

THE 80 TH ANNIVERSARY OF ACADEMICIAN LJUBOMIR ILIEV[†]

Every human personality is a half universe, reflecting the remaining half. Therefore the knowledge and understanding of the life of a distinguished personality widens and enriches our own part of universe. However to completely understand a person is impossible, just like it is impossible to solve all secrets of the universe.

In his original as a concept and intriguing as contents book "Mathematical methods in the cognitive theory", Academician Iliev has added to the title, after dots, the following words "and a mathematician in this world". The real meaning of this addition is known only to its author. We could only guess, that it is a synthesized self assessment, that is helping us to understand the difference between knowledge and wisdom.

There is no doubt that to the world Academician Iliev is and will be a first-class mathematician. But to Bulgaria and Bulgarian science he is much more than "a mathematician in this world". Half a century of the development of Bulgarian mathematics is linked by rights with his name. It is still early to analyze and evaluate the "Iliev" period of Bulgarian mathematics as we are not enough remoted in time to compare. However I do not doubt that Academician Iliev will be happy to see still more vigorous bloom of his beloved science and still bigger successes of his students.

My wish is to percieve the life-history of Academician Iliev, the undoubted doyen of our mathematical community, as an example to follow, as an example of dedication to eternal ideals, honoured and highly appreciated by all of us. For human societies have existed and exist so far as they have been welded together and lead by certain ideals. A society without ideals is an amorphous group of people, ready to be joined or absorbed by the ideals of another society.

One of the basic mainstays in Academician Iliev's life and activity is his consciousness of being Bulgarian and of belonging to Bulgaria. Born in one of the most Bulgarian towns - Veliko Tarnovo, Academician Iliev has a sharp feeling of national dignity and appurtenance to an ancient culture, that should be revived and defended.

This feeling of appurtenance could explain some not quite well known, but strong predilections of our jubilee. For example, he is a keen numismatist. The motivation of this hobby of his is to touch the sources of authentic information about the

[†] This speech was presented at the celebration of Academician Iliev's anniversary within the frames of the XXII Spring Conference of the Union of Bulgarian Mathematicians, Sofia, April 2-5, 1993.

history and culture of our land and people. He is not simply a collector of coins, but an explorer with his own theories and hypotheses.

Here we could find the explanation of the names of the Bulgarian Mathematical Journal "Serdica", of the series of Bulgarian mathematical papers "Pliska" and of the series of Bulgarian mathematical monographs "Az Buki". All three of them are founded and named by Academician Iliev with emphasized Bulgarian sounding of the names, that have at first sight nothing in common with their mathematical contents. I should confess that at first, when these names were proposed and defended by Academician Iliev, I was not aware of the real motives of their author, and did not accept them with enthusiasm. Now, when I have had the possibility to know closer the personality of Academician Iliev, I understand it as an expression of his deep conviction, that the mathematical creation is a considerable part of the culture of mankind, and that Bulgarian mathematical creation is a significant contribution to Bulgarian culture.

Educated as an European and a citizen of the world, Academician Iliev has always aimed at defending the worthy place of Bulgaria in this world. He has a deep knowledge of the historical and linguistical roots of his fatherland and he spares no efforts to make them known to the world when necessary.

It is natural that the mathematical work of Academician Iliev yields to a most extensive and fruitful discussion. We could analyze his results in the Theory of entire functions, the Analytical non-expendability of series and the Theory of univalent functions in many dozens of his scientific publications and monographs. The exact formulations of the concrete results are available to the professional mathematicians and they have been a subject of systematical consideration. Still such a discussion would draw us away from the author's personality. Instead I will venture to present my subjective opinion about the style, character and motives for the mathematical creation of Academician Iliev.

If mathematical creation is measured in the terms of the belles lettres, then Academician Iliev is no doubt a poet and a master of the verse, but not a prosaist. He craves for the short forms of well defined contents. His basic mathematical results carry the sign of the classical perfection. I think that Academician Iliev has never suffered from the lack of challenging mathematical problems. I was deeply impressed by a thought he shared more than 30 years ago, regarding the mathematical creation.

