

086067

JPRS-EER-86-016

4 February 1986

# East Europe Report

**DISTRIBUTION STATEMENT E**  
Approved for public release  
Distribution Unlimited

**DTIC QUALITY INSPECTED 2**

19980305 136

**FBIS** FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA. 22161

29  
127  
A07

#### NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

#### PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

## EAST EUROPE REPORT

### CONTENTS

#### ECONOMY

##### HUNGARY

Progress, Problems of New Enterprise Management Forms (Judit Kozma; NEPSZABADSAG, 18 Nov 85) .....	1
Unemployment Compensation Obstacles (HETI VILAGGAZDASAG, 21 Sep 85) .....	5

##### ROMANIA

Measures To Increase Coal Production (Dorin Gheata; REVISTA ECONOMICA, No 44, 1 Nov 85) .....	6
Actions To Increase Energy Resources (C. Gorie; REVISTA ECONOMICA, No 44, 1 Nov 85) .....	9
Ways To Reduce Energy Consumption (Gheorghe Manea; REVISTA ECONOMICA, No 44, 1 Nov 85) ...	12
Need To Improve the Transportation Sector (Anastasiu Manescu; REVISTA ECONOMICA, No 44, 1 Nov 85)	16
Need To Combat Fluorine Loss in Chemical Industry (Corneliu-Anton Cociasu; REVISTA ECONOMICA, No 44, 1 Nov 85) .....	22

#### POLITICS

##### GERMAN DEMOCRATIC REPUBLIC

Urban Migration Reversal Plans Explicated (Werner Ostwald; WIRTSCHAFTSWISSENSCHAFT, No 10, Oct 85)	25
---	----

POLAND

Today's Politicians Acknowledge More Individuality (Artur Howzan; ZYCIE WARSZAWY, 21-22 Sep 85) .....	52
Sejm Functions: Council of State Features (Jadwiga Mikolajczyk; TRYBUNA LUDU, 24 Sep 85) .....	53
Academic Has Pessimistic View of Future (Juliusz Gorynski; ZYCIE WARSZAWY, 15 Nov 85) .....	55
New Book Focuses on Policy Decision Making (Czeslaw Mojsiewicz; TRYBUNA LUDU, 22 Nov 85) .....	56
Soviet Education Minister on Reform, Contacts (Gennadiy A. Yagodin Interview; RZECZPOSPOLITA, 15 Nov 85) .....	58

SCIENCE AND TECHNOLOGY

INTERNATIONAL AFFAIRS

Development of Detergent Industry Examined (Aristina Parota; REVISTA DE CHIMIE, Aug 85) .....	61
--	----

HUNGARY

Microelectronics Chief Quizzed on Abrupt Retirement (Mihaly Sandory Interview; MAGYAR HIRLAP, 19 Oct 85) ...	71
Cyclotron To Be Operational by November (Jozsef Goz; NEPSZABADSAG, 29 Oct 85) .....	76
Superior Device for Detecting Flaws in Semiconductor Crystals (Katalin Magos; NEPSZABADSAG, 21 Nov 85) .....	80

POLAND

Laser-Beam Microtreatment of Materials (Wieslaw Wolinski; ELEKTRONIKA, No 1-2, Jan-Feb 85) ....	83
New Heavy Engineering Products Profiled (PRZEGLAD MECHANICZNY, No 17, Sep 85) .....	89
SR-125 Air Compressor for Marine Engines	89
RTA Marine Engines Licensed by Sulzer	90
New Boring Machine	91
Institute Develops PAS-80 All-Purpose Signature Analyzer (Andrzej Hlawiczka, Maciej Nowinski; POMIARY AUTOMATYKA KONTROLA, No 7, Jul 85) .....	94

New Software for CDC, Ryad Intercomputer Communication  
(Marek Frydryszak; ENERGETYKA, No 7, Jul 85) ..... 97

ROMANIA

Automation of Railroad Transportation System Discussed  
(Vasile Olievschi; STIINTA SI TEHNICA, No 7, 1985) ..... 99

Use of Minicomputer in Railroad Telecommunication  
(Corneliu Cosovanu; STIINTA SI TEHNICA, No 7, 1985) ..... 104

SOCIOLOGY

HUNGARY

Unemployment Problems, Facts in Three Poorer Counties  
(Endre Babus; HETI VILAGGAZDASAG, 21 Sep 85) ..... 108

GERMAN DEMOCRATIC REPUBLIC

Educator Stresses Importance of Developing Gifted Students  
(Guenther Hellfeldt Interview; JUNGE WELT, 6 Sep 85) .... 112

POLAND

Treatment of Rural Theme in Literature  
(Julian Kawalec Interview; KULTURA, No 17, 25 Sep 85) ... 116

ECONOMY

HUNGARY

PROGRESS, PROBLEMS OF NEW ENTERPRISE MANAGEMENT FORMS

Budapest NEPSZABADSAG in Hungarian 18 Nov 85 p 3

[Article by Judit Kozma: "In the Role of the Owner"]

[Text] The switch to new enterprise management forms is taking place at an accelerated rate. So far altogether one hundred companies have given over ownership rights to the company council, general assembly or conference of deputies, and the new management bodies will be established in 80-100 more industrial plants in the rest of the year. About two thirds of the affected companies will accomplish this year the first major decision, the election of the director, and by next spring the first phase of changing the enterprise management system will have been completed for the whole country.

180-200 Companies

The first solemn act, the formation of company councils, and later the first decision, the election of the director, give us some prediction about the sweeping change that increasing company independence and the democratization of management may bring about for enterprises. And at the same time they bring to the surface a few uncertainties of points of view and legal regulations that make the unfolding activities of the new management forms more difficult.

It is impossible to size up correctly and make a final analysis of the changes, because so far they have affected only a smaller portion of companies. The majority of the newly formed company councils have not had a chance yet to start their actual work. But we can record the facts of the events so far, and some of the experiences of the debates at enterprises, institutions and professional forums are also worthwhile mentioning -- not so much to summarize them as to draw attention to them.

Let us look at the facts first. During the year the preparatory work on changing the enterprise management system was completed. This task involved the collectives' debates on the management forms recommended by the ministry, the date of switch, and the necessary modernization of organization. It was particularly this latter that elicited heated arguments, and in many cases significantly postponed the formation of the new management body. As a result of these debates several new, independent enterprises were formed, and the

number of affected industrial plants increased from 306 to 325. So from among the enterprises under the Ministry of Industry, 58 remain under state supervision, the rest will continue their activities in one of the new forms.

By 30 October one hundred companies completed the switch. Of these, 75 formed an enterprise council, 17 decided on a conference of delegates, and in 8 a general assembly manages the enterprise. As we can see, the most common form is the enterprise council. Its composition can be examined from various points of view, but for us the council members' professional distribution is particularly interesting. From this point of view, the election of council members shows a certain duality.

Fifty-two percent of council members are technical personnel, 27 percent work in administration, and only 21 percent are laborers. And this -- that is, manual laborers' participation, direct participation of labor -- does not live up to expectations. True, there were no specifications for labor's ratio. This would not have been wise, because the forceful implementation of statistical considerations not only takes away from the democracy of the elections, but -- as examples have proven it -- it may lessen the efficacy of the body's work as well.

#### "The Enterprise I Represent"

But on the other hand, labor's stronger voice in decisions, the control of resolutions coming "from below" demands a more forceful labor participation. But the indications are that we can count on this only in the long run. In the course of elections that have taken place in enterprises so far it happened frequently that instead of the nominated fellow laborer workers "sent" their manager to the council, hoping that he will represent plant interests more forcefully.

In electing members into company councils, it was this effective interest representation that received the most emphasis; it is therefore understandable that the expressions "the collective electing me," and "the plant I represent" came up repeatedly during the debates of the first council meetings. Of course, these are just words that have no particular meaning by themselves. The unclear thoughts behind them only become telling when the issue of the division of labor between the company council and the trade union, traditionally representing and protecting labor, comes up.

In theory, of course, the roles are fairly clearly defined, but there is a lot of uncertainty in practice. Who can decide on what kind of questions? Which "forum" is stronger if a joint decision cannot be reached on an issue? What kind of difference can there be between the trade union, representing the interests of workers, and the company council, representing the owners, which, in the final analysis, means also representing workers' interests? Experiences indicate that the company council, the trade union, and the director all are still trying to find their place in this triangle, and it will take a long time and numerous arguments to resolve the issue. It will take a concerted effort to make it clear: the company council is not a new, democratic addition to the already existing forums, but it is an institution with different tasks; it exercises the rights of the owner.

Its success will also depend on how the elected council members can prepare for the new role, how capable they will be to bring strategic decisions in the interest of the enterprise. But it will primarily depend on the economic environment, influencing the activities of the enterprise and the company councils, and on how we can strengthen the spirit of ownership.

### Role of Regulation

Certain elements of the economic environment directly affect the activities of the company councils. One such element is the council members direct interest in the company's success, in the improvement of its efficiency. A specific example makes us think: one company council was faced with the important question of whether to go ahead with a significant investment essential for the future, but requiring a large capital. The development was necessary and they even had the money, but the investment was possible only with credit that was several times of the money they had -- it was a risky situation. They could fail, and there had been cases like that. A decision was reached: the company council voted to invest. Among the stipulated demands made on the director was the successful completion of the investment, thereby establishing his direct interest in the results and his responsibility in a possible failure. But one question remained open: in the final analysis, who shoulders in this case the responsibility inherent in all investments? What demands are put on company councils if the company goes bankrupt?

For the time being, we cannot give a definite answer. Another question is, how can we avoid giving too much weight to short-term interests in the activities of company councils, that is, favoring immediate wage increases over long-range interests and investments. This danger is present -- particularly now, when the ever tougher taxation and heavy credit and tax burdens on improvements do not favor investments. And their effects are clearly stronger than those of company councils' intentions.

In the same vein, the acceleration of capital regrouping depends much more on conditions than on enterprise management forms. It is frequently voiced that perhaps the national economy's interest is to channel capital where the most profit could be made. But the problem today is not just how to "convince" company councils to invest their money in ventures outside their domain, but more as to how to get them to decide on truly effective investments only. Barriers raised to discourage ineffective investments are much more successful in channeling companies' interest in the direction of closing down unprofitable areas, and this is better than restricting resources.

### Demands to be Reconsidered

The system of demands presented by company councils to directors makes it clear that we may have to rephrase company interests. These demands are formally quite varied. There are thirty page documents stipulating even the director's legal responsibilities and listing in detail the specific tasks of all the company's departments and plants, and there are documents that simply list in a terse manner the major technical and economic tasks of the company. For instance, the way people are handled, a good work atmosphere are not even hinted at -- these things cannot be measured, therefore they cannot be

evaluated either. (Although in reality these things play at least as important a role in judging a director as the economic results.)

In one way, however, these demands are by and large the same: in most cases they repeat the tasks that in the past were assigned to the director by the ministry. Of course, this by itself would not be a problem -- it is an issue, though, because these demands should have been reconsidered, independently of the new enterprise management forms. We live in a rapidly changing world, and the need to improve efficiency and urgently transform the industrial structure changes by necessity the demands put on enterprises and their leaders. It is hardly acceptable, if -- as we can see today in numerous companies' plans -- useful and good objectives like increasing the export, accelerating technical development, and increasing profit are based on increases in an unchanged production and company structure, in essence, conserving the present structure.

We may have to rethink demands established now, and success will obviously depend on how the economic environment, influencing enterprises' activities, will change; how interests and necessity will grow; whether the interests of enterprises and the national economy will coincide; and how these factors will influence the activities of company councils, whether they will contribute to the central role of improving efficiency in their work.

In debate on the work of company councils involves several issues. Many opinions are voiced about companies' scope of activities, the lack of clarity in thoughts about enterprise management and legal regulations, and about the lack of order. We have discussed here only a few issues, without wanting to explore them in depth or answer the questions with precision. Our desire was to utilize the experiences of conversations, to spur ourselves on to further thinking, and to reach agreement for the sake of the successful work of company councils.

12929/12366  
CSO: 2500/91

ECONOMY

HUNGARY

UNEMPLOYMENT COMPENSATION OBSTACLES

Budapest HETI VILAGGAZDASAG in Hungarian 21 Sep 85 pp 34-36

[Article: "Aid-Conjuring"]

[Text] Fewer rural than urban residents, by comparison, could claim unemployment compensation, if it really were still being paid today. That is what follows from Decree of the Minister of Labor No 3/1957 (15 June). For according to this decree, which is still in effect, unemployment compensation may be paid to the urban resident unable to find work, whose employment for an indefinite period the enterprise has terminated by giving him notice, or whose employment for a definite period or a specific work has ended. But even if these conditions are met, unemployment compensation could be paid only if the applicant had been employed continuously for at least a year before the termination of his employment, or had been employed for at least 3 of the past 5 years.

In principle, the rural residents who meet all these conditions could get unemployment compensation only if they support a family or live alone, are skilled workers, and their social circumstances already warrant paying them unemployment compensation. (The decree does not say what criteria must be met as a means test.)

To prove that he is unable to find employment suitable for his training and physical condition, the applicant for unemployment compensation would have to present a certificate to that effect from the nearest employment office to where he lives. But the employment offices are not issuing such certificates, and they do not even remember when they last had such a form in stock.

The decree specifies that the payment of unemployment compensation must be discontinued if the unemployed refuses to accept work suitable for his skills and physical condition. From the very outset, moreover, it rules out unemployment compensation for anyone who had been working for a private employer when his employment ceased; furthermore, anyone who holds a trade license or owns more than 5 yokes of plowland, respectively more than 1 yoke of vineyard or orchard. There has long been no precedent of anyone claiming unemployment compensation on the basis of the decree that is still in force. The fact that the persons eligible for unemployment compensation do not know about it has probably played a role in this.

1014  
CSO: 2500/143

ECONOMY

ROMANIA

### MEASURES TO INCREASE COAL PRODUCTION

Bucharest REVISTA ECONOMICA in Romanian No 44, 1 Nov 85 pp 1-2

[Article by Dorin Gheata: "Exemplary Plan Fulfillment in All Indicators With Sharply Reduced Fuel and Energy Inputs"]

[Text] Producing the planned output and thereby supplying the national economy with constantly growing quantities of coking and energy coal are highly urgent priority concerns of every mining enterprise and mine. It was emphasized at the meeting of the Political Executive Committee of the RCP Central Committee on 17 October 1985 that firm measures are required in order to further increase coal production, to deliver it regularly to the beneficiaries (thermoelectric power plants, iron and steel combines, chemical combines etc.), to recover the accumulated arrears, and to accordingly fulfill the mining industry's plan in all indicators. The actions taken by the workers collectives of the Valea Jiului Mining Combine to carry out their plan provisions for this year completely and to prepare for next year's production properly are among the special efforts made by miners toward exemplary fulfillment of the plan tasks for coal extraction.

