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INTERNATIONAL AFFAIRS

HUNGARIAN-SOVIET DISPLAY OF MAGNETIC-SUPERCONDUCTING SYSTEMS

Budapest MAGYAR HIRLAP in Hungarian 17 Oct 78 p 7

[Text] A display of highly-automated superconducting magnetic systems, developed as a result of Hungarian-Soviet scientific cooperation, opened Monday at the Moscow exhibit hall of the Kurchatov Atomic Energy Institute of the Soviet Academy of Sciences. On display are the results of the combined joint research program of the Central Physics Research Institute of Hungary and the Kurchatov Atomic Energy Institute. The exhibition, which will be open from 16-20 October, was opened by Anatoly Aleksandrov, director of the Soviet institute, and Ferenc Szabo, managing director of the Central Physics Institute.

The Soviet partner developed the magnetic coils and cryogenic cooling systems which can produce temperatures of minus 270 degrees. At present these are primarily for laboratory use, but they will eventually serve industry. The Hungarian partner, the Central Physics Research Institute, fabricates the electronic equipment and the variable temperature gas-flow inlays.

Ferenc Szabo, told the MTI correspondent that the exhibition demonstrates some of the fruits of nearly 20 years of cooperation between the two institutes. It began during the second half of the fifties when the first experimental nuclear reactor was put into operation in Hungary. In the sixties, research on solids and superconductors was emphasized; now some of the scientific equipment is fabricated in Hungary, and is duplicated in the USSR.

In the course of the exhibition, a Hungarian-Soviet scientific symposium will be held dealing with the technical-scientific problems of superconducting magnetic systems and the possibilities of their optimal use in practice.

CSO: 2502

INTERNATIONAL AFFAIRS

COMPUTER DEVELOPMENTS IN CEMA COUNTRIES SURVEYED

Paris ZERO UN INFORMATIQUE in French 11 Sep 78 pp 14-15

[Article by B. O. Szuprowicz]

[Text] World attention has recently been drawn to the continual strengthening of the military might of the Soviet Union and its allies of the Warsaw Pact, and the time therefore seems opportune to focus on the latest progress of CEMA in the construction and exploitation of computers. The 1978 Leipzig Fair, recognized as the great annual exhibition where the most recent achievements of CEMA in data processing can be seen, several months ago confirmed the maturity of the Riad series of computers.

While the new Riad computers are essentially third generation, with, however, wide utilization of MOS [metal-oxide semiconductors] and introduction of MSITTL [medium scale integration transistor-transistor logic] technology in certain models, these computers are still of relatively low speed. At the top of the line is the EC-1060, which it seems is henceforth to be designated the EC-1065 and which had been announced at the time of the first Riad generation in 1971 but whose testing began only in December 1976. It was necessary to wait until August 1977 for the Soviets to announce its mass production but, up to the present, no installation of the computer can be identified. Nevertheless it has recently been learned that the EC-1060 has a memory capacity of 2.048 million to 8.192 million octets and its productivity is stated to be equal to that of 100 of the Minsk-32. It also seems that it can be concurrently used by hundreds of enterprises and it may therefore be believed that it can be destined to become the basis for shared time operation of the Soviet service offices.

Ten Trillion Octets

In a recent evaluation of the future plans of the data processing industry in an East German publication the Soviet economists, T. Degtyareva, mentioned the work in progress on a fourth generation whose speeds could attain several hundred millions, and even several billions, of operations per second, and

the larger models of which could have a total storage capacity on the order of 6 trillion octets. Experiments upon a fifth generation of Soviet computers, making use of optico-electronics (laser, LED [light emitting diodes], luminous conductors, and photo-electric cells) are said to be in progress in the laboratory.

For the moment, the appearance of the BESM-10 prototype, awaited for a long time, which is capable of only 12.5 million operations per second, has just been put off, once again, to 1980. However, some Soviet sources insist that in that same year there will appear a veritable super-computer whose speed could be between 50 million and 120 million operations per second. In any event the CEMA consumer must be content with Riad computers whose performance capabilities lie between those of the IBM 370/138 and the 360/68-75. But, in view of the abundance of application programs for the IBM which can function under the Riad exploitation system the situation is not so bad as it may appear at first glance to the eyes of a western observer.

The Highly Coveted "Q" Emblem

The great success of the first Riad series, still in production, is unquestionably the Robotron EC-1040 produced in East Germany which is from 1.2 to 1.5 times as fast as a comparable IBM 370/145. Last October the USSR and CEMA press greatly stressed the fact that the 60th EC-1040 exported to the Soviet Union had been installed in time to celebrate the 60th anniversary of the revolution. The VEB Robotron-Elektronik plant responsible for manufacture of the EC-1040 was awarded the designation of "Enterprise of Excellent Quality" which permits it henceforth to affix to its products the highly coveted "Q" emblem.

Up to now the Soviet Union has been the largest purchaser of the EC-1040 outside of East Germany, and it has been importing them since 1974. It is interesting to observe that the latest EC-1040 installed in the USSR was for Tatneft, petroleum producer in the autonomous soviet republic of Tatarie, bringing to eight the number of these computers employed by the Soviet petroleum industry. Three others operate at the Institute of Nuclear Research in Dubna, near Moscow, and two have been identified at the Institute of Space Research of the USSR. These prestigious and strategic installations give an idea of the situation of these computers in the Riad program. It may well be that the EC-1040 has an already convinced market among the military establishments of the Warsaw Pact.

In addition to its exports to the Soviet Union Robotron has sold numerous EC-1040 computers to Czechoslovakia, Poland, Hungary, and Bulgaria, as far as eastern Europe is concerned. Also, two have been sold to Iraq and one each to Yugoslavia, India, Cuba, and the United States, and even, it is said, to the Peoples Republic of China. This computer has met with such success that its production is probably going to continue for several more years despite Robotron's announcement of its new model EC-1055 whose manufacture

should begin in 1979. This new computer is capable of 450,000 operations per second and makes use of MOS technology. With it a CEMA computer for the first time will have a potential memory of 16 million octets and a total capacity of 2,048 million octets.

Thousands of Systems

When one adds up the EC 1012 computers and now the EC-1015 of Hungary, the EC-1022, EC-1033, EC-1035, and EC-1050 of the USSR, the EC-1032 and EC-1045 of Poland, and the EC-1020 formerly made in the USSR and Bulgaria, it is suddenly realized that several thousand systems compatible with IBM 360 and 370 are operating in the CEMA countries. This is sufficient for opening new markets to western peripherals and data storage banks, markets perhaps of even greater value than was previously open to "original" equipment. The Riad is off and running.

11706

CSO: 3100

CZECHOSLOVAKIA

BRIEFS

NEW TREATMENT FOR PARADENTOSIS--Scientists of the Organic Chemistry and Biochemistry Institute in cooperation with the Institute of Pharmacology and the Galena national enterprise have developed a new remedy, Protosan, for the prevention and treatment of paradentosis. Research work on the new medicine started 5 years ago. The results show that the developed product is fully equivalent to foreign products. Its basic element is a certain part of corn oil. At the present time it is being clinically tested at selected work sites in the CSSR and full production is expected in 1979. It is to be produced in the form of drops under the name of Protosan. [Prague ZEMEDEL'SKE NOVINY in Czech 12 Oct 78 p 6]

CSO: 2400

EAST GERMANY

NEED FOR CHANGES IN BASIC SCIENTIFIC RESEARCH DISCUSSED

Need for Creativity, Risk-taking

East Berlin SPEKTRUM in German Vol 9 No 7, Jul 78 pp 5-9

[Report on address by Hermann Klare, president GDR Academy of Sciences, to 1-2 June 1978 joint scientific conference of the Academy of Sciences and the Ministry for University and Technical School Affairs, held at the Academy of Sciences: "Clever Interweaving of Potentials"]

[Text] The further increase in the realization of basic scientific-technical research and the development of scientific disciplines were topics of debate at a 2-day conference held on 1-2 June by the Academy of Sciences [AdW] and the Ministry for University and Technical School Affairs [MHF]. More than 250 scientists and representatives from government organs and enterprises took part in this conference. One of the tasks of the conference was to assess the achievements made since the Ninth Party Congress by the institutes of the Academy and by the facilities of the higher educational system in the formulation of basic research, and the contributions these made toward accelerating scientific-technical progress and the development of the sciences. At the same time, the participants in this conference drew conclusions for the further and efficient cooperation between the AdW and the universities and technical schools. The president of the Academy, Hermann Klare, whose introductory lecture we review here and give excerpts from, characterized above all the function of science and technology in the further development of the socialist society.

"Science and technology," he said, "have been laid down in the documents of the SED and in the resolutions of the government of the GDR as the prime routes toward improving production forces and toward increasing the work productivity and the intensification of national production. The consequences that follow therefrom are that the effectiveness of production, the

quality of the product, the working and living conditions of people under socialism, and the assurance of socialist development in the confrontation with the enemies of socialism are to be used as criteria in evaluating how well science serves this function."

He emphasized that socialism has to make conscious use of the progressive and humanistic character of science, giving science all opportunities to be fully effective. This preference of socialist society should be more fully disclosed and used in the future: "Through clever use of the great opportunities inherent in planned development of our socialist economy and through encouragement of the creative initiative--as was explicitly stated at the eighth session of the SED Central Committee--it will be possible to assure the fastest tempo of technical progress. This no doubt belongs to the more complex tasks in the further shaping of developed socialist society in the GDR."

By carefully considering these relationships, it is possible to deduce essential features of socialist science policy; these concern the application of science in practice as well as the shaping of scientific work in the facilities of the Academy and the higher education system, in industry, and in other areas. These alone are not enough, however, to yield the definition of the research questions or the major lines of research for future work. However, for the conception of a strategy for basic research, the Marxist-Leninist concept of the essence of science, its function, and that which is expected of science are significant in pointing out the right direction. To quote directly: "It is essential in trying to understand this essence of science--and we acknowledge this without reservation--that its function is to be a productive force as well as a decisive factor for the socialist shaping of our nation. The increasingly closer cooperation of both of our spheres attests to the unity of these functions."

Realizing the conception of "the long-term development of mathematical-scientific basic research within the scope of the AdW of the GDR and the MHF up to 1990" and the joint 1976-80 5-year plan for basic research was called an essential step in the implementation of that responsibility, indicated Prof Klare, given to the AdW and to the institutions of the MHF. This responsibility is the creation of scientific advance for the development of our national economy and of the entire socialist society. The speaker pointed out that the research potential within the AdW and the technical schools has improved both qualitatively and quantitatively and that the ability to produce results was especially enhanced by the training of cadres qualified both politically and scientifically. At the present time about 20,000 colleagues, among them about 10,000 scientists, are working to realize the conception of the long-term development in basic research.

One positive aspect was emphasized, namely, that the scientists continued to improve their skill in transferring results of research into practice and that successful forms of cooperation between science and production have been developed during recent years. Among these are joint research collectives,

technology transfer collectives, academy-industry complexes, application groups, consultant centers, university-industry research groups, and joint technical schools.

Good experiences have also accrued from the cooperation of natural and social scientists. However, measured against the task given by the Ninth Party Congress to determine content and form of this cooperation in view of the demands of society at large, progress to date is not satisfactory. Preparations for this conference have prompted the presidium of the AdW and the council of the MHF to prepare jointly an interim summation of the developments in interdisciplinary research by scientists in the natural, social, and technical fields. Prepared by a joint working group, which generalized earlier and more recent experiences in the area of possibilities and conditions for such cooperation, it indicates that today there exist more opportunities both in content and methods for the choice of interdisciplinary problems and for their solution.

"The creation of scientific councils for the various research programs and major lines of research," in the assessment of the speaker, "was a decisive step for the implementation of the science policy of both the SED and the government of the GDR as well as for carrying out responsibilities for the development of basic research in the GDR. A considerable number of scientists and practitioners participated in the preparation and coordination of the research work as well as in the evaluation and assessment of the research results. There are noticeable advances in developing the exchange of scientific opinions even when they are of opposing views. Frequently, however, even today, there is a lack of involvement and open-mindedness so necessary for scientific disputes."

The plenary sessions and the classes of the AdW and the advisers and scientific councils of the universities and technical schools have expanded their scientific and scientific-political activities in recent years and made significant contributions to the interdisciplinary interweaving of individual scientific disciplines, including the social sciences.

In spite of these successes, Prof Klare was critical of the small number of such above-average scientific results, which could affect larger areas of research and would influence entire branches of the national economy and be comparable to the international state of affairs in the appropriate disciplines. He underlined the necessity of bringing about such results, because such would change entire fields or give rise to new lines of research. Such research results influence the effectiveness of the entire scientific work and at the same time set standards for achievement that can be used to judge good science. In this fashion, they also positively influence scientific disputes and promote willingness to accept criticism and the will to produce.

A large portion of the presentation was devoted to concrete research results stemming from the cooperation between the Academy and the technical school system. Examples were given from the fields of mathematics, mechanics and

cybernetics, physics, and nuclear and materials research, as well as from chemistry, the bio sciences, geo and space sciences, and the research program "foundations of engineering science." In this connection, Prof Klare showed how these research results have been applied in important areas of the national economy. He named several areas of major emphasis: The long-term development of the energy base, the expansion of the raw materials base, and the development of basic material, stock, and equipment bases, as well as technical production preparation. Also included were the fields of information and communication, nutrition, the maintenance, promotion, and restoration of health, and the field of residential construction.

Starting with the requirement to raise steadily the levels of production and efficiency in research, the speaker expanded on the intensification of the research process. In this connection, he contradicted the still-circulating opinion that higher output is only possible through the use of additional cadres and resources. New investments and expansions, of course, will take place. But equally significant should be a clever structuring of the work force adapted to the long term and which can be applied in a timely manner to the solution of maturing problems. Justifiable risks in this connection should not be avoided and the scientists should have the courage to limit or discontinue research tasks that no longer have a significant outcome, and instead concentrate on directions having a higher promise for the future.