"A good mathematician should be able to write a new mathematical work, after he has read a good mathematical publication".

In his mathematical field, which is quite specialized, Academician Iliev has been led by his strong and beneficial intuition. His mathematical works are characteristic for their elegant proofs and strong conclusions.

His basic mathematical results are collected in a number of monographs, that have been published in foreign languages and represent basic sources for the state-of-the-art in these spheres of the contemporary mathematics.

The strongest urge in every living creature is the urge for reproduction. Therefore every strong and normal scientist feels the necessity and the irresistible urge to live on and reproduce by teaching his science.

I can witness about the pedagogical skill of the mathematicians, that taught us in the 50's. This period deserves a special consideration. There is no doubt that Academician Iliev has a worthy place in the newest history of mathematical education in Bulgaria. Starting from his work as a teacher, later an author of many textbooks on mathematics for high schools, initiator of the special courses in the Mathematical faculty for the future teachers in mathematics, the creation of the specialized mathematical high schools, of the pedagogical sections of the Spring conferences organized by the Union of Bulgarian Mathematicians and many others. Special attention should be paid to his initiative and contribution to the creation of the so-called 'industrial profile' in Sofia University. The opening of the industrial profile in mathematics in 1950 laid the beginning of the systematic education of professional mathematicians. This was as well the beginning of the revival of the University as a basic scientific center and the end of the tendency of its turning to a pedagogical institute.

I would like to share my personal opinion of the lectures of Prof. Iliev from my experience as a student. We were a happy generation. In our students record books we had the signatures of Academician Obreshkov and Academician Chakalov, Academician Kiril Popov and Academician Petkanchin, Prof. Tagamlitski and Prof. Mateev, Prof. Dolapchiev and associate Prof. Duychev, and many, many others, who captured our profound respect and appreciation. In this colourful bouquet Academician Iliev made a worthy presence as a young professor. On his lectures I was impressed by his desire to provoke and keep our not yet firmly established mathematical intuition, without fear that it could mislead us. Our pursuit of the absolutely necessary mathematical strictness should not cripple the fantasy in the search of facts that need to be proved. The nature of the mathematical creation is in the hypothesis, while the professionalism is in the skill of proof. The process of the mathematical creation is a string of rejections of hundreds incorrect hypotheses to reach the proof of a new mathematical fact.

Academician Iliev has the pedagogical gift to stand almost unnoticeably behind the profound ideas, that he is teaching, and to present them intelligibly to the largest possible audience. I remember, and this has been some 40 years ago, that from his lectures I understood that mathematical theories have a relief, that should be felt. Mathematics is not simply a set of definitions and perfect proofs. If you could not be moved by a mathematical concept, if you could not feel its inner beauty, you will lack the basic impulse for creation.

This attitude towards mathematics, that Academician Iliev preaches as a lecturer, could explain many of his other activities and attitudes, related to the application of mathematics and the essence of science in general.

Academician Iliev goes far beyond the frames of mathematical creation and seeks a definition of nature and basic laws of human creation in general. One of his great passions is to develop a harmonious theory of knowledge and creation. In a great number of his publications he builds up his comprehensive theory. His ambition is to apply mathematical approach to the theory of knowledge. The ambition to lay mathematical foundations in a certain philisophic matter leads Academician Iliev away from the strict mathematical symbolics up to the concreté problems of language and music. I cannot evaluate these works, however I am deeply convinced that their motivation is the belief in the abilities of mathematics as a universal modelling instrument.

It is common to appropriate somebody else's achievements, but one would rarely try to appropriate another's mistakes. We can talk about a remarkable era in the development of Bulgarian mathematics, that is closely connected with Academician Iliev's name. I would not wonder if in some years people will refer to it as Iliev's era.

One can talk and write a lot about the immense work and inexhaustible energy of Academician Iliev as organizer and leader of the Bulgarian mathematical community. I think that we could mention only some of the basic features of this organizational activity. As one of the close colaborators and associates of Academician Iliev in his research and organizational work I could allow myself to make certain conclusions without the fear, that they would compromise his future.