The technical, material and manpower resources that all the enterprises in the combine have and the special efforts of the party and state to provide for regular extraction and delivery of the coal are the decisive factors that can and must lead to supply of the national economy with greater quantities of coal. In many mining enterprises (Lonea, Paroseni, Vulcan et al.) those have efforts have resulted in complete fulfillment and even overfulfillment of the planned tasks. For example, since the start of the year the Lonea and Paroseni mining enterprises have piled up an above-plan output of about 10,000 tons of coal, despite the different technical conditions in the two units. While the Paroseni IM [Mining Enterprise] is extracting coal with modern technologies (80 percent of its entire output is extracted by mechanized means), the Lonea IM is still using traditional technologies that are modernized to be sure but without overall mechanization because of the geotectonic condition of the deposit. But the essential fact is that in both enterprises the managements and the workers collectives are making an intensive effort to organize the operations in every mine and at every working face properly and to maintain a regular and tight control of the daily performance of the production tasks.

Specifically, it is a matter of greater efforts to increase labor productivity at every face. For example, the productivity obtained at faces at the Paroseni IM is 150 kg of coal per operator's position above the planned tasks and about 100 kg of coal per position at the enterprise level. Meanwhile at the Lonea IM in addition to the physical increases in coal production per position, special emphasis has been placed on expanding technologies that have proved better than the traditional ones. Specifically it is a matter of expanding faces with reinforced hanging roofs, which increased labor productivity by 1.5 tons per position compared with the results obtained at the traditional faces. The importance of this technology is further illustrated by a few figures: While in 1984 18 percent of the total output was extracted by this method, this year it was expanded to 43 percent, and it will reach 75 percent in 1986.

Moreover all the mining enterprises in Valea Jiului are improving the qualifications and multiple qualifications of their working personnel in order to enhance labor productivity. This will lead to considerable gains in production and productivity in the future because the miner-technicians of Valea Jiului not only operate the assemblies for mechanized cutting and shoring that are in the inventory efficiently and keep them in perfect operating condition but also can lend effective aid to the service units both in maintenance, inspection and repair of the equipment and in installing or dismantling and removing it.

Correlating the cutting speeds at the mechanized faces with the rapid rate of preparation of new faces and of the future production capacities is another important aspect of the activity in this period. The Paroseni IM should show outstanding results in preparation and investment operations. Mechanization of the basic operations is a priority consideration in that connection, and large-scale use is being made of the combines for cutting both in coal and in waste, to say nothing of maintenance of continuous withdrawal of the coal on rubber conveyor belts, use of industrial closed-circuit TV at key points on the transport flow, etc.

Special mention should be made of the feat of the workers collective at the Vulcan IM, where a number of defects developed throughout this year that lowered the output in certain periods but were promptly eliminated by the joint efforts of the technicians, specialists and unit directors. It was largely a question of transport operations, both for removing the coal (done in an interrupted flow) and for supplying the working units with the needed materials and spare parts. The measures taken in this direction led to replacement of interrupted transport flows in the areas of maximum concentration of production with continuous transport flows on conveyor belts and on tracks where the situation required it. Reserve collecting silos were built, some with capacities as high as 900 tons, permitting continuous activity at the faces even in case of defects in the transport flows.

Supply of the operators' positions was also a major problem, but it is now largely solved. Monorail installations were brought in to every face, and they not only reduce the physical effort but also expedite the delivery of materials, which are brought as close to the face as possible. The systems of monorail installations, especially the high-capacity ones, are so designed that after they have been used to carry spare parts for the mechanized assemblies they can be further used without any changes to supply one or more of the working units in the area.

Once this transport problem was solved, the collective of the Vulcan Mine turned all its attention to expanded mechanization of the main operations at the faces, so that extraction will be 50 percent mechanized in 1986. An extensive effort is also under way to adjust the mechanized assemblies to the particular conditions of the deposit, in collaboration with the Petrosani IUM /Mining Equipment Enterprise/, Satu Mare UNIO, Timisoara UM /Machinery Plant/ and Petrosani ICPMC /Research and Design Institute for the Construction Materials Industry/.

But this year's results indicate that not all enterprises are making any sustained effort toward efficient and intensive use of their technical inventories or to exploit the conditions created for complete and regular fulfillment of the plan tasks. The Livezeni and Uricani mines, for example, are using the assemblies for mechanized cutting and shoring at less than half their installed capacity. Under these circumstances the productivity obtained has been below 10 tons of coal per position and even 5-6 tons per position, which is less than that of the traditional technologies. This situation can certainly lead to a considerable reduction in the output of coal extracted and delivered to the national economy. We must not for a moment forget that a mechanized assembly that is not placed in operation "produces" nothing but the amortizations that are paid for its procurement or manufacture. Accordingly more regular measures are required in order to use all mechanized assemblies in the inventory to full capacity and to extract greater quantities of coal on that basis.

5186

CSO: 2700/42

ROMANIA

ECONOMY

### ACTIONS TO INCREASE ENERGY RESOURCES

Bucharest REVISTA ECONOMICA in Romanian No 44, 1 Nov 85 pp 3-4

[Article by C. Gorie: "Firm Measures to Develop the National Energy Base. Regular Supply of Energy Equipment"]

[Text] As a vital requirement for the normal performance of all activities, priority development of the energy and raw material base has been consistently included among the regular objectives of the RCP's policy as an essential point in the strategy for the nation's continuous progress. The material, manpower and financial outlays invested for this purpose, in full accord with the national economy's constantly growing needs for electric power, have resulted in the activation of a large number of power units (thermoelectric and hydroelectric power plants). Extensive operations are now in full course to build and activate new energy capacities (heat and electric power plants at Govora, Giurgiu, Drobeta-Turnu Severin, Iasi, Craiova, Bucharest, Suceava etc. and the Iron Gates II, Dragan, Ipotesti, Beresti, Gura Lotrului and other hydroelectric power plants) in order to keep providing the energy resources essential to the development of the other sectors of the economy.

Pursuant to the guidelines set at the Session of the Political Executive Committee of the RCP Central Committee in order to provide the national economy with the needed electric power, special tasks are assigned both to the units involved in the efficient operation of the existing energy capacities and to those expected to secure the punctual completion and activation of the new ones. The enterprises under the Industrial Central for Power Equipment are in both categories, as well as the enterprises directly involved in completing the tasks set by the Political Executive Committee so that every unit in the electric power system, especially the coal-based centrals, will operate to the planned capacity, and also for purposes of accelerating the operations at construction sites and activating the planned new power capacities. These are important tasks of great political and professional responsibility for all those working in this sector of machine building, and the supply of energy resources depends upon the way they will be fulfilled.

In the first 9 months of this year the central's enterprises completed and delivered to the power investment construction sites over 43,800 tons of assorted equipment, including about 450 tons in advance and consisting among other things of boiler parts for the Turceni CTE [Thermoelectric Power Plant], Set No 7, the Giurgiu CET [Heat and Electric Power Plant], Unit II, the Craiova II CET, Unit I, the Govora CET, the Drobeta-Turnu Severin CET, etc.; turbine sets for CTE's; hydroelectric assemblies for the Iron Gates II SHEN [National Hydroelectric Power System], the Racaciuni and Saciari CHE's, etc.; particular power plant parts; circuits for high pressures and temperatures, etc. While supplying the construction sites with power equipment and the power units in operation with spare parts in sufficient quantities, the central specially emphasized improving their quality and securing a high reliability.

Nevertheless in the said period the central showed a backlog in the production and delivery of power equipment amounting to about 13,000 tons, consisting of components of boilers, turbines and hydroelectric assemblies. Analysis of the causes of it reveals both some subjective factors pertaining to the organization of the manufacturing operations (in the case of the backlogs in the manufacture of feed pumps at the Bucharest Heavy Machinery Enterprise and in that of some hydroelectric assembly components at the Resita Machine Building Enterprise, etc.) and some objective ones, especially in connection with the failure of various suppliers (particularly the units manufacturing pipes under the Ministry of the Metallurgical Industry) to meet their contractual obligations on time and the resulting difficulties.

In view of the tasks set by the Political Executive Committee of the RCP Central Committee when it examined the way the provisions of the Program to Produce the Specified Electric Power Output for 1985 were implemented, the initiated actions and measures and the efforts of the subject central's nine enterprises are focused on two great objectives: (1) to expedite deliveries of equipment for the power capacities with activation deadlines before the end of the year and especially those of spare parts for the power plants in operation, and (2) to provide for the greater reliability of the equipment and its efficient operation.

As for expediting the deliveries of equipment, the initiated technical, technological and organizational actions are intended to carry out the provisions of the special joint program of the MIM, MEE and MIUG [Ministries of the Metallurgical Industry, Electric Power and the Heavy Equipment Industry] to supply the investment construction sites with power equipment as well as the provisions of the joint program of the MEE and MIUG to supply spare parts for the fourth quarter of 1985 and the first quarter of 1986, especially the stockpiles needed for rapid and punctual performance of repairs. Of course the emphasis is on the organizational measures, designed to lead shortly to a radical improvement in the performance of the manufacturing processes, to strict observance of the technological specifications, and to better collaboration among the sections of the same enterprise and between the general supplier and the other suppliers.

Nor were the technical and technological measures forgotten that are specially intended to expedite each individual enterprise's fulfillment of the provisions of the programs for increasing labor productivity, for promoting technical progress, and for raising the technical and qualitative standards of the products. For example, every enterprise organized a team of specialists from its own

technological design section and from the subject research and design institute for purposes of tight control over precise observance of the manufacturing specifications and the terms of supply for all components, subassemblies and finished products, in conformity with the manufacturing schedules. Moreover a large number of specialists from the enterprises and design institutes are present both in the power units in operation and at the construction sites of the new capacities to lend on-the-spot technical aid and to promptly resolve the technical and technological problems that arise. Other measures entail, for example, arrangement of extended work shifts, as in the pump and general machinery (in the way of bushings) shops at the Bucharest Heavy Machinery Enterprise, or strengthening the working units by reassigning the highly skilled workers and assigning production of the various components to several sections, as at the Resita Machine Building Enterprise et al. Delivery of equipment in the technological order of installation is specially emphasized as a factor directly affecting acceleration of operations at the construction sites.

Greater reliability and efficient operation of the power equipment are objects of the maximized efforts of the workers collectives, technicians and engineers in the central's enterprises and in the research and design institutes. The central organized a team of specialists to check every enterprise's exact implementation of the programs for enhancing the reliability of the equipment and the schedules for its manufacture as well. Moreover in the effort to make the equipment more reliable the emphasis is primarily upon observing the technological specifications, strengthening control of every stage of the production process as well as internal control, improving and perfecting final quality control (by providing new test stands, supplementing the control teams with skilled personnel, etc.), better organized inspection of the raw materials and materials in order to prevent admission of unsatisfactory ones to production, etc.

5186

CSO: 2700/42

ECONOMY

ROMANIA

### WAYS TO REDUCE ENERGY CONSUMPTION

Bucharest REVISTA ECONOMICA in Romanian No 44, 1 Nov 85 pp 4-5

[Article by Gheorghe Manea: "Overall Integration of Industrial Districts in Order to Minimize Energy Inputs"]

[Text] Energy integration of industrial districts is one of the ways of reducing energy consumption, characterized by a relatively short period of implementing and recovering the investments, minimal demands upon the research sectors, and an ultimate major relative reduction of energy consumption in industry. As we know, the concept of energy integration of the districts is intended to minimize the energy and material inputs in the regionally organized production units.

Among the characteristics of the concept, the following are controlling:

- Horizontal integration of the production units (in industry, energy engineering etc.) generating residual energy sources (SER) with the adjacent economic units (small-scale and local industry, food industry, agriculture, fish breeding, urban localities with district heating, etc.) capable of receiving and making effective use of SER, at low thermodynamic parameters, that can no longer be used effectively or economically in the large industrial districts. As we now, in the process of converting fuels to energy only 30-35 percent of their energy content is actually converted to energy vectors, while the remaining 65-70 percent takes the form of SER. In some industrial processes the energy yield is even lower. For instance less than 5 percent of the energy consumed in crude oil refining installations is actually used to produce chemical reactions, the rest of it being used to heat the fluids in the process or taking the form of thermodynamic losses. A refinery, for example, loses 300 gram calories an hour to its cooling water, 30 percent of the thermal energy in which could be recovered by means of heat pumps.

In horizontal energy integration of industrial districts, the thermal energy consumers must be at low parameters and located in the neighborhood of the industrial districts. The distance between the SER consumers and the industrial district is the present technical restriction on transporting the vectors. At present

this distance is 5-15 km and studies are under way to extend it 50 km farther. According to the industrialized countries' experience, SER consumers are to be found in small-scale and local industries whose energy requirements are met by exploiting the SER from large-scale industry; in industrial processes including a stage of drying (ceramics, lumber and construction materials) or one of sterilization and concentration (the food industry: juices, canned goods etc.); in district heating of urban dwellings, heating greenhouses, intensive fish breeding, and biomass cultivation, and in generating electric power and discharging it into the networks.

Development of this network of consumers of SER from large-scale industry, that is an energy system extending over an area of about 7,500 square kilometers, is the critical step in carrying out the concept of energy integration of industrial districts, because the additional consumers come from various industrial and economic sectors and demand thermodynamic parameters of the energy vectors suited to each one as well as a level of consumption that sometimes varies in time, and this requires a diversified infrastructure for conversion and suitable transport networks, as well as design and installation of large heat accumulators to store the energy in periods of minimal consumption.

Successful energy integration requires a wide assortment of equipment (standardized, prefabricated and preassembled) for processing the SER and converting them to energy vectors (such as heat pumps, installations operating on the Rankine cycle, heat cells, hydraulic pumps, automation equipment, additives for carrying warm or superheated water over long distances, etc.). Prefabrication and preassembly of the installations for exploiting SER greatly shorten the time between the decision to use them and the point at which recovery has become effective.

- Vertical integration has to do with large industrial districts and is intended to supply them with energy vectors essential to the manufacturing processes. The industrial processes must be regular, regardless of economic conditions in the field of supply of fossil fuels and their conversion to energy vectors in a CET or CUT /Power Plant for Technological Services/ within an industrial district. The worldwide practice is to organize vertical integration on the basis of several interchangeable fuel sources, securing the continuity of the economic process under any unfavorable conditions on the foreign markets by making one of them local.

Previous experience has proved that energy integration of industrial districts intensifies the exploitation of the primary resources by 20-30 percent. Including a carbon-chemical unit in the CET's cycle (an industrial district, for example) has the great advantage of providing not only fuel for the CET and the industrial installations but also raw materials for the chemical and iron and steel industries, anticipating the postpetroleum period when carbon chemistry will take over more and more of the chemical and energy functions of crude oil. Moreover replacing the CET with a nuclear-electric power plant eliminates the effect of market conditions in the case of fossil fuels and directs the industrial processes toward the endothermic reactions characteristic of modern chemistry for converting coals to gaseous and liquid synthetic fuels and obtaining the hydrogen essential to carbon chemistry and and synthesis of nitrogenous chemical fertilizers or used as such for fuel.

