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CONTENTS

ASTRONAUT ON CSSR-USSR COOPERATION IN INTERCOSMOS PROGRAM

Prague RUDE PRAVO in Czech 28 May 82 p 6

[Article by Lt Colonel Eng Vladimir Remek, CSSR pilot-cosmonaut, hero of the CSSR and hero of the USSR: "Cooperation with the USSR and the Intercosmos Program"]

[Text] Economic scientific and technological cooperation between Czechslovakia and the Soviet Union is a steady source of values whose extent, especially in the progressive scientific fields and key technology, we can hardly estimate. Space research has a firm basis in the cooperation of the two countries today, especially as a component of international cooperation of socialist countries in the exploration and use of the universe in the Intercosmos program.

The official date for the beginning of the Intercosmos program is April 1967, when the delegations of socialist countries at the Moscow meeting dealt with the basic questions of cooperation in space exploration and targeting of their efforts in four main directions--space physics, space biology, space meteorology and space communications. Cooperation between the Soviet and Czechoslovak specialists had been evolving in this field even before this date, both in laboratories and in Czechslovak participation in experiments of the Soviet national space program.

Broader participation in space experiments was made possible in 1965 when the USSR offered to make available the free use of the newest space technology to all socialist countries within the framework of peaceful exploration and use of space. Czechoslovak participation in space exploration acquired a new dimension in the fall of 1969, when the first Intercosmos satellite was launched on 14 October to study the sun's radiation, and shortly afterwards when the Intercosmos 2 satellite with a program for study of the upper atmospheric strata was launched in December. In July 1976, during the signing of the new government agreement on the Intercosmos program, the Soviet delegation suggested that experiments be expanded from satellites to manned Soviet spacecraft as well. Czechoslovakia already had to its credit numerous successful accomplishments in the peaceful exploration of space.

Czechoslovak science participated significantly by installing and preparing experiments in all 15 Intercosmos satellites launched thus far, as well as in "Vertical" geophysical rockets, the first of which was launched in the Soviet Union on 28 November 1970. Not only were there achievements in the basic

research of space physics and astrophysics, biology, medicine and the like, these were augmented by geophysics and other fields in 1975 when the program was expanded in a fifth direction--the remote exploration of the Earth. The results of research in space communications also terminated in the signing of an agreement to create the international "Intersputnik" system and organization which had its tenth anniversary last year.

Manned space flights in the Intercosmos program, when cosmonauts of socialist countries work side by side with the Soviet Cosmonauts as international crews orbiting the Earth, have sometimes been called a turning point in the whole development of this program. I believe that these flights, and thus my space flight as well, were merely the logical conclusion, or better expressed, expansion of the preceding cooperation in the peaceful exploration of the space. The development reached the stage when even in those socialist countries which until had been utilizing only satellite technology, it was possible to prepare experiments for manned flights because the Soviet Union generously offered us the space in the spacecrafts and aboard the space stations. In my life, however, the first manned flight of the Intercosmos program meant a great deal--it was a true milestone. Besides the unforgettable experiences in the preparation for it and from my own space flight with Commander Aleksey Gubarev, it changed my work. Although I remain a military pilot and fly regularly, most of my time is now taken up by research in the field of space navigation, for example, and other correlated studies.

I will remember forever the often infinitely long days of demanding training, but also the people who were always willing to help and encourage us. This was how the Soviet cosmonauts and other workers of the Yuri Gagarin Center for Cosmonaut Training behaved toward myself and other comrades preparing for the joint flight. For the first residents from the socialist countries in "Star City", it was not only demanding training for the space flight but it was also an entirely new path for space science--preparing for the flights with international crews. The Soviet Union thus showed to the whole world that in its dealings words and deeds are not at odds, that it has unselfishly opened the way to space to other countries as well. The flights of the first international crews of all member countries of the Intercosmos program were accomplished, the path was opened, and today we are standing before another important event: at the threshold of a joint Soviet-French flight in the Soviet spacecraft Soyuz T and the work of the international collective aboard the Salyut 7 space station. This has confirmed that not only socialist countries but others as well, can use Soviet space technology for peaceful exploration of the universe.

Recollecting my own space flight--even after more than 4 years--I have the feeling that it was yesterday. On the other hand, a look at what Soviet science has achieved in space research in those 4 years suggests a far greater lapse of time.

After our first flight in Soyuz 28 to the Salyut 6 space station, there were flights of eight other international crews in Soyuz spacecraft. At the same time, however, as early as 1980, the new Soyuz T spacecraft was tested which can transport three cosmonauts into orbit around the Earth and to the space

station. Beside providing greater comfort for cosmonauts, this spacecraft has many new features to automatically control and check the spacecraft's systems; among other things, some piloting, orientation and stabilization functions of the craft are insured by the onboard computer. There is a large number of technical innovations aimed to increase the safety of space flights and the expansion and better quality of scientific experiments. And as for making the life aboard the space station more pleasant and comfortable, particularly for long flights, expanded communications of cosmonauts with the Earth by two-way television transmissions are an important feature. When we were flying, the Earth could see us. It is a significant advance that today it is possible to speak with and at the same time see friends and family, to watch a television program, even if only briefly, and to see, if the need arises, the details of a problem being solved that can be shown by the specialists from the control center.

All improvements and all knowledge and experiences acquired from further operation of the Salyut 6 space station were utilized in the new Salyut 7 station. Beside being better equipped with scientific devices and instruments it also provides better comfort for cosmonauts; for instance, perceptible reduction of operational noise during rest and sleep periods.

Beside technical advances in the spacecraft design and required instruments and other equipment and systems, significant progress was also made by biologists and physicians. For example, the regular crew of Salyut 6, Yuri Romanenko and Georgi Grechko, who brought us on board, at that time set the record of 96 days in Earth orbit. Since then, two Soviet longtime crews spent 6 months in space, all without any special effects on the human organism and with very quick adaptation of cosmonauts after their return to Earth. Moreover, as we know, the work ability and physical and mental states of these crews were good to excellent in every case. This is clear evidence of the marked progress in the development of biological and medical space sciences, whose representatives are convinced that even today the stay in space can be further prolonged.

In the development of Soviet manned flights we must also mention the Cosmos 1267 satellite, which by its mass practically corresponds to the Salyuts; today scientists are testing in it technological elements connection with the Salyut 6 station, which will lead to changes in utilizing near space for scientific and the national economic needs--modular orbital stations.

