mixture of 66.67% paraffin, 27.78% graphite and 5.55% zeolite. That mixture (paste) was heat smearing on the graphite core, punched from the used batteries. In servitude of which metal ion was bound for zeolite, four electrodes were made: Cu, Pb, Hg and Zn – zeolite electrodes. With this electrodes were potentiometric determined variety electrode potential in servitude of the different concentration of solutions:  $\text{Cu}(\text{NO}_3)_2$ ,  $\text{Zn}(\text{NO}_3)_2$ ,  $\text{Pb}(\text{CH}_3\text{COO})_2$  and  $\text{HgCl}_2$ . The results are given in graphs illustrated on pictures 1, 2, 3 and 4.

With received results it is possible to conclude that Pb – zeolite electrode shows better results of the other examined electrodes. Pb – zeolite electrode can be used in range of concentration between  $10^{-1}$  and  $10^{-5}$  mol/dm<sup>3</sup>. The value of Pearson Correlation, in these cases, is in range between 0.974 and 0.985. That means that line is very linear, and sensibility of received results is very high. Good results were shown and Hg – zeolite electrode, with used range of concentration between  $5 \cdot 10^{-1}$  and  $10^{-5}$  mol/dm<sup>3</sup>, and the value of Pearson Correlation is between 0.951 and 0.988. Cu – zeolite electrode can be used in range of concentration between  $5 \cdot 10^{-1}$  and  $10^{-4}$  mol/dm<sup>3</sup> and Pearson Correlation is between 0.975 and 0.986. Zn – zeolite electrode can be used in range of concentration between  $10^{-1}$  and  $10^{-4}$  mol/dm<sup>3</sup>, and the value of Pearson Correlation is between 0.955 and 0.983.

With received results we could conclude that Zeolite – modified solid carbon paste electrodes can have practically usage. Sensibility of these electrodes, in most examines cases, is to  $10^{-5}$  mol/dm<sup>3</sup>, like for the other potentiometric methods. These electrodes are very simply for make, and we can compare them with the other commercial electrodes.



## **Relations Between Attachment And Attributional Styles Towards Friends And Towards Ourselves In Adolescence**

Marija Trkulja, Marina Tumbas, Saška Mitrović

The main aim of this research was to examine relations between attachment styles and attributional styles towards friends in adolescence. Another aim was to find is there relations between attributing ourselves and our friends. Participants (N=50) were balanced by the gender. Attachment styles towards friends were measured by the modified Brennan inventory (Kamenov & Jelić 2003). Attributional styles towards friends were measured by the ASQ-test (Peterson et al. 1982) which was adapted to the needs of this research. This test comprises 4 dimensions of attribution – internal/external locus of control, stability/instability, global/specific and important/not important. Because all participants have secure attachment style, further analysis was done according to dimensions of attachment – anxiety and avoidance.

Results have shown that participants who are more avoidant towards friends treat positive situations inherent to their friends and themselves as external, unstable, specific and not important. Also, those participants treat negative situations inherent to themselves as external and not important. Higher score on avoidance dimension of secure attachment style can indicate mild distance from surroundings and other's feelings and behaviour. It was supposed that from that reasons, these persons will refer cause of friends' behaviour to other people or situations. Because they have positive opinion about themselves, it is surprising why they have negative attributions about themselves in positive situations. Though, positive image about themselves does not mean good self-knowing. Because they treat positive and negative situations as not important, it was supposed that they are less occupied themselves, their success and failure. Maybe from that reason they impute external states for their's behaviour.

Also, results have shown that participants who are more anxious towards friends treat negative situations inherent to their friends as global, and negative situations inherent to themselves as internal. Higher score on anxious dimension of secure attachment style can indicate higher dependence from others. It was supposed that higher attachment for friends refer higher fear from negative outcome of situations inherent to friend. Possible explanation was that these persons negative outcome treat as endanger and that it will evolve their relations with friends. Because these persons are more fearful and less secure in their abilities, it was supposed that this attributional style keeps less negative image about themselves.

It is noticed that these who are more anxious towards friends are more sensitive to the situations with negative outcome, and these who are more avoidant towards friends are more sensitive to the situations with positive outcome. Also, these with higher avoiding dimension have more optimistic opinion about negative situations, than these with higher anxiety dimension.

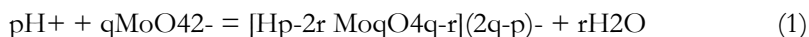
It was attained all significant correlations between attributions ourselves and friends in positive and negative situations. This result indicate that same mechanism we used when we attribute ourselves and our friends.

## **Investigation of reversible formation of [Hp-2r MoqO4q-r](2q-p)- clusters as a function of pH, concentration and temperature**

Dragana Vasić

The reaction of molybdate cluster formation was investigated spectrophotometrically, by varying the concentration of H<sup>+</sup>, total molybdate concentration and temperature.