The concept of energy integration primarily calls for a regional or central responsibility for making decisions concerning:

- Compilation of the energy reserves of the industrial districts with determination of the level and parameters of the SER;
- Regional economic development of industry, agriculture, fish breeding, housing construction etc., and assessment of the energy requirements of the consumers adjacent to the industrial districts;
- Compilation of the plans for use of the SER to meet the regional energy requirement, and approval of the investments of the purpose;
- Construction of the infrastructure needed to exploit the SER;
- Design and implementation of regular supply of the CET or CUT with fossil or substitute fuels.

Legislation must be enacted on the central level of the economy to facilitate recovery of the SER, especially in setting prices for the recovered equipment and energy that will interest both the beneficiaries and suppliers of energy and equipment, appointing the enterprise to operate the systems for use and transportation of the SER and energy vectors, etc.

In view of these considerations it should be pointed out that Romania has favorable conditions to begin extensive exploitation of its reusable energy sources. We are referring to the fact that nearly all counties have organized large industrial districts facilitating recovery and exploitation of the secondary and reusable energy sources and materials, as well as the fact that in some districts steps have been taken to integrate some activities with good economic results.

But in exploiting the conditions and acquired experience more prompt and efficient action must be taken in the sectors where the integrating process will lead to maximal economic effects. Experience tells us that this means overall energy integration in all industrial districts. The estimates indicate that in Romania 18-20 million tons of conventional fuel a year can be returned to economic circulation, a quantity that could contribute greatly to the national energy reserve.

The main objective of reducing primary energy consumption by 20-30 percent through regional energy integration of the industrial districts is feasible because the following factors all contribute to it:

- Some research and development programs for purposes of recovering SER, initiated and coordinated by the CNST [National Council for Science and Technology], in which strong research forces at the ICEMENERG [Institute for Power Research and Modernization] are engaged;
- The experience of units that have begun using SER. This is illustrated by the experiment at the Pitesti Petrochemical Combine, which is providing heating for a district with 5,000 apartments in Pitesti municipality by exploiting the heat in cooling water from the petrochemical processes.

- The ability of the machine building industry to provide the equipment needed to exploit SER.

- Intensification of agricultural production through use of SER at low thermal parameters.

Alongside other ways of reducing energy consumption in terms of absolute value, Recovery of SER provides a sure and relatively rapid way of reducing energy consumption as well as resulting surpluses for development of the economy.

Energy integration of industrial districts intensifies exploitation of the primary resources by 20-30 percent.

Under Romanian conditions, 18-20 million tons of conventional fuel a year can be placed in economic circulation through overall integration of all industrial districts.

A single unit, the Pitesti Petrochemical Combine, is succeeding in heating a district with 5,000 apartments in Pitesti municipality by exploiting reusable energy sources.

5186

CSO: 2700/42

ECONOMY

ROMANIA

### NEED TO IMPROVE THE TRANSPORTATION SECTOR

Bucharest REVISTA ECONOMICA in Romanian No 44, 1 Nov 85 pp 6-7

[Article by Anastasie Manescu, director of the Directorate for Planning and Development\*]: "Transport Means Efficiently Used Throughout the Economy"]

[Text] Proper operation of the economic mechanism, efficient technical-material supply of every enterprise and locality, regular sale of manufactured products to beneficiaries, satisfaction of the public's consumer needs, and complete and punctual production of the planned exports critically depend on the way transport operations are organized and performed and whether they meet the high standards of intensive development of the national complex. The constant urgency of transportation, especially in the present stage, is due to the vast flow of raw materials and materials among and within sectors, in the continuous circulation of products for the domestic market and export, and in its active presence at all levels and components of the national economy.

The transport sector underwent a most intensive development in recent years both quantitatively and qualitatively, and its technical, material and manpower potential is several times greater than it was 15-20 years ago. The existing technical potential (to be increased even further in the next five-year plan) has made it urgent to make the most rational possible use of it, with much greater economic effectiveness. As a matter of fact that is the main task the RCP and the state have assigned the transport sector, with emphasis upon the efforts to modernize the technological processes in the sector and to enhance its effectiveness so that it can keep up with the demands of qualitative-intensive development of the economy.

The session of the Political Executive Committee of the RCP Central Committee in which an exacting analysis was made to reduce the share of transport outlays in the total material outlays on production throughout the national economy is conclusive proof of the party administration's efforts to keep enhancing the efficiency of the activity in this field, to improve the quality of the work in all transport sectors, and to readjust transportation to the current and long-range requirements.

The effectiveness of transportation directly depends upon how far the planned volume of freight and passenger traffic has been implemented. It is notable in

\*In the Ministry of Transportation and Telecommunications.

this connection that the Political Executive Committee of the RCP Central Committee pointed out that the proportions of transport outlays in the total material outlays on production and in the social product have decreased every year. Nevertheless the transport outlays of both the MTTc /Ministry of Transportation and Telecommunications/ and other economic ministries and units are still in too high a proportion of the total material outlays on production.

In the MTTc, this situation is a direct result of the way the freight and passenger transport plan has been implemented, upon which the amount of the outlays unquestionably depends. With the exception of air traffic, in the first 9 months of 1985 the volume of freight carried by various means was below plan, with bad effects upon the effectiveness indicators and the transport outlays, especially in the case of automotive transportation, which logged much higher costs than the other sectors.

The particular importance of lowering automotive transport costs is to be viewed from the standpoints of both the activity of the units belonging to the MTTc and the results obtained by the economic enterprises in the other sectors. It is partly a matter of the many situations revealed by the analyses where transportation by the industrial enterprises' own automotive means is much more expensive than that by the MTTc's automotive means, and that has a bad effect upon the levels of production outlays, profits and economic effectiveness, seriously burdens the enterprises' budgets, and of course conflicts with the requirements of economic-financial self-administration. Accordingly Nicolae Ceausescu's directions apply alike both to the activity of the specialized units under the MTTc and to that of the economic enterprises in the sense of use of their own transport means to full capacity and over economic distances, proper operation and maintenance of the automotive park, choice of the best transport alternative (their own means or those in the park for general use depending on the situation), a considerable reduction in the costs of transportation by their own automotive means, etc.

Accordingly complete fulfillment of the indices of use of the motor vehicles is to be specially emphasized, particularly those for hauling freight, the indices for which are now below plan. This calls for firm measures from now on for punctual and complete maintenance operations in the enterprises' own motor depots and convoys, strict observance of the consumption norms for parts and assemblies, regular procurement of essential subassemblies (batteries and tires) for high-capacity dump trucks, at least 10 percent overfulfillment of the plan for reconditioning spare parts, etc.

Meanwhile rational use of automotive means to full capacity and by economic routes is a priority consideration for all units specializing in automotive transportation. The party higher administration's directions to this effect stipulate that the high-capacity park, especially that of dump trucks, must be activated, low-capacity vehicles must be withdrawn from circulation, the transport system with two, three and even four trailers must be expanded, specialized vehicles (with a crane with a rotating arm, lift panel, tilting platform etc.) highly effective in transport services must be used, unproductive runs must be curtailed, etc. In addition to those measures, the Central for Automotive Transportation has adopted firm measures to make runs on time, to establish a strict order in all activity, and to closely observe the legal regulations.

Major tasks await water transportation in the future. It is to play an increasingly important part in deliveries of goods among and within sectors and for export, depending on the needs of the national economy. The present situation in river and seagoing shipping is unsatisfactory as regards plan fulfillment, as contrasted with the sector's technical-material base, and as regards the transport outlays, which are still high. Both in seagoing and in river shipping especially the transport costs are lower than in the other transport sectors, so that the volume of freight carried by this system should be greater. This sector still shows lags in the indices of use of ships' capacities, especially in the case of ore boats and freighters.

The analyses showed that most of the causes of this situation are subjective, pertain to internal activity, and can and must be eliminated at once. We are referring in particular to stricter observance of the shipping programs and schedules, the duration of trips, and the regulations for operating in Romanian ports (so as to shorten the standing time of ships for loading and unloading) and to tighter discipline on board ships, etc. Meanwhile, as the party secretary general has pointed out, effective steps must be taken to make more use of the Danube for shipping, as well as some inland waters that can be navigated, to make intensive use of the Danube-Black Sea Canal and the existing harbor facilities, and to expand the modern systems of loading and unloading in packets, pallets, containers and transcontainers, with immediate and long-range consequences for growth of labor productivity and reduction of material outlays in this sector.

Alongside the other sectors, air transportation is making a considerable contribution to fulfillment of the MTTc's transport plan, and it is becoming a more and more important activity of ours every day. Although the sector's main indicators were fulfilled and even exceeded in the first 9 months and the period of 1-20 October of 1985 (except industrial aviation's conventional hours of flight), this sector must take steps to make some improvements in the quality of occupational training of navigating personnel, to rationalize electric power and fuel consumption, to enhance comfort and services on board the planes, etc. All this will help to develop the role of air transportation in the general structure of transportation in the future and to even further improve the activity in this field.

The Political Executive Committee of the RCP Central Committee made an extensive and quite special analysis of the quantity and quality of railway transportation, realizing the importance of developing its role in transport activity as a whole. We should note here that Nicolae Ceausescu has made repeated references to the activity in railway transportation and especially to the need of increasing its proportion and efficiency and improving its services.

The railway transport sector now has a good inventory, consisting of an adequate park of freight and passenger cars and of locomotives as well, 54.9 percent of which are electric and 38.9 percent diesel. This calls directly for a considerable increase in the contribution the railroads are to make to the daily course of freight and passenger traffic with high efficiency. This year's results have demonstrated once more that railway transportation with the existing inventory is much cheaper than automotive transportation, which means that more use must be made of this transport system and that it must be improved as well.

One of the first questions to come up is that of maintaining the locomotive and car park as well as the lines and installations in a technical condition in keeping with the transport requirements. There are some serious lags in this respect that are caused both by internal defects and by difficulties created by various equipment suppliers. Regarding the locomotive and car park, capital repairs on diesel locomotives, current repairs on locomotives, and repairs on passenger and freight cars have not yet been completed. For example, the average daily number of freight cars withdrawn from circulation for planned or emergency repairs is still large although it is less than in the same period last year.

As regards the technical condition of the lines and installations, results are below plan (88 percent in repairs on the main and primary lines and 90.6 percent in repairs on secondary lines and stations). These situations, which directly affect the volume of railroad traffic, are due in particular to some internal organizational defects (for example, failure to make capital repairs on schedule on 1,200 km of main and primary lines, on 1,200 km of secondary lines and on stations) but are equally due to shortages of materials and spare parts (concrete ties, clamps, storage batteries, LE [electric locomotive] axles, oils etc.) which, in the case of locomotives alone, have caused entirely excessive immobilizations for repairs.

Furthermore the indices of use of cars and locomotives must be improved. Whether it is the freight car hauling time (below plan) or the gross weight of freight trains (gross tonnage per train), which is 1.5 percent above the 1984 figure but below plan), more persevering efforts are required to fulfill those indices entirely. On the economic level this means a more intensive exploitation of the outlays on railroad transportation, that is their absolute reduction below the original provisions.

Accordingly the measures to improve the indices of use of cars and locomotives are being specially emphasized, preferably those concerning:

- Reduction of the waiting time of loaded cars in the stations near Constanta port through proper coordination of the deliveries with ship arrivals, that of loaded cars in way stations (awaiting processing by the Galati, Hunedoara, Resita and Calan iron and steel combines, the Valea Calugareasca and Navodari chemical combines, and the Mintia, Isalnita, Turceni and Doicesti thermoelectric power plants), and that of loaded cars immobilized by the beneficiaries' lack of storage space, failure to organize continuous loading and unloading of the cars by day and night and on legal holidays, lack of equipment and installations meeting the requirements, and insufficient manpower;
- Elimination of the delays in the circulation of a large number of freight trains;
- Lifting of the speed limits in the case of planned time limits and elimination of breakdowns of cars and locomotives as well as malfunctions in installations, etc.

In addition to the foregoing measures, importance is also attached to those for recruiting the required number of personnel trained in certain so-called scarce trades (locomotive engineers, assistant engineers, traffic managers, inspection

fitters, switchmen and car shunters) both by means of on-the-job training and by improvement courses.

Pursuant to the party secretary general's directions, in the immediately following period and in the next five-year plan the MTTc's efforts will be primarily concentrated on:

- Efficient use of the means in the inventory through regular assignment of cars according to the nature of the freight, revision of the systems for sending empty cars to the loading points, better organized processing of trains in the industrial stations and marshalling yards, coordination of loading operations with the capacities of the loading and unloading forces, and strict observance of the plan for assembling the trains;
- Reducing the hauling time of freight cars, or the time between two successive loadings, by shortening the time of processing the trains, or the time the cars wait in transit at the railroad units and at the beneficiary enterprises, and by raising the commercial speed of the trains;
- Improving the technical condition of the car and locomotive park by perfecting the technologies for repairing rolling stock in the repair shops and units for maintenance and operation, by strengthening the capacities for car repairs in the regional shops, especially those at the large combines and enterprises, and by improving the occupational training of personnel;
- Enhancing the comfort and hygienic-sanitary condition of the passenger cars by preparing them properly at the assembly stations and inspecting the electrical, technical and sanitary installations;
- Checking, jointly with the chemical, mining and iron and steel combines, observance of the technological process and immobilization of the cars for loading and unloading and thereby shortening their immobilization;
- Revising the present system for dispatching the empty cars for loading by rationalizing the empty runs by computers and sending the empty cars on economic routes;
- Raising the tonnage of freight trains by testing the dynamometric freight car on some sectors of circulation, which will permit maximum use of the hauling capacities of electric and diesel locomotives, and also by strictly observing the plans for assembling the trains, etc.

Special efforts are also concentrated on finding the best ways of supplying new high-capacity freight cars to carry coal, ores and other materials in bulk, hauling trains of empty freight cars with low-powered locomotives, and avoiding crossing runs by means of expanded rationalization (a method that eliminates useless runs and uneconomic outlays), etc.

The MTTc also has many tasks in its capacity as coordinator of transportation for the economy, such as establishing strict discipline at work, a high sense of responsibility in the performance of all plan tasks, and a correct moral attitude on the part of every worker in this system. The technical-material and manpower

resources this sector has, exemplary mobilization of the efforts of all workers collectives, and complete exploitation of the existing reserves are factors that can and will contribute to a major qualitative leap in transport operations so that they will fully meet the constantly growing requirements of the national economy.