An effective intensification that represents these principles should be tackled vigorously. That demands corresponding, cleverly thought-out decisions on all levels and should certainly not be left to those who have to solve problems, so to speak, in the field. Intensification starts as early as the preparation of a research task. It encompasses the knowledgeable choice of research goals, the determination of the solution variants to be pursued, and the checking and determination of appropriate cooperative efforts as well as the determination of personnel and material resources to be committed.

It is important that the scientists and collectives identify with their task and be inspired by it, because therein lies an essential element of intensification. Nobody should forget that, at the beginning, there is contemplation--and it is better to spend an extra day on this than one hour too few.

After extensively treating the methods of intensification, Prof Klare emphasized that nowadays it is necessary to refine the above conception about the long-term development of basic research in all major lines of research and research programs and to expand it for the period until 1995. The tasks for the 1981-1985 period have to be fixed within that in such a fashion that they will simultaneously form the essential preparation for the development of the 1981-1985 5-Year Plan. He again pointed to the three functions of basic research, which express the unity of scientific-technical progress as well as its economic and social impact within socialism, and continued as follows: "In looking back, we can say that the prognosis that formed the basis for the conception of the long-term development of basic research was essentially correct. The main directions of research that were developed at that time

are still wholly valid even today and serve as orientation such that necessary corrections are less the matter of research direction than they are of emphasis, with which these should be pursued in the future."

Because this section of the presentation contains directive hints for the further development of basic research, we will be presenting extensive passages below:

"In consideration of the dynamics in social and scientific development, it is necessary to continue the main line of attack in the development of research. We commit ourselves emphatically to a high degree of continuity in the treatment of scientific fields as they are a decisive precondition for the creation of a strong scientific foundation for the development of important segments of society and the successful development of science itself.

"Our task consists primarily of finding more original approaches for solving problems, using insights gained from a continuous prognostic effort, and to follow these up with a greater degree of consistency. In this we must direct our efforts to finding new properties and results not primarily through linear extrapolation of development trends in the national industry but deducing and verifying them through new scientific insights and developed scientific-technical solutions.

"The object of basic research should be primarily--I have to emphasize this explicitly again--those problems whose theoretical and experimental solution could lead to fundamental changes in industrial production and other areas of society. In this, the truly new shows up in isolated cases, is very infrequently spectacular, and often cannot be recognized without some other factors. For this reason, we have to invest so much more thought and imagination in the long-term conception of basic research, in order to create for ourselves the preconditions for research results that will bear fruit in the future.

"The understanding of the just-formulated requirements at times presents difficulties, as there must also be research on problems that at first--and at times for many years afterward--have barely any possible application, at least not to those for which there is an immediate commercial utilization.

"For dialectic thought, which is oriented on the insights of modern development theory, this difficulty does not present an argument against such goal-setting in basic or in theoretical research. The results of these fundamental researches, among which are also the knowledge, ability, and readiness of those who achieve them, form a certain treasure in fundamental insights and relationships, of which we do not know precisely when or in what manner they will be used. The risk to the development of society that we run by carrying out this research is less than the risk that would arise if such a store of knowledge would be foregone on principle. However, foresight, awareness of responsibility, and intuition of the scientist are decisive traits in keeping such risks within socially acceptable bounds.

"Of course, it will not be easy to reconcile the limited potential and the currently pursued research profile with the demand for higher concentration on those basic problems that determine progress within the branches of science and within the individual research disciplines. But we can draw on reserves and raise the efficiency of research if we rigorously limit the sometimes too-broad research within low-return areas as well as avoid that type of routine investigation that, to some extent, only serves to dot the i's or that improves existing results by small details.

"The solution of these problems demands much knowledge, much courage and tact, but it also requires concrete decisions and determined implementation of those decisions in the shaping of the major lines of research. We should be in a position to achieve with low friction losses an optimal adaptation of our research profile to the demands of social development and progress in science and to the national economic opportunities."

Prof Klare then emphasized the major areas on which the researcher should concentrate while considering the intranational and international cooperation. Following that, he said:

"The research programs, major lines of research, and other research directions developed 5 years ago have proved themselves as instruments for planning and coordinating basic research. There is no reason to replace through a different organization the one in existence, which is primarily shaped along disciplinary lines and which serves as a stable element of this structure. The current structure should therefore be preserved in principle. Necessary refinements and additions will be determined from further substantive work on the conception of long-term development in basic research.

The grants of government contracts have also proved useful, as have the development of coordinating programs, performance offers, and similar coordinating measures for research undertakings encompassing several major lines of research or research programs, respectively. In the future as well, we will follow this path and through such coordination programs and the use of coordination commissioners achieve the necessary interweaving of discipline-oriented and branch-specific research, development, and production, respectively.

"In the interest of a high-performance capability and efficiency in research, development, and production, there should be a closer connection between science and production. This requires primarily that research and development tasks be oriented to such performance that the industry and other branches will be put in a position to produce top scientific-technical output.

"Planning discussions are starting these days in all installations. We expect that a substantial part of the planning discussion will be the preparation of goal-setting for contributions, on the basis of which the industry and other national industrial areas will be able, by 1980, or, respectively, in the period 1981-1985, to have peak production in products, processes, and technology.

"In summary, let me assert the following: Ahead of us there lies strenuous and intensive work. The level and the efficiency of the conceptualized goal and task statements for our research depend on the extent to which we will succeed in drawing in and using the creative potential of all coworkers.

"All scientists are required--or to say it better: are duty-bound--to search for the most productive and advantageous ways for the further development of our research and to engage responsibly in scientific disputes."

University-Academy of Sciences Cooperation

East Berlin SPEKTRUM in German Vol 9 No 8, Aug 78 pp 11-14

[Report of address by Prof Dr Hans-Joachim Böhme, minister for university and technical school affairs to the 12 June 1978 joint scientific conference (see preceding report): "Heavy Demand Placed on Science"]

[Text] "Where does one's own performance stand in relationship to the level that science has already achieved in the world and in our own country? How does such performance serve the development and strengthening of the socialist society in the GDR?" These are the criteria developed by Comrade Erich Honecker, the secretary-general of the central committee of the SED, before the first secretaries of the district headquarters, which criteria were to be used in judging the contribution made by the scientists of the Academy of Sciences [AdW] and of the universities and technical schools in fulfilling the important needs of our society. This was also emphasized in the concluding remarks made by the Minister for University and Technical School Affairs, Prof Hans-Joachim Böhme, at the joint conference held by the Ministry for University and Technical School Affairs [MHF] and the AdW at the beginning of June. He thought that this conference was among the many-faceted activities of the working class, of the socialist intelligentsia, and of all other workers in preparation for the 30th anniversary of the founding of the GDR. The conference is making a contribution in fulfilling, with high credit, the future-oriented tasks given to science and research by the Ninth Party Congress of the SED. The minister pointed out that the discussions taking place were clarifying the sense of responsibility felt by our scientists and technical-school teachers for the social progress as well as for the visible successes in the theoretical level and in the application of the results in practice. While the speaker was analyzing the ground covered since the Eighth Party Congress in the field of basic research, he also called attention to the complexity of the work process in science and technology. By this, he meant the numerous problems yet to be solved in working out the strategy for research. One sees with satisfaction that the jointly planned and organized basic research continually contributes better to the acceleration of scientific-technical progress in our country. To an ever larger extent, the results of this basic research contribute to the development of top-quality products of our industry and lead to processes using the most advanced technologies. Cooperation with the practical fields and specialization in international research, especially with the Soviet Union,

contributed to these achievements. In spite of the good results of recent years, however, we should not overlook that, along with quality and development to the point of readiness for practical use in several research areas as well as adherence to plan and the rate of technical transfer, there are still further reserves to be unlocked. The demands of the party leadership for joint research groups and transfer collectives made up of scientists from the Academy, the technical schools, and of engineers and technicians from the enterprises and combines should be implemented in the future more energetically, more extensively, and with goal-orientation.

"When viewed all together, we find that sufficient progress has not been made in the integration of research goals between science and practice, in particular, from the long-term aspect so important for basic research, and in the coordination of basic research and research facilities in the enterprises and combines of our national economy with the 5-year plan for basic research developed by the Academy and the MHF."

The research strategies should be determined and then more completely implemented in the direction, planning, and organization of mathematical-natural-scientific and engineering-scientific basic research. "It is of elementary strategic significance that basic research encompass more consistently the research of fundamental problems of social progress and the discovery of basic laws in the development of nature, society, and human thought."

The scientists of the GDR should contribute increasingly to the study and solution of such fundamental problems of mankind as war and peace, scientific-technical and social progress, and shaping of the scientific-technical revolution for the advancement of social progress. Among these are the discovery of further natural laws in the structure of materials; the relationship between the structure and their properties; the discovery of further causes and fundamental relationships between health and sickness; questions of the environment; the cooperation in the solution of the world food problem, in particular, that of the protein problem; the assurance of an energy basis; and many others. At the same time it was pointed out that among them is the development of the productive forces of the developed socialist society. These forces contribute to work out the socialist production relationships, which lead to basic changes in the human work process; these forces make possible qualitatively new technologies and process techniques that make work easier and life in socialism richer and more attractive.

Much attention was given to interdisciplinary research. Besides the above-mentioned basic problems facing mankind, the following also play a significant role: The overcoming of significant differences between mental and physical labor and between city and countryside, the development of industrial-type production in agriculture, and the shaping of the spiritual-cultural life and universal education.

In speaking about setting demanding goals and willingness to accept high risks, the speaker mentioned that one of the significant ideological tasks

consists of encouraging the scientists to set the most demanding goals in research and to nurture a willingness to accept justifiable and calculated risks. Above all, it is important to bring research results to a high level of technological maturity. "Technological applicability of basic research results implies:

"1. At the technical schools and at the AdW, basic research must be organically tied to applications-oriented research.

"I emphasize this as an unconditional requirement. But since the problems were yesterday subjected to the absolute general requirement for a transferable, mature solution, I would just like to point to the fact that, of course, depending on the specifics of the work of the Academy and the technical schools, there are limits in this regard.

"2. An even closer tie between the researches of the technical schools and the Academy and the branch-specific researches and development of industry, agriculture, construction, health care, or other social fields.

"3. Creation and use, on a broad scale, of new forms of cooperation, such as joint transfer collectives, applications and research groups, and technical meetings.

"4. Assurance of high technological applicability of results of fundamental research for consciously creating cooperation with workers, innovators, and rationalizers of production in the enterprises and combines of our industry."

Prof Böhme also talked about the critical-creative spirit within the research collectives, which also was a topic for discussion at the conference. A most essential task, above all, for the leading scholars of our land is to work more diligently in bringing about a creative atmosphere. This atmosphere should be characterized by a close bond of analytic-prognostic and conceptual-planning work, by critical evaluation of work results, and by a high demand and critical posture toward one's own performance, as well as by creative discourses. A creative-critical atmosphere and a scientific life are the climate and soil in which scientifically capable, performance-willing, and creative young scientists can develop, and in which a new and capable generation of scientists is growing up. In this connection, the speaker simultaneously pointed to the responsibility borne in this by the universities and technical schools. Such responsibility can be met through teaching, which is theoretically demanding and stimulates creativity. Scientific competition among students, student conferences, and other means contribute to an early recognition of talent and gifts that can be selected and promoted.

Minister Böhme explained in his speech how the joint work of the Academy and the MHF, the scientific councils for the research programs and for the main lines of research, and the activity of the research collectives will be shaped in the future:

1. Accounting for the numerous constructive proposals made during the preparation and sessions of the conference, it now comes to fulfilling the 5-year plan for basic research in all its component parts. It is necessary to exceed the goals in level and completion date set in order to create an even greater preparedness for top performance. That means that in important fields of the national economy, such as microelectronics and technology, high performance is to be pursued and overfulfilling of results significantly accelerated. An important interim date for this is the 30th anniversary of the founding of the GDR.

2. This conference has produced important advice and is an impetus for the refinement and timely expansion of the long-term concepts for the shaping of basic research at the AdW of the GDR and within the purview of the MHF. The scientific councils for the research programs and for the main lines of research--by using materials from this conference--should develop appropriate proposals for shaping basic research through 1995, and in special cases even beyond. This concept has to be done in time so that it can form the basis for the preparation of the 5-year plan in the mathematical-natural science and engineering science basic research from 1981 to 1985 after integration with the central organs of all areas of society.

3. An important task is the working out and integration of goals for the next 5-year plan for basic research. Here it should be remembered that it is necessary to determine those problems that will require interdisciplinary research; that the necessary supporting single-discipline research tasks for programs be derived; that the design of the plan be available in such timely fashion that careful integration with all areas of society, for which the results of the basic research will be significant, can be achieved and on that basis international research cooperation could be carried out effectively.

PHOTO CAPTIONS

1. p 6. The Karl Friedrich Wilhelm Wander educational technical school at Dresden is a partner in the cooperation with the Academy. The school has been integrated into the "mechanical behavior of solids" major line of research which is directed by the AdW. The scientists and students of the physics section explore the effects of strengthening and edge reinforcement and of crack formation in manufacturing stock and thus help to clarify the mechanical behavior of solids. The photograph shows mounting supports for prisms being attached to a specimen.
2. p 7. Shown in front of a modern Soviet unified system digital computer installation at the Leipzig Technical University are (left to right): Shift leader Petra Schulze, group leader Volker Messtorff-Lebius, and systems programmer Peter Schnick. The ES-1022 is the first installation of this type at a GDR technical university; it can perform, among other things, 150,000 operations per second in solving problems of economics.

3. p 9. New substances are being tested at the Institute of Plant Biochemistry using a bio-test system (in this case a series of tests using the small phytochamber). The growth-regulator group of this institute has worked for many years in collaboration, among others, with the plant production section of the Martin Luther University at Halle/Wittenberg, where a special topic of research is the manner in which plant hormones act.

6948

CSO: 2302

HUNGARY

SIXTH INTERNATIONAL RARE METALS CONFERENCE

Budapest MAGYAR ALUMINIUM in Hungarian No 5, 1978 pp 179-180

[Article by Sandor Brukner]

[Text] The sixth meeting of the rare metals conference series was held 5-7 Oct 77, in the Medical University Building in Pecs. These conferences have been organized regularly, have enjoyed increasingly wide interest and the recent one was of international dimensions.