First. Academician Iliev has always taken seriously his obligations as an organizer in science and education. I have some impressions of his activity as a Vice-rector of Sofia University, Secretary general and afterwards Vice-president of the Bulgarian Academy of sciences, Director of the Center of Mathematics and Mechanics, Director of the Institute of Mathematics and other leading scientific positions.

A basic feature of Academician Iliev's organizational work is his total preoccupation with accomplishing his ideas at the expense of personal positions. This can explain some specifics of his science managing career. Very few people know that Academician Iliev had refused to occupy high places, because he judged it could hinder other, more important, while not so prestigious activities. I will mention just one case, when he declined the Rector's post in Sofia University. Today, going back to that time, but knowing what happened afterwards, I could rebuke him, that he did not accept to be the University Rector. But I am sure, that he was lead by considerations higher than his personal interests.

Second. Academician Iliev always tried to substantiate his administrative decisions by comprehensive theories. The most characteristic example is the development of mathematical science in Bulgaria ubder his leadership. He has created a complete theory about contemporary mathematics structure, that is well known to the mathematical community in Bulgaria and abroad. This theory has aimed at substantiating and defending the development of Bulgarian mathematics as a part of mathematics in today's world. I think it was the best of its time. The changes in the decisive factors

necessitate now other approaches, but that does not belittle all done up to now.

As regards structurizing mathematical science and the organization of mathematical institutions that followed, it is important to emphasize the attitude of Academician Iliev to mathematics application. We owe to him the comprehension that mathematics as a science should not be divided into first quality – the so-called pure mathematics, and second quality mathematics – the applied one. It is better to speak about mathematics and mathematics application. It is not a purely terminological dispute, but a matter of substance, a key to the problem of mathematical cadres and optimizing mathematical work.

Every human personality is a result of the collision between two information flows. The first comes from the genetic code of the individuum, that determines the colour of eyes, quality of hair and no doubt the basic features of character and mental capacity. The second information flow is generated by environment, related to time and space, where the first flow is displayed. It is obvious, that the collision is a strongly non-linear process with charactersistic synergetic effect. Happy are those people with considerable synergetic effect. I am presenting these abstract reasonings as an introduction to the assessment of Academician Iliev's contribution to development of computer science and technology in Bulgaria.

The so-called information era began to take shape in the developed countries in the beginning of the 50's. It is not a chance phenomenon that best actors on this stage were famous mathematicians as Norbert Wiener, John von Neumann and Andrey Nikolaevich Kolmogorov. A new science appeared – cybernetics. Information models for control had a bright manifestation in discovering the genetic code and reaffirming Mendel-Morgan genetic theory. The most serious damages, caused by the politization of science and the then official materialistic theory during the second half of our century refer to the brutal denying of modern genetics and cybernetics. This combination is not a matter of chance. Both for modern genetics and cybernetics the basic substance is information, but not matter. Matter is only information carrier.

Despite his official position and party affiliation at that time, Academician Iliev did not compromise with his science consciousness. He disputed with the official ideologues and phylosophers, but not for the sake of the dispute. His aim was to provide possibilities for development of informatics and computer science in our country. It was an expression of civic courage and responsibility to the future of Bulgaria.

Academician Iliev did not only perceived the potential possibilities of the forthcoming information era, but he also accepted the onus of organizer of the concrete action. I remember his maxim at that time "New people for the new fields". That was the end of the 50's and the beginning of the 60's, when he was not even 50. If he had approached egoistically, from the viewpoint of his personal scientific interests, Academician Iliev could safely select for himself some modern sphere of mathematical informatics. But he preferred to discover and encourage young people towards the new

spheres, and to try hard to provide conditions for development of informatics and computer technology. With his chair he started the first lectures in numerical methods, in software, in operational theory and optimization. He initiated and was the first director of the first computer center in Bulgaria.