5186

CSO: 2700/42

ECONOMY

ROMANIA

### NEED TO COMBAT FLUORINE LOSS IN CHEMICAL INDUSTRY

Bucharest REVISTA ECONOMICA in Romanian No 44, 1 Nov 85 p 8

[Article by Corneliu-Anton Cociasu: "Recovery of Fluorine in the Chemical Industry"]

[Text] In addition to the steps taken to discover new useful substances, procurement of the necessary volume of resources for the proper performance of the economic activity of every sector also requires firm measures to recover those contained in combination or in various mineral substances the exploitation of which helps greatly in reducing the imports of such raw materials. One such resource, in growing demand recently, is fluorine (whose content in phosphate rock varies from 1 to 4.5 percent), which figures as a secondary product especially in the chemical industry, in the form of hydrofluoric acid and silicon tetrafluoride in the acid attack of phosphate rock in the fertilizer industry, in the concentration of phosphoric acid and production of enamels in the glass and ceramics industry, in its dull finish in the iron and steel industry, and in the gases from combustion of some types of coals in hydroelectric power plants. Recovery of this useful substance and its recycling in various forms in the production processes have become not only possible but also necessary today in the existing technologies.

In addition to environmental protection, recovery of fluorine also became necessary because the demand for fluorine compounds has greatly increased in the industrially developed countries in recent years, since it is used in the manufacture of the fluorohalogenated hydrocarbons used as propellants for aerosols, as refrigerating agents and to put out fires and in that of plastics and rubbers with special properties, pesticides, pharmaceuticals, metal fluorides (aluminum, sodium and synthetic cryolite) and sulfur hexafluoride, used to extinguish electric arcs, to insulate high-voltage switches, etc. Moreover the recovery and use of fluorine compounds makes production of fertilizers, aluminum etc. profitable because more complete use is made of the raw material and there is a saving in the natural raw materials with a fluorine content, which are scarce in some countries including Romania.

Hydrofluoric acid is a byproduct of the manufacture of phosphorous fertilizers, obtained by treating the raw material (apatite) with a mineral acid (sulfuric or

nitric acid, and more recently with hydrochloric acid, which is cheaper and is replacing the scarce sulfuric acid). In the wet manufacture of phosphoric acid about 50 percent of the fluorine is freed during digestion, about 30 percent remains in the phosphogypsum cake, about 25 percent is dissolved in the phosphoric acid, and about 40 percent is eliminated during concentration of the final product.

There are also fluorine reserves in the manufacture of aluminum. About 30 kg of aluminum trifluoride and about 30 kg of sodium hexafluoraluminate (cryolite) are consumed in the technological processes to obtain 1 ton of aluminum, and they are used as a flux to lower the operating temperature in electrolysis of alumina (aluminum oxide) below 1,000° C and as a solvent for alumina. It is planned in the future to lower the percentage of cryolite or aluminum trifluoride, including sodium fluoride, by recovering the fluorine from the aluminum manufacturing operations and reusing it to obtain the above-mentioned compounds. There are also resources like this in other technological processes in the chemical industry.

In order to separate and recover the hydrofluoric acid as efficiently as possible that is released in the form of hexafluorosilicic acid in the residual gases from the various manufacturing processes, in the last few years some countries have developed a series of processes that have a number of advantages: The equipment used has no moving mechanical parts, it operates continuously, it is very efficient (with very low operating costs), it consumes little raw materials, it is easy to operate, and it is manufactured with low investments.

The only raw material for manufacturing microcosmic salts that is available in Romania is the fluorosilicic acid recovered from the residual gases from the manufacture of phosphorous fertilizers and phosphoric acid by a process developed by ICECHIM [Central Institute for Chemical Research]. On the basis of this raw material and the fluorine potential recoverable from the premises of the fertilizer combines, industrial production was developed in Romania of sodium fluoride and synthetic cryolite, products essential to the aluminum industry, that of sodium hexafluorosilicate, necessary in the glass industry and to obtain some antiacid cements that are imported, and that of zirconium hexafluorotitanium and some salts (ammonium, potassium, magnesium etc.) with various uses in the national economy. Sodium hexafluorosilicate as such is used in agriculture as a pesticide to control pests preying on sugar beets, flax, legumes etc. The ammonium, magnesium and zinc hexafluorosilicates are used to preserve wood and as an insecticide in agriculture.

The hydrofluoric acid obtained by recovering fluorine is used as a raw material to make propellants (Freons) and fireproofing agents and to make high-octane gasolines in the petroleum processing industry and raw materials for detergents etc in the petrochemical industry. The optimal capacity for hydrofluoric acid is 10,000 tons a year, corresponding to an annual production capacity of 100,000 tons of phosphorus pentoxide.

Romania has capacities for manufacturing phosphorous fertilizers, both for its agricultural requirement and for export, and the raw material for them (phosphates) is imported. At present only 40 percent of the fluorine needed to make sodium fluoride is recovered from the manufacture of simple superphosphate. Despite the results obtained so far by the Ministry of the Chemical Industry, the

products resulting from the manufacture of phosphorous fertilizers, including fluorine, must be recovered and used in order to make better use of the raw material (phosphates). To that end it is necessary to intensify studies to:

- Intensify recovery of fluorine in the form of hexafluorosilicic acid, especially from the diluted phosphoric acid solutions, since the national economy demands greater quantities of fluorine compounds, like synthetic cryolite for example, because of increased aluminum production;
- Develop an economical technology for manufacturing synthetic calcium fluoride as a raw material for hydrofluoric acid in order to eliminate importing it;
- Develop integrated technologies, to manufacture cryolite for example, that will permit making several fluorine compounds at once;
- Develop some technologies for dry recovery of acid gases containing hydrofluoric acid that result from the manufacture of aluminum (melting and electrolysis of alumina) on an absorbent solid, such as alumina for example, in order to improve economic effectiveness by conserving fuels and electric power.

Intensified fluorine recovery along with better use of the phosphates will make it possible to increase the existing sodium fluoride and synthetic cryolite capacities and also to develop a fine-synthesis, low-tonnage organic chemistry sector with a high degree of processing, efficient and conducive to elimination of some imports.

5186

CSO: 2700/42

POLITICS

GERMAN DEMOCRATIC REPUBLIC

URBAN MIGRATION REVERSAL PLANS EXPLICATED

East Berlin WIRTSCHAFTSWISSENSCHAFT in German Vol 33 No 10, Oct 85 (signed to press 15 Aug 85) pp 1441-1466

[Article by Prof Dr Werner Ostwald, head of research programming for the Territorial Planning Office of the State Planning Commission: "The Territorial Structure of Social Reproduction as a Condition and Subject of Comprehensive Intensification"]

[Text] The SED program<sup>1</sup> contains important demands for structuring territorial proportions in the reproduction process of socialist society and includes them organically in the requirements of principle for fulfilling the historic mission of the workers class.

At the 10th SED Congress, Erich Honecker explained that "the management and planning of the territorial development (receives) increasing importance for the further intensification of the economic reproduction process. It mainly becomes a matter of ensuring in any given territory the proper proportions between work, educational opportunities, living and recreational conditions, and the care and provisioning of the citizens. Each state organ, on whatever level, has to consider that all decisions in bezirks, kreises, towns and communities in particular, trigger investment decisions, long-term in their effects. Thus they must also always be geared to the requirements of later developmental phases."<sup>2</sup>

In his speeches at the seventh and ninth Central Committee sessions and before the kreis first secretaries, Erich Honecker reiterated the importance of the territorial reproduction conditions for tapping all the potentials for comprehensive intensification.<sup>3</sup>

The party program turns overcoming the essential urban-rural disproportions into a basic political concern. For the shaping of the developed socialist society according to plan, the program sets a strategic goal for it, ranging far into the gradual transition to the higher phase of communist society. That takes up and renders historically concrete a goal Marxism-Leninism has scientifically established.

Marx, Engels and Lenin are known to have paid great attention in their studies to the structure of the social reproduction process. They often emphasized that

all elements and processes of social development are objectively tied to locations on earth, to a territory,<sup>4</sup> that the public life of men, their production and the satisfaction of all needs take place under concrete territorial conditions that differ by nature, and in the outcome of men's public activity, from place to place and region to region<sup>5</sup> and through this differentiation co-determine the effectiveness of economic activity. Our classic authors defined the earth, the territory, as an embodied condition for the occurrence of the labor process, which provides the worker with a location and his labor process, with a place of work, as Marx put it in "Das Kapital."<sup>6</sup>

Lenin recognized that social processes, due to the territorial division of labor, are territorially differentiated, wherefore all economic processes, in particular, depend on their territorial organizational forms.<sup>7</sup> To this territorial differentiation and territorial organization, i.e. the territorial structure of social reproduction, the classic authors attribute an elemental place value for reproduction effectiveness.

Territorial structure is a complex structural form of social reproduction. It constitutes its form of territorial existence, movement and organization. The territorial structure of social reproduction is determined by the developmental stage of the productive forces and the character of the production relations. In socialism, it is being shaped according to plan by the socialist state, under the leadership role of the Marxist-Leninist working class party, and based on the public ownership of the means of production.

The SED, right from beginning the construction and shaping of the socialist society, has consistently and continually conformed to those precepts from the classic authors. The planned shaping of the urban-rural relations, the shaping of the conditions for production and for public life and of the economic and sociostructural particulars in the bezirks, kreises and towns as well as the proportions among them have always been its basic political concerns. They have crystallized in all party resolutions on sociostrategic objectives and measures. Under party leadership they are being organically integrated with the implementation of the economic and social policy by the socialist state power.

From this basic concern one has also been proceeding in shaping the political-territorial social and state structure as a system of social communities on the bezirk, kreis, town, and communal levels. According to plan and in concrete terms, a closer connection between economic and social processes as characteristic of and necessary for the transition to comprehensive intensification is being established in the territorial units of the socialist society and economy.

Political and state management by this system has stood up well for more than 30 years. This long-term, stable political-territorial structure, which had taken into account the historically grown economic specializations and interlinkages, had, among other things, the effect that the bezirks in the GDR developed into basic objective economic regions with an economic structure by way of a division of labor within the economy. The further rationalization of economic relations within and among the bezirks is a constant source for further economic efficiency improvements and an important factor in comprehensive intensification.

This concern is benefited by that the political-territorial units are as much a basic structural form of socialist democracy as are the working class party's bezirk and kreis managements, the other parties and mass organizations, and the elected local people's representations and their organs, a form deeply rooted in the citizens' awareness and sense of home. So the political-territorial structure is a framework condition for mobilizing the initiatives of the working people and all citizens, so as to fully tap the territorial reproduction conditions for a dynamic economic performance development.

The GDR bezirk and kreis contribution needed for economic performance growth calls for measures of comprehensive intensification in conformity with the specific, bezirk and kreis, reproduction conditions.

The local people's representations, according to the central economic and sociopolitical resolutions, lead the enterprises and facilities under their responsibility to implementing the principal task under their own responsibility by maximum contributions to economic efficiency and the citizens' standard of living. They ensure at the same time that all the combines and enterprises in their territory get optimal territorial reproduction conditions for comprehensive intensification through the main course of scientific-technical progress.

Central state management and planning is setting up for it ever improving overall social and economic framework conceptions for the long-term economic and social development of the capital and the bezirks. In this, special attention is required for the towns, especially the bezirk and kreis capitals.

Including the territorial aspect in shaping the reproduction process according to plan, i.e. the unity of the branch and the territorial principle in management and planning, helps tap and unfold the impulses of socialism and trigger new impulses.

In carrying out this basic concern, the GDR in all phases always could rely on the great historic experiences of the Soviet Union. In the practical course of development in the Soviet economy and society, in the CPSU's economic and social policy, and in the constant further development of Marxist-Leninist social and economic theory by Soviet science, the territorial aspect of production and of public life has for decades held a prominent position. This is not only due to the territorial expanse of their country--as Soviet scientists themselves keep emphasizing--but, in conformity with the lessons from the classic authors of Marxism-Leninism, it is one of the essential questions in the theory and practice of socialism as such.<sup>8</sup>

The practice and theory of the site distribution of the productive forces in the GDR are in this sense marked profoundly by four decades of learning from the Soviet Union, starting with the application of Soviet experiences in the industrialization of agrarian regions to assuming such comprehensive scientific sets of instruments as the general scheme for the site distribution of the productive forces.

## The Territorial Structure of the Developed Socialist Society

As the outcome of the purposeful and continuous integration of the territorial aspect in SED economic and social policy, it may be summarized, historically, that a territorial structure was set up in the GDR with essential features and basic proportions that by and large conform to the requirements of the developed socialist society.

Through the planned setup of branch and territorial structures in the economy, this policy surmounted the serious territorial disproportions the capitalist past and the imperialist split had left behind, for all intents and purposes. Surmounted was the large economic and social backwardness of particular territories such as the former Mecklenburg and Eichsfeld. Surmounted was, through socialist industrialization, that the former Land of Saxony in 1950, with only 16 percent of the territory, produced 37 percent of the industrial output, but Mecklenburg and Brandenburg, with 50 percent of the territory, only 14 percent of the output.<sup>9</sup> In the subsequent decades, those territories, backward until 1945, got more than half of the increase in industrial labor in the GDR in conjunction with the shifting or expansion of industrial enterprises.

Surmounted in the process of industrialization also was the disproportionate territorial distribution of the working class and the other classes and strata in the territorial population. Today, a politically and technically highly qualified working class has been settled in all GDR bezirks--statistically expressed by a proportion of industrial and construction workers (the core of the working class, in other words) between 30 and 56 percent in all bezirks.<sup>10</sup> In Schwerin Bezirk and Neubrandenburg Bezirk that proportion, in 1955, came to 15 or 13 percent respectively; today it is approximately 32 and 30 percent.<sup>11</sup> The proportion of the working class in these territories under socialism thus has partly more than doubled.

Such a territorial proportionality for the distribution of the working class is important for practically enforcing the party's leadership role in all parts of the country, in economic and sociopolitical respects as well as with regard to national defense.

The process of industrialization and a concomitant territorial distribution of the working class went hand in hand with the perfecting of the network of towns as the territorial centers of the working class and centers of production, science, housing, provisions, education, and intellectual-cultural life. Even the GDR bezirks with the lowest population density today have a town with more than 10,000 inhabitants on 1,000 square kilometers<sup>12</sup> and railway and road networks with densities far above the European average.

To make that possible, the infrastructure in the GDR territory in this historic process also was developed in all parts of the country, the technical infrastructure for energy, water and transportation services in the territory, as well as the housing and all the rest of the social infrastructure. In towns, the infrastructure called in part or even entirely for completely new investments.

Simultaneously, with the development of socialist agrarian production and also of the non-agricultural production in the countryside, a penetrating quantitative and qualitative improvement of the working and living conditions was brought about in the rural settlements. The backwardness in the villages' infrastructure provisions, compared with those in towns, a capitalist legacy that was most rampant in agricultural territories that had mainly been composed of landed property, was largely done away with.

The elimination of fundamental territorial disproportions between industrial urban sprawls and once backward agrarian areas, and between town and countryside, was moreover brought about in the GDR in such a way that in spite of a more equal site distribution of the productive forces the existing territorial concentration of the working class, of production, of science and technology, with all their leadership advantages, was not touched, but this reproduction advantage for the economy remained intact.