The conference was organized jointly by the RTKB [Internportfolio Coordinating Committee for Rare Metals], the National Hungarian Association of Mining and Metallurgy and the Pecs Committee of the Hungarian Academy of Sciences. It was chaired by Dr Adam Juhasz, undersecretary of heavy industry; its presidium consisted of:

Otto Bihari, academician, president of the Pecs Committee of the MTA [Hungarian Academy of Sciences]

Sandor Csepanyi, deputy minister, KGM [Ministry of Metallurgical and Machine Industries]

Jozsef Fulop, academician, president of the RTKB and of the KFH [Geology Central Bureau]

Dr Laszlo Kapolyi, deputy minister, NIM [Ministry of Heavy Industry]
Gabor Kreffly, president, OMBKE [National Hungarian Association of Mining and Metallurgy]

Ferenc Marta, academician, secretary general of the MTA

Sandor Simon, academician, rector of MNME [Technical University of Heavy Industry, Miskolc]

Istvan Soltesz, executive director, Csepel Iron and Metal Works

Jeno Toka, director, MEV [expansion unknown].

The current conference dealt with the results achieved in the production and utilization of rare earth metals and radioactive metals as well as with the presentation and discussion of the analytical methods used in their examination. The theme encompasses a broad area of specialties. Reports were given by 20 foreign and 26 Hungarian speakers to an audience of more than 130 people which included 30 guests from Socialist countries.

At the plenary session on the second day of the conference, Dr Adam Juhasz' introductory lecture, in his absence, was presented by Dr Laszlo Kapoly as follows:

In the series of rare metals conferences, for the third time, I have the honor to address you in the opening speech or in words describing the work of the conference. I am using this opportunity to survey and evaluate briefly the results of the previous conferences before saying a few words about the goals of the present program. In general, a conference or symposium is organized in order to provide a meeting for specialists of similar interests. The conferences initiated by the RTKB show a two-fold deviation from the general custom in their range of topics and in the character of their work. However, the source of both changes is a desire to promote a vertical flow of information. On one hand, the aim is to integrate the information of specialists working in various fields along a technological chain starting with the raw material and stretching all the way to the utilization of the product. On the other hand, we wish to provide a direct and unrestricted contact between the spheres involved in the guidance-coordination and in the implementation of technological development.

It has been 6 years since the first rare metals conference was organized in Miskolc. The material of the conferences published since encompasses about 150 lectures and their discussion, on about 2,000 pages.

Miskolc was chosen as the location of the first conference because, at the suggestion VI. Department of Technical Sciences and of the MTA, of the RTKB, the Technical University of Heavy Industry in Miskolc accepted the task to become the institution responsible for the nationwide developmental activities involving rare metals at the basic research level. The first conference was characterized mainly by a search for directions. Within a few years already, at the V. Conference again in Miskolc, the results achieved at the university in the field of rare metals production and passed on for utilization were presented.

We organized the II Conference at Pecs, the site of the present meeting. Our subject, just as today, was discussion of production, purification and use of rare earth metals from the rich family of rare metals our situation today is as favorable as it was in Miskolc. We can assess not only the given area, but the dynamics of development because the subject matter is the same.

The III. Conference was held in Ajka. In accordance with the natural endowments of the location, the topic of the active discussions by the participants was the work conducted within the Hungarian Aluminum Industrial Trust, i.e., the problems of rare metals production and the perspectives of their utilization as they relate to aluminum production. The quantitative expansion of domestic gallium production as well as the program to produce gallium of increased specific value were developed and are continuing in the framework of realizing the conceptions formulated during this conference. Furthermore, the idea of specialization of production of pure metals also surfaced at that time.

At the IV. Conference which also marked the 10 year achievements of the RTKB by a professional type of celebration, the state and future of the total, national economic utilization of rare metals were discussed. The work of the conference provided direct support to the definition of the tasks which were given great emphasis in the Fifth Five Year Plan, and to the initiation of the intermediate-range program plan for rare metals.

With the increased experiences and results, the spectrum of the area which can be covered at one time has naturally been narrowed. At the same time, in order to compensate for the danger of a one-sided approach, the demand arose to direct our problems toward our environment and also to match them to the prevailing global trends. Therefore, steps were taken to provide an international forum. Initially, the specialists of friendly nations were invited to our conferences. Today, we are at a phase in which our problems and future tasks are discussed at an international conference.

Both objective and subjective reasons influenced the decision that a few of the more important radioactive elements be added to the conference theme of rare earth metals. We know that, of all the elements in the periodic table, there is a relationship between the structures of the outer electron shell and lanthanides and actinides. As a result, their chemical properties and the closely related production technology have many common features. It is no accident that many of you have encountered elements from both families in your own field of specialization. Also, following the successes achieved in the area of uranium technology, the Mecsek Ore Mining Enterprise established an effective base for collective research dealing with the production and separation of rare earth metals. Approached from a subjective direction, the other reason can be presented using the following simile: just as uranium is looked upon today as one of the principal factors in our efforts directed at changing the structure of our energy production, a more widespread utilization of rare earth metals is similarly carrying the promise of a fundamental change in the industrial structure of our nations.

Following the introduction by the state secretary, the aims and achievements of the RTKB were briefly presented by Dr Gyozo Varhegyi, secretary of RTKB, who did not fail to mention the difficulties and problems encountered in the course of their work.

The review of RTKB activities was followed by a discussion by Dr Laszlo Kapolyi, deputy minister, who spoke about the possibilities of the recovery of rare metals, among them the rare earth metals, based on the conception of complex processing of the domestic raw materials.

Starting with the current state and tasks of our national economy, and based on a global change in the approach to the economy of raw materials, which is also reflected in the III/12 resolution of the XI. Congress of the MSZMP, he examined the problem, stressed the significance of the work done by the participants of the conference and reinforced a sense of its importance.

The last plenary lecture was given by Dr Bela Czegledi, secretary of the Pecs Committee of the MTA. He analyzed the domestic capabilities of rare earth metals production, primarily on the basis of experiences at the Mecsek Ore Mining Enterprise.

The professional lectures were delivered amidst great interest from those present. This interest was also characterized by the large number of comments. The lectures which drew a wide range of interest will be discussed again in this journal.

The plenary lectures were followed by comments from Dr Sandor Simon, academician, who stressed the importance of rare metals research and the outstanding role played by the conferences in promoting such work. He emphasized again the positive attitude, continually provided by the Technological University of Heavy Industry and by its rector personally, toward these problems.

At the conclusion of the conference, a letter from Istvan Soltesz, executive director of the Csepel Iron and Metal Works was read in which he offered the hospitality of the Csepel works and invited those interested to the VII. Rare Metals Conference to be held in Csepel. The topic of the conference will be high melting metals and microalloys.

With the end of the conference, we can conclude that it succeeded in serving its set aims. The lectures presented provide ample experience to better satisfy the rare metals demands of our industry both from a qualitative and quantitative aspect.

2473

CSO: 2502

HUNGARY

ACHIEVEMENTS, GOALS OF THE INTERPORTFOLIO COORDINATING COMMITTEE FOR RARE METALS

Budapest MAGYAR ALUMINIUM in Hungarian No 5, 1978, pp 181-182

[Article by Dr Gyozo Verhegyi, doctor of technical sciences, secretary of the Interportfolio Coordinating Committee for Rare Metals]

[Text] The central unification of domestic rare metals research, on the basis of an Economic Committee resolution, was initiated with the formation of the RTKB [Interportfolio Coordinating Committee for Rare Metals], in 1965. The preceding events, initiation of the work and the results achieved had been analyzed in detail by the President of the Committee, Jozsef Fulop academician, in his report on the 10 year activity of the committee which was delivered by the IV. Rare Metals Conference. In his evaluation, which was prepared with the cooperation of a broad range of specialists, he concluded that considerable results have been achieved by the committee in the field of:

- opening up domestic sources of raw materials,
- setting up nationwide registry data on rare metals,
- changing the structure of rare metals import,
- setting up the rare metals production technologies,
- setting into motion the domestic rare metals production,
- advancing the broad range utilization of rare metals,
- provision of a nationwide information and data service and
- promotion of the establishment of a modern instrument park, in Hungary.

From the beginning, this wide-branching activity has been oriented in one direction by a single, common and essentially unchanged aim. Starting with the consideration that modern energy production, communication technology and telecommunication, the instrument industry, the industrial products for public consumption and, finally, the production tools themselves as well as the methods of their organized regulation are all based on the exploitation of the unusual properties of the rare metals, an increase in the rare metals demand of the domestic industry has been considered the principal task. Because of such close unity between the utilization of rare metals and the concept of scientific-technological revolution, we could conclude that the more rare metals are utilized, the more highly developed our industry will be and the more modern will be the industrial structure of our country.

This aim can be approached from various directions, however. During the initial phase, in addition to fruitful work, there was evidence toward an effort to be self-sufficient. We wanted to satisfy all of the rare metals requirements of our industry from domestic sources. For example, let us recall our efforts made toward the domestic production of semiconductor-quality silicon. During the subsequent phase in the early 70's, there was considerable progress in the industrial utilization of rare metals. At the same time, however, parallel with the increased role of foreign trade activities, there was an overemphasis on the view that our rare metals consumption be satisfied by imports. It happened in certain cases that we imported some rare metal of which Hungary is the potential world market producer. Today, in the era of the Fifth Five Year Plan, the qualitative and quantitative expansion of rare metals utilization remains to be equally important. In addition to securing the necessary imports, however, the utilization of the rare metals content of our domestic, natural energy sources is also treated as an important task. This two-pronged approach is best suited for the aims of our national economic plan and it gives the greatest security against the effects of the deteriorating rare metals exchange ratio on the world market, on our attempts to satisfy the rare metals needs of our industry. The possibilities of exploiting our natural resources and the tasks of expanding the domestic rare metals base will be summarized by comrade Dr Laszlo Kapolyi, deputy minister, in his lecture.

Coordination is the main characteristic of the activity by the committee. However, coordination is defined not merely as the cultivation of coordinate relations, as is often done in a narrow interpretation, but rather as the examination of individual problems in the totality of their relationship to their environment. Such a complex treatment is realized by way of coordination both in the horizontal and vertical directions. The horizontal relations have been built on three distinct levels:

among portfolios,

among institutions and

among specialists in development-production.

The interportfolio coordination is accomplished by the committee itself which consists of representatives of the departments and determines the trends of development by way of setting up the long range, intermediate range and annual plans as well as by supervising the tasks accomplished at other levels. The coordination forum among institutions is provided by the meetings of a coordinating council consisting of representatives of the institutes and companies, and by the sessions of the international cooperation work committee. The assumption of tasks which are in proportion with the internal intellectual and technical conditions, the problems of cooperation and the rate of fulfillment are determined at this level. Finally, the interaction among specialists in development and production takes place at the various project council sessions, specialist conferences and work discussions, and is aimed primarily toward the methods of execution of the developmental activities and an exchange of experiences.

The concept of vertical coordination, of course, includes the flow of information among the three levels described. I feel, however, that the assurance of uniform contracts threaded through the production hierarchy is a more important element. When, based on the analysis of the trends of industrial development, the long range requirement of a rare metal becomes known to us, we must examine the methods of satisfying this demand, the possibility of domestic production and the necessary natural resources. In the reverse case, if the domestic geological survey activity indicates the potential presence of natural resources of some rare metal, we have to take steps to organize exploitation, to provide for its manufacture and sale in the most valuable, highest-developed form possible.

The results achieved in the production of high melting metals and in the field of pure metals production can be mentioned as examples of developmental activity based on the knowledge of long-range demands. Research in the production of pure metals was initiated, about 10 years ago, based on the recommendation of and financed by the committee. As a result, by last year, our country has specialized in the production of about a dozen metals and also assumed the long-range task of meeting the needs of the friendly nations. The organization of alkali metals production, currently in progress, and the expansion of gallium production are among the examples where natural endowments were taken into consideration. Hungary provides 10 percent of the world's gallium production and we have the capability to considerably expand its quantitative production. In addition to the quantitative production, increasingly more stringent qualitative demands must be met to secure the market. That special quality which today represents an intellectual market potential including even an export element, will be considered only as common raw material tomorrow. Therefore, the constant development of technology is necessary. The effect of gallium on the structure of the domestic industry can be insured only by developing it ourselves into semiconductor industrial and electrooptical products which are more valuable by orders of magnitude.

Especially in the early phases of committee activity, a broad coordination could not always be realized. There were instances when central support was directed toward some research the rapid rate of development of which was not insured by domestic endowments. In another case, a modification proposal which was produced as a result of coordination was late and a technology was introduced in industry which did not adequately provide for the enrichment and recovery of the rare metals. This was the situation in connection with the condensation and collection of oil flue dust with a large vanadium content.

The most important tasks associated with the production and utilization of rare metals were laid down in the KFH-2 [presumably: Central Development Office] Rare Metals Research Target Program. Without doubt, it follows logically from what was said earlier that the word research is interpreted not merely as the method of organizing new knowledge by our own efforts. This expression embraces a unified technical developmental activity over and above sectional divisions, in a broad spectrum from raw material to consumer. We do not feel that the task of acquiring basic knowledge belongs to the sphere of influence of the Committee but rather the direct industrial utilization of the knowledge is constantly in the foreground. We have ample experience to show that academic institutes and university departments which are expressly sites of basic research do produce results which can be utilized directly by industry if suitable coordination and exchange of information are provided. Therefore, there is an increasingly large number of activities dealing with experimental-industrial production and the production of experimental products by the industries, in the current program of the coordinated field.

The rare metals research goal program encompasses 15 theme groups. The individual theme groups are coordinated by institutions requested to do so. One third of the theme groups is concerned with further development of rare metals sources, i.e., production of the raw material. Two thirds of them deal with satisfying the demand generated by the most important developmental objectives of the domestic industry, i.e., these are utilization oriented. The realization of the activity projected in the Fifth Five Year Plan will cost on the order of 400 million forints 10 percent of which will be provided by the FKH [Geology Central Bureau] as a direct source, from its own funds. This sum is of course insufficient to accomplish the most important tasks of the goal program but it is sufficient to insure effective coordination and to overcome those obstacles which stand in the way of the industrial realization of the results.