The molybdate clusters formation followed equation (1) (Emeleus 2004):



The cluster  $[\text{H}_p\text{-}2r\text{ MoqO}_4\text{q-r}]^{(2q-p)-}$  in the equation (1) is characterized by combination (p,q). Clusters may be present in the system either as ions or crystals. One of the most successful reaction models predicts the concentration of cluster (p,q) as a function of pH and total metal concentration (Figure 1).

Absorption spectra of the molybdate solution at different pH values are shown in Figure 2. It can be seen from the Figure 2 that the lower the pH value, the higher wavelengths of the absorption spectra. It can be inferred from these data that the larger clusters appear in the solution (Validžić 2004). At  $\text{pH} < 1$ , the absorption spectrum does not change. It can be concluded that in the pH range from 1 to 7, molybdate ions form clusters which contain different number of monomer units.

Experimentally obtained pH is always lower than calculated pH, because of the protonation of the clusters (Validžić 2004).

The ratio  $R = p/q$  can be determined as a difference between calculated and experimentally obtained pHs, following the equation (2):

$$R = (C_k * V_k / V - 10^{-\text{pH}}) / C_{\text{mo}} \quad (2)$$

It is possible to predict from the Figure 1 which cluster is the most abundant one. The results shown in Table 1 confirm that larger clusters, which may contain up to 36 monomers, dominate at higher pH values and that the investigated reaction model can be applied to molybdate clusters.

The reaction of cluster formation is reversible, as can be seen in Figure 3.

Functions of absorbance vs time in reactions of forming and disintegration of the cluster are shown in Fig 4. The cluster disintegration is faster than the cluster formation and both reactions are first-order. Rate constants, obtained from these curves, are shown in Table 2. Larger clusters show lower stability than smaller ones.

The absorption spectra of the molybdate solutions with different total concentrations are shown in Figure 5. It can be inferred that the more the total molybdate concentration, the more the number of monomers in a cluster.

Absorption spectra of molybdate solutions at two different temperatures are shown in Fig 6. Higher temperatures favor precipitation of larger clusters, and smaller clusters remain stable in the solution. After cooling, larger clusters dissolve in the solution. It can be concluded that smaller clusters are more stable than larger ones.

The stability times of clusters in a solution are shown in Fig 7. At lower pHs, lower temperatures and higher total molybdate concentrations, larger clusters dominate in a solution. Decreasing pH and higher temperatures favor transition of clusters from solution into a crystal form.

## Synthesis and Structural Characterization of Complexes of Pyridoxal Aminoguanilylhydrazone with CO<sub>2</sub>

Stefan Vujčić

The reaction of warm EtOH solutions of  $\text{CuX}_2 \cdot n\text{H}_2\text{O}$  ( $X = \text{Cl}$ ,  $n = 2$ ;  $X = \text{NO}_3$ ,  $n = 3$ ) with pyridoxal aminoguanilylhydrazone (PLAG) yielded the mono(PLAG) complexes. The complex  $[\text{Cu}(\text{PLAG})\text{Cl}_2]$  has pentacoordinated structure and complex  $\text{Cu}(\text{PLAG})(\text{NO}_3)_2 \cdot \text{MeOH}$  probably has tetraordinated structure. Complexes are characterized by elemental C, H, N analysis and conductometric measurements and in case of  $[\text{Cu}(\text{PLAG})\text{Cl}_2]$  with X-ray diffraction analysis.

**Ways of shortening words in classified ads**

Lara Vujović

The ways of shortening words in classified ads are examined in this project, on the material of classified ads from one issue of the magazine 'Tender Ads'. The results of the research show that there is a system in shortening words in classified ads, because the rules could be set by which the words are shortened. It has also been established that, if the word is shortened in several ways, there is one way which is the most frequent. Besides shortening words according to the recommendations of the Orthography of Matica srpska, certain breaches of the rules have been noticed as well. This project also points to the problems concerning the lack of precision in the recommendations of the Orthography itself, so the correctness of certain abbreviations cannot be set.

### **Archaeological map of Obrenovac area**

Jelena Živković, Sanja Spasojević

Thanks to the movable archeological findings on the territory of Obrenovac, continuity of the life from Starcevo culture (5000 BC) can be followed until middle age (XV century). Neolithic settlements can be found on the left lowland bank of Colubara as far as Sava.

In the period of Bronze and Iron age, sites could also be found on the right bank of Colubara, principally tombs and pantries.

Central place in the period of Roman domination represents locality of Usce, where the military camp was. Here, besides ceramics findings, also the metal findings could be concluded.

From the period of middle age there were stated three lines of locality but it wasn't possible to consolidate their exact function. In Mislodjin can be found remains of church s. Hristifor from the XV century.