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TRANSLATIONS ON EASTERN EUROPE

SCIENTIFIC AFFAIRS

No. 570

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## INTERNATIONAL AFFAIRS

### NUMERICALLY CONTROLLED EAST GERMAN, HUNGARIAN PRODUCTION SYSTEMS DISCUSSED

Budapest FINOMMECHANIKA-MIKROTECHNIKA in Hungarian Vol 16 No 11 Nov 77  
pp 331-340

[Article by Dr Miklos Acs, scientific department head, Computer Applications Research Institute, and Laszlo Paradi, production manager, Precision Mechanical Enterprise: "Machine-Manufacturing Technology and the Computer"]

#### [Excerpt] 2.2. The CONCEMA System of the German Democratic Republic

The CONCEMA system developed in the German Democratic Republic may be used for building DNC [direct numerical control] systems of both the MTC [machine tool controller] and the BTR [behind tape reader] type. The principle of this system is shown in Fig. 7.

These systems have been already displayed at the Leipzig Fairs several times, and several DNC systems are already in use for several years. The system is further developed with government support in an intensive manner. According to reports, the series manufacture of the system will begin in the near future.

#### 2.3. DNC Systems in the Electrical Industry and Instrument Manufacture

It is interesting to note that DNC systems have been used for the manufacture of circuits before they were employed in chip-forming fabrication. For example, Siemens uses NC [numerically controlled] equipment and instruments for the preparation of the master drawings of circuit boards, for making masks of integrated circuits, for drilling printed circuit boards, for the wiring (by means of the wire-wrap method) of printed circuit boards, and for controlling the equipment used to check the circuits. Table 1 summarizes the average information needs of the various NC devices.

By the end of 1975, seven DNC systems have been installed at Siemens for the control of circuit board rear wiring and for the checking of the circuit boards. The configuration of the Siemens DNC system used in the electrical and instrument industries is illustrated in Fig. 8.

The following are the major functions of the system:

- Central storage of the NC programs;
- Handling and maintenance of the NC programs;
- Real-time distribution of the NC control information for the direct, on-line control of NC equipment;
- Manual and computerized collection of manufacturing data on the site, central storage of the data, and evaluation of the data.

The system stores the NC programs needed during manufacture on magnetic disk or rotating magnetic drums. The data go to the appropriate NC system from the central memory through a multiplexer.

Table 2 contains the characteristic data of the seven operating systems of Siemens.

Siemens also publishes experiences about the individual phases of the creation of the DNC systems. According to these publications, all user needs cannot be met with a single standardized DNC system; the concept of the system must be adapted to the task involved. The biggest problem always is the optimum inclusion of the DNC system in the overall information system. This task can be accomplished only by close cooperation between the manufacturer of the system and its user.

To sum up: The DNC systems are now in the period of acceleration after a halt during the early 1970's. Their role is likely to become increasingly important from the 1980's onward.

The DNC systems should not be evaluated in their own right; they must be evaluated on the basis of the fact that they will become subsystems of manufacturing systems of higher integration and eventually of intelligent manufacturing systems guided by computer hierarchy.

Development of DNC systems proceeds intensively in Hungary, as it does in the Soviet Union and the other socialist countries.

## Integrated Manufacturing Systems

Creation of Integrated Manufacturing Systems (IGyR's) is a new, advanced step of the automation of the manufacture of small and medium series. Two important prerequisites for the development of IGyR's are the integration into a single system of the entire manufacturing process and the automation of the material and parts supply, the feeding of the needs of production, and the storage operations.

Basically, the manufacturing system, consisting of discrete processes, has three basic features: movement, storage, and conversion. The material must be moved to the manufacturing equipment; the equipment changes the form of the material; and the finished part or product must be stored.

The following are the forms in which these elementary features appear:

- Movement: Conveyor, automated carriage, industrial robot;
- Storage: Pellet, shelf, warehouse, automated depository with stacks;
- Conversion: Lathe, milling machine, fabrication center, assembly automaton, electron-beam welding machine, and so forth.

The integrated manufacturing system concept is not only an engineering and technological problem; it is also an organizational problem of the same importance. A hierarchic system may be built up from the devices listed for the three elementary features. The lowest level in this hierarchic system is represented by the individual devices. If we combine several devices, for example several lathes, we obtain a manufacturing cell (Fig. 9). Several cells may be combined in a workshop, and several workshops may be combined into a production unit guided by the enterprises' information system.

Since there are major differences among the various factories manufacturing small and medium series, the software controlling the Integrated Manufacturing Systems vary also according to the type of factory involved. The development of the software for an IGyR requires much work and time; thus, software that can be parameterized and used for the preparation of various types of IGyR is of very great significance. The processing of an IGyR information can be divided into three main groups:

- Processing of technical information (computer-aided design), manufacture planning;
- Processing of production guidance information (production guidance, control commands of the devices);

- Control of the manufacturing process (fabrication, assembly, checking, warehousing).

Many computer programs have been developed independently for the automation of these operations. The component-part programming languages APT, EXAPT, and the like may be classed in the first category; the programs for production scheduling, warehouse management, material-requirement calculations, and the like may be used in the second category; and the various NC, CNC [computer numerical control], and DNC, as well as automated warehouse management and industrial-robot programs are used in the third category for modern automation.

However, for the effective operation of the production units it is not enough to automate the activities in the three categories; we must have an overall system. A manufacturing system may consist of a number of different devices. The number and type of device may vary widely, depending on the nature of the plant. Insofar as control is concerned, the devices may be classified in four groups:

1. Fabricating devices (machine tools, assembly machines, control instruments);
2. Conveying devices which move the products without changing them (such as conveyors);
3. Operational conveyors and feed devices (metering devices, removal devices, industrial robots, waerhouse cranes). These devices move and bring to the required position the products (they may move in various directions and ways).
4. Storage devices (intermediate warehouses, stacked storage warehouses).

The control systems must be capable of handling the tasks corresponding to these four groups in a simultaneous and integrated manner. The control model of an IGyR is shown in Fig. 10.

If we examine the control software in relation to the three categories mentioned earlier, we find that the functions of the programs for the first and third categories differ significantly; thus, they can be separated clearly. The software processing the technical information is the most important part of the software for the automatic programming of NC equipment.

The software controlling the manufacturing process is based on the schedule plan of production which in turn is prepared by the software of a higher-level management function. The software controlling the manufacturing process supplies the NC devices with the appropriate control information. This information has been prepared and stored earlier by the software

processing the technical information. The conventional software packets are also part of the flexible software system. The production schedule plan is also a necessary part of the operation of the devices.

The production-control software of the IGyR may be divided into two categories:

- The general manufacturing schedule plan;
- The detailed schedule, which is the control software since it determines the effective operation of the individual devices.

The general manufacturing schedule plan software performs off-line processing; basically, it provides specific instructions on the basis of the production schedule and the capacity data for the individual production devices.

The control software performs on-line, real-time processing. It evaluates the deviations from the prescribed schedule, checks the pass-through times, assesses the loading of the IGyR, monitors the status of the individual projects, and so forth.

As an example for an Integrated Manufacturing System, we discuss the system used at Csepel Machine Tool Factory in some detail.

Development of IGyR's in Hungary is supported by the OMFb [National Technical Development Committee] and the KGM [Ministry of Metallurgy and Machine Manufacture]. Csepel Machine Tool Factory (CSSZG) cooperates with the MTA SZTAKI [Research Institute for Computer Technology and Automation of the Hungarian Academy of Sciences], and the SZIM [Machine Tool Factory] cooperates with the VIDEOTON Factory in the development of a linear system for the automated manufacture of small and medium series of prismatic, cabinet-like, and lid-type parts.

In the manufacturing system of the CSSZG, the castings are checked before machining, and the necessary markings are applied. This is followed by the fabrication of the bases, rough machining, intermediate finishing, and final finishing.