This successful balance-sheet in establishing economic and social proportionality in the territorial distribution of the productive forces does yet not ignore some still surviving contradictions in territorial structure, either stemming from the past or even forming anew. This relates to territorial differences in the efficiency of resources employment, in energy and material consumption intensity, in labor productivity, but also to territorial differences in housing conditions, in close-by recreational conditions for the citizens, altogether in the natural environment, differences in the capability of the technical and social infrastructure in connection with disparities in structural conditions and the wear and tear and similar matters. Such territorial level disparities are not being accepted because they are unacceptable and in some territories interfere with the full development of the impulses of socialism. Reducing them is the central concern in all planning, and advances in it are constantly accountable, e.g. in the above-average growth rate in the modern and sanitary, technical apartment equipment in Karl-Marx-Stadt Bezirk, where previously, due to the age of housing, the outfitting in apartments was below par.

Such territorial level disparities that have to be overcome in the process of the continued successful shaping of the socialist society have nothing in common with the territorial disproportions from the capitalist past, which were truly substantial, or from the imperialist split, with which the GDR still was confronted only a few decades ago.

The territorial structure that was formed according to plan and as the outcome of SED economic and social policy is, at the national scale of the GDR, up to the demands of the further shaping of the developed socialist society. It provided ever better territorial opportunities for a deliberate, planned utilization of the economic laws of socialism. This makes possible an ever higher degree of the branch and territorial proportionality of the social reproduction process. Increasingly, through the planned development of the territorial structure of social reproduction, can one then conform to the dialectics of political, economic, social, and natural processes with regard to national defense requirements, as demanded by the 10th SED Congress.

Establishing and using this proportionality according to plan unlocks inexhaustible reserves for the process of continued comprehensive intensification, the performance development of production, and the further improvements in the working and living conditions of the population.

Lack of success in properly using site locations, in the policy of the developed capitalist industrial countries, marks a contrast to these successes in the GDR's socialist site location policy. In spite of comprehensive analytical and conceptual research on the site distribution for the productive forces in those countries, so-called space research, which in part produces interesting technical data, that space location policy can make no difference to that the contrast between town and countryside continues and gets worse in many countries. That is seen, mainly, by the growth of modern industrial centers on the one side and economic stagnation and population drain, on the other. For all that, even in the centers of economic growth, unemployment is considerable.

After the downtown areas decay and rentals become usurious, especially in the big cities, and the environment comes under great stress in the urban sprawls, there comes a progressive suburbanization then, with rather big losses in the importance of many big cities and traditional centers. That corresponds to a certain gain in importance of medium-size and smaller towns, where capital finds better utilization opportunities under the conditions of the scientific-technical progress, for instance by using robots and microelectronics in smaller enterprises localized in smaller settlements.

All told, the territorial structure of capitalist society will continue to be marked significantly by the contrast between town and countryside.<sup>13</sup> Furthermore, chronic financial shortages in those countries and communities lead to concessions to the monopolies in the use of regional and local resources. All that then still gets another shot in the arm from the political-territorial reforms. By them, for example, urban territories in the FRG have constantly been enlarged, and the county territories were more than doubled in 10 years (1968-1978). The number of independent towns dropped in those 10 years from 135 to 91, the number of counties was cut in half (from 400 to 200), and the number of communities belonging to counties was even reduced from 24,000 to 8,000, that is to one-third.<sup>14</sup>

Considering that the territory increasingly becomes a major focal point for the continued implementation of the economic strategy, through the central research plan of the Marxist-Leninist social sciences in the GDR, 1981-1985,<sup>15</sup> the mission was assigned to produce a problem- and practice-oriented analysis of the site distribution of the productive forces in the GDR, including a prognosis for their further development up to the year 2000. As pre-planning material, that study is supposed to become a lead for drafting the 1986-1990 5-year plan.

The general scheme for the site distribution of the productive forces, produced through the cooperation of several science disciplines and central and local state organs by following the Soviet model, was defended with success a year ago at the State Planning Commission headquarters and on the science council for questions in the site distribution of the productive forces. Subsequently,

a theoretical generalization was drawn from the insights gained. At that, four criteria were brought out of the territorial structure in the GDR's reproduction process. They indicate the territorial structure is the subject as well as the condition of comprehensive intensification of further increasing place value.

#### High Status of Productive Forces Development in All GDR Bezirks

The first criterion is that with the socialist planned economy, through socialist industrialization in areas that formerly were weakly developed, economically and socially, and through the development of an agriculture in the GDR marked by socialist property and modern large-scale production, an even site distribution of the productive forces was attained. That brought the development of a more balanced class and social structure of the population in all bezirks and a more even distribution of working class centers over the whole country. Essential disparities in the developmental level of the productive forces, as between town and countryside, were surmounted. In the outcome of this process, the territorial distribution of the population and of the social labor capacity has stabilized. And that also remains a relatively stable territorial basis, over the long run, for the basic proportions of the further performance and efficiency development of the economy in all the bezirks although demographic development in terms of kreises is highly differentiated in part.

The working people's fine education and skills can be used much better still everywhere in the scientific-technical progress in all GDR bezirks. Level comparisons between bezirks and kreises found and did away with unacceptable territorial differences in the efficiency and use of the labor resources. Especially in conurbations and large cities can the potentials of the concentration of the GDR labor capacity much better be exploited still.

From an analysis of the territorial leveling processes in the developmental stage of the productive forces and from the development of the socialist production relations in all bezirks and kreises, theoretically generalized, a trend of territorial adaptation that is objectively inevitable in socialism can be derived. This trend toward a territorial adaptation of the production and living standards in socialism leads--in contrast to the development in capitalism--to a relatively balanced and stable territorial structure of social reproduction at the range of the whole country. This is a necessary territorial prerequisite for the transition to comprehensive economic intensification based on scientific-technical progress. A relatively balanced and stable basic territorial structure of social reproduction is prerequisite to ensuring and further elevating the population's material and intellectual-cultural standard of living, to the rapprochement among the classes and strata and, thus, to further reducing the essential urban-rural disparities.

The greater evenness of the site distribution of the productive forces achieved, historically, on the GDR territory was mainly demonstrated by research on the population structure and its class and social structure. That took account of the causal connection between the process of overcoming essential differences in the territorial developmental level of the productive forces, in the production and living standards, especially between town and countryside, on the one hand, and the territorial distribution of the population and its social labor capacity, on the other.

The stability of the population distribution on GDR territory is a relatively safe, accountable foundation for further economic performance and efficiency development. Relative stability in the population distribution in the territory means that certain tendencies in the territorially differentiated demographic development will continue over the long haul, which gives rise to effects and requirements for the economy of live labor, especially for assigning the social labor capacity. One can speak of such territorial structural effects of the demographic development, for instance, when the number of population at working age develops differently in towns and in the countryside, or when the average age of working people in the conurbations begins to differ from the national average, or when the number of women at working age starts to differ in some kreises from the national average, or things of that nature.

Such a territorially differentiated population trend is caused in part by a territorially uneven age structure and in part by internal migration. That attaches a growing importance to the causes and motivations for internal migration and chances for indirect controls over it. Economically relevant this internal GDR migration mainly is because of considerable differences between the structure of the migrants on the one hand and the population structure, on the other, and because of concrete migration streams.

Compared with the total population, the migrants are, above average, younger citizens and technicians. More than two-thirds of the domestic migrants are at working age, about half of them in the 18-30 age-group.<sup>15a</sup> That also has significant effects on the skill and vocational structure of the territorial population.

Migration increases have steadily concentrated for years on Berlin, the GDR's capital, most of the bezirk cities and several other towns that have thus far been preferred sites of industrial development and housing construction. Under the conditions of the current, by and large balanced, reproduction level of the population in the bezirks, urban and rural kreises and the communities, a socially undesired population drop in rural kreises, and especially in rural communities with fewer than 1,000 inhabitants, is being curbed through immigration by means of greatly cutting back in urban growth.

In indirectly affecting internal migration in the GDR, more must be made of qualitative requirements. Socially unnecessary and economically ineffective domestic migration must be cut back further. A targeted influence taken on domestic migration must meet more skill- and occupation-specific requirements.

It is also of growing importance to change the structure (thus also the rank and rating) of the reasons and motives for migrating, tendentially as well as in a differentiated manner both territorially and sociostructurally. An important control tool at the social range, housing construction is likely to continue to be in the years ahead. Increasing importance in this attaches to the quality of housing and of the environment of it, and to the number of rooms and the size of apartments.

One must not make an absolute of the effect of any single conditions and factors on domestic migration. For a targeted control over domestic migration, higher

requirements arise for deliberately affecting the totality of the living conditions in any given place or area of residence with all the complexity of working, training and housing conditions, opportunities for meaningful leisure, and the shape of the environmental and recreational facilities. More research on the causes, inevitabilities and effects of domestic migration is imperative for it.

Such territorial developmental tendencies are hard to influence. But they have to be addressed to

- achieve, for one thing, in territories with increased labor a maximum of efficiency in the use of the social labor capacity and, hence, a crucial contribution by such territories to the performance, efficiency, and structural development of the economy, and to
- organize, in addition, in territories with strongly diminishing labor the most effective measures for saving live labor.

The high developmental status of the productive forces in all GDR bezirks, the first criterion for the territorial structure of social reproduction, principally is the point of departure for determining the site distribution of production as the centerpiece for the site distribution of the productive forces.

The further growth and more efficient production can, for all intents and purposes, take place within the scope of the given site distribution in the GDR. With it, the site structure of production is being led onto a higher qualitative level through the rationalization of the branch and territorial production linkages and through modernizing the material-technical base. With it, the use of resources is intensified and specific transportation costs are trimmed.

The dynamics of the performance capacity of material production in the GDR mainly depends on perfecting and further developing its site structure, no longer mainly on changing its site distribution. Through proper specialization and cooperation, concentration and combination, the intertwining among production sites can be further rationalized within the scope of comprehensive intensification.

Through joint conceptual efforts by combines, enterprises and local organs, the territorial production organization can be perfected, especially through a higher level of territorial rationalization. That includes, among other things, the processing of domestic raw materials at the sites where they are, the rationalization of the site distribution of industry in the towns in close connection with the requirements of inner-urban construction, and the establishing of rational territorial production links in industry, between the production levels and sites of agriculture and the foodstuffs industry, and between the construction material production and processing and prefabrication and construction on the basis of production-transportation optimization.

In this connection also the locational and technological fragmentation of production and of the research potential is further curbed, and an optimum proportion is sought between territorial concentration and a relatively even distribution of the productive forces. To make increasingly more of the territorial reproduction conditions while elevating the production functions

of all settlements, production capacities of various magnitudes (large, medium-size and small enterprises of the centrally and bezirk-managed combines) are being maintained or further developed.

In industrial rural kreises losing labor and, generally, in settlements with limited labor capacities, the modernization and specialization of medium-size and small enterprises in terms of a targeted reduction of the number of jobs while maintaining job opportunities as varied as possible is gaining increasing importance.

Also the scientific-technical innovation processes and the economic structural changes occur primarily at given production sites. In part, to be sure, they will also cause a considerable restructuring of such locations. The specific, location-related development of the "workers' skills" (their production-specific skills)<sup>16</sup> in connection with the social bonds the working people have to their places of residence and work, the site distribution of the means of production, especially of the solidly installed working tools and, in extractive industries, also of the work materials, under such circumstances play the role of predominant site factors for establishing new economic tasks.

Economic dynamics will however also lead to the formation of new elements in the site structure of production in the future. New local allocations and appropriations for expansion fairly large in size are to be expected, particularly in connection with the expansion of the domestic energy and raw material base, the production and processing of secondary raw materials, and the enhanced refining of raw materials. Here a site integration is largely given by the links to the deposits and the water supplies, and also by already local production for the purpose of technological tie-in. Also in the processing industry, certain changes may, prognostically, become necessary in the site distribution, due especially to scientific-technical innovator processes. One must carefully analyze and assess the various effects such changes in the site distribution of production may have. A special spot goes here to controlling the connection between the effects that either permit savings or make demands on resources and the infrastructure while introducing the scientific-technical progress in production. That applies equally to economic structural changes as to the restructuring of production.

Through a well balanced territorial and timely combination of both effective trends territorial units are enabled to cope with the growing tasks by means of the given or the developing resources and the concomitant infrastructure. In principle, this ensures resource-demanding new tasks through a lead rationalization with resource-releasing effects in the territory. Copious redistribution of resources from bezirk to bezirk are, in principle, no longer possible. Attention is always paid here to ensuring, through developing and perfecting the site distribution of production, the rational use of the social labor capacity as well as full employment. Solving social problems like the reassignment of released labor is a standard component of the given territorial conceptions.

## On the Developed Settlement Structure, a High Degree of Urbanization and an Adequately Dense Urban Network in the GDR

The second criterion of the territorial structure is the developed settlement structure in the GDR, i.e., the high degree of urbanization and the density of the urban network. The developmental level reached in this regard may be assumed to be, in principle, sufficient for a long future developmental period of the developed socialist society. The GDR has a settlement structure that offers the population in all bezirks and kreises favorable conditions for a high standard of living and all it takes for continued performance improvements.

In this sufficiently dense network of cities, apart from the outstanding role of the GDR capital Berlin, the other large and middle-size cities also occupy an important position. Almost half of the country's population lives in them. The functions of these urban centers of population, production, science, culture and so forth are being further developed and qualitatively enriched. That is true especially of the bezirk and kreis capitals. The relations of those towns to their perimeters can also be further intensified. For the further planned structuring of the socialist urbanization process in the GDR, what will count thus for the decades ahead initially is intensive urban development.

The economic and social capabilities of the cities in the GDR as centers of the working class and all the population, the potentials of the cities as centers of production, science and culture, can still more and more intensively be tapped and used.

A further extensive population expansion in the cities through influx can, in principle, be avoided, apart from less politically and economically motivated exceptions, as in the case of the capital Berlin.

Likewise to be avoided is more of a surface expansion of the GDR cities, a spread of urban construction to more and more parts of the perimeters. Apart from a few exceptions, no economic necessity is indicated for urban expansion in terms of population or area. That would contradict the comprehensive intensification requirements and, furthermore, run up against the thresholds of the urban infrastructure, which then would have to be extensively expanded in most cities. Economic science, by still more precise prototype surveys and theoretical generalizations, must still contribute more to that consistent standpoints are enforced everywhere, in accordance with party resolutions, on the intensive development of the cities and their place in intensive expanded socialist reproduction. Economic science, through its surveys, must convey convictions and show approaches of principle to solving the difficult problem that, on the one side, the production expansion necessary in the future in terms of our economy and also the setting up of new types of production must, in principle, be undertaken in the cities because they have the best prerequisites for it, without, on the other side, greatly enlarging in these cities the total number of jobs and expanding the built-up surface area.

It is a task that can, in principle, be solved. Yet it calls for new steps in comprehensive intensification in the larger towns and, with it, more

pervasive surveys on the targeted recruitment of labor and the rational use of surface areas, including research on the planned management of such processes. The same is true of the problems in more inner-city construction, especially housing.