Even though flights to distant planets do not yet belong fully to the exploration of the Intercosmos program, we cannot leave them unmentioned. After all, the successes of the exploration of Venus achieved by the latest Soviet interplanetary stations Venera 13 and 14 this past March [1982], and the data obtained from this planet have also been used by socialist scientists. Moreoever, experts from socialist countries will participate in the preparation to explore Halley's comet. Czechoslovak science was entrusted among other things with the task of developing and setting up an oriented base which will house the necessary measuring instruments.

Concurrently with the development of Soviet space technology and space experiments, research in the framework of the Intercosmos program was also expanded. The first stage of manned flights of international crews from

socialist countries has been terminated, but this reasearch goes on. Individual socialist countries prepared scientific experiments and also helped with the needed instruments and equipment, many of which became standard equipment on the Salyut space stations. The experiments themselves are continuing in various programs of subsequent crews of the space station and the results are provided to the laboratories of the individual countries.

After the conclusion of our flight, the Czechoslovak space effort was seemingly reduced. This is not so. Additional Intercosmos satellites have been since introduced in Earth orbit. Of particular importance to us was the "Intercosmos" 18 satellite, from which the first Czechoslovak satellite "Magion" separated on 14 November 1978. It was an important outcome of the cooperation between Czechoslovak and Soviet experts. Biological experiments also continued, primarily using Soviet "Cosmos" satellites. Work of Czechoslovak scientists in the processing of the data of past space experiments and preparation of new ones is extensive. A review of the work of collectives in the laboratories of the Czechoslovak Academy of Sciences, at the universities and some departmental institutes in the past year, for example, can provide the picture of our activity.

In 1981, in the field of space physics the processing of telemetric data from the earlier launched satellites Intercosmos 18, 19, Magion and Prognoz 8 continued. The Czechoslovak and Slovak Academies of Sciences continued their cooperation with the School of Mathematics and Physics of Charles University and departmental institutes in the development of scientific equipment for the "Intershock" project (study of shock waves in interplanetary space), for a space probe destined for the flight to Venus and Halley's comet, and in preparation for experiments involving manned space flights.

The year 1981 saw the launching of the "Vertical 9" rocket which carried two Czechoslovak X-ray objectives and of "Vertical 10" for which our specialists developed and produced an instrument for measuring the angular distribution of the intensity of charged particles in the magnetosphere. Last year, after being active for 3 years, the "Magion" satellite perished. It provided a magnitude of data which were processed as received. Analysis of the data from Czechoslovak instruments placed aboard the "Prognoz 8" satellite continued, and the catalog of X-ray effects was completed from earlier measurements of long-range sun activity on board "Prognoz" 5, 6 and 7.

In the Institute of Geology and Geotechnology of the Czechoslovak Academy of Sciences the study of lunar soil samples has continued. For measuring purposes of the "Bulgaria" 1300 satellite, workers of the faculty of nuclear and physical engineering of the Czechoslovak Military Institute of Technology put into operation a laser radar of the first generation and started revitalizing the second generation of satellite radars of the Intercosmos network.

In the field of space technology our workers in the Institute of Physics of the Czechoslovak Academy of Sciences, in cooperation with the development workshops of the Czechoslovak Academy of Sciences, desinged a new "Krystalizator" device which will be used in orbiting laboratories. In the field of

space meteorology, a set of programs for processing multichannel picture information from meteorological satellites was tested last year. The data are processed in digital form, the programs can be adjusted for any meteorological satellite and can be used with any computer. Space communications workers developed a second class land receiving station and assigned it to the experimental area in the Soviet Union for testing.

In the field of space biology and medicine, the long-term "Stres" experiment was complted; it involved placing laboratory rats in a Cosmos statellite and at the same time carrying out model experiments on Earth. Analysis of biorhythm experiments on board Cosmos 1029 have been completed, as had analysis on additional biological research projects. Development of Czechoslovak instruments for manned and unmanned spacecraft and preparation of appropriate biological and medical experiments for bio-satellites and space stations has also continued.

At our workplace, in addition to other things in the past year we also continued research in the field of space technology; for example, preparation of a methodology for the utilization of brief periods of weightlessness on L 39 aircraft; utilization of a centrifuge for preparation of technological experiments, and testing of instruments for research projects aboard the space station. To a lesser degree we are participating in the design of an oriented base for the Halley's comet probe and we continue analyzing the data obtained from space navigation and work on other partial research tasks.

These are only some of the results and work of Czechoslovak space research in the past year. At the present time, in their everyday life, our citizens are sharing space communications and space meteorology--through television broadcasts, long-distance telephone calls, weather forecasts, and the like. In the Soviet Union it is also remote Earth exploration which provides great values for the national economy. The time is not far away, however, when this trend of space exploration will also provide a practical contribution to our economy, just as will space technology or other fields of space exploration later. Today, it is very difficult to estimate the enormous contribution of peaceful space science for humanity in future years. In the 25 years of the space era--this fall we shall commemorate the launching of the first Sputnik which foretold one of the most progressive trends in current science--in cooperation with the USSR, our scientists have been able to participate in its development for two-thirds of the existence of the space era; not only in the laboratories but in cooperation with Soviet experts even beyond the boundaries of our planet on using satellite experiments and manned spacecraft and space stations. With the use of the latest space technology our scientists were able to raise their share of contributions to the peaceful exploration of the universe.

9562
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CSSR-USSR COOPERATION IN AGRICULTURAL SCIENCE AND TECHNOLOGY

[Bratislava EKONOMIKA POLNOHOSPODARSTVA in Czech No 6, 1982 pp 241-244]

[Article by Engineer Emil Cakajda, 1st Deputy Minister of Agriculture and Nutrition of CSSR, Anatoliy Aleksandrovich Pomorchev, Deputy Minister of Agriculture, USSR]

[Text] Scientific and technical cooperation between the CSSR and the USSR is founded on a long tradition. It penetrates all areas of agriculture and contributes unquestionably to it. Cooperation with the All-Union Academy of Agricultural Sciences, name of V. I. Lenin, as well as with a number of all-union Soviet research institutes and research institutes of the Soviet republics, has meant a great deal for Czechoslovakia. It has meant a contribution toward the development of both traditional and new professions concerned with basic, specialized and applied research. It actually contributes to bolstering the research base and to mesh research with practical application.