The NC devices used in the system are Type M6 drilling-milling units made by the CSSZG. An interesting feature of the concept of the system is that instead of maximum operation concentration it aims for an optimum separation of the operations, making use of the various capabilities of the individual devices. The goal is to achieve the advantages usually associated with large-series manufacture in small- and medium-series manufacture. These advantages are short cycle time, scheduled parts release, and minimum

tool complement. The manufacturing line contains five drilling-milling machines with three horizontal, one vertical, and one universal spindles each. In order to improve the accuracy, the coarse and intermediate finishing are carried out on separate machines, for example the machine with universal spindle performs only rough finishing. The similarity of the individual machines, at the same time, permits the switchover from a malfunctioning unit to another.

The designed accuracy is IT-7. The technological programming of the workpieces made is carried out in the small computer center, which is connected to the large computer ICL System 6/52 of the large computer center of Csepel Works. This connection plus the availability of various peripheral devices (graphic display, drawing machine, and so forth) provide the equipmental prerequisites for modern programming.

The operation of the manufacturing system is controlled by a central Type TPA 70/25 small computer through the MTC's (without individual control units) in the DNC system. In order to increase the operational reliability of the process control, there are two identical small computers in the computer center; thus, if the control computer malfunctions, the reserve unit takes over.

The computer center is directly connected to the tool-setting unit, whence the tool-setting data, dimension-correction data, and tool-complement data are issued. There is also connection to the pellet acquisition station to ensure workpiece coding, start instructions, and exchange of other relevant information.

The designers of the system considered it very important to have efficient, accurate, and objective evaluation of the parts produced. They have therefore incorporated a digital measuring device in the system which checks each and every part. The results are processed by a computer, and the manufacturing program may be modified if the results so require.

The measuring unit may also perform additional functions: it may adjust the device components on the pellet, and it may check the excess material left on the workpiece. In the latter case, the process computer issues the appropriate instruction to the machine tool for removing this excess in the machining and for adjusting the tool accordingly. Worn tools may be readjusted or replaced on the basis of the data obtained with the measuring device.

In addition to performing measurements, the computer also performs many tasks related to the operation of the manufacturing system, as well as

various control and administrative functions. To check the operational performance, automatic tests are carried out to assess the operational state of the machine units, to evaluate the compatibility of the related operations, and to prevent the improper operation of the system.

The computer records the production of the manufacturing system, monitors the device, component, and tool reserve stock, and monitors the entire material flow, as well as any device malfunctioning. If so required, it issues instructions for various manual interventions. We therefore have a practical system for ensuring precise and continuous operation of the entire manufacturing process.

It is expected that the system will become operational in 1978, and that by the end of 1978 the trial operations will be completed.

#### 4. Conclusions

The integrated manufacturing system today still seems like a dream in most factories. However, if we want to keep up with developments on a worldwide level, we must take the trend toward such a system into consideration when we reconstruct, plan, and design new manufacturing operations.

The integrated manufacturing system concept is not only a new step forward in the automation of machining and fabrication; it also represents a new approach in other technologies than machine manufacture. For example, it is conceivable that an integrated manufacturing system can be introduced in the communications-technological industry, where many microwave units could be manufactured under computer control.

The concept of the integrated manufacturing system means the full automation of the manufacturing process in the international literature. However, in many instances the only proper road toward the aimed-for goal is the "step by step" approach to achieve the establishment of automated systems. It is very likely that in a multiple-technology system — where, for example, sheet-metal sections are cut, machined, heat-treated, galvanized, joined (by electron-beam welding), and colored by enamel — the system cannot be fully automated in a single step. In those cases, an optimum man-machine system should be developed to provide the best economical and technical solution.

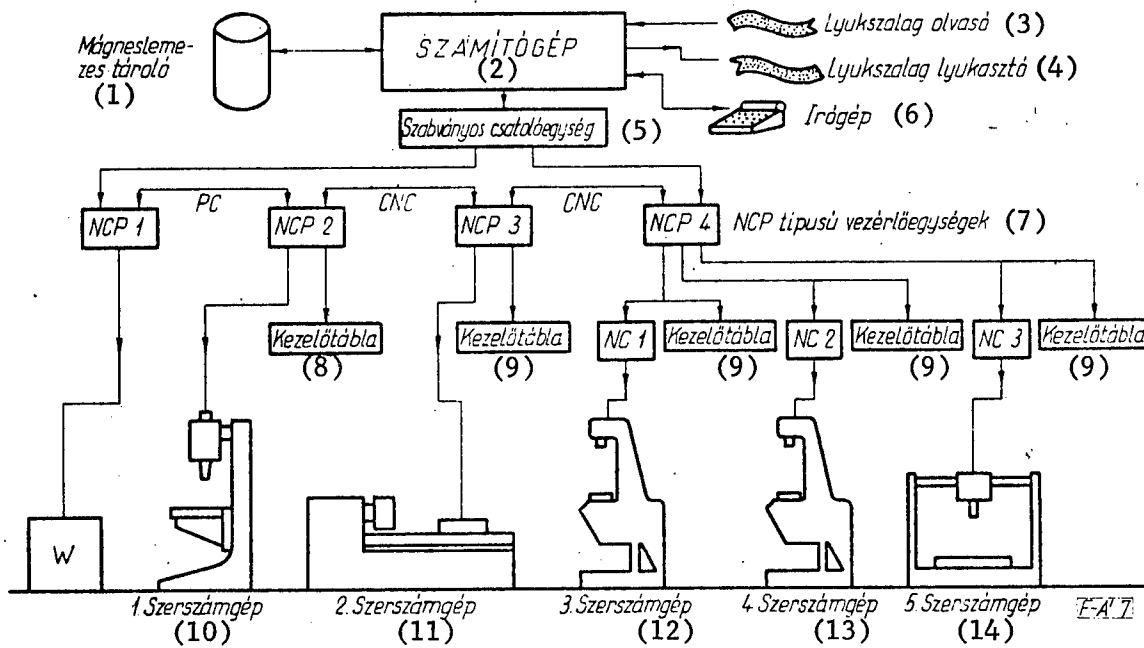


Figure 7. The principle of the CONCEMA system of the German Democratic Republic

- Key:
- 1 = Magnetic-disk memory
  - 2 = Computer
  - 3 = Perforated-tape reader
  - 4 = Tape perforator
  - 5 = Standard interface
  - 6 = Typewriter
  - 7 = NCP type control units
  - 8 = Control console
  - 9 = Control console
  - 10 = Machine Tool 1
  - 11 = Machine Tool 2
  - 12 = Machine Tool 3
  - 13 = Machine Tool 4
  - 14 = Machine Tool 5

Table 1.

Application area of the NC devices	Amount of information Number of characters	Length of the perforated tape	Information carrier	Method of program preparation
Drilling, turning, milling	8,000	10 m 20 m	Perf. tape	Manual Computer
Drilling of printed circuit board	80,000	200 m	Perf. tape	Computer
Wirewrapping	120,000	300 m	Perf. tape	Computer
Wiring checking	2,400,000	6,000 m	(Perf. tape) Magnetic tape	Computer
Drawing printed circuit boards	80,000 400,000	200 m 1,000 m	Perf. tape	(Manual)
Drawing integrated circuit board masks	200,000 8,000,000	500 m 15,000 m	Magnetic tape	Computer