The SED has couched the important resolutions on intensive urban development as a component of comprehensive economic intensification. These resolutions have to be implemented more rigorously still everywhere. The spectrum of the measures needed for it must be made very broad if urban development is to contribute to a new quality of comprehensive intensification. That also includes measures on

- improving the urban structures through a more rational handling of relations between the working and residential locations and the sites of public institutions,
- reducing the fragmentation of production sites in the cities,
- improving the efficiency of the urban infrastructure by way of reconstructing and modernizing existing facilities or of replacing them, and
- enforcing the strictest rationality in general in using all territorial resources in the cities, along with the social labor capacity and the surface resources also the water resources and transportation services and all other infrastructure services.

Such a comprehensive, intensive urban development in its unity of rational and cultural design also meets the principles for the socialist development of urban construction and architecture, issued by the SED Central Committee Politburo.

New solutions, in which economic science also has a stronger part to play, are needed for that mainly for the time after 1990 when, e.g., the still existing inner-urban empty lots will be built up by housing while the demand for a rational use of surface areas with good urban housing conditions at the same time nonetheless will rightly continue to exist.

For the intensive development of the cities as the territorial focal points for comprehensive economic intensification there are therefore many new questions and problems which on the whole call for more of a participation by the economic sciences, even transcending territorial economics as a part of the economic sciences discipline.

At least as much attention as for the intensive development of the larger cities is required for the rural settlements, the villages and the small towns. In the small towns of the GDR (2,000 to 10,000 inhabitants), more than 3 million GDR citizens live, nearly one-fifth of the population (18.7 percent in 1983).<sup>16a</sup> Thosetowns have important production functions, mainly supply functions for the rural territories. Such functions of the small towns can and must be expanded and stabilized. That can be an important contribution to the stabilization of agricultural and industrial production and a contribution to comprehensive economic intensification.

Opportunitis for that go mainly to those small towns in all bezirks that do not exercise kreis capital functions. That holds true for the small industrial towns in the bezirks of Halle, Leipzig, Karl-Marx-Stadt and Dresden, as for the

small towns in the agrarian hinterland in the bezirks of Rostock, Schwerin, Neubrandenburg, Potsdam, Magdeburg, and Frankfurt/Oder.

Most of these small towns are very receptive to economic and social functions. They need such functions also as points of departure for their own further development, for solving their developmental problems, for enhancing their attractiveness and a further social revalorization, and for stopping the population drain from those towns. And it should mainly pertain to production functions, such as rationalization means production. The construction substance existing in those towns ought to be a sufficient start for such developments. A functional revalorization of the small towns would bring effective measures toward cutting down the degree of wear and tear in the infrastructure funds in those towns.

The villages in the GDR's settlement network are of great importance to economic performance development, mainly in agrarian production. On housing and living conditions in the villages, the supply levels and the opportunities to satisfy intellectual-cultural needs, mainly on the needs of young people, greatly depends ensuring the agrarian production. Stable villages and effective agrarian production, survey results show, belong together.

There have been many examples meanwhile in the GDR bezirks and kreises showing how the elected local people's representations and the village mayors can assist agricultural enterprises and vice versa, how agrarian policy and communal policy, in other words, can be enforced in unity in a territory.

As far as the results of surveys go, one ought to point out in particular that along with the housing and living conditions in the villages, mainly the working conditions in crop and livestock production play a crucial role for the stability in the labor resources. No longer primarily and not in an isolated manner discounting other factors does the infrastructure count today among the migratory motives of the rural population. The easing of heavy physical work in agriculture must, in parallel with the further improvement in housing conditions, contribute, in a targeted and territorially concrete fashion, to a further stabilization of agrarian production and of the villages. Also important for such stability are a certain variety of job opportunities and improved commuting to the places of work and the infrastructure facilities in the urban settlement centers.

To ensure supplying, in particular, peripherally located villages with infrastructure facilities, traffic facilities have to be improved. Good examples exist for that in territorial initiatives for using all possibilities and reserves. Here one may proceed from the fact that on the global scale the GDR already has one of the densest public rural passenger transportation networks.

The GDR's settlement structure--as a complex territorial structural form in social reproduction--may on the whole be regarded as stable. When socialism was being constructed in the GDR, the relationship between town and countryside first was marked by a territorial assimilation process in conformity with the inevitable requirements. Then the less urbanized and industrialized bezirks and kreises developed in above-average dynamics mainly by way of an

extensively expanded reproduction in material production and in the infrastructure. Manpower and investments in production, mainly in industry and in the infrastructure, were channeled into selected large and medium-size towns. That produced a high territorial concentration of productive forces in those territories. No longer does a need exist, in principle, for carrying on that process and especially the functional, population, manpower, and substance reduction in the countryside that connects with it.

With the transition to comprehensive economic intensification in the further shaping of the developed socialist society, for the further development of the settlement structure and the further urban-rural rapprochement, the following favorable conditions exist:

--The population and manpower growth large and medium-size towns still need can increasingly be ensured through the demographic reproduction of their own population potentials. That ensures the reproduction of the social labor capacity for industry, concentrated primarily in the large and medium-size towns, which is being further developed by way of the principal course of intensification and, particularly, of socialist rationalization. Continuing the influx from small towns and villages at the magnitude of the 1970's is, discounting a few exceptions, no longer necessary.

--A continued stable economic and social village development and intensive agricultural development call for a stabilization of the rural population and manpower development. Already since the end of the 1970's has the migratory potential of rural territories been exhausted, at the total range of the GDR.

--With the transition to comprehensive intensification in housing and urban construction, the proportion of new housing construction for substitute purposes is increasing on inner urban sites, particularly in large and medium-size towns. The proportion of modernization in housing construction is growing. More and more can these apartments be used for further improving the housing of citizens already residing in the towns. At the same time, with this complex reproduction of the housing substance in its unity of maintenance, modernization, and new construction, a more even site distribution becomes possible for the benefit of rural territories, small towns and villages.

The relevant strategic developmental goals for a continued planned development of the settlement structure in its functional and territorial diversity must in the future be more undergirded by science investigations. Then the further change in the urban-rural relationship, in line with the SED program goals, will also in the future shaping of the developed socialist society retain its fundamental importance as prerequisite for the gradual transition to communism. The strategic objective lies in overcoming, step by step, further essential social urban-rural disparities. The planned proportionate development and shaping of the settlement structure in its functional and territorial diversity reflects that process while it also forms a complex territorial condition for it.

#### High Standard of Living in All Parts of the GDR, Developed Infrastructure

The third criterion for the territorial structure in the GDR is that along with socialist development the working and living conditions were fundamentally improved in all bezirks, kreises, towns and communities. Simultaneously, the

serious territorial disparities in working and living conditions, handed down as a historic legacy by capitalism, were by and large done away with. The living standard for the inhabitants of all communities is marked by planned job security, constant improvements in working conditions, and adequate basic infrastructural facilities in the territory. That, in turn, consists of:

- Adequate housing and, in the future, full plumbing for the apartments,
- shopping opportunities for daily necessities, fairly close to where one lives,
- hooked up to the power and central drinking water networks,
- school and kindergarten reasonably close enough,
- general medical supplies ensured,
- the chance to take part in social life everywhere, and
- for each village, attainability of a qualitatively higher infrastructural setup in rural settlement centers or, for towns, through being hooked up to the communications networks.

In the broader sense the working conditions, i.e. job security and the steady improvement of the working conditions, are included in the territorial standard of living. Territorial differences in the standard of living are still found in an uneven quality of the working conditions and uneven access to the infrastructure. They can be overcome increasingly by modernization and the rational utilization of the extant production structure and infrastructure. In some territories, complex infrastructure access, if inadequate, is further being improved according to plan and in conformity with the party's sociopolitical program, as economic possibilities permit. Larger territorial differences in natural living conditions (close-by recreational opportunities, purity of water and air and the like) are gradually being balanced. More attention will be given to them when infrastructural access and the shaping of the working conditions get further improved.

The standard of living as well as the economic capabilities of all territorial enterprises and facilities depend, as one knows, on the infrastructure. It has a cross section function, as it were, in the reproduction process, as shown already, on a basis of principle, by Helmut Koziol in his book "Reproduction and National Income."<sup>17</sup> That is why the infrastructure is such an essential factor for enforcing all the social goals of the working class party and an important component of the material-technical base of socialism. The infrastructure plays a key role among the territorial economic reproduction conditions.

The infrastructure is defined as the aggregate of facilities and installations that have to be available in each territory as general production and living conditions while satisfying the criteria of

- a) serving equally the supplying of the public and the functionality of all territorial enterprises and facilities,
- b) being available at all times in conformity with daily and seasonally differing needs,
- c) being available to the population and the economy in the territory in their complexity, and
- d) being stable in their locations and long-lasting through a high fund intensity and localized interlinks with their users.

The social infrastructure embraces the institutions and facilities which exclusively serve the population and, via the reproduction of labor, affect the economy. The technical infrastructure serves directly both the population and the economy.

The infrastructure on GDR territory at large and in all its parts has attained a developmental stage that is internationally recognized. An outcome of the SED's economic and social policy, it is marked by adequate capacities, high functionality, and a high level of qualitative achievements. Thereby it ensures the basic territorial prerequisites for comprehensive intensification in all economic branches and sectors and an ever improving satisfaction of public needs. That is why territorial infrastructure is organically included in comprehensive intensification.

Through the infrastructure development on GDR territory, profound level differences were reduced or eliminated in only 40 years in infrastructural service as between bezirks and kreises and between town and countryside. A high installation and supply level has been reached altogether.

For example, in all parts of the country already an almost sufficient quantitative housing supply (each household one apartment) has now been achieved. The backlogs that there still are will be eliminated by 1990. Apartment quality has much improved. Public education facilities ensure all children of equal educational opportunities. Kindergarten spots are ample. The material-technical base for out-patient medical care is in place everywhere, as are the commercial stocks in goods of everyday need. In the availability of nursery vacancies, the apartment hook-up to central drinking water supplies, and the density of even the rural public passenger transportation network, the GDR is holding top positions in the world. Energy supply is ensured everywhere.

This dense infrastructure network all throughout the GDR territory in principle suffices even long-range for supplying the population and production. Some types of infrastructure capacities are still being expanded extensively in all territories.

That holds true, e.g., for sewage treatment plants, the central heat supply, the communal economy, and long-distance facilities. Apart from that, however, extensive measures for the infrastructure can remain confined to opening up and supplying a few new urban residential areas and some new industrial and mining projects. The main way to develop the infrastructure, as in all economic sectors, will be that of intensification.

Through intensification in the infrastructure, a higher quality and continuity of achievements are possible with improved full-capacity utilization and the reduction of specific costs. To that end one has to use new science data and technologies both for the simple and expanded reproduction of infrastructural funds and in the territorial organization of the supply systems. This orientation applies to the social and the technical infrastructure alike.

There is something particular about the technical infrastructure in that it to some degree processes and provides extant natural resources (water and energy management) and is itself highly energy-intensive (transportation) and surface-intensive. The economic guideline on the thriftiest and most rational use of energy and water thus becomes the most important point of departure for intensifying the technical infrastructure. The output has to be increased in the decades to come without additional or only the slowest increase in energy and water use and in transportation requirements. Reserves in the facilities and installations that could be tapped through but slight efforts are hardly any longer in existence in the infrastructure. More therefore than ever before must R&D be oriented over the long run to economically feasible new solutions for saving water and energy, shipping space and transportation routes.

In enforcing solutions of the scientific-technical progress, one must in the future proceed more from the concrete territorial conditions.

The scientific-technical progress in industry and agriculture and the non-material sectors is going to place new demands on the technical infrastructure (e.g. energy supplies, sewage treatment, data transmission) and thereby also require new technical procedures and systems within the technical infrastructure. Their effectiveness will in the future depend still more on the quality of these preliminary production achievements. As the technical infrastructure is becoming increasingly important, more attention has to be paid to breakdown insurance and optimal reserve stocks and to the national defense requirements.

As to the technical infrastructure in the GDR, a special point has to be made about the adequate density of its networks, which again is the outcome of decades of efforts in site location policy. The network density of the technical infrastructure, increasing from north to south, mirrors the structure of the site distribution of the productive forces and of the settlement structure. At that, the GDR was actually able to take over from the capitalist past relatively complete networks only in transportation. The energy networks, despite previously available high degrees of hook-ups, had to be vastly expanded and adapted to territorial requirements. The electrical energy networks and those of transportation and communication today go into all communities and settlements.

As to the water supply, after World War II only 4 to 5 percent of all communities in what are today the bezirks of Rostock, Schwerin, and Neubrandenburg had central water supplies. After four decades of socialist development, 90 percent of all GDR inhabitants are now taken care of by central drinking water supply installations.<sup>18</sup> To stably supply the industrial sprawls, a comprehensive system of reservoirs and long-distance water pipes was set up which, as a side effect, even precludes flood damage.

Altogether, the GDR's technical infrastructure network has been built up so that here too, over the long run, all needs can be satisfied by way of comprehensive intensification, i.e. by way of maintenance, repair, reconstruction, and modernization of what there is, not by new investments. That means, e.g., for the traffic infrastructure, as a material prerequisite for local changes in the social reproduction process the network of which is adequately

built up, to focus long-range mainly on further improving the quality and efficiency of the plants and networks of the important traffic routes, on a more intensive utilization of the extant installations by means of the production-transportation optimization, and on the further improvement of the lines of transportation between places of work and residence, especially in commuting, the connection with urban and rural supply centers and, more and more also, the recreational centers.

Under capitalism, the social infrastructure facilities and networks on what is today GDR territory were altogether inadequate, and were unevenly distributed territorially to boot. The capital utilization process called for a developed, educated working class with its appropriate social infrastructure in the industrial sprawls of the south only, with its large cities. The rural north had but inadequate educational and cultural institutions for the rural workers.

In the social infrastructure the accomplishments of the GDR's socialist course are most impressively identifiable. Thanks to the housing construction program as the centerpiece of the party's social policy, the GDR, as Erich Honecker computed it before the kreis first secretaries, with nearly 7 million apartments,<sup>19</sup> i.e. 400 apartments per 1,000 inhabitants, holds a top position on the international scale.

The installing of a bathroom and shower in apartments in the bezirks with the least of plumbing was increased at an above-average rate. In Karl-Marx-Stadt Bezirk, e.g., with its many old industrial towns, in 1971 still less than 29 percent of apartments came with bathrooms or showers, but 10 years later it had already climbed to as much as 60 percent.<sup>20</sup> Apartment quality, in implementation of the apartment construction program, has and is being significantly improved further in all bezirks. Simultaneously it was possible to cut back the territorial level disparities in housing quality among the bezirks by nearly half.

Similar statements are possible about other performances in the social infrastructure. Kindergarten and school care is adequate and fine everywhere. For day nurseries, the degree of care in 1983 lay between 57 percent in Karl-Marx-Stadt Bezirk and 78 percent in the capital.<sup>21</sup> That also is a very high level, which of course does not preclude that in some places there may still exist a higher demand. The housing total which in 1990 in the capital and in the bezirks is reached by solving the housing issue as a social problem covers total housing needs in the GDR. New housing construction can then, among other things, serve to substitute for run-down apartments and reduce territorial disparities in plumbing.