It was precisely Soviet agricultural science which influenced Czechoslovak agricultural science as long ago as the time between the two world wars. This was accomplished by direct contact between the All-Union Academy of Agriculture, name of V. I. Lenin, and the pre-WWII Czechoslovak Academy of Agriculture. In spite of the provisions of the bourgeois state apparatus numerous contacts with representatives of Soviet agricultural science and progressive Czech specialists were established, under the influence of the CPCZ and other enlightened elements. As a result, starting in 1924, some Soviet scientists who were endowed with unquestionable scientific authority gradually became honorary or corresponding members of the agricultural academy as it existed then. Direct information about Soviet agriculture, which was not ideologically distorted, started to appear in the CSSR, especially starting in the 1930's. At that time a number of papers by leading Soviet scientists were published among them we may cite: Michurin, Tsitsin, Pryanishnikov, Prasolov, Nestrejov, Glinka, Vavilov, Kolesnev, Swircevskiy, et al.

After 1945 and especially after 1949, Czechoslovak-Soviet scientific cooperation in the field of agriculture achieved fresh start and gradually intensified, especially with regard to village socialization. In addition

to studies and to adaptation of Soviet experiences to our own situation, another major factor was the considerable Soviet material, technical and foodstuff assistance for Czechoslovakia. With the development of Czechoslovak socialist science and research the scientific and technical cooperation has been gradually increasing.

Cooperation in Breeding Experiments and in Agrotechnology

The main stress was on the development of the grain production which started in latter half of the 1960's. It is no accident that progressive increases in winter wheat yields occurred in the CSSR starting in 1967, at which time the Soviet variety Mironovska 808 occupied a considerable amount of the sown acreage. The Mironovska variety which provided the major part of the acreage sown to wheat has been an outstanding stabilizing element in grain production in Czechoslovakia during all three latest five year plans.

Mironovska variety was intensely cultivated in the CSSR starting in 1967 and in that period more than 3 million tons of high quality grain were produced. Due to their outstanding economic and biological qualities Soviet varieties were widely utilized in breeding programs as well. On the average they were used in 65 percent of the crosses which were carried out in breeding stations. They were also used because of large ear production, of resistance to cold weather and grain quality. During the years 1976-1980 using Soviet varieties as a base 10 new wheat varieties were bred and released for use--Slavia, Hela, Juna, Mirela, Vala, Odra, Solaris, Istra, Amika and Kosutka.

Soviet specialists on the other hand have used Czechoslovak genotypes to breed spring barley in the Ukraine. The most promising of these materials--according to tests done at the Mironovskiy Institute--are new crosses KM 38-336-75 and KM 5-250. These have been grown in an accelerated program at the Kironovski Institute in experiments to gain better yields in various parts of the Ukrainian SSR. It is assumed, for example, that in 1982, the strain KM 38-336-75 could be included in state experiments in the USSR in a combined study of different varieties. Thus gradually scientific and technical cooperation has been encompassing wider areas.

There is broad cooperation in working on the whole complex of questions involved in the technology of cultivation, harvesting and handling of hops. In 1976 a bilateral agreement was signed concerning these problems and 1978 was designated as the year in which two temporary international collectives were to be formed. The first temporary collective, based in the CSSR, was aimed at solving the problems mechanized cultivation, harvesting and post-harvest handling of hops, and the second one, based in the USSR, was aimed at the study of genetics and breeding of hops.

Czechoslovak and Soviet scientists of the first collective constructed a suspended platform to be used with a tractor in order to attach the hops which had already been arranged in bundles. As a result of this joint project both countries produced working models of special equipment needed to prepare these bundles. Mobile platforms were successfully tested

operationally both in the CSSR and in the USSR with the resulting recommendation that hop-conductors ought to be suspended directly on the ceiling of the hop carrier without using any hooks. A further development was the joint project of the hop handling construction SCHK-79 using a minimum of construction materials. These experimental hop-stations were built on a area 0.2 hectares in size in both countries.

The second international collective worked out a method of accelerated development of varieties of hops in 6-7 years, and produced a model with basic parameters of varieties which corresponded to basic breeding needs of both countries. During this cooperation an intensive exchange of selected seeds and planting materials took place. In addition, two joint expeditions in search of hop strains growing in the wild were undertaken in the Carpathian region of the USSR.

In another area--that is, within the framework of progressive technology of agricultural cultivation under irrigation, improvement was achieved in the cultivation of winter wheat, alfalfa and soy beans; irrigation methods were improved and also methods of using irrigation water more economically. At the same time the system of basic and soil cultivation prior to sowing were completed, planned levels of yields and needed amount of industrial fertilizers were made more precise and recommendations were issued as to the most favorable times and methods of their application, thus increasing the advantage of using fertilizers.

Also, within the cooperative framework, joint field trials were undertaken in breeding high yielding varieties of singly germinating sugar beets, and several singly germinating specimens were sown for cross breeding. The nurserymen carried out crossbreeding of 5 Soviet singly germinating strains with Dobrovieka C, Dobrovicka, N, Wonhanka and with 2 tetraploidal pollinators. Thus 25 combinations were obtained. One singly germinating strain which was pollen sterile was crossed with a multiple germinating pollinator, which was resistant to cirhospores.

An extensive exchange of breeding materials took place in agrotechnology and in fruit breeding; also preparations were made to establish an orchard in USSR which would be planted to varieties resulting from Moldavian and Czech breeding experiments; each to be on a area of 0.5-1.0 hectare (apricots, plums, etc). The same varieties will be planted in South Moravia, CSSR. The basic aim of this cooperation is the cultivation of new varieties, adjusted to local conditions, which are more frost resistant, disease resistant and produce better tasting fruit. The best selected varieties are now being checked.

Interesting results were obtained in developing varieties of apricots for rootstock. Four types were cultivated which are highly frost resistant and high yielding with high percentage of germination (up to 95%) free of viruses and easily grafted. Two varieties of English walnuts, Apolo and Jupiter, were grown which were distinguished by early fruit production, high frost resistance, self-pollination and high yield. In agreement with a

previous plan USSR is testing a special Czechoslovak prophylactic program to protect fruit trees against viral diseases.