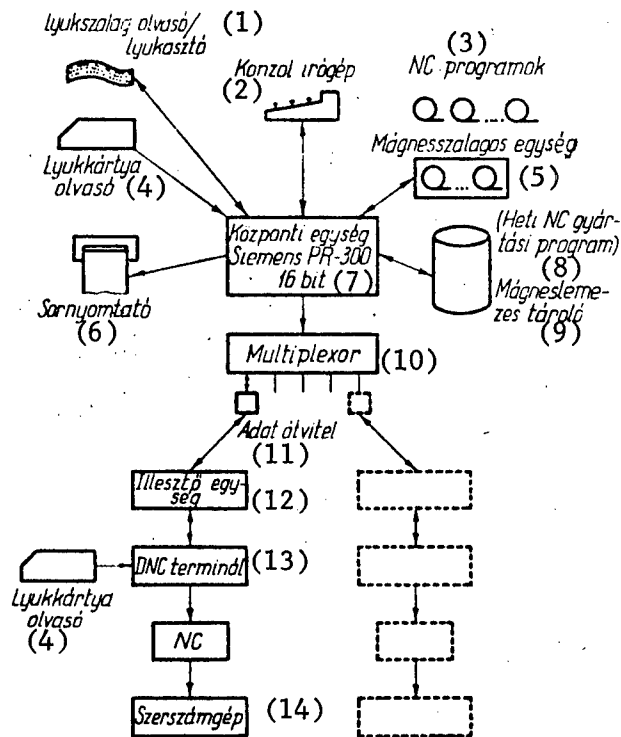


Figure 8. Principle of the configuration of DNC systems used in the electrical and instrument-manufacturing industries

Key:

- 1 = Tape perforator/reader
- 2 = Console typewriter
- 3 = NC programs
- 4 = Punched-card reader
- 5 = Magnetic tape unit
- 6 = Line printer
- 7 = Central unit (Siemens PR-300, 16-bit)
- 8 = (Weekly NC manufacturing program)
- 9 = Magnetic-disk memory
- 10 = Multiplexer
- 11 = Data transmission
- 12 = Interface
- 13 = DNC terminal
- 14 = Machine tool

Table 2

Serial number	NC machines controlled Number	Description	Number of NC programs stored	Year of installation	Operating mode
1.	10	Automatic wiring and checking machines	7,000	1971	BTR
2.	18	Semi-automatic wirewrappers	200	1973	MTC
3.	16	Automatic wiring machines	4,000	1973	BTR
4.	13	Automatic checkers	8,000	1973	BTR
5.	3	Semi-automatic wirewrappers	40	1974	MTC
6.	-	Wiring and checking machines	-	1975	-
7.	-	Wiring and checking machines	-	1975	-

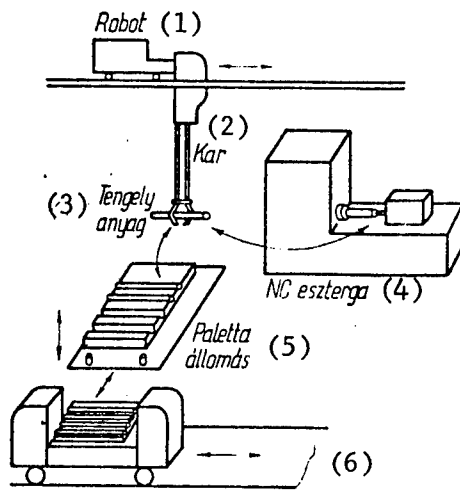


Figure 9. Schematic drawing of the principle of a manufacturing cell

Key:

- 1 = Robot
- 2 = Arm
- 3 = Shaft material
- 4 = NC lathe
- 5 = Pellet station
- 6 = Electrically propelled transport carriage with inductive control

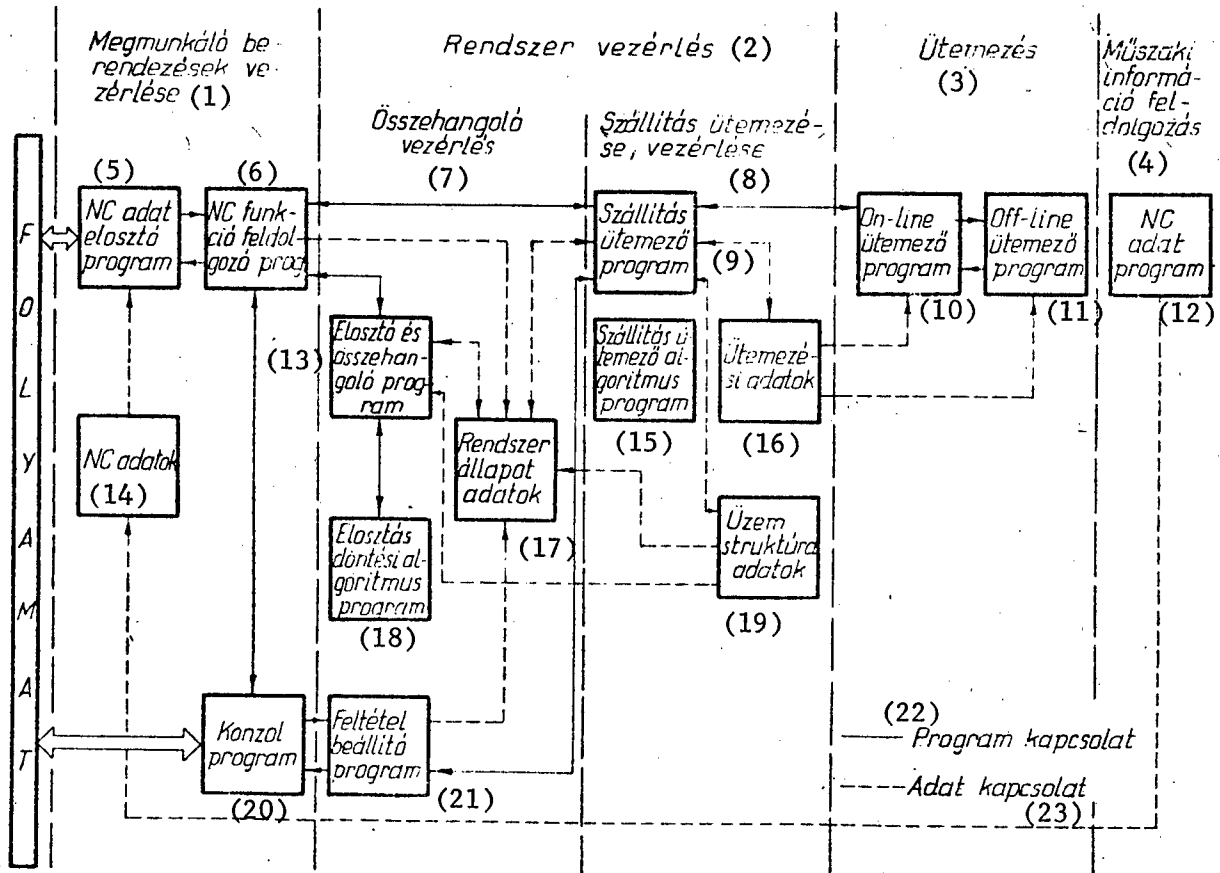


Figure 10. Control model of the Integrated Manufacturing System

[Key on next page]

[Key for Figure 10; preceding page]

- 1 = Control of the fabricating machines
- 2 = System control
- 3 = Scheduling
- 4 = Processing of technical information
- 5 = NC data distributing program
- 6 = NC function processing program
- 7 = Coordinated control
- 8 = Scheduling and control of transportation
- 9 = Transportation scheduling program
- 10 = On-line scheduling program
- 11 = Off-line scheduling program
- 12 = NC data program
- 13 = Distribution and coordinating program
- 14 = NC data
- 15 = Transportation scheduling algorithm program
- 16 = Scheduling data
- 17 = System status data
- 18 = Distribution decision algorithm program
- 19 = Operating structure data
- 20 = Console program
- 21 = Condition setting program
- 22 = Program connection
- 23 = Data connection

2542

CSO: 2502

POLISH-SOVIET COMPUTER LINK-UP SUCCEEDS

Gdansk GLOS WYBRZEZA in Polish 28 Nov 77 p 1

[Text] A test of direct teletransmission communications between a Polish digital computer and a Soviet terminal (i.e. a computer terminal) went successfully. A lightning-fast reply to a question formulated at the Moscow International Center of Scientific and Technical Information and sent directly to Poland was furnished by the Odra-1305 computer of the Computing Center of the Wroclaw Politechnical Institute using the information data base in Wroclaw.