In the field of rare metals, the bulk of the technical-scientific cooperation is expressed by agreements which were made through the coordination center that was created by the KGST [Council for Mutual Economic Assistance], targeted on the problem of "New Semiconductor Materials and Metals of Unusual Properties." Among these agreements are analytical studies of global quality, forecasts and developmental tasks which are to be accomplished through international coordination

and cooperation. To utilize the tasks accomplished in the spirit of the Complex Program, the problems of production-specialization and the establishment of joint ventures come to the foreground now.

2473

CSO: 2502

HUNGARY

WORK OF VIDEOTON COMPUTER FACTORY ASSESSED

Budapest SZAMITASTECHNIKA in Hungarian No 9 Sep 78 p 3

[Excerpt] On 28 April of this year, the Computer Technology Department of the Janos Neumann Computer Science Society visited the VIDEOTON Computer Technology Factory. The factory hosts were Janos Kazsmer, factory director, and Ferenc Kiss, deputy director. In the course of the meeting it was learned that in 1978, VIDEOTON will make computer engineering equipment worth 3 million forints; 50 percent of this will consist of computers while the remainder will be 25 percent displays and 25 percent line printers. The recruitment of a staff of 3,200 skilled workers, technicians and professionals is considered a major achievement. They are employed at facilities in Szekesfehervar and Tab. So far the factory has sold 500 R-10 computers.

The outlook for the future appears to be difficult: Between 1978-1980, there will be a fundamental change in the selection of products. Factory officials feel that modular, fast-hardware units made up ECL components suitable for simulation will constitute the basis of modern computer architecture. In addition to the updated R-10 (the R-10M) they are developing the R-11 which can be expanded by a store capacity of 1 Mbyte. Lack of a socialist-developed magnetic disc having a capacity of between 10-100 Mbytes is a problem. Displays are being modernized, and the possibility of making steel-ribbon line printers is under discussion. VIDEOTON is attempting to reduce prices. Although service and organization of training are progressing well, much remains to be done. Provision of software must be increased substantially, but the factory has had a software-producing capacity of 200 persons for only 3 months.

CSO: 2502

POLISH ACADEMY OF SCIENCES ACTIVITIES, PERSONNEL

Warsaw NAUKA POLSKA in Polish No 6, Jun 78 pp 127-139

/Excerpts/ Scientific Cooperation Agreements Entered Into by PAN /Polish Academy of Sciences/

In Warsaw on 21 January 1978 Tadeusz Orłowski, full member of PAN and first deputy secretary for scientific affairs of PAN, acting on behalf of PAN, and professor Dr Abdel-Fattah Rizk, acting on behalf of the Academy of Scientific Research and Technology of ARE (expansion unknown), signed a Protocol on the implementation of the Executory Program of Scientific Cooperation of 20 August 1977.

During the course of the talks that were held decisions were reached as to the scope of personnel exchange programs to be arranged during 1978 with respect to the specific, agreed upon areas of scientific cooperation, and the substantive aspects of the residency programs to be carried out within the framework of exchange agreements between both academies that do not require outlays of foreign exchange were also spelled out.

On 30 and 31 January 1978 talks were held in Warsaw between delegations representing the Polish Academy of Sciences and the Austrian Academy of Sciences that were devoted to an evaluation of the results of cooperation during the period 1976-1977 and to outlining plans that will guide cooperation programs during the period 1978-1979.

During the course of these talks it was concluded that the setting of basic guidelines for cooperation programs has had a positive impact by encouraging the resurgence and strengthening of ties between the scientific research institutions of both countries. For example, the PAN Institute of State and Law and the University of Vienna Institute of Civil and Administrative Law have organized "Polish-Austrian Law Days" which were observed in 1976 in Lublin and in 1977 in Vienna. Documents held in Austrian archives were drawn upon for the publication in Poland of two monographs: "The Structure of Land Holdings in Malopolska in the 18th Century" and "Relations Between the Polish Republic, Turkey, and Russia, 1674-1679." During 1977 preparations were completed by the publishing facilities of the Naturhistorisches Museum in Vienna for the printing of a work jointly authored by professor Dr M.

Mlynarski of the Institute for Taxonomic and Experimental Zoology of PAN and professor F. Bachmayer, director of the Naturhistorisches Museum.

Bearing in mind the positive experiences resulting from the organization of scientific cooperation and the interests of both sides, it was decided that during the period 1978-1979 cooperation between PAN and the Austrian Academy of Sciences will be focused on eight principal problem areas, i.e., the historical background of Polish-Austrian relations (politics, economics, law, culture, art); botany, zoology, molecular biology; pharmacology; ecology, limnology, the protection and modification of man's environment; chemistry, physics, Earth sciences; mathematics, cybernetics; elementary metallurgy; mechanics. All in all, the cooperation proposals cover 42 projects, which will be carried out on behalf of PAN by 31 separate scientific institutions and committees. Agreement was also reached concerning the organizational and financial groundrules of these cooperative ventures, and with a view to the implementation of specific projects both sides earmarked funds to pay for 50 weeks worth of short-term tours and for 12 months worth of research grant tours.

The protocol on Scientific Cooperation Between the Polish Academy of Sciences and the Austrian Academy of Sciences During the Period 1978-1979 was signed on behalf of PAN by Witold Nowacki, full member and president of PAN, and for the Austrian side by the president of the Austrian Academy of Sciences, professor, Dr honoris causa Herbert Hunger.

From 20 to 23 February 1978, at the invitation of PAN, a delegation from the Hungarian Academy of Sciences, accompanied by its secretary general, academician Ferenc Marta, paid a visit to Poland. During its stay in Poland the delegation held talks on the subject of the implementation of the plan for cooperation between PAN and WAN (Hungarian Academy of Sciences) during the period 1976-1977. As a result of these talks, which were presided over on behalf of PAN by Jan Kaczmarek, full member and scientific secretary of PAN, it was concluded that most of the cooperation projects for which arrangements have been made are proceeding successfully and that some good results have been achieved. Three cooperation projects received negative assessments, and, as a result, these projects were excluded from the 1976-1980 cooperation plan. Bearing in mind the interests of both academies, a decision was made to incorporate four new projects into the cooperation plan in the fields of agrophysics, molecular physics, and the utilization of computer technology in the field of artificial intelligence. Bearing in mind the work that is under way on the drafting of a plan for scientific cooperation between PAN and WAN during the period 1981-1985, the foreign departments of both institutions were enjoined to reach an agreement by the end of 1979 on the basic guidelines for the concentration of scientific cooperation that will contribute to the definition of project problems and themes. In this connection it was decided that both institutions would share their long-range scientific development plans with each other, and it was recommended that a study should be drawn up which would analyze the goals and results of current cooperation projects. In response to a suggestion made by PAN a proposal was also accepted whereby joint awards be conferred by PAN and WAN in recognition of outstanding achievements arrived at through cooperation between Polish and Hungarian scholars.

It was further decided that in recognition of the 20th anniversary of cooperation between PAN and WAN, which will occur in 1982, a special scientific conference would be organized, and that steps would be taken to publish a directory of the Hungarian Academy of Sciences in the Polish language and a directory of PAN in the Hungarian language.

The WAN delegation was briefed on the research work that is now under way at the PAN Institute of Physical Chemistry and the Research Center for Catalysis and the Physiochemistry of Surfaces and also on the activities of the Krakow branch of PAN.

On 23 February 1978 in Warsaw, in the presence of the Hungarian ambassador to Warsaw, J. Garamvolgyi, J. Kaczmarek, full member and scientific secretary of PAN, and academician F. Marta, general secretary of WAN, signed a protocol concerning the talks that were held.

Scientific Research Achievements

New Analytical Methods in the Field of Architectural Design

The Research Center for Architectural Design Theory of the PAN Institute of Basic Technical Problems, with the cooperation of the Warsaw Institute of Technology, has laid the theoretical groundwork and developed computer analysis programs for the production of modern, mass-produced trussed roofing units that are used to build roofs for arenas and buildings. As a result of these analytical programs, it is now possible to substantially reduce the consumption of materials used for current building projects. This work comprises original analytical solutions and computer programs that permit the structural analysis of trussed building roofs that are in general use throughout the world and more and more frequently in Poland as well. The most important feature of the results that have been achieved is the mastery of the basic difficulties involved in the drafting of engineering designs for structures consisting of thousands of separate components. This was made feasible owing to the use of an original method that takes advantage of the standardized way in which these kinds of structures are built. The findings that were arrived at as a result of these theoretical studies at the same time lay the groundwork for the standardization and optimalization of this kind of architectural design.

This study was made within the context of a key project assignment with the heading "Durability and the Optimalization of Architectural and Machinery Designs." The results of this work can be used in the structural analysis of building roofs, which is the first phase in the drawing up of these designs. Several institutions have already benefited from the use of these structural analysis computer programs, including, inter alia, The Zielona Gora Higher School of Engineering, the MIASTOPROJEKT General Architectural Research and Design Office for Metal Structures in Warsaw, the Lodz Urban Planning Office, and the Krakow Urban Planning Office.

The use of modular building roofs in architectural designs, in place of the traditional roofs whose components consist of flat lattice trusses, is bringing about a substantial reduction in the consumption of building materials. In many cases only through the use of these computer programs is it possible to draw up economical architectural designs.

High-Power Hydrokinetic Clutches

At the PAN Institute of Fluid-Flow Machinery in Gdansk a research project was carried out between 1974 and 1976 that resulted in the development of the basic principles governing the design of high-efficiency clutches. This project was carried out under the direction of docent, Dr eng Stanislaw Dabrowski of the PAN Institute of Fluid-Flow Machinery and with the cooperation of the ZAMECH General K. Swierczewski Machine Building Plants of Elblag. In 1977 a team of workers from the PAN Institute of Fluid-Flow Machinery and ZAMECH were honored with an award presented by the minister of the power industry and atomic energy for the introduction of custom transmissions with controlled, high-power, hydrokinetic clutches used to regulate boiler feed pumps in power generating units. The clutches that were designed are characterized by a high degree of efficiency, a wide-ranging revolutions control capability, and complete adaptability to operation in automated control systems. They also represent a pioneering breakthrough on more than just a national scale. Owing to the original designs of the fluid-flow components, these clutches are superior to any of their foreign-made counterparts in terms of efficiency and inertial properties.

The clutches designed by this team are taking the place of clutches imported from dollar-market countries. The start-up of the domestic production of these clutches has turned Poland into the sole producer of regulated high-efficiency clutches in the socialist camp.

An Acoustic Method for the Examination of Larynx Functions for Purposes of Phoniatic Diagnosis

At the Center for Cybernetic Acoustics of the PAN Institute for Basic Technical Problems a research team led by professor Dr eng Janusz Kacprowski developed the conceptual and technical aspects of and subjected to experimental verification using clinical specimens an acoustic method for the examination and appraisal of the vocalic functions of larynxes under physiologically normal conditions and in pathological situations involving nerve paralysis, structural tissue changes, and post-operative conditions. The acoustic method of larynx diagnosis is based on the theoretically sound and experimentally verified assumption that all innate or acquired changes in the anatomic structure and all restrictions of the mobility of the larynx and the voice canal are manifested by measurable changes in the physical parameters of the acoustic speech signal when analyzed as a function of time and frequency.

By utilizing the physical model of the larynx source developed for this purpose and its mathematical description it is possible to identify and localize anomalies of anatomic structure or the physiological causes of restricted larynx motor functions. This is done by comparing the results of analyses of the statistical breakdowns of specific speech signal parameters under the pathological conditions or in disease situations that are being examined with appropriate data with corresponding data reflecting physiologically normal states serving as a data control group.

The method that was developed has all the marks of being an original and innovative contribution to the field of medical phoniatric diagnosis. In technical terms the application of this method is based on the cooperation of unique analogue-computer speech signal analyzers with a domestically produced MERA 300 minicomputer, relying on a specialized program that was developed for this purpose by the Center for Cybernetic Acoustics.

The testing of this method and diagnostic system under clinical conditions was performed in close cooperation with the Otolaryngological Clinic of the Surgical Institute of the Warsaw Medical Academy, based on the analysis of the speech of children and adults in states of normal good health, representing the control group, and in states of ill health involving unilateral or bilateral paralysis of larynx nerves. The results of this study were published in domestic and foreign professional journals and were referred to at acoustical and medical scientific conferences held in Poland and abroad, encountering a great deal of interest and praise among specialists in these fields.

The Physical and Mechanical Modelling of the Bedrock Foundations of Dams

Disruptions of the equilibrium of dam foundations has been the cause of much damage and numerous disasters throughout the world, resulting in heavy material losses and enormous losses of human life. This is related to the difficulties involved in gaining an accurate knowledge of the complex geological and engineering conditions that generally exist in dam foundations and in their representation in the form of physical and mechanical models.

Between 1971 and 1976 a series of comprehensive field, laboratory, and computer studies were carried out within the context of the ministerial task-force project assigned to PAN under the heading "Hydraulics and Civil and Marine Engineering" that were dedicated to the development of a methodology for the research and designing of dam construction projects. Within the context of these studies a great deal of emphasis was placed on the development of physical and mechanical models of dam bedrock foundations. These studies were made on the basis of the findings of research work that was carried out for three proposed dam construction projects (Czorsztyn, Besko, and Mloty), which served as full-scale experimental facilities.

Work on these study projects included the development of models of the fractures that occur in dam foundations, the description of the hydraulic

characteristics of dam foundations and the distribution of hydrodynamic pressures, in connection with which allowances were made for different kinds of counterfiltration factors, and the development of mechanical models of dam foundations in conjunction with the description of the basic mechanical properties of bedrock formations. These models were then used to draw up analyses of the stability of the foundations of the proposed dams. The results of these analyses were furnished directly to the design offices in charge of drawing up the blueprints for these dam projects.