Technical Development in Animal Production

We must single out the highly effective cooperation in the area of animal production, where, due to sharing of work among scientific research organizations it was possible to solve the problem of constructing progressive types of industrial poultry complexes. A joint experimental technical project was worked out for a complex built for fattening 500,000 geese, which would eventually result in construction of such a complex in both countries. At this time construction of the first segment of this complex has been started in the USSR in the Kokcheta collective, and in CSSR in Dunajska Streda and in Michalovce. Effective joint cooperation of Czechoslovak and Soviet specialists made possible the creation of such a project in a relatively short time, which corresponded to modern needs, demands for a greater level of mechanization and automation of the production process with high economic parameters. Thus in Czechoslovak-Soviet scientific and technical cooperation it has been possible to bridge over the difficulties connected with the fattening of geese on an industrial scale.

The next experimental technical project to be worked out was a poultry house equipped with cages, which could accommodate 500,000 turkeys annually, as well as a project for constructing a set-up for producing 3 thousand tons of turkeys fattened for slaughter and kept on floors covered with grates. In the CSSR this will be built in the Zvolen district and in the USSR an appropriate location of the project is at present being selected.

Construction of the above-mentioned complexes will enable both countries to thoroughly study their experiences, prepare concrete recommendations and utilize them in working out modern prototypes of similar projects.

Further cooperation was aimed at working out methods of disinfection and the handling of manure on large mechanized farms. Three different schemes were worked out to provide technical solutions for the handling of manure. The first two involved a system of dividing the manure into liquid and solid and using the solid as fertilizer and the liquid as waste. This was successfully tested in the CSSR and an experimental set-up to handle this is being planned in pig raising complexes of Agropodnik Hodonin and of Masospol Opava. The third scheme is a system of leaving the manure in decaying chambers--thus obtaining biogases to be used as heating fuel and using the solid and liquid parts as fertilizer. This is now being tested in the CSSR. This particular scientific and technical cooperation is based on the principle of mutual division of labor. For example, the Soviet Union has made available to the Czechoslovak specialists experimental results which involved removal of manure by washing it away. By making use of their experiences, and after judging them on the basis of technical possibility in the CSSR, it became possible to halt Czechoslovak research efforts aimed at solving these very problems.

A filtration centrifuge was used in the USSR after the separation of manure. This has been given to Czechoslovakia and is now being tested. In the meantime CSSR offered the Soviet institute their method of "Feeding pigs with liquid manure." Collaboration has been successful in this area from the beginning and is mutually advantageous. Predetermined division of work removed the possibility of duplication in solving some of the problems, thus resulting in financial savings.

Common Problem Areas Are Becoming Broader and Deeper

In addition to mutual exchange of specialists in solving problems decided upon long ago, several consultations took place at which questions of future agricultural research were studied and an exchange of documentation, projects and some technology was undertaken. This form of cooperation contributes significantly to broadening the knowledge of both countries.

During mutual exchanges by specialists new areas for effective cooperation are constantly being discovered. In addition, new proposals also emerge from the regular meetings by the highest representatives of agriculture of both countries. One such proposal, for example, concerned the hydro-thermo-pressure method of processing straw into feed, new method for long term preservation of feed on a biological basis, a possibility of cultivating varieties of plants which have only lately been found to have significant industrial potential or use as feed be it for animals or for people. Another proposal was the utilization of further, new sources of non-traditional raw materials for these purposes.

Needless to say, even in this unambiguous effective cooperation there are further possibilities of increasing its scope. The second half of the years 1976-1980 was marked by concentrating efforts on the one hand on selection of the most important themes for scientific and technical cooperation, in the coming years 1981-1985, which would produce desires results in both countries, and on the other hand to utilize such forms of cooperation which would speed up solutions and improve their quality.

A series of scientific research themes from the period 1976 to 1980 have continued on into 1981-1985. Also both temporary international collectives will be continued and will continue to solve problems involving cultivation, harvesting, post-harvest handling and breeding of new varieties of hops, with potential yields of 2500-3000 kg per hectare. A number of up to date poultry complexes will be produced using industrial technology, and after these experiments are verified, model projects will be constructed. Along with developing and introducing effective methods for removing, processing and using liquid manure in pig farms--techniques for handling liquid manure with a 92-94% moisture content, and manure water with a moisture content of 95-98% will be tested, as well as their potential use as fertilizer. The problem of constructing a technically satisfactory set up for handling liquid manure and manure water will be finally resolved and an operational system will be worked out.

Solution of problems of agrotechnology and fruit culture breeding will lead into the development of technology of apricot production using complex mechanization. Also it will facilitate working out and checking consistent methods for primary varietal experiments and fruit breeding, and a development of methods for obtaining virus-free fruit clones.

Breeding and creation of new varieties of winter wheat and of barley are based on combined breeding of varieties of winter wheat with potential yields of 8-9 tons per hectare, marked with considerable cold resistance, good quality of grain, resistance to flatting and to fungal diseases; also varieties of barley with potential per hectare yield of 6-7 tons, marked with high drought resistance, resistance to flattening and to fungal diseases and with high technological quality of the grain.

In addition to all these themes the scientific and technical organizations are collaborating to improve the technology of preparing and storing cattle feed, where the primary goal is to substantially decrease nutrient losses, and to activate long term storage of feed while maintaining all its important nutritional properties.

Further cooperation is aimed at creating high yielding varieties of flax, with high fiber quality, short growing period, resistance to flattening and diseases, and improved cultivation techniques. For this purpose experimental set ups will be constructed for forming the raw material into large bales. Problems concerning conservation of moist flax stalks will be addressed and solved.

In breeding and seed culture of new varieties of legumes and in the agro-technology of their cultivation cooperation will be aimed at breeding new legume varieties suitable to growing conditions of both countries; cooperation will also be aimed at breeding varieties of lupine suitable for feed, with an average size grain, and yielding 3 tons per hectare, containing a minimum of 38 percent protein, without any alkaloids, with a shorter growing period and with an even flowering on both the side branches and the main stem. In agrotechnology new methods will be worked out for the cultivation of new varieties of white lupine, of soy beans, peas and beans for feed. In order to use the new irrigation technology in corn cultivation, corn will be specially bred and the highest yielding varieties and hybrids will be the ones used to increase per hectare yields in irrigated experiments.

Tests of new efficient machines and adapters for soil cultivation, harvesting and post-harvest handling of grain and of green fodder will be undertaken, with the aim of reducing losses as much as possible. At the same time irrigation techniques will be improved.