Communication tests were conducted within the framework of cooperation between the Moscow International Center of Scientific and Technical Information and the Polish Center for Scientific, Technical and Economic Information--with the participation of the Center for Scientific and Technical Information of the Wroclaw Politechnical Institute. This was the first successfully completed information-exchange endeavor based on teletransmission links within a framework for the development of an international system of scientific and technical information of CEMA countries. The test, in the opinion of specialists, opens the way for the utilization of rapid mutual scientific and technical information transmission and exchange. It is an important step forward in the creation of potentialities for the integration of socialist countries' information centers.

CSO: 2602

HUNGARY

EXPERIENCES IN ESTABLISHING PENC COSMIC GEODETIC OBSERVATORY RECOUNTED

Budapest MAGYAR TUDOMANY in Hungarian No 11 1977 pp 863-867

[Article by Ivan Almar: "The Cosmic Geodetic Observatory in Penc: Some Experiences Gained in the Establishment of a New Institution"]

[Text] The creation of a new scientific establishment from practically nothing is an exciting but very rare task, which a researcher could hope to have no more than once in a lifetime. The usual way for a new scientific establishment to develop is by division; departments which have been in operation for years obtain partial or full independence. And whoever, as a result of fortunate coincidences, is given the opportunity to carry out a "creation" of this kind (a task which takes several years) will obviously be aware of the fact that the science-administrative and other experiences collected in the difficult first years will be of no further use to him. The management of the institution, once it has been established, is a quite different function, which has its own extensive literature and methodology. In addition, there is considerable experience in this field, both domestically and abroad.

As, in the summer of 1972, the National Geodetic and Cartographic Bureau (OFTH) of the MEM [Ministry of Agriculture and Food] appointed me deputy director of the Geodetic Institute (FOMI), I was instructed to set up a new facility, namely the Cosmic Geodetic Observatory (KGO) of the institute. Although this assignment did not come from the blue sky, the fact was that I lacked experience about setting up an institution and about cosmic geodesy. My knowledge was especially deficient in the field of financial and economic matters. Yet, as it turned out later, such knowledge was most important for the proper accomplishment of the assignment.

In my earlier job, at the Institute of Astronomy of the MTA [Hungarian Academy of Sciences], I led the work of a small team engaged in the observation of artificial heavenly bodies over a period of more than ten years. The geodetic utilization of these observations, in cooperation with the OFTH, started during the 1960's. Young scientists (geodetic engineers) studied the methods of photographing artificial satellites at the Baja observatory of the Institute of Astronomy and at Gothard Observatory in Szombathely. They were assigned to this task by the OFTH. The cooperation between astronomers and geodeticists strengthened in the Artificial Satellites Subcommittee of the Astronomy Committee of the MTA and later also in the Cosmic Geodesy Subcommittee of the Geodetic Science Committee. The cooperation stressed from the beginning the aims of the Interkosmos space research project of the socialist countries. The SZUTA [USSR Academy of Sciences], as the coordinator of the cosmic geodetic programs, provided major assistance to the growth of this specialty by providing telescopes, forecasts, and training programs.

By the end of the 1960's it became evident that cosmic geodesy in Hungary needs a well-equipped central observation facility, a special observatory. The "joint tenancy" with the astronomic facility impeded, rather than helped, further advancement. The basic goals of the optical observation of the artificial satellites are the following:

- 1) Geophysical (aeronomical) goals, since the deceleration of the satellites permits conclusions to be drawn about the density of the upper atmosphere;
- 2) Geodetic (geodynamic) goals, since
  - a) The moon may be simultaneously aimed at from remote points so that the combination of the upper-level geodetic networks may be combined on a continental scale (geometric method),
  - b) The perturbations of the satellite orbits are functions describing the terrestrial gravitational potential, through which the shape and internal mass distribution of the earth can be studied in more detail (dynamic method).

Researchers of the satellite-observation group of the Institute of Astronomy actively and successfully study the upper atmosphere since 1962. However, for the accomplishment of the international obligations in the field of cosmic geodesy, we needed a new "supraordinate" observatory, properly equipped for the task.

## From a Resolution to the Inauguration

The government resolution finalizing this project was promulgated in 1969. This was followed by the selection of the site, the approval of the funding, and the appointment of the contracting enterprise. A suitable site was found in Penc, which is relatively close to Budapest, and which is satisfactory in terms of optical and radio observation conditions. It is located in the Cserhat mountains, 40 kilometers from Budapest. Unfortunately, nobody among the present leaders of the observatory had any say in the important process of site selection. In spite of this fact, the OFTH — which was in charge of the project — carried out the basic tasks satisfactorily, for example the acquisition of the land, the surveying of the road (3,500 m long) to the site, the preparation of the plans for the buildings, the planning of the utilities, and so forth. The investment project was thus on its way. The site and the funds allocated, as well as special considerations, to some degree impeded the work of the AETV [Architecture Design Enterprise], which was the prime contractor. However, the planned arc-shaped two-storey main building was later found to be well suited for the purpose in every respect. As the project went along, it became necessary to change the plans for the sliding-roof secondary buildings located 80 to 100 m away from the main building since the instrument complement changed from the original plans.

My first task, a critical one, after my appointment in 1972 was the development of the system of the observatory for observations, evaluations, and processing. On the one hand, we needed the final instrument complement plans for the designing of the buildings, and on the other hand the fact that it takes a long time to get the instruments pressed for the decision. A problem was created by the fact that we were inexperienced and that there has not been relevant domestic experience. We would have needed good experts in the fields of optics, photogrammetry, electronics, computer technology, and so forth for proper planning. Furthermore, these experts should have been competent in the special matters related to the observation of artificial satellites. Where would we find such people? It became obvious that the task could be accomplished only through external consultants obtained through personal relationships. But since the time available was short, we first had to set down in writing our basic ideas for the tasks of the observatory. Thus, in 1972 we completed the Functional Plan of the KGO. This plan outlined the goals of the new observatory (which was then named the "cosmic geodetic observatory"), its basic tasks, its staff size, its functional structure, and so forth. We gave this Functional Plan to six

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outside experts and asked them to submit their specific proposals within a short period of time about the methods and facilities which would be needed to carry out the goals in the areas of observation, evaluation, and processing. The first six staff members of the KGO totalized and unified the proposals received, and evaluated them critically, of course adding their own professional judgments. The voluminous System Plan prepared on the basis of all this was finalized in 1973 after much debate, by teamwork. It contained not only the description of the instruments (together with the related procurement, service, development and other ramifications) but also their mutual relationships and the system as a whole. In this phase of planning we had to consider many, sometimes contradictory, factors. Obviously, all instruments to be purchased had to be the most modern models available, yet financial and economic considerations compelled us to damp our enthusiasm.

During this exciting phase we were often faced with a typical situation: we had to choose between an instrument which appeared more advanced but which was relatively unknown and never before tried, and one which has been produced for some time and found satisfactory but which had only limited potential for development. (Of course, in the planning we realized that for years we will not be able to replace an obsolete instrument.) In addition, we had to prepare the System Plan in such a manner that the observatory is equipped with a set of modern instruments in 3-4 years, when it starts operating, yet we needed certain parts of the system already in 1973! We made many compromises (considering information about the equipment of foreign institutions with a similar goal, usually obtained indirectly). Finally, we succeeded in procuring all basic instruments. The System Plan also contained several alternatives; however, after the decisions were rendered, we had to prepare the final Technical System Plan describing the "final" decisions. This task, which took approximately two years to accomplish, provided valuable experiences to the staff members, who were appointed one by one, since they came into the "pressure-cooker" atmosphere of planning. This gave them a good introduction for their future tasks.