This prognosis, to be sure, assumes that apartment allocation will then only exceptionally be a means for newly settling manpower in a given territory, for redistributing populations in a territory, in other words. It is being assumed here that, in principle, all combines and enterprises cover their manpower requirements for a higher capacity use of their fixed assets or for putting new capacities into operation out of the social labor capacity in situ and its reproductive sources.

On the whole, the social infrastructure also can be further developed by way of intensification, mainly through the reconstruction and modernization of what there is. The infrastructure intensification itself is subject to its dual-function of ensuring and improving highly vital human conditions while steadily taking care of production needs. The unique result of that is that the intensification factor of the infrastructure frequently does not appear in the economy of the infrastructure, but in the production and improvement of the standard of living. In either case it cannot be or can hardly be quantified.

Furthermore, when one includes the infrastructure in comprehensive intensification, one has to differentiate among various levels of demand concentration as for densely settled territories, especially towns, and for territories fragmented in requirements, i.e. the rural settlement network. On the territorial demand concentration also depend the further deepening of the division of labor in the infrastructure and the concentration of infrastructure capacities needed for an economical use of modern installations, technologies and forms of organization.

Irrespective of that, however, in all GDR territories there are reserves in the form of higher, economically unjustified demands made on the territorial infrastructure that have to be cut back, through production-organizational and technological measures, to a realistic, socially acceptable demand level. Such reserves have already been tapped by territorial rationalization through the joint utilization of enterprise polyclinics, culture houses, nurseries, and kindergartens, heat supply and water pumping installations, motor pools and things like that; they are now exhausted completely. Such facilities and installations can frequently, however, also be expanded through less of an effort, in the communal interest. Conversely, in some enterprises, inefficient infrastructure installations might be closed down.

The basis for tapping all infrastructure reserves is a concentrated and long-range coordinated use and development of all its components, installations, facilities and networks in the territory.

The Territorial Reproduction Conditions Under High Demands in All Parts of the GDR

This fourth criterion of the territorial structure lies in the fact that the economy is facing a threshold where any further demand made on the territorial reproduction conditions, i.e. the social labor capacity, natural resources like area surfaces and water, and the achievements of the technical infrastructure, the ubiquitous elements of the territorial structure, will in the future call for higher expenditures by leaps and bounds.

Not only that the GDR has no unemployment as such, there are not even any labor reserves worth mentioning in any territory.

There is enough water now to satisfy demands, even though there are territories with ground water deficits paying heavily for reservoirs and long-distance water conduits. Housing construction and, in general, the further elevation of the population's standard of living also rapidly increase water requirements--

each newly built apartment raises the daily requirement by 1 cubic meter, each reconstructed apartment, by half a cubic meter. Needless to say, satisfying this growing demand is a priority.

Furthermore, to boost the agricultural output, far more volumes in surface and ground water are needed for the agricultural irrigation program.

Then, industry has increasing needs for refrigeration purposes, though one has for years oriented, with success, on reducing the specific consumption of utility water. Particularly in industry, new scientific-technical solutions for economizing in water are urgently needed.

Satisfying the increasing requirements for drinking and utility water from what will in principle remained an unchanged natural water supply in the GDR territory, while furthermore ensuring the requisite water quality, is going to cost much more money than before. Territorially differentiated, it first will come in the kreises where, for lignite strip mining, the water table has to be lowered.

Equally high demands will have to be estimated for the "acreage" resource. Although great advances have been made in the effort to reduce the acreage requirements, those efforts have to be vastly strengthened in all economic sectors, and the application of the socialist thrift principle with regard to surface resources has to be more strongly supported through economic levers. The withholding of farm acreage, the resorting to miming acreages, and the surface requirements for the complex housing construction will in the future call for vastly higher economic investment and cost appropriations.

Altogether, through the science and technology plans on the central state level and on the level of the combines, enterprises, institutions, cooperative farming communities, and cooperatives, one must see to it much more that the territorial reproduction conditions are used economically and rationally. In using technologies that save resources and are friendly to the environment one will have to proceed in terms of territorial priorities. The multiple reuse required for territorial resources and infrastuctural conditions calls, especially in industrial sprawls and conurbations, for enforcing proven forms and applying new forms of territorial rationalization. Such an approach to the natural territorial reproduction conditions conforms to the resolutions on the protection, use, and cultivation of the natural environment.

Natural resources and the natural environment are fixed localized preferential conditions the territories have for social reproduction. There are prerequisites everywhere for further raising their availability by way of intensive expanded reproduction. The natural conditions in the territories are rationally used and protected mainly by

- trimming the residue of waste products by developing and introducing procedures low in waste products and not demanding much water and energy, and
- constantly making a better use of the residue of by-products with the stress they cause the environment and increasing the availability of regenerative natural resources, air, water, soil, flora, and fauna, by long-term measures for recycling waste products and waste water.

Procedures for a more rational substantive utilization of primary raw materials, for creating closed material cycles, methods for waste products recycling and the industrial use of biotechnological processes, energy-saving procedures and effective energy conversion processes, as well as water-saving and water-free procedures can be used relative to the corresponding degree of environmental stress. The priority goes to the industrial sprawls. There also the largest economic effect is achieved.

Measures for the desulphurization of fumes, for further reducing nitrogen emission, and for dust-arresting in connection with the retention and utilization of noxious substances are concentrated, apart from the conurbations, on recreational areas and forests.

Recycling measures for industrial and communal waste water are concentrated on the river areas of the Elbe, Saale, Mulde, and Spree. When environmental protection measures are taken, one always considers that the waste product recycling would simultaneously reduce environmental stress in the territory and limit the scope of the economically necessary extraction of domestic raw materials as well as that of the imports. That is all the more of importance to the GDR in as much as territorial economic expenses are steadily increasing and have become a key issue about economically justifiable expenditures for all mineral raw materials.

Likewise, suitable measures in the territories for the protection and rational use of natural resources can contribute to further stabilizing agricultural and forestry yields and keeping the citizens healthy.

Separate measures taken by combines, enterprises, and local organs for the use and protection of natural resources and the planned shaping of the natural environment must therefore be more coordinated in the territorial context. That has to be increasingly aided by economic levers on the basis of cost/benefit comparisons on the territorial scale in combination with modern means and methods for the management and planning of environmental protection.

The developmental level of the territorial structure discussed by way of the four criteria referred to is a sound basis for further enforcing a successful economic and social policy over the entire territory of the GDR and in all bezirks and kreises. The future site location policy may be directed at the use and further perfecting of the site location matrix created, no longer, mainly, at altering it. In those terms then is the territorial structure of social reproduction achieved in the GDR both a condition for and subject to continued comprehensive economic intensification.

#### Comprehensive Economic Intensification Includes the Intensification of the Territorial Structure

In the transition to comprehensive intensification, the territorial reproduction conditions discussed are gaining increasing importance. Through their intensive use and planned territorial organization, economic efficiency as well as the material and intellectual-cultural living conditions of the population can steadily be further raised. Their being drawn into the planned control over the social reproduction process enforces the economy of space, of

the territory, as a territorial aspect of and condition for the effect of the law of time economy. The territorial economy becomes a significant inevitability for the continued effective shaping of the developed socialist society as such.

The territorial reproduction conditions above all are important conditions for enforcing the scientific-technical progress as the principal course toward comprehensive economic intensification. They are marked by a relatively high stability which increases still more through the national and international changes of the socialization processes in the territories.

Scientific-technical progress, however, alters the territorial reproduction conditions over the long run. It changes the demands the combines and enterprises are making on the territory (site location requirements) and on the territorial reproduction conditions (site location conditions). In tendency, this development is a relative reduction of demands made on the territory (trimming the specific consumption of territorial resources per production unit) while making growing demands on the quality of the territorial reproduction conditions.

At the same time the scientific-technical progress facilitates a rationalization of the territorial production organization and of public life. Mobilizing the territorial reproduction conditions for enforcing the scientific-technical progress is a task of the first rank in all territories. The preferential conditions for that are offered by the conurbations with their high degree of production socialization and their high concentration of labor capacity and infrastructure. Scientific-technical innovation processes, placing extra demands on territorial resources temporarily, call for appropriate release measures in the territories concerned. The same holds true for territorially securing structural changes in the raw materials and energy industry and, in principle, for all demands made on the territory in connection with the introduction of new commodities and technologies.

When the scientific-technical progress is made to prevail according to plan, one must mainly more

- entwine science with production in the territories,
- connect changes in territorial production specialization and cooperation with rationalization of communication,
- conform to the higher demands made on the quality and continuity of performances in the technical and social infrastructure,
- ensure the most rational use of the performances in the technical infrastructure and the most flexible use of the facilities in the social infrastructure, and
- ensure the thriftiest access to natural resources to enhance their availability and protect the natural environment.

Comprehensive economic intensification through the scientific-technical progress then enhances especially the economic function of the towns in the territory and facilitates a stable long-range village development.

The connections between comprehensive intensification and the territorial structure are diversified and intricate enough for the territorial reproduction conditions always to be carefully analyzed and projected, especially in a relatively small socialist country like the GDR where the degree of extracting and using resources is so high. Presciently adapting and adjusting long-range the territorial structure of the social reproduction conditions to new requirements in social development in a broad sense significantly contributes to tapping and unfolding the impulses of socialism.

According to the SED program, together with the ways and means of the continued shaping of the developed socialist society, one also always sets down the development of its territorial structure and mobilizes the working people and the citizens in the bezirks, kreises, towns and communities for its implementation. This way the dialectical contradiction between the requirements of the socialist society as a whole and the conditions of its territorial units is being resolved on a qualitatively higher level. The basis for it lies in the socialist ownership in the means of production, which guarantees a conformity in principle between overall social, branch, and territorial developmental targets. That is accomplished under the leadership by the working class party and through the consistent implementation of the principle of democratic centralism.

Accordingly, bezirk, kreis, municipal and communal activities are aimed at investing, through an effective organization of the territorial reproduction process, all here available capacities and funds in an optimally efficient social reproduction process. That way they help enhance the social wealth and, with it, the constant improvement of the material and intellectual-cultural living conditions in the given territory.

The quality of territorial conditions and the population becoming aware of it release new impulses for action in terms of social progress. Hence, a conformity constantly and steadily established through awareness between overall state, branch and territorial objectives acts as a stimulus for solving the principal task in its united economic and social policies. Of outstanding importance to it are optimal proportions in producing, forming, housing, supplying and care-taking within and among all territories. The 10th SED Congress called these territorial linkages essential economic connections, and the planned shaping of which, a central concern of socialist economic planning in enforcing the party's social strategy.

That gives rise to high requirements for central, branch, and territorial management and planning. Their quality is determined crucially by perfecting the analysis of and prognosis for overall social, branch and territorial processes and their well-timed coordination.

#### General Scheme for the Site Distribution of the Productive Forces

The practical and theoretical insights presented are scientific investigative results of many years of research in line with the central research plan for the Marxist-Leninist social sciences of the GDR, 1981-1985. They followed Soviet experiences, adapted to the conditions of the GDR with its high territorial concentration and the interlinkage of its productive forces. The idea

was to shape the long-term development of the territorial structure in the GDR under the conditions of comprehensive economic intensification. Through analyses and previews on productive forces site distribution, handles and proposals are presented for the intensive use and further perfecting of the territorial structure in the 1986-1990 period.

The work was organized as a cooperative socialist effort by a large collective of scientists from various institutions and disciplines and government associates, directed by the research program bureau of the Territorial Planning Office of the State Planning Commission and coordinated in the science council for matters of productive forces site distribution.

In line with the Soviet model, the general scheme for the site distribution of the productive forces is a pre-planning document, part and parcel of economic plan preparation. The requirement of the general scheme is based on the SED resolutions on social and economic strategy.

Proceeding from there, analyses and prognoses were prepared for selected priority problems in the productive forces site distribution, problem-oriented ones, in other words. That also provides the work on the general scheme with a practical orientation. The problems were selected in such a way that through the final outcome of the analyses and prognoses a total statement is made that conforms to the complex character of the territorial structure of the social reproduction process in its unity of political, economic, social, military-economic, and natural factors. To that end, one analyses and prognosticates on the territorial structure of the population and of the social labor capacity, the site distribution of the mineral raw material industry, the processing industry, agriculture and the foodstuffs industry, the building trade, the technical and social infrastructure, the development of selected areas, and the territorial development of natural resources and environmental conditions. Conclusions and proposals from it on the further shaping of the territorial structure of reproduction are addressed to the various levels of official responsibilities. The general scheme is projected for 15 to 20 years.

The Next Interdisciplinary Research Tasks for the Site Distribution of the Productive Forces

Further interdisciplinary research on the site distribution of the productive forces in the GDR will have to pursue three topics.

The first one is to submit quantified proposals undergirded with computations and assessments for still more territorial reproduction conditions to help prepare basic and more long-range decisions from the State Planning Commission and other local organs and also reach some theoretical results. Thus far, computed results have been presented on population reproduction in the territory, on the territorially differentiated input/output in extracting mineral raw materials, on the site distribution of reproduction in construction, and on the natural environment.

The second point is to get more information on the site distribution of industry as the centerpiece in the site distribution of the productive forces.

Here the territorial structure in industry should be analyzed systematically, and it should be brought out, in particular, how territorial conditions can be used for the industrial combines in a more target-directed manner. Central attention there is directed at

--the interrelationship between the territorial effect or requirements of the scientific-technical progress in industry and the territorial reproduction conditions,

--the perfecting of the territorial organization of comprehensive intensification, especially with regard to territorial rationalization,

--the connections between production profiling, the rationalization of cooperation relations between the combines and enterprises, and the trimming of economic transportation expenditures, and

--the specifics in the site distribution of selected industrial branches and combines and the account taken of them in the planned organization of their reproduction processes.

Cost/benefit computations will also be part of it, for instance in connection with curbing the fragmentation, due to locations, of the production capacities.

The third point pertains to more deeply still penetrating the territorially differentiated reproduction conditions to get practicable data and new theoretical insights as quickly as possible. That also includes all the problems in space utilization.

Some new questions will also be taken up relative to the natural environment in the territory. Once analyses and proposals for gradually improving the natural environmental conditions were set down in the present general scheme on selected GDR territories, subsequent projects turn more to territorially specific possibilities for an economically effective processing and utilization of settlement waste products and to similar questions, so as to make still more evident the connection between waste product utilization and environmental protection as a basic concern of the environmental policy, especially in the territorial context, and make a contribution to enhancing the availability of recyclable natural resources in the GDR.

A special spot in all further interdisciplinary research on the site distribution of the productive forces will be reserved for the cornubations in the GDR. Together with the bezirk and kreis planning commissions concerned, the advantages the GDR's industrial sprawls offer to the GDR's economic reproduction must be brought out still more persuasively, so that it will assist in tapping them still more for our economic performance and efficiency development.