Scientific research organizations of both countries will also collaborate in solving two tasks flowing out of the "comprehensive program of scientific and technical cooperation between the CSSR and the USSR in the area of the use of biochemistry and chemistry in agricultural production, during the period 1981-1985." The main stress will be an attempt to make more precise minimum requirements and norms for vitamins, trace elements and aminoacids

for domestic animals, and also to obtain veterinary and health evaluation of stable grain forms of vitamins A, D_3 and E, which can be used as feed.

Cooperation Is a Permanent Interest In the Agricultural Sector

In addition to all of the above, cooperation will also be aimed toward exchanging and introducing technology of cultivation of selected types of field crops. It is assumed that this will help accelerate the introduction of modern cultivation technology into agricultural production.

These questions were scrutinized at the last meeting of the agricultural sector representatives of CSSR and USSR in January of 1982 in Moscow. Among other matters, for example, they decided on cooperation aimed at supplying agricultural concerns of both states with alfalfa plantings. They also decided that in 1982 they will exchange experiences with alfalfa cultivation in agricultural concerns of the Dniepropetrovsk oblast, covering an area of 500 hectares, where they will utilize Czechoslovak technology and invite participation of Czechoslovak specialists. At the same time necessary quantities of seed, of chemicals and other material technical means will be delivered. Also in the USSR they will be testing the possibility of introducing alfalfa seed production, based on the CSSR technology, in the Uzbek SSR and other "oblasts" of the USSR, where climatic conditions will be naturally advantageous for the cultivation of this important crop.

One of the priority problems is the solution to the question of how to introduce results obtained in agricultural research into practical production. It was decided that during 1982 there would be a bilateral meeting of specialists and experts on this subject and combined proposals to improve the system will be worked out. The question of introducing the research results into production emerge also from scientific and technical cooperation between member nations of the Warsaw Pact; therefore bilateral meetings between CSSR and USSR specialists would be a very important contribution toward solving this very important problem.

In addition there will be cooperation in judging the present state of personnel and of agricultural services, from the standpoint of their economic effectiveness and efficiency and with the intent of improving them.

Utilization of new effective forms of cooperative, such as cooperative solution of research problems based expressly on division of labor, or common solutions resulting from establishing temporary international collectives--all these were major aims of both countries. The period 1981-1985 will be marked by transition from previous scientific and technical cooperation into these more tangible forms. At the same time solutions will be aimed primarily to approaches which will be common to both countries, thus ensuring effective collaboration. Even when we introduce results of research into production, if that research had been based on only our own efforts, introduction would necessarily be delayed--while collaboration between the two countries will help a great deal.

Prior division of scientific research work among scientific research organizations of CSSR and USSR, which up till now has been carried out according to a work plan, will be formalized in the next 7-year period in form of a agreement. A number of agreements will be signed concerning cooperative problem solving which will designate more precisely terms and tasks of the partner organizations and which will further enhance the continuity of the collaboration. In addition to the two established temporary collectives for solving the problems of hops, there has been discussion of signing an agreement for another temporary collective, this one to be concerned with the problem of conserving the moist stems of flax.

The subject of the yearly meeting of the agricultural sector representatives of both countries will be the course of future cooperation, results to be achieved and further scientific and technical improvements. Certain common tasks for the near future have been singled out, which will be carried within the meaning of the directive of the 16th CPSU Congress and the 16th CPCZ Congress and are expected to be completed within a year. It is in the interest of all participants in Czechoslovak-Soviet scientific and technical cooperation that the development of agriculture should be ever more dynamic and should thus ensure the nourishment of the inhabitants of both our socialist lands.

This cooperative article is also appearing in Russian in the all-union monthly called "Ekonomika selskovo khozyaistva."

5478
CSO: 2400/62

PRODUCTION, EXPORT OF EC 1055 COMPUTERS REPORTED

First EC 1055 in Magdeburg

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 16 No 11, Nov 79 p 29

[Article by Dieter Buttgereit: "EC 1055 in the VEB Magdeburg Data Processing Center"]

[Excerpts] On the eve of the 30th anniversary of the founding of the GDR, the first computer of the ESER II (RYAD II) series, the EC 1055 was put into operation in the Magdeburg data processing center.

In Magdeburg Bezirk, plans are to create, with the help of a widely branched data teleprocessing network, direct access of many users to the central computer of the data processing center (EC 1055). The Robotron 4230 data collection system, which is to be installed at a later date, will substantially increase efficiency.

Academy of Sciences Computer

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 8, Aug 80 p 2

[Unattributed report: "EC 1055 at the GDR Academy of Sciences (AdW)"]

[Text] An EC 1055 computer was delivered to the Center for Computer Technology of the GDR Academy of Sciences in late May 1980. With this installation it will be possible to introduce new, more effective ways to use computers in research.

Installation in Schwerin

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 12, Dec 80 p 2

[Unattributed report: "Installation in Record Time"]

[Text] In the record time of only 15 days an EC 1055 was installed and put into operation in the Schwerin Data Processing Center.

Installation in Neustadt

Dresden SAECHSISCHE ZEITUNG in German 11 Apr 81 p 2

[Excerpts] (Neustadt) Three months ahead of schedule the Robotron combine delivered a modern EC 1055 electronic data processing system to the Fortschritt Agricultural Machinery Combine. As a joint party congress project for the two combines, use of the ESER computer was turned over to the youth of the computer center in Neustadt as their project by Dr Thieme, director of the Fortschritt combine.

First EC 1055 to USSR

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 2, Feb 80 p 3

[Unattributed report: "First EC 1055 Punctually Delivered to the Users"]

[Text] The first installations of the new EC 1055 data processing system were delivered to the partners in the Soviet Union in late 1979 by the VEB Robotron Electronics in Dresden. In mid-1979 the collective had started series production of the central unit 3 months ahead of schedule. With the punctual delivery of the systems the working population wants to contribute to integration and closer cooperation. The Robotron collectives in Dresden have met their plan targets for over 70 months.

Export for USSR Power Grid

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 6, Jun 80 p 2

[Unattributed report: "EC 1055 for Northwest Soviet Republics' Power Supply System"]

[Text] An EC 1055 from the Robotron combine was delivered in Riga to the dispatching administration of the North-West Associated Power System. North-West unites the electric power networks of the Belorussian, Estonian, Latvian and Lithuanian SSR and those of Leningrad, Karelia, the peninsula of Kola and Kaliningrad. This power system, which is controlled by the Riga dispatch center, secures the power supply for the industrial centers in the northwestern USSR. The EC 1055 is to contribute to a more flexible control of the power system, where for 4 years a small Robotron 1840 computer has already been in use.