Based on this research work and the models that were made, a method was devised for the physical and mechanical modelling of the rock formations that make up the foundations of dams. This method defines the rules that are to be followed in making these models, the techniques that are to be used in gathering the data that are essential for this purpose, and the way in which these data are to be used to estimate the stability of dam foundations.

This research work, which was interdisciplinary in nature, i.e., calling for contributions by experts in the fields of geology, hydraulics, and rock mechanics, was carried out by a number of specialized institutions, including, inter alia, the HYDROGEO Geological Enterprise for Hydrotechnics in Krakow and the HYDROKOP Testing Center in Krakow. whereby the project as a whole was placed under the direction of the PAN Hydrotechnics Institute of Gdansk represented by its staff member, professor Dr hab eng Kazimierz Thiel.

Anti-Air Pollution Efforts

At the PAN Institute for Fundamental Environmental Engineering in Zabrze a seven-member team headed by Dr M. Sadowski, working together with an eight-member team representing the former PAN Institute for Organization and Management and the Ministry of Science, Higher Education, and Technology headed by Dr. Lech Krus, has finished work on a series of two-year research projects devoted to the study of problems caused by the emission of air pollutants and, in particular, to the computer simulation of the processes whereby pollutants generated by multiple sources in urban-industrial complexes are dispersed in the atmosphere. An air pollutants dispersion model was developed for a selected area reflecting normal meteorological conditions and conditions of air stagnation and poor ventilation as the basis for taking action to reduce pollutant emissions and to forecast and control air-quality protection measures.

Phase one of this project, which had the general heading "A Model of Gaseous Pollutants Dispersion," was carried out within the framework of the Fundamental Environmental Engineering Institute's own project workload and also within the framework of its assigned key project tasks. Phase two, under the general heading "A Model of Particulate Pollutants Dispersion," was carried out within the framework of the Institute's assigned key project tasks.

As a result of this research work, 10 computer programs were obtained written in FORTRAN language. These programs automatically simulate specific phases of pollutant dispersion, including two basic models of verified dispersion patterns within the environs of four cities of the Upper Silesian Industrial District, i.e., Zabrze, Gliwice, Bytom, and Ruda Slaska. Based on the performance of an optimization analysis of the tested models, more precise general guidelines were developed that are helping to lower the costs of air-quality protective measures in this model area. The models that were developed, which make it possible to determine the impact of emissions sources on air quality, are at the same time a useful tool in the planning of air-quality protective measures. They also make it possible to carry out multiple-variable studies of emissions using any of the computers in the "Odra 1 300" series. The results of this research work were made available to U.N. researchers working in this problem area.

And the results of this work were utilized in five experts' reports prepared by the BIPROHUT and BIPROSTAL offices of metallurgical studies and plans for the Katowice Metallurgical Works and the Lenin Metallurgical Works.

An Effective Method for Improving the Productive Characteristics of the "Polish Red" Cattle Breed Involving the Utilization of Cross-Breeding Methods

At the PAN Institute of Genetics and Animal Breeding in Jastrzebiec, as a result of research work that was carried out between 1963 and 1976 under the direction of Dr S. Poczynajlo, an effective method was developed for improving the productive characteristics of the Polish Red breed of cattle. On the basis of experimental research work it was demonstrated that by cross-breeding the Polish Red breed of cattle with the Jersey and Belgian Red breeds it is possible to bring about an efficient increase in the milk and meat utilization parameters of the Polish Red breed.

By employing the method of cross-breeding Polish Red cattle with stud bulls of the Jersey and Belgian Red breeds under semi-intensive breeding conditions milk output increased annually by 140 kilograms and butterfat output increased annually by 7.4 kilograms during the period 1965-1973. Tests were made during 1975 and 1976 of the milk, fattening, and slaughter utilization rates of the newly developed red cattle breed in comparison with the lowland black-white cattle breed.

In light of the findings obtained by the Institute concerning the effectiveness of cross-breeding methods in improving the productive characteristics of the Polish Red cattle breed it was shown that the proposed method (which was experimentally verified) can produce greater economic benefits than the breeding procedures that are currently in use.

This research work was performed by a team of experts consisting of Dr Symeon Poczynajlo, professor Dr Henryk Jasiorowski, Dr Jerzy Kwiatowski, Dr Ryszard Grabowski, eng Ryszard Kilianczyk, technician Halina Golebiowska,

and technician Czeslawa Komar-Zak. Starting in 1976, this project was carried out within the framework of the interministerial task-force project under the general heading "The Genetic and Physiological Fundamentals for Bringing About an Increase in Farm Animal Productivity" and coordinated by the PAN Institute of Genetics and Animal Breeding.

During the course of this experimental research work it was demonstrated that it is feasible to improve the milk and meat utilization rates of the Polish Red breed of cattle. The proposed method is making it possible under semi-intensive production conditions to increase the average milk output of Polish Red cattle by approximately 1,000 kilograms and their average butter-fat output by approximately 50 kilograms. The first option, whereby Polish Red cattle are cross-bred with the Jersey breed, was put into practice in the former Siemiatycze Powiat in Bialystok Voivodship.

Notes on Polish Academia

A Model of the Typical Educated Pole of the Future

The "Poland in the Year 2000" Research and Long-Range Forecasting Committee of the PAN Presidium organized a conference that was held from 13 to 15 January 1978 in Jablonna near Warsaw. The theme of this conference centered around the development of a model of the typical educated Pole of the future and, in this connection, the development of a general concept of public education. The conference was presided over by Bogdam Suchodolski, full member of PAN and chairman of the Science, Culture, and Education Subcommittee of the "Poland in the Year 2000" Research and Long-range Forecasting Committee. Taking part in the deliberations of the conference were prominent specialists in various fields of knowledge from academic centers all over the country, namely, pedagogues, psychologists, sociologists, physicians, and technologists. The conference agenda covered the following questions: how to give people an understanding of the world, nature, and society through the educational process; the integration of knowledge about the world, and man's intellectual capacities. These topics were discussed by 40 separate papers.

A characteristic feature of this conference was its openness to debate, the exchange of ideas and opinions, and its broad-minded view of the future and the concept of public education in a socialist society, which is closely bound up with the ideal of continuous education. There was a discussion of the shortcomings of the modern educational system and of what kinds of changes ought to be made in this system in order to meet the demands of the future, which will be a product of our present living conditions and development prospects. It was stressed that we should set store not only by what a man knows what kind of knowledge he possesses, but also by what kind of a man he is, how he acts, and to what degree he feels himself to be responsible for his own actions. It is therefore necessary, it was

concluded, to educate the individual in such a way that he will be prepared as much as possible to carry out the difficult tasks that will be imposed by the complexities of modern life. In this connection an up-to-date model of individual education at the beginning of the 21st century must be different from the model that is in use today. It must be based on reality, and it must be a product of real conditions, needs, and possibilities. Emphasis was placed on the need to insure that educational programs at all levels of curricular and extracurricular instruction and the system of continuous education are relevant to the realities of modern life. A great deal of attention was devoted to a discussion of the problems of general education in the broad sense of that term, starting at the elementary school level and going all the way up to the university level, as an important factor of individual personality development. It was from this standpoint that the conference examined the rearing function of culture and the arts and the need for the greater de facto integration of individual areas and branches of knowledge in the process of educating and rearing our children. There also was a discussion of moral and ethical topics, the shaping of attitudes, the combining of education with practical work, and the teaching of children to fulfill their civic duties.

One of the tasks awaiting the "Poland in the Year 2000" Research and Long-Range Forecasting Committee is the preparation of an experts' report concerning the future of education in Poland. The Jablonna conference and the wide-ranging debate which took place at this conference will certainly be helpful to the committee in carrying out this task.

A Symposium of Economists from Poland and the GDR

The third joint symposium of economists from Wroclaw and Dresden was held in Wroclaw from 19 to 20 January 1978. This symposium was organized by the Oskar Lango Academy of Economics in Wroclaw and the Technical University of Dresden. The theme of the symposium's proceedings centered around the issue of prices and wages in a socialist economy. Ten papers were read before the symposium.

The rector of the Wroclaw Academy, professor J. Popkiewicz, gave a lecture entitled "The Formation of Wages and Prices in Poland During the Period 1971-1976." The director of the Institute of Political Economy of the Technical University of Dresden presented a paper entitled "The Role of Prices and Wages in the Workings of a Socialist Economy." In addition: professor J. Kaleta spoke about clearing prices in Poland; professor H. Uebermuth lectured on some of the theoretical and practical principles governing the formation of industrial prices in the GDR; docent Dr J. Kaden explained the economic problems involved in ascertaining the production-cost basis of prices; in his lecture docent Dr S. Linek concentrated on the theoretical and practical problems of price formation in Poland; Dr P. Wieczorek discussed the role of use value in the formation of industrial prices in the GDR; docent Dr. A. Lukaszuk spoke about labor productivity in relation to

wages; professor R. Janke discussed certain aspects of the formation of wages in the GDR, and Dr. B. Klimczak and Dr. F. Macha lectured on certain aspects of how wage funds are set up in large-scale economic organizations.

As a result of these proceedings, the economists from the GDR and Poland agreed that both sides stand to gain a great deal from such direct exchanges of ideas.

A Seminar of Political Scientists in Poznan

On 23 January 1978 the Institute of Political Science of Adam Mickiewicz University and the Poznan Branch of the Polish Political Science Society organized a seminar in Poznan to discuss some of today's most urgent international economic problems.

Lectures were given by docent Dr Zdzislaw Nowak, on principal development trends in the world economy, docent Dr Marian Guzek, on new factors in East-West economic relations, and professor Ludwik Jankowiak, on inflationary processes in the capitalist system.

The seminar was attended by research workers and students in the fields of economics and political science.

Environmental Protection Law

The Task Force for Legal Issues of Environmental Modification and Protection of the PAN Legal Science Institute, working in cooperation with the Voivodship Administration of the Polish Free University Society in Wroclaw, organized a conference on emerging trends in environmental protection law in light of the draft law on the protection of the natural environment in the PRL. The conference was held in Przesieka from 16 to 17 January 1978.

The conference proceedings were attended by representatives of university law schools in Poland, scientific institutions, the Ministry of Administration, Local Economy, and Environmental Protection, and local authorities. Nine lectures were given related to the theme of the conference.

The Internationalist Nature of Soviet Military Science.

In conjunction with the 60th anniversary of the armed forces of the USSR a symposium was held on 16 February 1978 at the Karol Swierczewski General Staff Academy of the Polish Army on the subject of the "Internationalist Nature of Soviet Military Science." The symposium was attended, inter alia, by general of the army Afanasiy Shchegolov, representing the Central Joint Armed Forces Command Headquarters of the Warsaw Pact Member States, colonel Valentin Korzhenkow, army naval, and air force attache of the USSR Embassy in Warsaw, and others.

Colonel, professor Julian Kaczmarek presented the opening address entitled "The Internationalist Nature of Soviet Military Science," In addition, lectures were given by colonel, magister Wladyslaw Jura ("Lenin's Teachings on the Defense of the Socialist Fatherland as an Important Factor in the Training and Instruction of Students of the General Staff Academy of the Polish Army"), colonel, professor Kazimierz Nozko ("The Role and Significance of Soviet Military Science in the Training of Command Staff Personnel at the General Staff Academy of the Polish Army"), and colonel, professor Emil Jadziak ("Political and Military Aspects of the Liberation Mission During the Years 1944 and 1945").

While the symposium was in session an exhibition was mounted entitled "Famous Poles in the Soviet Army."

Soviet Studies

On 23 and 24 February 1978 the Main Administration of the Polish-Soviet Friendship Society and the Editorial board of NOWE DROGI organized a conference in Warsaw on the subject of "The Advancement of Knowledge About the Soviet Union and Polish-Soviet Friendship in People's Poland." The conference proceedings were attended by political and social activists, research workers, engineers, and representatives of the cultural world.

The conference was opened by Jan Szydłak, member of the Politburo of the PZPR Central Committee and chairman of the Main Administration of the Polish-Soviet Friendship Society. The editor-in-chief of NOWE DROGI, Stanisław Wróński, discussed the importance of the Polish-Soviet alliance and friendship to the further development of Poland and the building of a socialist society. Next, the deputy chairman of the Planning Commission of the Council of Ministers, Janusz Hryniewicz, spoke about the importance of economic cooperation with the Soviet Union, and Sylwester Kaliski, minister of science, higher education, and technology and full member of PAN, discussed the social aspects of scientific and technical cooperation between Poland and the USSR. Contacts between athletic groups and private citizens, tourist exchanges, and cooperation between towns and villages, work places, and border districts of the USSR and Poland were discussed by Bolesław Kapitan, chairman of the Main Committee for Physical Culture and Tourism, and Stanisław Lewandowski, secretary of the Central Council of Trade Unions. The importance of cultural exchanges between these two countries was described by Tadeusz Kaczmarek, chairman of the Cultural Affairs Committee of the Main Administration of the Polish-Soviet Friendship Society. In his address Waclaw Barszczewski, general secretary of the Main Administration of the Polish-Soviet Friendship Society, focused on the organized, mass social movement dedicated to learning more about the Soviet Union and to the strengthening of Polish-Soviet friendship, while the role of the comrades-in-arms tradition in the strengthening of these ties of friendship was discussed by the dean of the Political History Department of the Military Political Academy, Kazimierz Sobczak.

Space Law

On 15 February 1978 the Polish Astronautics Society and the Association of Polish Lawyers organized a conference in Warsaw on the subject of problems pertaining to the current state of space law and to legal problems associated with the advancement of international cooperation in the exploration of outer space and with the exploitation of the space environment, among other reasons, in order to meet communications needs, to study the Earth's natural resources, and so on.