The compilation of the staff was not easier than the compilation of the equipment. Already the Functional Plan outlined an ideal staff structure of 20 individuals whose competence complemented each other; they were to be geodeticists, astronomers, physicists, engineers, and so forth, plus the staff of assistants. It was already decided that the observatory will have three departments. But the sequence of appointments presented a difficult problem since we had to hire 3-5 staff members each year. But who should be appointed when? Should we start with the department heads

and should we then let them complete their staffs? This is not what has happened. Since an agreement with the Institute of Astronomy permitted us to continue the observation of the artificial satellites in Baja and the evaluation of the observations with the monocomparator of the institute, we first hired observers and evaluators to permit them to become proficient in these two operations. They thus started their "training." A number of outstanding young experts, who wanted to make a career in the field of cosmic geodesy, "moved over" from the mother institution and various sections of the FOMI [Institute of Geodesy]. In this way we established the nucleus of the staff. This was great help since those already appointed recommended additional staff members for the vacant positions.

In these starting years the mother institution provided invaluable assistance. We obtained much help in the fields of technical and economic management, and in the field of investment planning and administration. We practically learned "how to walk" in this manner. It seems that in establishing a new institution we must have a base such as the FOMI has been for us. As we went along, we had to modify our ideas about the staff complement several times, since it was practically impossible to ensure that the needed competences, which complement each other ideally, can be had with so few individuals.

Unfortunately, the construction progressed very slowly during this period; the contractor enterprise did not meet the deadlines, and the day of inauguration seemed to remain distant. At the same time, the schedules established with the other Interkozmos partners, which were approved, pressed us to go ahead with the systematic increase of our staff, the procurement of new instruments, and the setting up of the operations. In 1975, we already carried out the evaluation of the measurements in house; as a matter of fact, systematic nocturnal observations were started on the site, using an already received and installed Type AFU-75 Soviet satellite tracker camera. During this time, construction of the main building was still in progress. Crowded in the rooms of the Institute of Geodesy in Guszev Street, the staff worked and waited eagerly for the move. When we discuss the successful progress of the preparations, we should also mention the fact that since 1973 we held weekly "tea parties" where advanced training was given, sometimes by invited outside specialists, that we built up our library, and provided intensive language and specialty training to our young colleagues.

In this difficult period we were faced by the problem of how to store the already procured furnishings and how to organize our operations. Since we

lacked experience in establishing the preliminary operational schedule of the observatory, which is working day and night, as well as the preliminary budget, we had difficulties in this field also. We tried to make use of the similar experiences of other observatories. Finally, we had to think that the operation which started in the summer of 1976 (18 months later than the original schedule called for) without major mishaps, the observations were made regularly, and the work proceeded without interruptions represented success.

### The Present Situation

At the present time, the construction and equipment of the Cosmic Geodetic Observatory of Penc, which was inaugurated on 26 November 1976, is as follows. Approximately one-third of the staff resides in Budapest, one-third in Vac, and one-third in Penc. The observation department has a staff of four researchers. Their principal observation instrument is a special Schmidt telescope, with a mirror diameter of 50 cm. It was developed by Zeiss specially for the automatic tracking of artificial satellites and for their photography (Figure 1). The apparatus uses photographic plates and provides directional accuracy of 1" to 2". Its smaller version is the Soviet-made AFU-75 camera, which is housed in another observatory building. From the films taken with this, directions can be measured at an accuracy of approximately 4". There is also a photographic laboratory and modern time system, which are accommodated in the central building (Figure 2). The latter is based on a quartz clock and an atomic clock, regularly checked with the aid of radio and television, giving us the observation time at an accuracy of 1/1000 of a second. The technical department established this facility. The SBG telescope received in May 1977 a laser gun, made within the framework of the cooperative Interkozmos project, for the measurement of geodetic satellites (covered with laser reflectors) at an accuracy of a few meters. The KGO provides the required time service and the electronic facilities.

The data-processing and research department evaluates the measurements with an Ascorecord-3DP monocomparator, which is also a Zeiss product. It is controlled by a small computer. The data are prepared, filtered, and so forth, with a benchtop computer (HP [Hewlett-Packard] 9830 B). The photographic laboratory, the computer, the time service, and the photogrammetric sections are housed in air-conditioned areas. A central air conditioning system is used. In this area we prepared, among others, a program for the forecasting of the passage of artificial satellites, and also a program for identification of the photographs with the aid of a star catalog recorded on magnetic tape.

The still relatively few instruments of the technical department are housed in the workshop and the electrical laboratory. This department maintains the instruments and performs technical development. Its head has experience gained at the Cairo and India stations of Interkozmos in the laser observation of satellites. We also have a nice little library, an auditorium, four rest rooms, where the night workers can relax, and so forth.

The observatory endeavored to make up the delays in its start by introducing a new observational technique practically every year. Hundreds of photographs represent the achievements and our participation in the cosmic geodesy projects of Interkozmos. This is not enough for the long range, of course, We need (1) to develop the observational techniques further and to start radio observations; (2) to participate actively in the complex processing of the data, and the acquisition and application of dynamic techniques; and (3) to participate in the solution of some traditional problems of Hungarian geodesy (astrogeodesy).

For the last-mentioned task we plan to move the National Longitude Main Base Point to Penc, and to acquire a modern astrogeodetic instrument for it. A test network will also be set up in the vicinity of the observatory.

The OFTH formulated the goals and tasks of the observatory in the following manner: "To carry out the operative satellite observation and processing work assigned to the Hungarian Geodetic Service. In addition to carry out such studies and programs which serve the advancement of satellite geodesy in general and geodetic science in particular. Furthermore, the observatory is equipped to participate in additional work aimed at the development of the Hungarian astrogeodetic network."

It is our hope that these goals will be fully met through the help of international cooperation and of academic institutions with a similar profile.

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DEVELOPMENTS IN COMPUTER INDUSTRY, APPLICATIONS NOTED

Budapest SZAMITASTECHNIKA in Hungarian Nov 77

1. Minitip System Demonstrated

[p 1]

[Text] The MINITIP standardized production programming system was exhibited recently at a conference held in the Institute for Administration and Computer Technology in Metallurgy and Machine Manufacture (KG ISZSI). The computer programs of the MINITIP system may be run on the R-10 (R-12) computer made at Videoton. The main users are to be small and medium-size manufacturing and installing enterprises.

The MINITIP system was introduced first in the Machine Component Factory in Ujpest. The experiences so far were favorable. Fast and precise processing of production-related information facilitates the rendering of proper management decisions and the elimination of overlaps. The economic benefits of the use of the system may be objectively measured.

The Ministry of Metallurgy and Machine Manufacture classified the MINITIP system as a standard system within the jurisdiction of the ministry.

2. Orion Terminals, Displays in USSR

[p 1]

[Text] There has been a major step in the history of the computer-technology branch of the Orion enterprise: The largest contract so far has been signed recently. It covers the delivery of computer-technology equipment in the value of 3,039,000 rubles to the Soviet Elektronorgtehnika foreign-trade enterprise through Budavox Limited during 1978. The shipments include 40 AP-64 (ESZ [Unified Computer System]-8564) terminals with a total of 320 displays and 80 AM-1200 (ESZ-8006) modems. So far. Orion has doubled its

output of computer-technology equipment each year. This contract, together with other orders already received, will result in further major growth.

### 3. Floppy Disk Plans, Progress Detailed

[p 3; article by Laszlo Borovszky]

[Excerpts] More than 20 manufacturers worldwide produce the drives today. The socialist countries — Bulgaria, Czechoslovakia, Poland and, last but not least, Hungary — are among those who develop and manufacture such equipment. Today in Hungary VILATI [Electrical Automation Institute] already started the manufacture of drives on the basis of a licence procured from Data Recording Instruments, and MOM [Hungarian Optical Works] started the manufacture of a drive developed internally.