Computer for Belorussian SSR

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 18 No 7, Jul 81 p 3

[Unattributed report: "EC 1055 for Belorussian Economy"]

[Text] In Minsk an EC 1055 was delivered to the Soviet user on the occasion of a technical exhibit presented by the Robotron Export-Import foreign trade

enterprise. It will be used in the Niwa scientific production association which develops automated management systems for Belorussian agriculture. This computer is the 25th EC 1055 exported from the GDR to the USSR. The Robotron combine has delivered approximately 150 electronic data processing machines to the Soviet Union.

Twenty-six EC 1055's for USSR

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 18 No 9, Sep 81 p 3

[Unattributed report: "Twenty-six EC 1055 Computers Delivered to USSR in the First Half of 1981"]

[Excerpt] These Robotron ESER computer systems will be put into operation at the USSR Academy of Sciences, in the finance and transportation fields, in the petroleum industry, in the Kama Truck Factory, and in the Togliatti Automobile Factory. The computers will be linked to Bulgarian and Soviet disk storages, Czechoslovak printers, graphic output machines and peripheral equipment from other countries.

Fiftieth EC 1055 for USSR

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 18 No 12, Dec 81 p 2

[Unattributed report: "EC 1055 Delivered to the USSR"]

[Text] In late October 1981, an EC 1055 was delivered to the information center of the USSR State Committee for Science and Technology by Prof Dr Wolfgang Sieber, general director of the Robotron combine. This is the 50th computer of this type that the Dresden combine has exported to the Soviet Union.

The first EC 1055 was put into operation in the spring of 1980 in a power distribution system. More computer systems are located in Moscow institutes, in the Togliatti Automobile Factory and in the Ministry of Petroleum. The information center of the State Committee for Science and Technology has been using an EC 1040 and an EC 1055 for some time. At the information center, data are stored and processed in such volume that the use of modern computer technology is indispensable.

Computer for CSSR Coal Industry

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 5, May 80 p 2

[Unattributed report: "Robotron Computer Technology Successful in Czechoslovak Economy"]

[Excerpt] In late March, the "Robotron 80" technology exposition was held in Bratislava where the GDR Robotron combine introduced the 1980 production assortment, including the modern EC 1055 computer. The first unit of this type for Czechoslovakia will be installed in an enterprise in the Ostrava-Karvina coal district. Included among the exhibits is the 4230 data collection system. Three of these systems are presently being tested in Czechoslovak enterprises.

Planned Export to Czechoslovakia

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 18 No 8, Aug 81 p 3

[Unattributed report: "Prague 'Buefa 81" Exhibits GDR Computers"]

[Excerpt] In late May 1981 the "buefa 81" Robotron technical exposition was opened in Prague. It presented such office equipment as the computer family A 5100, component assemblies, microcomputer and graphic output equipment [Reisszeichentechnik]. At a press conference it was reported that the CSSR currently is using Robotron systems valued at approximately 3 million korunas, including 50 ESER EC 1040 computers. In the past year alone the GDR and the CSSR exchanged products of this sort valued at almost 1 million korunas. Two EC 1055 systems have been put into operation; Robotron will deliver a total of 25 of these computers to Czechoslovak customers by 1985. In 1981 the State Savings Bank of Prague, the Skoda factories in Plzen and the Slovnaft chemical combine in Bratislava will be provided with EC 1055's.

The GDR, on the other hand, has been importing reliable computer equipment from the Zbrojovka firm for years. Marketing of complete CSSR computer systems will start in the GDR in 1981. After the USSR, the CSSR is the most important socialist export partner of Robotron.

Computer for Prague Bank

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 19 No 6, Jun 82 p 3

[Unattributed report: "EC 1055 in CSSR Bank"]

[Text] In April 1982 VEB Robotron Combine placed a new EC 1055 computer at the disposal of the Prague municipal state savings bank. With the help of this computer the Prague financial and credit institution will at first collect data on some 180,000 checking, salary and savings accounts; it will gradually expand this number to include the entire Czech Socialist Republic, for which this state savings bank is responsible. Two years ago the Robotron combine installed the first EC 1055 in the CSSR in the Ostrava-Karvina coal district. Another of these computers is currently being installed in the Skoda works in Plzen.

Exports to Hungary

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 11, Nov 80 p 3

[Unattributed report: "Robotron Computer Technology Successful in Hungary"]

[Text] Three EC 1055 computers will begin operation in Budapest this year: one at the insurance company, which also uses smaller computers from Robotron for rationalization purposes, and the other two at the Ministry for Machine Building and in the Noto (National Organization for the Technical Servicing of Computers) office of the Hungarian center for the service of ESER (RYAD) and SKR (system of small computers) equipment. Robotron computers have been

operating successfully for 6 years in Hungary. This equipment includes 19 EC 1040 computers in Hungarian factories and institutions, along with thousands of accounting machines, data collection machines, and small computers exported to Hungary annually.

The entire optimization of transportation of the Hungarian State Railways (MAV) is done on an EC 1040. In the Csepel Automobile Factory a GDR computer is helping with the restructuring of the production process and the rationalization of operational procedures, and in the Hungarian petroleum enterprise an EC 1040 serves as the "electronic grid" for recording all the data gathered in geological reconnaissance. A Robotron computer in the energy institute of the Ministry for Heavy Industry, is proving highly useful for the planning and calculation of the economic benefits of the energy savings program.

Romania Receives First EC 1055

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 19 No 5, May 82 p 3

[Unattributed report: "EC 1055 for Romania"]

[Text] An EC 1055 data processing system with a storage capacity of 2048 K bytes was delivered to Romania in mid-March by representatives of the Robotron combine and the appropriate GDR export firm. This is the first system of this type that has been delivered to Romania.

The GDR and Romania have long had a strong relationship. For many years the GDR delivered punched card technology to Romania; this equipment was then replaced by electronic data collection machines. These are already being used in many Romanian finished products.