In the lectures that were given at this conference it was stressed that the treaties dealing with outer space law that are currently in force are an outgrowth of the most progressive principles of international law. This is because they declare it to be mandatory that the outer space environment should be exploited exclusively for peaceful purposes and recognize it to be the rightful property of all men, while cosmonauts and astronauts are in turn recognized as the emissaries of all mankind. It was pointed out that there are some problems in this area which have yet to be resolved in a proper legal manner. The conference called attention to the open nature of the organization of the socialist countries participating in the exploration and exploitation of outer space under the terms of the "Interkosmos" and "Intersputnik" programs. It was also emphasized that the undertaking of international manned space flights this year involving the participation of cosmonauts who are citizen of the socialist countries amounts to an important step in the advancement of international cooperation in the exploration and peaceful exploitation of outer space.

Environmental Protection in the Southeast Macroregion

The PAN "Man and the Environment" Committee, working together with the PZPR Voivodship Committee in Tarnow, organized a scientific applications symposium on the subject of critical problems of environmental protection and modification as viewed against the background of the socioeconomic development plan and regional development plans in the southeast macroregion. The symposium took place in Tarnow on 1 and 2 February 1978. The symposium proceedings were attended by the secretaries of PZPR voivodship committees and governors of eight (Kielce, Krakow, Krosno, Nowy Sacz, Przemysl, Rzeszow, Tarnobrzeg, and Tarnow), representatives of PAN scientific institutions, institutions of higher education, and ministerial institutes, prominent representatives of industry, and specialists in the field of environmental protection and modification.

The agenda for this symposium consisted of 23 lectures on topics in various disciplines having to do with the fundamental problems affecting the natural environment in the southeast macroregion, communiques from the voivodship offices that make up this macroregion, reports from planning agencies, and the sociological programs of the macroregion's largest industrial enterprises whose production activities are often the cause of adverse effects on the environment.

The keynote address that defined the key issues facing this symposium and set the tone for ensuing discussion period was delivered by Dr Andrzej Karpinski, deputy chairman of the Planning Commission of the Council of Ministers and chairman of the Macroregion Development Commission, and the broad background of this problem area was outlined by Wlodzimierz Michajlow, chairman of the PAN "Man and the Environment" Committee and full member of PAN. Fourteen persons took the floor during the discussion period to comment, inter alia, on the lack of progress in this macroregion when it comes to taking action to protect its people both against the increasingly adverse effects of industrial activity and also against the lack of foresight in the development of land and natural resources. A serious problem facing the southeast section of the country has to do with the proper exploitation of the raw materials deposits that exist in this area, i.e., sulphur, stone, salt, and gravel. It is therefore necessary, among other things, to develop methods for the reclamation of these raw materials deposit sites.

Analyzing the Quality of Harvested Crops By Means of Biometric Methods

The Polish Biometrics Society and the Wroclaw Agricultural Academy organized a symposium which was held on 30 and 31 January 1978 in Wroclaw to discuss: "Variance Analysis and Its Applications." The symposium was attended by research workers from agricultural academies and other scientific research centers from all over Poland.

Lectures were given on the findings of the latest studies that have been made involving the use of biometric methods, primarily as they related to assessments of the quality of harvest of various grain varieties, fodder plant crops, and perennial plant crops and the utilization of pasturelands exposed to the threat of contamination by urban sewage.

The Protection of Field Crops

From 2 to 3 February 1978 an international scientific symposium was held in Poznan organized by the Institute for the Protection of Field Crops and devoted to a discussion of the findings of the Institute's scientific departments with respect to the use of agents that effectively protect unripe grain crops against mycosis and the prospects for reducing losses incurred through the spoilage of domestically grown field crops. The symposium proceedings were attended by representatives of the scientific community coming from scientific centers all over the country, agriculture, and industries producing goods for the agricultural sector, in addition to specialists from England, Czechoslovakia, France, Japan, the GDR, Switzerland, Hungary and Italy.

The holding of this symposium coincided with the 60th anniversary of the founding in Pulawy of the State Institute for Fertilization and Soil Science, the Poznan branch of which was established in 1952.

Wladyslaw Wegorek, director of the Institute for the Protection of Field Crops and associate member of PAN, discussed the evolution of the scientific discipline of field crop protection over the past half century. A great deal of attention was devoted to methods used in the development of new pesticides and other field crop protection techniques which are less harmful to the natural environment. There was a discussion of the successes achieved in the area of combating field crop diseases and pests and the automation of grain harvesting and of the resistance of field crops to pests, e.g., the plum-hops aphid, to chemical preparations, and so on. The findings of research work in the cultivation of hot-house crops were presented. Emphasis was placed on the economic benefits resulting from the use of chemical agents that promote the protection of domestically grown field crops.

Fertilization Efficiency

On 9 February 1978 a scientific applications conference was held in Poznan on the subject of the intensive fertilization of field crops. The conference was organized by the Center for the Popularization of Progress in Agriculture of the Poznan Agricultural Academy. The conference proceedings were attended by specialists from the regions of Wielkopolska, Lubuska, and Gorzowska.

The keynote address was delivered by professor Zbyszko Tucholka. Professor Tucholka called attention to, among other things, the relatively low efficiency of fertilization in Poland and to the selection of suitable applications of artificial fertilizers and microelements. The subject of soil microelements was taken up in his lecture by Dr Alfred Czekalski.

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ACHIEVEMENTS IN PHYSICS CITED BY INSTITUTE DIRECTOR

Bucharest FLACARA in Romanian 23 Au 78 p 18

Interview with Dr of Medicine Marin Ivascu, director general of Central Institute of Physics, by Emil Leonard

Text I am pleased to accept the FLACARA editors' request to discuss the role and future of science in our socialist society, a request that calls for knowledge of a given situation at a particular point in Romanian history with which we are contemporary.

Question I quite agree with your view, but at a distance of more than three decades I think we can compare ourselves with ourselves.

Answer Well in that case I shall say what may be known to some and not to others, namely that in August 1944 Romania gained recognition in various sciences through its schools of mathematics and medicine and in physics through only a few personalities, to confine myself to just these examples. Obviously the situation has changed radically in the last few years for the branches that were poorly represented over 30 years ago, and it has greatly improved in the fields wherein we started from zero. Not to prolong this contemplation of the past too far, I shall point to the present organization of Romanian scientific research, the foundations of which were laid by the Romanian president Nicolae Ceausescu himself after thorough, painstaking and deliberate analyses and which now displays a solid and effective structure that is productive both in theoretical considerations and in practical applications. The first principle of organization is that of the central research institutes such as those for biology, machine building (there are even two of them), chemistry, physics etc. In the strategy proposed by our party secretary general and adopted by us, all these represent scientists as veritable detachments for the economic branches who will coordinate the whole phenomenon of creation throughout Romania.

Question Since you are director general of the ICEFIZ Central Institute of Physics, an illustration of your statement by the present situation in physics would be welcome, especially if it is indicative of the general phenomenon.

Answer Here we are in the Magurele area at the National Physics Center, which has three research institutes, two centers and one enterprise but a

scientific "jurisdiction" that also extends over other such specialized institutions as the Pitesti Institute of Nuclear Reagents, the Cluj-Napoca Institute of Isotopic and Molecular Technology, and the Iasi Center of Industrial Physics, besides which it also coordinates all research activities in faculties and institutes of higher education (concerning physics, of course).

Question Is it possible, over so broad a scope, to state the National Center's main concerns so that by analogy we can understand what is going on in other fields of scientific research too that are characteristic of Romania today?

Answer We make a correlation, coordinating the problem as a whole and selecting the major subjects demanded by the needs of our national economy, while avoiding the minor aspects overemphasized in the past. To be more frank, I shall say what was going on in research about 10 or 12 years ago, in Heliade Radulescu's time: We were not asked to investigate anything, but merely to do research! We are now far beyond this rather infantile stage and have concentrated on problems and subjects of both national and international significance. To be more specific, Nicolae Ceausescu implemented this characteristically Romanian, original form of organization toward the end of 1976 and that is how we for example have proceeded, making use of the party's extensive support. We have treated the particular problems in the central institutes and included the new branches of physics. The Institute of Nuclear Physics and Engineering, the Institute for the Physics and Technology of Materials, the Institute for the Physics and Technology of Radiation Instruments, the Center for Earth Physics and Seismology, and the Center for Astronomy and Space Sciences have individualized their problems. A dilution has been replaced by a concentration of several major problems in specialized institutes. You see how broad the range of our interests has become. And the same thing is true of other disciplines too. You see, for example, how well research in industrial chemistry has been established, the Central Institute of Chemistry being famous both at home and abroad. This also applies to machine building, and electronics as well. All these examples bear out the fact that Romania has an outstanding research, planning and industrial engineering force that I would not hesitate to call a vast force for development of original ideas and plans standardized at the world level, in other words the whole arsenal needed to expedite the overall development not only of our economy as such but also of our entire society, further and faster than ever before. In metallurgy, for another example, the researchers of the central institute have perfected a series of models of superior steels and alloys in addition to the assimilated ones. Science has been afforded a very broad field of activity including agriculture, which is a field I have not yet mentioned wherein our own research is providing another and a faster pace as well as a growing independence of studies at other points in the world. Physics, for example, is supplying basic concepts and specific developments to all areas of research, where they are taken over and exploited.

Question Since we have come back to physics again, please mention some fields that have been successful because of original thinking.

Answer Gladly, but only a few. In the field of nuclear power engineering, we have completed studies to provide power-producing and regulator fuels for

nuclear power stations. Great strides have been made at Cluj-Napoca in isotopic refining and separation. Nuclear methods and equipment are now being used in all branches of the national economy and all social activities (medicine, biology, agriculture). Romanian researchers have developed methods of automation and control (in the case of blast furnaces, for example) in industry and methods of diverting watercourses etc. in hydraulics. The founding of the Production Center for Radioisotopes, which is supplying the economy with a very wide assortment of isotopes suited to the precision required by the most modern industrial processes, is a culmination of all these studies. Of course we owe this progress to our excellent equipment, which is among the best in Europe. That is why we were among the pioneers and later among the first experts in the field of rapid electronics installations. I should also say something about the use of lasers as well as radioisotopes, since they have highly varied applications and they were developed and "built" in Romanian research laboratories.

Question What is the position of Romanian research in the world brain trust?

Answer I am convinced that Romania can no longer be ignored now in speaking of the "world research trust." Not at any rate in nuclear physics or the physics of solid bodies or lasers. The same is true of chemistry, medicine and biology. Many Romanian scientists belong to the administrations of higher continental and world forums. The list would be far too long to repeat here in its entirety, but most of the figures in medical, chemical and physics research are high in public esteem here and abroad. But in technological physics I think we are still dependent upon others who are more advanced than we at present. But the ICEFIZ is making a major effort to train specialists with a better technological background to fill this gap as soon as possible in the fields of nuclear energy, special materials and new energy sources.

Question What bearing does research have on economic effectiveness now?

Answer I say it is our policy to apply all studies made in our central institute and in others (chemistry is once more a shining example of this) to the national economy as soon as possible for the sake of technical progress and better use of all our natural resources as a priority task assigned scientists by the party. There is a rising line of elevating industry to the level of science and a "declining" (but not in the ordinary sense of the word) line of involving science in the economy. While we can say today that every leu invested in research yields 5 lei in industry, in a very general way we intend to do what we have succeeded in doing in some sectors, namely to make the same leu yield 100 lei. The originality at any price that some were still practicing has ceased to exist. All scientists' efforts are concentrated upon the basic research that will really win prestige (a new phenomenon or an original innovation) and upon eliminating the attempts to "supplement" what has already been achieved in the world. We are determined to make technical and technological research the one to take over and exploit the results of Romanian scientific thought to meet the requirements of the national economy.

Question How would you describe the scientist of our socialist era?

Answer On the basis of the directives of our party secretary general, who has asked us to make a concerted and constant effort to develop a new kind of

researcher whose character and activity will be determined by the solution of the problems of our socialist society. That is what we are trying to accomplish. With my hand on my heart I can say that the Romanian researchers who go abroad to work under the collaboration programs for various periods are highly respected for their superior theoretical education. This makes me happy. But I am most happy when these scientists, raised by our system and guided by our party, succeed in making people confident of mankind's future and when by their tireless work they remove obstacles of any kind from their path. As it follows the course it has taken, Romanian science will assume new proportions and an ever broader scope that will lend it the ties with the economy as a whole which alone enable it to carry out any new idea and make of it a powerful and decisive means of guiding and quickening the pace of modern life, both economic and social, until it reaches the peak of human aspirations in communism.

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CSO: 2700

DOMESTIC DRUG TO BE PRODUCED IN ITALY

Bucharest FLACARA in Romanian 23 Aug 78 p 18

Article by Nelu Ionescu: Covalitin Approved in Italy

Text Question You have just returned from Italy. Is it true, Dr Tina Covaliu, that you have brought good news to us at home?

Answer That is true.

Question It is our responsibility to our readers to publish this news immediately.

Answer A clinical study was made of the effects of Covalitin for a whole year in Prof Dr Franco Bianchi's urology clinic in Italy. The specialists of this clinic made periodic checks with great care and professionalism. Prof Bianchi himself checked the evolution of the patients' condition.

Question I am glad to see you are a master of suspense. What did this study show?

Answer The Romanian drug has a very high therapeutic effect of 85.71 percent. It is tolerated well by patients. It has no secondary effects and affects no vital organ. The clinic agreed that the Romanian product Covalitin should be used in the daily treatment of renal lithiasis. The Italian clinicians sent a letter to the CNST National Council for Science and Technology expressing the intention of founding a lithiasis institute over there for Covalitin treatment.

Question It is quite a token of esteem and a joy.

Answer Unquestionably, but it is shadowed by another fact. I would have been happy to see the first institute of the kind founded in Romania. Wasn't this natural?

Question Acceptance of the product in Italy is a first step toward international recognition of Covalitin.

Answer I think so too. Its effectiveness is being studied in other countries too.

Question In addition to the joy of fulfillment, actually this also means provision for an increased output of Covalitin.

Answer Exactly right. Covalitin needs better production conditions. But actually it all depends upon people, and the Bucharest Drug Industry has a director general who is a professional, intelligent, sympathetic and a patriot, namely Mihai Gheorghiu.

Question What do you think is the main significance of the approval of this Romanian product in Italy?

Answer The approval is one more argument to the effect that Romanians have a head for research.