#### Domestic Development of User Devices

VILATI started the development of information systems based on floppy disk in 1975. Data-recording and data-preparing units form the basis of the systems. Three basic types will perform all data-recording functions: the FLOPPYMAT D (see the photograph) which is compatible with the basic IBM 3741 model in performance and disk-recording format, the FLOPPYMAT I, a twin-drive version which, among others, also performs the functions of an advanced organizer automaton (copying, data organization, and so forth), and the FLOPPYMAT M, which is the version equipped with a mosaic printer for preparing, among others, permanent documentation. The FLOPPYMAT D has already been exhibited in a number of international fairs, where it was received with interest. Its series-manufacture has started.

All FLOPPYMAT versions may be had with data transmission facilities, so that they can be used to perform the functions of modern terminals. A mosaic printer may be connected to Versions D and I (DZM 180).

The next level of information processing is realized with the use of small computers. In this field, VILATI has already joined the drives as background memory devices with its Practicomp 4000 small computer. The prototype of this system operated, with three drives, satisfactorily for more than a year. This solution is of the hardware-sector information organization type, meaning that is not compatible with software-sector versions complying with ISO [International Standardization Organization] or ESZR [Unified Computer System] standards (Adopted from IBM).

In the Practicomp 4000 as well as in other small computers, the basis solution is the use of the FLOPPYLINE (on-line FLOPPYMAT), which provides input and output for the small computer, may perform the tasks of the background memory, and may also be used as a console unit. Series-manufacture of the FLOPPYLINE will begin in 1978.

There is progress in the development of two types of connection to large computers, which will represent the peak of the information system. One is an on-line input-output system which initially will be available in two drive versions as a peripheral unit for the R-40 and R-55 computers. It is based on a joint development with the Robotron Combine.

Another method for combining with large computers is the floppy disk to magnetic tape converter, which operates in the off-line mode. This precedes the appearance of the input-output unit since there are no software problems in this version.

In our judgment, all computer-technological problems can be solved with the information system described briefly (data recorders, small computers, and large computers) with the advantage that the data carriers and even the recording format are unambiguously defined. The chaos which has developed from the many different and cumbersome data carriers is best eliminated with this approach in a modern way. Thus, the efforts exerted toward its realization are worthwhile.

#### 4. Videoton Equipment at Soviet Oil Fields

[p 3; article by Ferenc Arato and Sandor Namenyi]

[Excerpt] VIDEOTON has delivered three R-10 computers and many terminals for the data teleprocessing system of the natural gas and petroleum field in Tyumen within the framework of a joint Hungarian-Soviet-East German project. The remote data acquisition and data processing system will solve the following problems:

- Recording of the quantitative and qualitative data of the petroleum produced;
- Recording and processing of the technical and operational data for the individual wells;
- Recording the amounts of petroleum introduced on the market;
- Providing data to geologists for help in new explorations.

From the hardware side, these tasks are performed by a triple-hierarchy, highly complex system which is built up from the following stages: perforated tape and matrix printer terminals for on-site information acquisition and interrogation; R-10 computers for regional data concentration and some data processing functions; and R-40 computer for central data processing.

The data flow among the various hierarchy levels is through telephone lines and radio relays. The maximum distance involved is approximately 700 kilometers. Before emplacing the system, studies were carried out on the quality of the telephone system. It was established in these studies that the probability of a perfect transmission is approximately 0.99. This value, with appropriate error filtration, ensures dependable transmission of the data required for the operation of the system.

The system designed required special software for the tasks; this was developed primarily by the experts of VIDEOTON Computer Technology Works. The software system offers multi-point connection possibility between the R-10 and R-40, and the terminals. Part of the system packet is a test software which checks out the terminals and the complex terminal network.

The special software packet performs the data-bank functions in the R-10/R-40 complex. The data bank contains the data (petroleum production, natural gas production, standstill time, average 24-hour yield, and so forth) needed for the preparation of the monthly reports about the operation of the field. The data bank also contains information about the quality of the petroleum produced in the individual wells (such as water, salt, chlorine, and solid matter content).

The user software packet permits access to the data in the bank for all terminals. Thus, it offers considerable help both in the production and the exploration work.

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## HUNGARY

### PROGRESS, BENEFITS OF RYAD SYSTEM NOTED

Budapest MAGYAR NEMZET in Hungarian 22 Nov 77 p 8

[Article by Andras Faludi: "Computer Near Man, In a Unified System"]

[Excerpts] The socialist countries exert considerable effort to establish the unified computer system (ESZR). In Hungary too, computer technology is a featured industry branch, and the use of computers spreads to more and more factories and research institutions.

### Mutual Equipment Shipments

The computers and peripheral devices manufactured in the various countries are compatible with each other. Soviet computers acquire the messages from the console typewriter — a data input device — made in Czechoslovakia. The data stored in a Bulgarian-made memory device are processed and printed out by Hungarian-made tape perforators. In 1973 the R-10 was combined with the Soviet-made R-30, and the two computers were able to "communicate" with each other. This is an outstanding achievement in this field. Between 600 and 800 factors must be taken into consideration if we deal with computers and peripheral units by the 75 participating enterprises in the individual countries!

Mutual shipments of equipment started in 1973. Nobody can say that the manufacture of the equipment is a problem-free operation. Today, four years after the first shipments, we may state that the ESZR equipment operates satisfactorily in each country. Their average utilization rate is between 85 and 95 percent of the total time, which is a satisfactory percentage. The new, intermediate-size units, of which the type designation number ends with "5," are now being made in each country. In Hungary, we build the R-15. The drawings of the "third stage" of production are already being prepared by the designers.

It is estimated that there are perhaps as many as 300,000 computers in the world, if we combine all units, with various capabilities. Ten percent of them operate in the socialist countries. Most of these are computers of the ESZR system. Ten years ago there were none of this type. The dynamic growth of the ESZR units is inadequately illustrated with these figures. There are two reasons for this. One is the following: there are several parallel systems in the capitalist countries — for example identical computer complements in many petroleum companies — whereas the same purpose is served by a single system in the socialist countries, thanks to the socialist system. The other is the following: There is some "inflation" in the use of computers in the western world. For example in the United States the average degree of computer utilization is not more than the time of one working shift. In Hungary, the average degree represents 1.8 shifts per day. Thus, a ten percent higher value represents a larger capacity than the numerical ratio.

### Intellectual Content

Sometimes it seems that we have more computers than the enterprises can use at the present state of their development. The "excess," however, is apparent and not real: it would be desirable to have computer centers in more locations. We have too few good application programs and, as we all know, the computer is worthless without them. The intellectual content, meaning the good programs, is as important as the computer itself. Also, a computer can be used effectively only in factories where the procedures are well organized and capable of being programmed. A computer center requires clear and well-functioning administrative and productive systems. No matter how perfect is the warehouse management program if the basic documents for incoming and outgoing shipments are inaccurate and spotty. In this way the computer is given improper information. It is simpler to set up the computer center than to communicate properly with the computer so that it understands the tasks, or to reorganize the factory so that it lends itself to control by the computer.

A system, operating in an oil field, which combines an R-40 and three R-10 computers with 200 data terminals for each, is still a rarity. But such a system is capable of handling and displaying the production, storage, and shipment data for 600 stations upon demand. Such a system is installed in a Soviet petroleum field. The capabilities of this computer system illustrate well the potentialities of the use of computers.

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## HUNGARY

### RESEARCH OF POSTAL EXPERIMENTAL INSTITUTE

Budapest MUSZAKI ELET in Hungarian 18 Nov 77 pp 1,18

[Article by Dr. Zoltan Torok]

[Text] The Postal Experimental Institute carries out its work quietly, so that the public cannot have a detailed picture about its accomplishments and about the projects presently being investigated by the scientists of the institute.