CSO: 2302/5

BRIEFS

EC 1055M COUPLING FOR DUBNA--In 1981 the producers of computers and typing equipment in the GDR have achieved remarkable results. Commodity production rose to 117 percent compared to 1980, and labor productivity rose to 116 percent. Exports to the USSR rose to 136 percent compared to 1980. The installation of a coupling of two EC 1055M computers in the Dubna Nuclear Institute, planned for the anniversary of the October Revolution, is an exceptional scientific-technical achievement. A model of this coupling will be shown at the 1982 Leipzig Spring Fair. [East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 19 No 4, Apr 82 p 2]

CNC 600 IN SERIES PRODUCTION--Series production of the newly developed microelectronic CNC 600 machine-tool control has started in the VEB Karl Marx Numerik enterprise. This product represents the first time in the GDR that a control has been developed and built on the basis of microelectronics. Compared to conventional technology, these computer-controlled machines permit a doubling of productivity. The programming effort is lowered by almost 75 percent and the processing time is reduced on the average by 10 percent. The control is used in individual machines and in complete processing centers. [East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 3, Mar 80 pp 2-3]

CNC 600-1 SERIES PRODUCTION--(Karl-Marx-Stadt)--A new microelectronic control, the CNC 600-1, has been put into series production in the VEB Karl Marx Numerik enterprise. The new control represents improved performance over the known CNC 600, especially with regard to expanded range of application. [East Berlin NEUES DEUTSCHLAND in German 12 Jul 82 p 3]

COMPUTER-CONTROLLED WELDING INSTALLATION--The first GDR electron beam welding installation controlled by a microcomputer was put into operation on 13 July 1982 in the ZIS (Central Institute for Welding Technology) in Halle. The ESA 150 MR installation was developed by the Manfred von Ardenne Research Institute in Dresden. The microcomputer control and programs originated in the ZIS Halle. The new installation is the most highly productive of its type in the GDR and can accommodate steel prices of 60-80 millimeters for welding. [East Berlin NEUES DEUTSCHLAND in German 14 Jul 82 p 1]

CSO: 2302/7

LATEST DEVELOPMENTS IN NUCLEAR MEDICINE

Bucharest FLACARA in Romanian 4 Jun 82 p 22

/Interview with Tiberiu Pop, doctor of medical sciences, chielf of Nuclear Medical Unit at Bucharest Panduri Clinic, member or honorary member of several societies for nuclear medicine or ultrasonics in the United States, Belgium, Italy, Sweden etc., member of European Society for Nuclear Medicine, author of more than 250 scientific papers published in Romania and abroad, sole or joint author of many books including "Pulmonary Scintigraphy," Medical Publishing House, 1971, "Nuclear Medicine in Athletics," Sport-Tourism Publishing House, 1974, "Nuclear Medicine in Clinical Diagnosis," Military Publishing House, 1979 and "Ultrasonic Diagnosis," Medical Publishing House, 1982, and laureate of the Romanian Academy's Victor Babes Prize for 1979, by Ovidiu Ioanitoaia/

/Text/ /Question/ Strictly speaking, Dr Pop, just what is nuclear medicine?

/Answer/ To put it briefly, it is a new branch of medicine dealing with isotopes and ultrasonic waves. This young branch developed as a logical consequence of the information "explosion" and it has been gaining ground for the very simple reason that it provides better opportunities for investigating the human organism. Most often nuclear medicine begins when traditional medicine's resources have been exhausted and its limitations have to be recognized. Let us make one thing clear. Nuclear medicine has never been intended to replace traditional medicine. That would be patently absurd. It merely supplements and intensifies it.

/Question/ How?

/Answer/ It is the starting point of some new approaches to treatment of the patient, being the most graphic example of an interdisciplinary science resulting from combining some fields of physics, chemistry and electronics with medicine. Furthermore, by its diagnostic methods, whether they are radioisotopic or ultrasonic, it reduces two basic aspects of one biological process, namely the concepts of structure and function, to the same common denominator. The recent progress made both in equipment and in radiopharmaceutical agents has broadened, intensified and diversified the field of application of nuclear medicine, and cardiovascular nuclear medicine, urological nuclear medicine, gynecological nuclear medicine etc. are referred to more and more often today as distinct specialties.

/Question/ Let us say we understand that. But there is still need of some further explanation. What are the advantages to nuclear medicine's methods of investigation?

/Answer/ First, they provide information unavailable by ordinary methods. Nuclear medicine penetrates the organism in depth.

/Question/ Just a minute. Give us an example.

/Answer/ Radioimmunology, for example, has emerged as a subbranch and has succeeded in identifying hormones and enzymes like the parathyroid hormone or serous calcitonine that are impossible to detect by other means. As another example, diagnosis of the prostate has been refined by scintigraphy with Extracyt marked with Iodine 131, an invention patented by Ioan Galateanu and Tiberiu Pop. It is called a "Process for Scintigraphic Vizualization of the Prostate Gland" and bears the number 63,398, dated 19 April 1978. Of course the main ailments of the prostate are adenoma and cancer, but they are rather difficult to detect by traditional methods. What did we accomplish? We expedited treatment by identifying them scintigraphically. In general the methods of nuclear medicine, especially, ultrasonics, have several definite advantages. They are harmless, convenient, rapid and precise.

/Question/ If you say so. You are better able to say. But doesn't the very term nuclear medicine alarm you? Don't the technique and equipment involve risks?

/Answer/ Risks? There is no question of that. It is a prejudice! Let us discuss it. You will agree no method of investigation is infallible. Every method has some defect and can be improved. The most modern ones like cardiac catheterization or arteriography provide very valuable data to be sure, but they subject the organism to traumas and also involve a modicum of risk. They are, in medical terminology, invasive. Nuclear methods are not. Take echography for example, diagnosis with ultrasonic waves, a veritable miracle of the last decade and a method recognized for its clinical applications. Do you know about it?

/Question/ A little. Bats guide themselves in flight and detect obstacles by means of ultrasonic waves, do they not?

/Answer/ Yes, the principle is largely the same. But I repeat the method is distinguished by exceptional qualities. It can be said of it that it not only has been developed but it has invaded contemporary medicine. It is harmless, in the first place. No substance is introduced into the organism and there is no risk of irradiation.

/Question/ Very good, but what does the examination consist of?

/Answer/ The transducer, a kinf of electrode, is placed on the skin. It produces ultrasonic waves that are reflected upon impact with the issues and appear on a screen in the form of electric impulses. And finally, not to burden you with details, a kind of map of the respective tissue is obtained, that is information about the state of its health. In the second place, the method is also convenient because the patient needs no preparation of any kind before the examination.