Question What more good news do you have for us, Dr Tina Covaliu?

Answer News of work. In September we are starting a course for foreign physicians, Soviet, Italian and others. It is a further proof of the justified interest in this national creation.

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ROMANIA

FURTHER DEVELOPMENT OF FELIX C-256 COMPUTER URGED

Bucharest SCINTEIA in Romanian 27 Sep 78 p 3

[Article by Mihai Draganescu, corresponding member of the Academy of the Socialist Republic of Romania: "Computer Architecture in a Period of Radical Changes--A Long Range View of the Implications of Automatic Data Processing in the Enterprises"]

[Excerpts] The evolution of computer architecture depends, on the one hand, on the way in which the user conceives the ideal architecture and, on the other hand, on the extraordinary progress in microelectronics during recent years. The conception of the ideal architecture is not a simple problem and an ideal abstract computer has not yet been defined.

It is certain, however, that technological development is occurring so rapidly that we are obliged to make urgent reorientations and it is desirable that, in the following periods, the modifications which we will be enscribed on a positive trajectory for the evolution of computer technology in Romania. The most positive in recent years is the defining by the Central Institute for Management and Data Processing, the Institute for Computer Technology, and the Bucharest Polytechnical Institute, through the department for electronic devices, circuits, and apparatuses and the department for electronic computers, together with the Electronic Computer Enterprise, of a family of micro- and mini-computers produced by their own efforts, on a level with similar products from abroad. Although there have been some delays, the introduction of this equipment into manufacture and its utilization will mark the entrance of our country on to a modern path in the area of computer technology, a positive direction, with the aim that superior units of mini-computers will be produced and that they will surpass the average-capacity calculators which we are using today.

This poses the following problem: what will happen to the architecture of the average capacity calculators, in our case, of the Felix C-256, the Felix C-512, and the Felix C-1024, and to those of a higher generation?

The line of the four generations, with the Felix computers belonging to the third generation, could be eliminated, with computer architecture moving on to a new trajectory determined by the extremely powerful micro-electronic components which have appeared in the world electronics industry.

In the light of such transformations, what can we propose, taking into consideration what our economy has accumulated up to now in the area of computer equipment and programs and in light of the technology assimilated in the electronics industry?

We said earlier that we must act in the direction of new structures in research, in such a way that the talented collectives which create viable prototypes can have their ideas used in industry. On the other hand, one cannot justify changing the average type Felix C-256 calculator in regard to the essential aspect of its architecture and in regard to the programs which we use for this calculator in the economy. The transition to a computer of the 3.5th or 4th generation cannot be permitted if it involves reprogramming work and recycling of cadres--efforts which are not thought to be economical.

The continuity of programming for the four generations of computers represents an economy restriction which the manufacturer must take into consideration. The taking on of a "new" computer which would be made compatible with the Felix C-256 could not be allowed under current conditions, unless a foreign partner would rely on its production in Romania. Until new viable architecture is found, which will certainly have a definite convergence on the world level, the best thing would be the development of the Felix C-256 computer, the continued improvement of its performances and the abandonment of its manufacture when its tasks can be taken over by the new architecture, which is different from the tradition of the four generations. The country will need a number of very strong computer centers, equipped with supercomputers for broad scientific and technical problems and for very voluminous data bases. This role should naturally be assigned to the territorial electronic computation centers which will also serve as support stations for the national network of electronic computers and the national data processing system.

In the enterprises, just as in other units of the economy effectiveness of the use of electronic computers at the present time, the failure to see the immense potential of this instrument for raising social labor productivity means to travel on the difficult road of the old, on the road which leads you to more and more difficult labor instead of working systematically so that the work of the human being becomes closer and closer to the ideals of Communism, easier although more complex.

ROMANIA

BRIEFS

NEW CALCULATOR--One of the most recent successes of our electronics industry is the "Felix FC 96" invoicing and bookkeeping calculator, executed on the basis of original technology by specialists from the Research Institute for Computer Technology in Bucharest. The processor which serves as a basis for the FC 96 is composed of five [as published] units: the arithmetic control unit, the operational memory, the fixed programmable memory, and the peripheral control unit. Because of its special processes, FC 96 can be combined with peripheral equipment such as an electric typewriter, a tape perforator and a tape reader. [Bucharest MUNCA in Romanian 22 Sep 78 p 1]

JAPANESE-ROMANIAN PROTEIN PLANT--Tokyo 6 Oct KYODO--Dainippon Ink and Chemicals Inc. (DIC) of Tokyo announced Friday the completion of a plant, capable of producing 60,000 tons of single-cell protein a year, in Romania. The leading chemical company said the plant would start operation in December at the earliest. The plant has been built at Curtea de Arges, central Romania, for RONIPROT, LLC, owned 43 percent by DIC and 57 percent by Romania's chemical industry ministry. Officials said this would be one of the world's largest plants to product single-cell protein, which will be used as animal feed. The joint subsidiary will market the product in Romania and other nations in Europe. [Text] [Tokyo KYODO in English 0837 GMT 6 Oct 78 OW]

CSO: 2020

EXPERTS DISCUSS FEASIBILITY OF DOMESTIC COMPUTER PRODUCTION

Ljubljana TELEKS in Slovenian 27 Jul 78 pp 19-23

[Article by Mija Repovz]

[Text] Slovenia has been waiting a long time for a domestically manufactured computer. Then, almost at the same time, appeared two: Iskra's Cyber 18 which is closely related to the computers of the American company, Control Data Corporation, CDC for short, and Elektrotehna's Delta which has a more distant relation to the American firm, Digital Equipment Corporation or DEC.

Iskra acquired its computer by purchasing the license while Elektrotehna obtained its own under the OEM relation. Iskra is completely dependent on CDC but the OEM relation is a full partnership and leaves Elektrotehna a free hand in selecting the firms from which it will purchase some computer parts.

Hardware, the operating apparatus, is the visible part of the computer. Iskra will make a gradual transition to development of its own hardware. Elektrotehna has already taken the first steps. In the process, Elektrotehna attracted to cooperation some Slovenian organizations of associated labor.

Software, the systems equipment, is the most important and valuable part of the computer. Elektrotehna already has mastered part of it, that is, the operational software. Iskra obtained all of its software from CDC.

It should be mentioned that Iskra's computer does not look too kindly at Elektrotehna's, in fact, not kindly at all!

The computer, until recently thought of as something unreal, as we wrote in one of our earlier issues, has nowadays become a necessity so essential in every society that its former mysteries have almost faded away.

In this country, too, people started to make calculators. Some are trying one way, others another. There seems to be not much love lost among them.

Silence about something so important for society as computers is strange. We wanted to break through it and decided to hold a roundtable discussion.

It is vacation time, therefore some of the invited experts could not attend. Others were absent for quite different reasons.

Participating in the roundtable discussion were: Prof Jernej Virant, dean of the Faculty of Electrical Engineering; Prof Anton Zeleznikar from the Jozef Stefan Institute; Rado Faleskini from the University computer center; Franta Komelj, director of the Institute of Statistics; Miran Mihelcic from the Economic Chamber of the Socialist Republic of Slovenia; Professional Engineer Marjan Krisper from the republic committee for social planning and information system; Drago Juretic, director of the AOP sector at Mercator; Professional Engineer Janez Strubelj, director of the computer TOZD [Basic Organization of Associated Labor]; Professional Engineer Damjan Zemva from Elektrotehna, and Jure Apih, principal editor of TELEKS.

The following did not respond to TELEKS' invitation. Prof Dr Milan Osredkar from the Jozef Stefan Institute; Dr Desan Justin, director of the republic computing center; Janez Cemazar, president of the commission on computers at the Economic Chamber of Slovenia; Dr Ljubo Pipan of the Faculty of Electrical Engineering (on vacation), Professional Engineer Gregor Svajger of Gorenje,; Joze Pertovt, director of Emona's electronic center (on vacation); Professional Engineers Milos Kobe, Dusan Res, and Andrej Uratnik from Iskra (one of whom was on vacation); and Magda Spartas, president of the commission on equipment imports at the republic committee for economic relations with foreign countries (on vacation).

"Esteemed Comrade Mija Repovz:

"As agreed in our telephone conversation I am sending a written formulation of the opinion which is an essential part of the two statements aptly quoted in your article.

"I feel that duplication or multiplication of capacities for the manufacture of electronic subelements, elements and subassemblies for computers is totally intolerable. Iskra has acquired the technology for this purpose in connection with the production of Metaconta telephone exchanges. Therefore it is, from the point of view of investments, quality aspects, and market, inappropriate for someone else (Elektrotehna) to begin again from the start. If the capacities and capabilities of Iskra are inadequate there is still Gorenje which has developed quite admirable capabilities in the field of electronics."

"I wish you luck and enough people with character in carrying out your roundtable discussion. Should you decide to postpone it, I shall be available after 1 August."

Signed Ljubo Pipan

"Esteemed Comrade Editor:

"Thank you for the invitation to participate in the roundtable discussion on computers on 12 July 1978.

"I cannot accept your invitation because between 12 and 15 July I shall be out of town participating in the work of one of the commissions of the Federal Executive Council.

"Moreover, I question the rationale of additional discussions of the representatives of various organizations within the framework of TELEKS whose purpose and expertise level correspond to an "information weekly," since the same people are in one way or another through their roles and responsibilities already included in the mechanics and process of formulating and implementing society's policy in the field of computers."

Regards,

Professor Dr Milan Osredkar

"TELEKS, Ljubljana:

"Thank you for the invitation to the roundtable.

"Concerning participation of Gorenje in the field of computers we wish to advise the following.

"The field of computers is designated as a priority area in our intermediate range plan.

"Prior to its publication for the benefit of the public at large we have an obligation to coordinate our plan with the appropriate commissions of the Economic Chamber of Slovenia which we intend to do at the earliest possible time.

"Wishing you a most fruitful discussion at the roundtable, we are extending to you our comradely greetings."

SOZD "Gorenje" Velenje,

by Gregor Svajger

TELEKS: "The basic question of interest to our readers is why did we have to decide for production of a domestic computer at all. From this question follows another, namely: do we have the economic, technical, and professional capability for this purpose?"

Faleskini: "The production of computers must be considered from two aspects. First it is important to know what it is that such production requires. This refers to the entire electrical and mechanical technology, research and development activity, sales, service and maintenance, and training of

personnel in the computer field. Second, the production of computers must also be considered from the general social impact point of view. We know that in a self-managing society we must build a new method of production which requires a revolution of all our production processes. This revolution is technologically conditioned and that to a large extent precisely by the development of computers and data processing."

Krisper: "The 1976-80 intermediate range plan of the Socialist Republic of Slovenia has already emphasized and established the responsibilities of the domestic economy in mastering the production of computers. This decision stemmed from the fact that while Slovenia had not enough possibilities for the development of the basic industry it did possess sufficient expertise for the purpose. And the mastering of computer production depends primarily on expertise.

"However, in developing domestic computers we should by no means forget that we are generally lagging far behind in the area of computer technology. Domestic computer technology should be supported, but this by no means implies that we should forgo foreign computer equipment for this purpose and limit the importation of modern computer technology. Such course of action would have devastating consequences for our development."

Zeleznikar: "I think that in speaking of why must we develop domestic computer technology and accelerate the development of computer technology in general we are frequently oblivious of the fact that computer industry contributes to the growth of other industries, particularly the mechanical, alimentary products, and processing industries."

Virant: "Concerning professional expertise--it is not at all difficult to educate 20 to 50 professional engineers so that they can start developing computer technology, it is difficult, however, to attain a general cultural level and awareness of what is information. This we do not have. We do not teach intermediate school students what is information and frequently workers in associated labor have no idea about these matters."

TELEKS: "People say that it is not a good idea to buy computers, we should develop and produce them ourselves."

Faleskini: "Naturally, we can avoid technological colonialism only by mastering the entire production structure."

Viran: "Our constitution provides for society's information system. This system is something new, unknown elsewhere in the world. Therefore, it can only be developed by ourselves. In fact, it is impermissible to allow foreigners to get hold of it. To be specific: We have the system of deputies and we have decided to set up informational documentation centers, INDOC, which we know should be efficient and of service to the system of deputies. We cannot expect others to build INDOC for our system of deputies, this is something we must do ourselves, but to speak about the army or the Internal Affairs Administration."

Computer Is Not A Technological Problem

TELEKS: "Producing computers is not a simple matter, particularly not at the level of technological development reached by our society. We have had some bad experience in this connection, too."

Virant: "Iskra had indeed failed with its licensing agreements a few years ago which, however, is understandable: It was some years ago. Today it is no longer so difficult to master a computer system, therefore we would find it hard to understand the failure of a computer design. We only have to look at the possibilities of the so-called OEM relationship: one buys as an equal partner of a firm all or some of the parts which he then assembles at home. The computer system produced in this way is certainly original. This is how Delta came into being, as is well known."

TELEKS: "Mastering computer production is then not a technological problem?"

Virant: "The part of the computer equipment consisting of the apparatus, the hardware, is nowadays more the concern of a system engineer than a technologist. Of course, the reliability of the system made in this way then rests on the shoulders of the manufacturer."

TELEKS: "Of primary importance, then, is the mastering of the computer's systems component, the software."

Virant: "It is difficult to draw a clear-cut line between the software and hardware. If one visualizes the development of technology it is apparent that it, too, requires part of the software."

TELEKS: "Then we may say that the two parts cannot be considered separately."

Zeleznikar: "We can certainly say that."

TELEKS: "The decision to manufacture computers then also requires production of the hardware?"

Mihelcic: "These two things are completely overlapping. It is true that in Slovenia we do not have extensive possibilities for the development of basic industry but on the other hand we are at the frontier of international competition with some other industries. We could reach such level of competitiveness in the production of computers, too."

Neglected Intellect

Juretic: "I do not understand why there is so much talk about hardware. In 1950 the ratio between hardware and software used to be 1 to 4, today it is 4 to 1. No enterprise in Yugoslavia or in Slovenia is capable of producing its own software."