Typically, the PKI [Postal Experimental Institute] tries to adapt the results of research, wherever it has been performed, to the improvement of the quality of the work of the postal service. In recent years, for example, there have been accomplishments in the field of solid-state technology, light-conducting cables, microwave satellite technology, and computer technology which have the potential of contributing significantly toward the solution of problems in postal service and telecommunications. These accomplishments must be utilized through the adaptation work of the institute, while the operation of the existing facilities must be continued without interruption. All new solutions must be adaptable to the methods used presently. At the same time, automation must be the ultimate goal since, among other reasons, the available labor must be utilized in the most efficient manner possible.

In order to meet this general goal, the experts in the institute carry out studies in the fields of telephone network, broadcasting, postal operations, and data transmission. We can only describe some examples to illustrate their work.

#### Automated Error Localization

One of the achievements of the PKI is the automated network analyzer which is essentially a combination of two devices. One operates in the telephone

exchange, from where it initiates "trial calls" using preprogrammed call numbers. These calls are switched to the other type of device located at various points of the telephone system which play the role of subscriber telephones. But in these calls not the live subscriber but the device will answer the call. The device can evaluate the manner in which the telephone system functions from the data of these calls, and can even find the approximate location of the malfunction if there is any.

This system can perform a large variety of logical functions with the help of integrated circuits. It can determine the phase of the call where the malfunction has occurred. If the defect is such that immediate intervention is necessary, it activates a "hot wire" to alert the repair department. In other cases it merely records the malfunction so that the repair personnel can learn about it when it reviews the recording on perforated tape. The system not only determines whether a connection on the given line is possible but also examines the connection for any noise or attenuation, meaning that it evaluates the quality of the telephone service. If there are any symptoms which by themselves cannot be classified as malfunctions but represent a deviation from perfection — for example if the dial tone arrives very slowly — it reports this also.

This portable network analyzer, which can be easily connected to the installed equipment, is the first anywhere with which the operation of any telephone exchange can be checked. It has passed its initial trials with flying colors this year: it "checked out" the connection between Budapest and Kaposvar. It succeeded in reducing the percentage of defects from 35 to 40 percent to less than 5 percent.

#### Long-Distance Calls From Coin-Operated Telephones

Experts of the institute developed a coin-operated telephone with which long-distance calls may be made from public telephones. Any subscriber in any country with which we have telephone connection may be called. The apparatus is fed with 2, 5, and 10 forint coins. After the dialing has been completed, meaning while the conversation goes on, the device automatically "enquires" about the rate for the call and determines the fee for the conversation. It notifies the caller as soon as the connection purchased with the inserted coins comes to an end, and it also returns any excess money. Some such public telephones are already in operation; for example at Ferihegy Airport, in a booth on Moricz Zsigmond Square in Budapest, some locations around Lake Balaton, and so forth.

The apparatus incorporates a number of Hungarian-developed innovations. This is the first device of its kind in which all coin denominations are placed in one slot. There is no need for "specialized coin slots" since the coins are evaluated electronically, with the information handled through various cables. The apparatus employs a number of parameters for the unerringly accurate identification of the coins.

#### Electronic Vending Unit

It is the aim of the experts in the institute to use electronics for a variety of vending operations, where the device evaluates the inserted coins, determines the appropriate fee, and returns the excess change. They have developed the principle of a device which dispenses a variety of merchandise such as postage stamps, post cards, telephone tokens, and the like in any desired quantity. The electronic device totalizes the prices of the pushbutton-selected merchandise units, determines the total charge, and refunds the excess. So far as we know, no such device has yet been installed anywhere. The first units are likely to be completed by the end of next year.

#### Digital Space Model

Another original development of the institute is a digital space model. The staff members determine the relief conditions of the whole country at a high degree of accuracy. The country is divided into appropriately sized blocks (200 by 200 meters) and prepare a separate sheet for each block on the basis of the data obtained from the cartographers. These cards contain all relief, morphological, residential, and other information. The data are stored in a memory system and used to determine for any desired location such information as broadcasting reception conditions or favorable placement of a transmitter facility. Of course, the same data may also be used for other purposes, for example for establishing the best possible route for a railway line to be built.

Atmospheric conditions also affect the propagation of microwaves. For example, atmospheric humidity affects waves of less than 10 GHz, and various types of precipitation affect waves of more than 10 GHz frequency. In order to be able to determine the features of the atmosphere at various altitude levels in terms of these parameters, the institute equipped a small model airplane, propelled with a small gasoline engine, with lightweight instruments. This aircraft can rise to altitudes of several kilometers and transmit information to ground stations in regular intervals from various altitudes in ten-meter increments.

According to literature data, this solution for the evaluation of the microwave propagation characteristics of the atmosphere has been employed for the first time anywhere in the world by the experts of the Postal Experimental Institute.

A patent has been applied for to cover an invention made by the institute. According to this invention, it can be established at a high degree of accuracy how much time has elapsed between the mailing of a letter or a parcel and the actual delivery to the addressee. The device will also determine where the mail has been delayed (if it has been), what was the cause of the delay, and how much the delay has contributed to the total mailing time.

2542

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HUNGARY

INSTITUTE PRODUCES PROTEIN FROM FATS, VEGETABLES

Budapest MUSZAKI ELET in Hungarian 18 Nov 77 p 7

[Unattributed article]

[Text] Studies are underway everywhere in the world to modernize the food supply and specifically to explore new sources of proteins. The goal of the studies is, on the one hand, to reduce the overfeeding which takes place in the industrially developed nations and, on the other hand, to improve the food situation in undeveloped or underdeveloped nations where there is a food shortage. The results of the scientific studies will be used to demonstrate to the suppliers that proper modification of the composition of the foods promotes public health and yields economic benefits.

In Hungary too, studies are in progress for the development of new foods with high food value. We asked Presidium Member Dr. Gyorgy Karpati, from the Hungarian Scientific Institute for the Food Industry, scientific consultant of the Central Research Institute for the Food Industry. [He advised as follows:]

- In our institute we stressed studies in recent years for the food-industrial utilization of various protein sources and materials until now considered as waste or byproducts. Among these products we were especially interested in protein concentrates of vegetable origin (soy protein, sunflower protein) and in so-called biological masses of microbiological origin (yeast types). Our aim was to demonstrate that it is not the origin — whether animal or vegetable — of the protein what counts insofar as nutrition is concerned, but the type and percentage of the valuable (and sometimes indispensable) protein components.

- It does make a difference whether much or little energy is expended in the production of one kilogram of protein, and how much arable land is used. This applies particularly to our large-scale agricultural facilities, of which the industrial character becomes more and more pronounced, and where

the need for energy increases by leaps and bounds, and is felt already in the national energy balance. Insofar as energy expenditure is concerned, proteins of animal origin stand at the top of the ranking. If we evaluate the calorie utilization, we find that we get back no more than 6 or 8 percent of all energy invested with the fodder in meat or other animal protein. The efficiency increases approximately six-fold if the same amount enters the food in the form of protein of vegetable origin.

- We developed a method for the manufacture of protein fit for human consumption from fats of animal or vegetable origin by means of fermentation methods. Much fat originates in the meat industry from bones, or other parts which cannot be readily marketed. This is presently used as fodder. Some of the fat is discharged into the sewerage system. If we would collect these fats and, for example, process them in yeast-processing establishments, we could produce food-industry materials of high value with some relatively minor new equipment. Microbiological methods could be used. Certain microbe strains can convert fats into proteins and vitamins. In this way we could obtain 500 grams of protein from one kilogram of fat. This is economically a very attractive proposition. The price of one kilogram protein made by microbiological methods is \$ 1 to \$ 1.20, while the price of one kilogram protein in the form of meat is \$ 12 to \$ 14.

- A major research theme in our institute is the processing of soybeans grown domestically for food use. We noted that the role of the soybean also increases in developed industrial countries since it is equivalent to meat insofar as nutrition-biological aspects are concerned, yet the protein obtained from soybeans costs only 1/7 of that obtained from meat. The possibilities opened up as a result of new achievements in chemistry and biology.