The organizational talents of Academician Iliev are well known. However one of the projects he headed, holds a significant place in the history of Bulgarian computer science. I have in mind the team that designed and built the first Bulgarian electronic computer named Vitosha. This year is the fiftieth anniversary of the creation of electronic computers in the world. Our first computer, completely original, was built under the leadership of Academician Iliev thirty years ago with tremendous enthusiasm and no less difficulties. Was it worthwhile to work over this expensive experiment, that did not bring to creating of a practically useful computer? My personal answer, not shared by all members of the Bulgarian mathematical community, is categorically positive.

I remember about some ten years ago, an exhibition of American artists was shown in Bulgaria. Among them was the American artist of Bulgarian origin Christo (Hristo Yavashev), whose philosophy roughly speaking is that the final product is not important for the artist, but rather the process of its creation. To a great extent, this was true with the Vitosha project. the process of its creation was what mattered, since within this process many specialists grew together with the confidence in the possibilities of Bulgaria to develop computer technologies. I hope that today's difficulties in industry will be overcome and the effect of the initial impulse will not completely fade.

For the sake of exactness, we cannot restrict the contribution of Academician Iliev in the sphere of management of informatics. He only devoted many pages of his studies to the nature of computer sciences. His studies and concepts have been exposed in a number of lectures for mathematicians and the general public. I will cite a part of the book 100 years mathematics in Sofia University "Kl. Ohridski".

"Informatics started to develop from technological stage. It still lacks enough mathematical creation. Therefore it is not still considered a mathematical science. It is natural to expect something more from it. For example the application of such algorithms, that billions of operations per second would be no longer necessary to solve the same problems. However this depends on the mathematical work in this sphere."

Despite his known tolerance, being a professional mathematician Academician Iliev is not lacking mathematical chauvinism. A characteristic feature of his philosophy about development of sciences, is that their mathematization brings them closer and joins them to mathematics. This could be naturally comprehended under certain concept about the nature of mathematics. More essential is that Academician Iliev pays special attention to the specific problems of the substance 'information', that are to be solved by means of mathematics. I would like to join the prediction of Academician Iliev about the colossal progress in overcoming these problems, as well as his statement that we are still in the very beginning of studying the intimate nature of the information

structures.

The information concept is at least as general and comprehensive as the concepts of energy and matter. The big successes of contemporary informatics are mostly due to the profound knowledge of the structures of matter as information carrier, attained through the physical, chemical and biological sciences. But as Academician Iliev points out, it is still in the future that the very structures of information itself will be understood and utilized. He means such information structures as living languages, knowledge as structurized information, displaying of information, that generates images, and even those higher information structures, that we call wisdom. Mind that matter is divided into living and not-living, and although these two different states are built by one and the same atoms, the generation of life is still a secret. It is not impossible that for the information structures, built by one and the same elementary bits of information, the principles of reductionalism could not be applied.

One simply cannot exhaust all significant moments about our jubilee, however we should not omit his international activity as a mathematician and leader of Bulgarian science. Academician Iliev is a longstanding representative of Bulgaria in the International Mathematical Union (IMU), where he was elected member of the Executive Board, a representative of our country in the International Federation for Information Processing (since its formation), where he was elected in the Executive Board and a Vice-President of the Federation, a foundation member and Board member of the International Institute for Applied System Analysis (IIASA) and others. We would like to especially underline Academician Iliev's activity for restoring and development of the Balkan Mathematical Union, whose longstanding chairman he was. It is a pity that now, when this union is so necessary, enthusiasm and energy lack for its next revival.

I could not complete my short speech about Academician Iliev, without saying several words about Mrs. Ilieva, although she deserves much, much more. Our Balkan-Oriental manners still restrain us from the real assessment of the wife's role in man's professional life. In many social events, congresses, conferences, visits of foreign scientists, organized by Academician Iliev, the caring attention and fine taste of Mrs. Ilieva have been of decisive significance. Here the maxim is completely valid. saying that behind every remarkable man is a remarkable woman.

We wish to Academician Iliev and his wife Mrs. Ilieva still long years of fruitful life and satisfaction with all done by them for Bulgarian mathematics, Bulgarian science and Bulgaria.

Bl. Sendov