"And then there is the third element, the so-called peopleware. I could somehow understand why are we logging in the first two but I do not understand why are we behind with the third. In this Intertrade has done the most through its schools in Radovljica."

Zeleznikar: "I cannot agree with the statement that we are not capable of or that it is not economical to produce the hardware domestically." At its heart are integrated components which are smaller than matchboxes in size. These could be produced in Yugoslavia--and they will be, too--in spite of certain obstacles. The weaknesses are not in our electrical industry but rather in our mechanical industry and some supporting industries such as, for example, the plastics. Concerning the software: In Yugoslavia we already have mastered the operational system pertaining to the production of computers, that is, the hardware, but we have not mastered the operational control of the computer. This operational control is very extensive and we are aware that such systems required the efforts of a 5,000-man team for a period of 2 years. That is how it was with the IBM. The Japanese, too, who merely copied the IBM system, required an equal amount of time."

TELEKS: "We can then, manufacture minicomputers but we do not have the capability of producing software?"

Virant: "We cannot. This is a consequence of erroneous assessment of what is essential for computers. We probably are the only country in the world with a constitution that mentions a national data system. But what are we doing? Instead of thinking which computer system will be best suited to its activities, the organization applying to the equipment imports commission thinks only about computer technology, that is, about hardware."

Trade, But No Cooperation

Juretic: "We certainly are not capable of producing system software but there is also user software. In this area we are indeed only artisans. Every organization has its own program, every bank in Yugoslavia, although they are all doing the same work, has its own program. So far as I can remember, I have never seen several organizations with similar activities put together a common program for the same purpose. At best it may happen that the director of one electronic data-processing center comes to another inquiring whether he could acquire their program and receives the reply that the program is available for a consideration of 50 million dinars!"

Zeleznikar: "One cannot develop software by simply taking a sheet of paper and deciding to design software. One can start developing only when the basic information is already available. Only in this way you can be competitive and say in clear conscience that the software was developed by yourself alone. If, then, I want to make such system for domestic banks, I take from somebody else's package what I can use. I only have to know what you want."

Juretic: "And this is within the capabilities of domestic manufacturers of computers."

Zeleznikar: "Of course."

Faleskini: "Experts from Elektrotehna working together with in-house personnel of Ravne iron works have set up and put in operation a DEC computer. With the use of this computer the quality of production increased while energy costs and consumption of various other, sometimes quite expensive, materials decreased."

TELEKS: "Then there is no doubt that it is essential for our society to tackle the manufacture of our own computers. Nevertheless, the decision for such an undertaking probably is not only the sole concern of a manufacturer but also the task of social planning and mutual agreement?"

Gorenje Is Entering From the Back Door

Krisper: "Considering that Iskra was at that time the largest manufacturer of electrical equipment, its role in the plan was defined accordingly, that is, Iskra was to be responsible for negotiating the agreements but should not be the sole manufacturer of computer equipment particularly because this involves largely work on the systems as opposed to technological processes."

TELEKS: "And what was the role of the Economic Chamber in negotiating and directing the mastering of computer production?"

Mihelcic: "A 1978 resolution designated the Economic Chamber as the association within which potential manufacturers should conclude their agreements."

"This year we conducted talks with both Elektrotehna and Iskra. Elektrotehna did not avoid discussions except when it would have to inform Iskra of its intentions. We shall have to remind Iskra, however, that since it is the agent of negotiations it should conduct itself appropriately. For the time being it is not responding properly."

TELEKS: "There are more than two enterprises in Slovenia. There is Gorenje..."

Mihelcic: "At present Gorenje is more or less standing by. We have become used to this in its case: it is in the habit of appearing suddenly and at a time when somebody has already started manufacturing a product. But this should not be allowed to occur in the present situation."

TELEKS: "Is Gorenje ignoring the Chamber?"

Mihelcic: "I would not put it this way, it only does not want to provide information."

TELEKS: "Do you expect a surprise?"

Mihelcic: "Not really. It is simply Gorenje's habit to come out with things of which it would not say a word in advance."

TELEKS: "Elektrotehna may have something to say, at least so far as the initial negotiations with Iskra are concerned."

Ungrateful Homeland

Skrubelj: "We became established as an independent TOZD [Basic Organization of Associated Labor] only last year but 2 months later we already had sent our first letter to Iskra. And we do work! Some are taking us for a group of enthusiasts, others maintain that we have barely begun to show signs of life and that it will not be long until somebody gets us under his control. We find more confidence in our computers and abilities abroad than at home considering that Delta was written up in two international computer journals.

"The OEM cooperating contract we concluded with DEC provides for our independence from foreign suppliers, and this is precisely the reason why we avoided the licensing relationship. The price of Delta computers is competitive, people are snapping them up and we have sold our entire 1978 production. We are competitive on foreign markets, too. We can export our computers to Germany and still realize a profit.

"More important than the fact that we have produced a computer in which we invested a great deal of our work is the usefulness of this computer in production. Consider the case of Ravne--reported by Ravne's principal technologist in Chicago--which was ranked as number two in the world. What was accomplished at Ravne with our help--we worked out the entire conceptual scheme and we maintain the computer 24 hours a day--could be accomplished neither by the Swedes nor by Krupp. The Ravne iron works paid off the investment within 4 months."

TELEKS: "In the report to the Federal Economic Chamber Iskra, E I [Elektrical Industry] Nis, as well as Rudi Cajavec, argue something like this: Recently, several import-export organizations have appeared in Yugoslavia in which is gathered professional personnel capable of developing software. In this process, import-export organizations are allied with organizations which have nothing in common with electrical engineering (the wood and timber-processing industry, for instance) which under the ruse of such alliances import computer equipment as material for reproduction, and so on."

Strubelj: "Let me state that these allegations, with the exception of a few instances, were totally refuted in the Federal Economic Chamber."

Zeleznikar: "Iskra undoubtedly made a correct statement. Only it forgot that the same applies to itself, too. All the initial activities directed at mastering the manufacture of computers start by importing first which is then gradually followed by manufacturing. Except that Elektrotehna

started its process 8 years ago in which time it was able to educate quite a few people. Iskra is running behind."

Innocent Users?

Komelj: "I think that there is not enough user participation in the decision-making on the manufacture of computers. It should first be established what it is that the user needs. Of course, we also should know what do we want to achieve with computers and where do we wish to use them. Iskra, EI Nis, and Elektrotehna and no other potential manufacturers of minicomputers have done this. This is as if a factory produced a rifle and then said to our army: Here is a gun for you, now go ahead and use it."

Skrubelj: "This was indeed our mistake. But let me tell you that there already are 150 DEC computers in Yugoslavia maintained by Elektrotehna. Also important is the fact that our computers used in industry supply 90 percent of the market. And, not to be overlooked is the fact that DEC's and therefore Delta's technology is acknowledged to represent an international standard, a standard in the United States Army as well as in the Yugoslav People's Army. It is modern although the basic concept in fact harkens back to 1969 although considerable improvements have been made since that time."

Zeleznikar: "It is not simple to tell what our users need because they themselves do not know it. Developments in the world show that users are influenced by manufacturers who press on them certain technologies which the users may or may not utilize. From this it becomes apparent what is used and what is not, that is, what the users need. Our cultural level is not yet so high that users--and here I mean industrial users--could know what their needs are. That which we decided to manufacture is thus determined on the basis of three factors, that is, a rough assessment of needs, what is available, and what we can make ourselves."

Virant: "I would not underestimate the users to such an extent. I think that the quality of our computer operations would rise very steeply if we relaxed imports and users could select computers according to their own needs and preferences. The only question that arises in this connection is what would be the cost of such relaxation to our society and economy."

Users certainly should be given the opportunity to obtain and purchase a system that would meet their needs and satisfy all the agreements, regulations and contracts. And, first of all, there is a great deal that must be done for the compatibility between manufacturers and computers. Who will be in the position to say: 'In this organization we shall use the Iskra system, in that the Delta system and so on but in such manner that everything will constitute a compatible whole?' We are again at the software. Only those who can set up its own will be successful in Yugoslavia. If we do not insist on this, if it will not be possible to link five or six different computers we shall wind up only with a heap of hardware and nothing else."

Elektrotehna Leads 150 to 2

TELEKS: "The principal common denominator of the Slovenian conquest of computer manufacture seems to be lack of coordination. No one has investigated what the user needs, the Economic Chamber does not know about the preparations of Gorenje, one of the largest manufacturers of electrical equipment, let alone the lack of coordination between Iskra and Elektrotehna. Also uncoordinated and rather isolated are the professionals who work on some aspect of computers in Slovenia."

Virant: "Cooperation is possible only after the appropriate self-managing agreements have been signed. The Faculty of Electrical Engineering is preparing an agreement with Elektrotehna, Iskra, and Gorenje as well. All of these agreements still have to be signed. After three of four meetings we finally came to an understanding with Elektrotehna, it is only necessary to sign the formal agreement. On the other hand we already have gone through 12 drafts with Iskra without reaching a final agreement. We certainly will cooperate with Elektrotehna as well as with Iskra and Gorenje. The faculty's policy is to support that computer design which will make the most of domestic expertise."

Mihelcic: "Notwithstanding the Economic Chamber's lack of information on the intentions of Gorenje it is not necessary that this roundtable emphasize the lack of coordination. This discussion should provide an idea of what kind of computer manufacture is needed in Yugoslavia."

Faleskini: "I think that Elektrotehna's concept is sound, proved by the 150 DEC computers in Yugoslavia that are installed and maintained by Elektrotehna. On the other hand Iskra has only two: one at the Faculty of Civil Engineering and the other at the IS [Institute of Statistics] in Belgrade."

"And again: the essential effectiveness of computers is not found in trade and banks but rather in manufacture, because only industrial production can create new values. Therefore, production processes must be equipped with computers. Elektrotehna has, accordingly, made a correct decision and it is well that it decided on a technology in which it has full capability. It is important that they decided to manufacture everything that we can make in Yugoslavia. Why should we import copper wire made of copper produced in Bor?"

Tons of Computer Equipment

TELEKS: "Then we cannot stand on the observation that there is much uncoordinated activity in the process of developing the domestic production. What action will be taken by the responsible factors in the future?"

Mihelcic: "Within a week we shall, on the basis of the adopted methodology, invite the Slovenian manufacturers of computers to tell what kind of computers they will offer to industry."

TELEKS: "Will you also inquire about the prices of all three computers?"

Mihelcic: "Yes."

Zeleznikar: "I do not see how the Economic Chamber can influence the manufacturers and economic policy."

Mihelcic: "The Chamber is only a meeting place where negotiations are conducted and it is within its framework that the common denominator should be found. Since this is not possible, it will be enough if our manufacturers agree on the division of labor. There are ample opportunities for this but whether the parties are willing remains to be seen."

Krisper: "Not all computers are suitable for every user. Therefore it would be very ill advised to say that the manufacturing of computers should be restricted to one organization only."

"And, to answer your question as to who will take action, there is something being done in the area of social organization. The Executive Council, for example, has prepared specific documentation on organizational solutions."

Komelj: "Even a tenfold increase of domestic calculators will not meet all the needs. Accordingly, this is not a matter of deciding between one type of computer or another unless a certain group seeks to attain a monopoly position."

Zeleznikar: "Iskra is a big organization, therefore we always expect big things from it. It is only in this way that 'Iskra Data,' its minicomputer developed entirely by Iskra's own resources which is a component of some large system, remained in relative obscurity. Telephone exchanges manufactured by Iskra also contain computer technology. The third project currently under development by Iskra will have an impact on Ljubljana's traffic as Iskra will connect its calculators into the city's traffic signal system. All this was developed by Iskra on its own with the exception of those small 'chocolate bars' which Iskra imports. In this field Iskra is the first and the strongest in Yugoslavia."

Virant: "Iskra should rank first. I visited the hall of Elektrotehna Kranj where there were 10 boxcars of finished computer equipment. They are capable of great accomplishments. If we could introduce division of labor, which at present does not exist, we would know exactly what are the responsibilities of the Faculty of Electrical Engineering, the Jozef Stefan Institute, Iskra, and Elektrotehna."

Krisper: "This is precisely what we want to accomplish. The large gap between the mini and macro computer no longer exists and it is a fact there are great opportunities for Iskra in the fields of minicomputers and telecommunications. Moreover, Iskra has ample and well qualified personnel of which it has made no use at all."

TELEKS: "Will then there be as many factories for computers in our country as there are for the automobiles?"

There was no answer.

PHOTO CAPTIONS

1. p 21. Drago Juretic: "What cooperation! At best it may happen that the director of one electronic data processing center comes to another director inquiring whether he could acquire their program and receives the reply that the program is available for a consideration of 50 million dinars."
2. p 21. Anton Zeleznikar: "The essential part of the hardware are integrated circuits that are smaller than a matchbox. These could be manufactured in Yugoslavia. And they will be, too."
3. p 21. Franta Komelj: "Manufacturers of the domestic computers act as if a factory produced a rifle and then said to the Army: Here is a gun for you, now go ahead and use it."
4. p 22. Marjan Krisper: "Iskra should be responsible for carrying out the negotiations on agreements but should not be the sole manufacturer of computer equipment particularly because this predominantly involves work on the systems as opposed to technological processes."
5. p 22. Rado Faleskini: "I think that Elektrotehna's concept is sound. The proof of this are the 150 DEC computers in Yugoslavia installed and maintained by Elektrotehna."
6. p 22. Janez Skrubelj: "Some are taking us for a group of enthusiasts, others maintain that we have barely begun to show signs of life and that it will not be long until somebody gets us under his control."
7. p 23. A journalist from Iskra's house organ, somewhat somber and the only man from Iskra who dared to come, and on his own initiative at that, to the roundtable discussion.
8. p 23. Jernej Virant: "Instead of thinking which computer system will be best suited to its activities the organization planning to import a computer thinks only about the computer's technology, that is, hardware."
9. p 23. Miran Mihelcic: "I would not say that Gorenje ignores the Economic Chamber, it only does not want to provide information. We are not really expecting a surprise from Gorenje because it is its habit to come out with things of which it would not say a word in advance."