- The main problem was to eliminate the undesirable flavor and odor of the soybean products. We have used soybeans primarily as oil seeds, and we used the soy meal, containing approximately 50 percent protein, only as animal fodder. But if we remove the shell of the soybean, defat the residue by extraction, and then heat-treated what is left with steam, we eliminate the components which impart the undesirable flavor and odor. Another method is extrusion: in this method we extrude the deskinced soybeans under high pressure. In the process the soybeans are heated to the required temperature and expand as they leave the extruder. We evaluated the product in cooperation with the National Institute of Dietetics, the Infant-Food Enterprise, and the Hungarian Association of Cooks, as well as various food manufacturing enterprises. A variety of recipes resulted from this cooperative project which produce valuable, tasty foods with increased protein content and nutritional value.

According to Dr. Gyorgy Karpati, both subjects are studied in projects supported by the OMFB [National Technical Development Committee] with the aim of increasing the protein supply. The achievements of the soybean project are already implemented for the manufacture of food products for children and adults. The government organs provide valuable assistance here. But it would also be desirable to complete successfully the other study aimed at the manufacture of biological mass (protein-vitamin concentrate) as soon as possible by a joint effort. If the proper domestic fermentation base cannot be created for this, then — according to the experts — tests should be carried out within the framework of CEMA integration, for example in the Soviet Union or in the German Democratic Republic. The experiences in these plant trials could then be utilized for the establishment of manufacturing facilities for human food and animal fodder.

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## BRIEFS

BIOLOGICALLY ACTIVE SUBSTANCES VIA COMPUTER--Over the past 15 years many new methods have been evolved for the numerical investigation of effect-structure relations and for planning biologically active compounds. These processes all make intensive use of the computer. In Europe, in addition to France, Germany and the USSR, Hungary has evolved two methods developed by a research team at the Ministry of Heavy Industry Institute of Industrial Economics and Systems Analysis [NIM IGUSZI]. One of these makes use of numerical optimization instead of regression calculation. The other makes use of the results of achievements in artificial intelligence research for automating statistical and quantum chemical type calculations. It can be used to automatically process data of several thousand compounds. It is also an inexpensive way of obtaining an estimate of the probability of favorable biological effects of compounds not previously produced. The measured effects of compounds described in the literature or produced in Hungary can be used for the initial data. [Budapest MUSZAKI ELET in Hungarian 18 Nov 77 p 19]

CSO: 2502

## NEW DRUG FOR TREATMENT OF LIVER DISEASES

Bucharest FLACARA in Romanian 10 Nov 77 p 10

[Article by Ovidiu Ioanitoaia]

[Text] Dr Magdalena Timar, a worker of the Bucharest Chemical-Pharmaceutical Institute, began her basic research which recently resulted in the new Romanian unique drug Tropofar by proceeding -- like in most outstanding discoveries -- from a very simple observation. While studying the systems capable of triggering drug side-effects, during the 1957-1958 period, Dr Timar noticed that, as far as the liver was concerned, the metabolizing processes of some pharmaceuticals (barbiturates, sulfamides, and so on) do not occur in the parenchymatous cell but in the mesenchyme, mainly involving the Kupff cells and SRE dependent elements. The very bold observation of the Bucharest research worker which contradicted the conventional hepatological concept according to which the mesenchyme is directly responsible for the chronicity of liver diseases was made public as early as in 1969 when the prestigious review BIOCHEMICAL PHARMACOLOGY which appears at Oxford printed it in a shocking scientific report. It provided accurate data on the reconsideration of liver etiopathology and urged hepatologists to take into account the tropic and metabolic functions of the mesenchyme. Theoretically there was only one step from this point to the natural conclusion that "any hepatoprotector substance must involve both tissues under discussion!" But this step involved almost 10 years of persistent efforts which Dr Magdalena Timar did not make by herself but in conjunction with biochemist Handrich Ingeborg, pharmacist Doina Talos, and laboratory assistants Maria Savulescu and Florica Pintilie.

All this research work was neither simple nor easy and involved gropings and renunciations. The team headed by Magdalena Timar proceeded from the audacious idea that hepatology in recent decades misused biochemical knowledge about liver functionability, suggesting for treatment chemical structures belonging to various metabolic processes of the organ, combinations of vitamins, amino acids, and purine or pyrimidine structures (in other words, drugs

such as Aspatofort, Purinor, Esentiale, and so on). In order to act on the liver for protection these drugs had to penetrate the liver membrane, a difficult process since crossing the membrane usually involved an active transport of vehicular structures which in case of disease were in short supply. In this context in which greatly reduced therapeutical effects were obtained because of the stress on the remaining structures and considering that the liver extracts with Vitamin B<sub>12</sub> additions -- also clinically tested -- did not lead to satisfactory conclusions, rather because of allergic side-effects, the specialists of the Chemical-Pharmaceutical Research Institute focused on the study of the membrane. They considered that the liver disease first of all involved a membrane disturbance.

Tests were conducted over many years, first on a laboratory scale, later on animals, and in the end on humans. The very broad casuistic basis involved more than 800 patients in reputed clinics in Bucharest, Cluj-Napoca, Iasi, and Oradea, under the supervision of authorities in the matter such as professors Marin Voiculescu of the Clinic of Infectious Diseases of the Colentina Hospital, General Iuliu Suteu of the Central Military Hospital or Ion Triandaf of the Iasi Medical Clinic No 2. Consequently, Dr Magdalena Timar and co-workers succeeded in scientifically developing a unique Romanian drug, Tropofar, which involves a structure of cellular membrane, extracted from an animal organ. In other words, the new drug which compares with and, according to some, even is superior to the above-mentioned vitamins, supplants the lacking structures in membranes and restores their function.

Of course, strictly scientifically, many more things could be said about the new drug which will be soon available in pharmacies as a white soluble lyophilized powder which will be injectable. We dwell on the, let us say, theoretical aspect of the matter only. However, we shall recall that 19 of the 120 scientific surveys by the inventor of Tropofar strictly deal with the drug under review. Some of them were read at specialized international congresses when the FH Hepatoprotector Factor (the scientific designation of the Romanian drug) aroused great interest and surprised the attendance by the solidity of the demonstrations and the novelty of the research. Tropofar was reported for the first time, naturally in an incipient stage, to the medical circles in 1969, at the Fourth International Pharmacology Congress in Basel, Switzerland. Subsequent ampler reports occurred in 1972 and 1976. In 1972, at the Fifth International Pharmacology Congress in San Francisco, the report of Magdalena Tomar won an award of the International Union of Pharmacologists. It was taken into consideration by the International Society for the Study of the Liver which focused on it during a work session held in Budapest in 1976.

Various foreign clinics asked for Tropofar in past years. The drug was the topic of two round table conferences at Cluj-Napoca, on 8-9 March 1976 and 4-5 October 1977, when specialists from several countries in the attendance praised the therapeutical effects of the drug. At a round table conference held two weeks ago in the town on River Somes, hepatologists from three continents concluded that Tropofar has outstanding qualities in stabilizing specific liver disturbances, preventing the worsening of hepatitis and its turning into cirrhosis. The specialists who pointed out the great therapeutical value of the new Romanian drug included Prof Dr A. O. Williams of the Ibadan Hospital (Nigeria), WHO delegate (he emphasized that FH could be administered in diseases in which cortisone was contraindicated), the Viennese doctor Kurt Horak representing the International Society for the Study of the Liver, Prof Dr A. Par, from Pecs, Prof Dr G. Uzunov, from Sofia, and the representative of the Otsuka Company in Osaka, Japan, with whom the inventor cooperated until 1975, under a firm contract between the Chemical-Pharmaceutical Research Institute and the above-mentioned firm, with the Japanese specialists providing the Bucharest research worker with the study on structures.

As mentioned above, the drug will be available in pharmacies in the next months.

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