/Question/ And in the third and fourth places?

/Answer/ It is of course very accurate, with no possibility of errors in the equipment. It is also very rapid, as the results appear on the screen at once.

/Question/ As far as we know, doctor, your unit, a methodological authority on nuclear medicine, made the first computerized echograph in the world. Tell us about it.

/Answer/ The unit, founded 20 years ago, is equipped without exaggeration on the highest level. If I do say so we have the most modern equipment in the world at Panduri, and I stress the point that it is concentrated under the same roof. Why do I stress it? Because in other countries nuclear medicine has been dispersed or is about to be dispersed, every discipline, endocrinology, gynecology etc. having its own echographic service.

/Question/ What is wrong with that?

/Answer/ The information is also inevitably dispersed, and I say that is bad. Corroboration of the data from the equipment is obligatory and also decisive. Diseases affecting one organ alone are increasingly rare today. Rather they affect the whole organism, and therefore the data should be analyzed according to a uniform conception.

/Question/ By the way, how was all this highly sophisticated equipment procured?

/Answer/ The party and state have been supporting development of nuclear medicine in every way, and we have received considerable funds for the purpose. And in view of the specializations we have brought about under UN sponsorship in several countries (Sweden, Italy, the Netherlands, the USSR, Austria, the United States, Canada, England etc.), we persuaded both the International Atomic Energy Agency and the UN Program for Development to provide us with technical aid and experts. The unit in which I work and where I hope I have succeeded in forming and consolidating a fine team of specialists was visited among others by the famous professors John Morris of Sydney and Will Nelb of Seattle. They were favorably impressed with the progress made, even acknowledging that in some areas we Romanians are ahead of everybody. A proof? The very computerized ecograph you mentioned, the first one of them in the world. It was presented at some major congresses in Cologne and Vienna in October 1981 and May 1982 respectively. The interest aroused by this Romanian first was extraordinary.

/Question/ Doctor, isn't all this equipment remote from a patient?

/Answer/ No. Nuclear medicine is not exclusivist and it knows that the world did not begin and end with ultrasonic waves. Its examinations are conducted in connection with the clinic and the observation sheet is law. Nor does it discredit an analysis but rather selects a given method, one way or another, according to the clinical signs. But admittedly there is a risk that can come from complete ignorance of the equipment. Theoretically speaking it can go astray if uncontrolled, so that every unit needs highly qualified personnel. Panduri is exemplary in this respect, since the biologist Elisei Petcu, the radiochemist Doinita Dumitrache, the electronics expert Pavel Horoziu and the physicist Emil Toroiman are top-flight professionals with sound backgrounds.

/Question/ One more incidental question: Who trains these personnel, and when and where?

/Answer/ As I was saying, nuclear medicine is expanding rapidly. There are 27 or 28 units in Romania but the personnel problem is still unsolved. The unit heads must be certified by the IFA /Institute of Atomic Physics/, but the courses have been limited to a few months. In this connection I must say that there has been a Romanian society for nuclear medicine for 7 or 8 years, but it is mostly in name only and it does no actual work. I think the time has come to join all forces in this sector, for the benefit of the patients of course. Unfortunately a number of physicians are ignorantly fostering the prejudice that echography is hazardous, that it irradiates, that it endangers lives, etc. It is a mistaken and unscientific conception. Moreover one of our finest internists, Reader Benedict Gheorghescu at Fundeni, is one of the pioneers of Romanian nuclear medicine along with Gheorghe Jovin. And in view of the way a great many strong nuclear medical units are operating, at the Institute of Endocrinology, at the Brancoveni Hospital, and at the oncological institutes in Iasi, Cluj-Napoca, Timisoara, Baia Mare, Tirgu Mures etc., etc., their efforts would be better channeled. An active society would solve the problem to a great extent.

/Question/ Perhaps that is the most important concern of the specialists in nuclear medicine. What do you think?

/Answer/ What more could I do?

/Question/ I don't mean you. You have done enough, haven't you? By writing the books you have written, which are highly esteemed at home and abroad, you have opened up a path and it is the task of the competent ministry to continue it. In another connection, how available is the medicine you practice to the great mass of patients?

/Answer/ Now why shouldn't it be? Patients come here mainly from the Panduri Hospital but also from all the other affiliated units, or distributed units to use the correct term. Actually they come from all over the country, for when it is a question of a man's health don't you forget whether it is distributed or not when you go into the consulting room. To do otherwise would unquestionably be a most serious error.

/Question/ How expensive is a nuclear medical diagnosis?

/Answer/ It is not expensive and furthermore some of the data it provides are not available in any other way. It is an old saying that health is beyond price. At any rate it is all free of charge to the patient. But not all physicians know about it! I don't think 3 percent of my colleagues know exactly what an echograph means! I give some of them the extremely sophisticated and also extremely valuable results, they thank me and, lowering their voices, they ask me to explain them in their language! But nuclear medicine has only one language, and no other has yet been invented.

/Question/ We understand the diagnosis, and it is clear. How about the treatment?

/Answer/ Nuclear medicine has also been opening new windows on treatment. Radioactive iodine is unbeatable for thyroid cancer. Cancer of the urinary bladder, polycythemia vera, dermatoses etc. are also being treated. Problems of dosing are most certainly within the competence of nuclear medicine, it is sufficient to say. And there are its applications to spectator sports. We have been collaborating for many years with the Center for Sports Medicine and, I permit myself to judge, the results are noteworthy both in dosing those exerting effort and, more particularly in recoveries from injuries. Several soccer players (Iordanescu and Iordache as I recall now), a number of athletes (Natalia Marasescu, Carol Corbu and the swimmer Cristina Balaban), and other top performers have benefited by nuclear medical care and have been cured rapidly. But our branch is not a panacea. It repels nothing and removes nothing, it only supplements and intensifies. Let us consider, in passing, the medicinal plants. Of course they have no bearing on what we are doing, but that does not mean we ignore or look down upon that ancient and inexhaustible source of health. Wasn't it Heraclitus who said "Nature is the best physician"? As a personal opinion, I would even be tempted to say that not everything has been done to exploit the plants. On the health front the medicine we are practicing is a redoubtable and effective weapon, but it is not the only one for all the fact that it is the most modern and sophisticated one and it uses computers. While knowing its virtues we also accept its limitations.

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