#### FOOTNOTES

1. Cf. "Programm der SED," Dietz publishing house, Berlin, 1976, pp 19 ff.
2. E. Honecker, "Bericht des Zentralkomitees der SED an den X. Parteitag der SED," Dietz publishing house, Berlin, 1981, p 117.
3. Cf. E. Honecker, "In kampfereueller Zeit setzen wir den bewaehrten Kurs des X. Parteitages fuer Frieden und Sozialismus erfolgreich fort, 7. Tagung des Zentralkomitees der SED" [In These Times of Struggle We Press Ahead Along

- the Road to Peace and Socialism Charted by the 10th Party Congress--7th SED Central Committee Session], Dietz publishing house, Berlin, 1983, pp 24 ff; E. Honecker, "Aus dem Bericht des Politbueros an das Zentralkomitee der SED, 9. Tagung des Zentralkomitees der SED" [From the SED Central Committee Politburo Report--9th SED Central Committee Session], Dietz publishing house, Berlin, 1984, p 51; "SED Central Committee Secretariat Conference With the Kreis First Secretaries," NEUES DEUTSCHLAND, 2/3 February 1985, pp 1 f.
4. Cf. K. Marx/F. Engels, "Werke" [Works], Dietz publishing house, Berlin, 1956-1968, Vol 23, p 374.
  5. Cf. F. Engels, "Anti-Duehring," K. Marx/F. Engels, "Werke," loc. cit., Vol 20, p 48.
  6. Cf. ibid., Vol 23, p 195.
  7. Cf. V.I. Lenin, "The Development of Capitalism in Russia," "Werke," Dietz publishing house, Berlin, 1955-1965, Vol 3, p 440.
  8. Cf. N.N. Nekrassow, "Territorialoekonomie," Die Wirtschaft publishing house, Berlin, 1979.
  9. Cf. F. Klitzsch, "Industrielle Standortplanung," VEB Technik publishing house, Berlin, 1953, p 54.
  10. Cf. "Statistisches Jahrbuch der Deutschen Demokratischen Republik" [GDR Statistical Yearbook] 1984, Staatsverlag der DDR, Berlin, 1984, pp 118 f.
  11. Cf. "Statistischer Jahresbericht des Bezirkes Neubrandenburg 1956," VEB Deutscher Zentralverlag, Berlin, 1957; Bezirksstelle fuer Statistik Neubrandenburg, ed., "Statistischer Jahresbericht des Bezirkes Neubrandenburg 1984"; "Statistischer Jahresbericht des Bezirkes Schwerin 1956," VEB Deutscher Zentralverlag, Berlin, 1957; Bezirksstelle fuer Statistik Schwerin, ed., "Statistischer Jahresbericht des Bezirkes Schwerin 1984."
  12. Cf. "Statistisches Jahrbuch . . . 1984," op. cit., pp 1 and 7.
  13. Cf. S. Grundmann, "Materialien zur Stadtentwicklung in kapitalistischen und sozialistischen Laendern" [Materials on Urban Development in Capitalist and Socialist Countries], Social Science Academy, SED Central Committee, Berlin, 1984.
  14. H. Schmidt, "New Equilibrium in Society," "Sozialdemokratische Kommunalpolitik im Schatten Bonns" [Social-Democratic Communal Policy Under Bonn's Shadow], Vorwaerts publishing house, Bonn, 1983, p 90.
  15. "Central Research Plan of the Marxist-Leninist Social Sciences of the GDR, 1981-1985," EINHEIT, No 12, 1980, pp 1209 ff.
  - 15a. Cf. W. Ledenig, "Territorial Aspects of the Population Trend in the GDR in the 1980's," WISSENSCHAFTLICHE ZEITSCHRIFT, Bruno Leuschner College for Economics, Berlin, No 3, 1982, p 11.

16. K. Marx/F. Engels, op. cit., Vol 23, p 54.
- 16a. Cf. "Statistisches Jahrbuch . . .1984," op. cit., p 8.
17. Cf. H. Koziolk, "Reproduktion und Nationaleinkommen," Die Wirtschaft publishing house, Berlin, 1979.
18. Cf. "Statistisches Jahrbuch . . .1984," op. cit., p. 154.
19. Cf. "SED Central Committee Secretariat Conference With the Kreis First Secretaries," loc. cit.,
20. Cf. "Statistisches Jahrbuch . . .1984," loc. cit., p 170.
21. Ibid., pp 66 and 80.

5885

CSO: 2300/125

POLITICS

POLAND

TODAY'S POLITICIANS ACKNOWLEDGE MORE INDIVIDUALITY

Warsaw ZYCIE WARSZAWY in Polish 21-22 Sep 85 p 8

[Reprinted from article in PRZEGLAD TYGODNIOWY by Artur Howzan: "Opening"]

[Text] In postwar history, propaganda has somehow very strongly formed a collective portrait of government from similar and sometimes even identical colors. There was no place in this portrait for human individuality. Political identity alone was what counted and people only knew about this what they got from reports, speeches and newspaper photographs.

In recent years, much in this regard has changed in Poland. The press and recently some books too (such as those written by Mieczyslaw Rakowski or Czeslaw Bobrowski) have broken out from the recent mold. This process has also been encouraged by very politicians whose public image has changed very much lately.

Party leaders, members of government, ministers and vice-ministers not only no longer shun the mass media as much as they once did but they also do not try to avoid answering the sort of questions that up until a few years ago would have been a violation unwritten principles.

Today it is no longer considered tactless or politically arrogant to demand that a high-level functionary justification explain some decision, ask about personal position on matters not related to his public function, request verification of some stubborn gossip or publish a government figure's earnings, etc.

Of course, this openness is a question of the method and style of government and the use in practice of the rule of "there are no questions without answers". It is true that not everyone still pays tribute to this principle but the decided majority of members of the present government feels that the veil of secrecy they once enjoyed brought nothing but trouble and that it is high time that we eliminate it altogether or at least act to make public figures as open as possible.

12261  
CSO: 2600/26

POLITICS

POLAND

SEJM FUNCTIONS: COUNCIL OF STATE FEATURES

Warsaw TRYBUNA LUDU in Polish 24 Sep 85 p 3

[Serialized article by Jadwiga Mikolajczyk on "What You Should Know About the Sejm"]

[Text] In accordance with the Constitution, at its first session, the Sejm elects a new Council of State from among its own deputies. After the term of Sejm is ended, the Council of State continues to function until a new one is chosen by the next Sejm. The Council of State is made up of a chairman, four deputy chairmen, secretary and 11 members.

The Council of State is responsible in all that it does to the Sejm. It fulfills the traditional functions of head of state as well as many others called for by the Constitution and law.

The Council of State:

- represents the state, appoints and dismisses Poland's diplomatic representatives, adopts lists accrediting and dismissing the diplomatic representatives of other states and ratifies and rules on international treaties;
- administers Sejm elections and calls Sejm sessions;
- in the period between sessions, exercises certain functions on behalf of the Sejm. It can issue decrees with the weight of law which it then presents for ratification to the next Sejm session (the Council of State created by the 7th Sejm issued 6 decrees);
- supervises people's councils.

The other powers of the Council of State are the issuance of medals, decorations and honorary titles, etc., grant pardons, confer academic titles and appoint and dismiss judges and the Prosecutor General.

Under its supervision of the activities of justice organs, the Council of State reviews reports on the work of the Supreme Court, the Supreme

Administrative Court, the General Prosecutor's office and the bar. It performs many tasks associated with supervision of the work of organs of control.

During the term of office of the last Sejm, the Council of State carried out some important tasks to provide legal and other aid to trade unions and worker self-management organs. The Sejm also gave the Council of State authority over the Chief Bureau for Control of Press, Publications and Public Performances.

The Council of State has the right to initiate legislation. It has in recent times frequently made use of this power and presented the Sejm bills on the system of people's councils and territorial self-government, trade unions, Sejm and people's council elections, amnesty and the Supreme Court.

The Council of State functions as a collegium. It is assisted by commissions formed from council members and other political, social and state figures and specialists. These commissions are the Commission on Organs of Control, the Social and Professional Affairs Commission, the Legal Commission, the Commission on People's Councils and Territorial Self-Government, the Ratification Commission, the Commission on Pardons, the Academic Cadres Commission, Citizen Affairs Commission and the State Decorations Commission.

The Council of State is also assisted by the National Commission on Social Actions and the Competition Court for the yearly "Master of Thrift" competition.

Commission matters requiring a decree by the Council of State are presented at the council's plenary sessions.

12261

CSO: 2600/26

POLITICS

POLAND

#### ACADEMIC HAS PESSIMISTIC VIEW OF FUTURE

Warsaw ZYCIE WARSZAWY in Polish 15 Nov 85 p 3

[Comment by Juliusz Gorynski on prospects for the year 2000 published 10 Nov in SLOWA LUDU]

[Text] "In regards to our domestic affairs, I am moderately pessimistic. One, however, needs to be candid with himself and others when bringing into full focus the number of impediments and the magnitude of problems which await us. I believe that this will be a time for the courageous.

One must start with the demography. Gradually the population will be comprised of more younger and older people; therefore, each person of working age, including bachelors, who are people with absolutely no dependents, will find himself having to feed more and more mouths. For this reason, output and productivity must increase.

The economy, without question, will be dominated by foreign debts. We should pay this back by the year 2000 because otherwise the grandchildren of our 20-year-olds will still be carrying its burden. It is our fault. My generation is to blame. We must take this "procrastination" into consideration.

We must change our way of thinking, for up to now it was as follows: if demand increases, then we must increase production in order to meet additional demand; supply proportionately more raw materials and energy; build still another factory, coal mine, power plant; employ an adequate number of people; etc.

This philosophy lacked a rational means of satisfying demand. That is why, for instance, we celebrated the production of a further thousand megawatts of energy as if it were a national holiday, a symbol of modernity. However, never was there a celebration when someone demonstrated that the same could be produced using half the amount of resources. We must learn to weigh the cost of meeting demand with the cost of rationalizing demand. What will it cost to build new power plants in relation to the cost of saving the same amount of energy needed to be produced?

A classic example concerns residential buildings. We thought that "we had saved money" in their construction by not insulating them, but because of this, we must meet an additional demand in heating buildings by building still more new sources of energy--coal mines, power plants, etc."

13090/12245  
CSO: 2600/170

POLITICS

POLAND

NEW BOOK FOCUSES ON POLICY DECISION MAKING

Warsaw TRYBUNA LUDU in Polish 22 Nov 85 p 4

[Review by Czeslaw Mojsiewicz of book "Decyzje polityczne: Elementy teorii"  
[Policy Decisions: Elements of Theory] by Artur Bodnar, PWN, Warszawa, 1985, 398  
pages]

[Text] The problem with the quality of public administration and government in our country is a long-standing one. On any given day, a number of decisions are being made at all levels, from the lowest to the highest. A great deal of self-deception exists by thinking that such decisions are made purely out of goodwill or some intrinsic inclination by either the individual or collective decision-maker.

Decisionmaking at this time is extremely involved, difficult and accountable. The socialist process in revitalizing life in Poland assumes both the elimination of voluntarism and uncertainty in administering the national economy and in governing the country. Therefore, society demands that competent and sound decisions be made at both the local and national levels.

This demand for practical and reasoned decisionmaking is discussed by Prof Dr Habilitatus Artur Bodnar, director of the Central Institute for the Systematic Study of Political Science, in a book entitled "Decyzje polityczne".

This book is the first of its kind in Poland. An important academic and practical attribute of the study of political theory in Poland is in broadening the theoretical research on policymaking. With this book, the decisionmaking process in domestic foreign policy is finally being investigated more closely.

"The work," writes its author, "attempts to put forward a systematic discourse on the most significant methodological and theoretical problems pertaining to such an important phenomenon in society as policy decisionmaking. Decisions are one form of human activity that are made in a specific situation".

In the space of seven chapters, the author, in a systematic manner, reveals to the reader the methods, conditions and difficulties associated with decision-making.

The work, as the subtitle suggests, is theoretical in nature. This, however, should not discourage readers; for the author took great pains to include a number of actual, mostly Polish, case studies.

This book aims at showing policymaking decisions as a technical and pragmatic function. Therefore, one could consider decisionmaking as being, to some extent, regimented. However, every decision is precise by virtue of it having been reached in a narrowly defined place and time. Decisions bear the specific aims and class interests of those making them.

However, as experience would show, the most just intention or noble aim alone does not protect the decisionmaker from making wrong decisions with inappropriate results. Every policy decision needs to take into account all aspects of the situation it is to cover, as well as alternative decisions, in order to foresee both short-term and long-term results.

In light of this, one can better understand the recent tendency in Poland to consult various collective and citizen groups expressing different solutions to a problem. This still is not a panacea to eliminate wrong decisions. What is important, however, is to conduct a public opinion poll on many important issues before making a decision.

There is no decision made which will satisfy everyone. This is impossible to do. Society is composed of various social groups with dissimilar interests and values. The decisionmaker will find himself unable to avoid the assessment of his decision from varying viewpoints.

The book does not claim infallibility. It contains controversial arguments and omissions, for instance, on the subject of the decisionmaking process within the rank and file of the party. Political rank is an extremely vital element in the decisionmaking process. Perhaps the recent practice by the PZPR in the improvement of cadre policy will allow another book to be written, one on cadre decisionmaking which is, after all, important in understanding policy decisions.

Artur Bodnar's book provides the research which was lacking in this field. It is a contribution to the study of politics in Poland. Despite a limited number of copies, the book will do service to students of political science and to a number of decisionmakers held responsible for the decisions they make.

A. Bodnar's work is also a contribution to the discussion of political education. It is a unique book conscious of the importance of preparing, undertaking and realizing a decision. Even the finest decisions may hang in mid-air if not understood, appreciated or carried out. Therefore, it is for this reason that "Decyzje polityczne" deserves attention.

13090/12245  
CSO: 2600/170

POLITICS

POLAND

SOVIET EDUCATION MINISTER ON REFORM, CONTACTS

Warsaw RZECZPOSPOLITA in Polish 15 Nov 85 p 3

[Interview with Prof Gennadiy A. Yagodin, Soviet minister of Higher Education, by Franciszek Januszkiewicz; date and place not specified]

[Text] At the invitation of Professor B. Miskiewicz, minister of Science and Higher Education, Poland recently was host to a Soviet delegation from the Ministry of Higher and Specialized Education led by Prof Gennadiy Alekseyevich Yagodin, minister and associate member of the Soviet Academy of Science. In the course of the visit, a review of Polish-Soviet cooperation in education, particularly at the university level, was made.

A representative from RZECZPOSPOLITA asked Minister G.A. Yagodin for an interview on the Soviet delegation's last day in Poland.

[Question] Comrade Minister, the first group of young Poles, consisting of 20 individuals, were accepted to study in the Soviet Union in 1946.

[Answer] Our fruitful and multifaceted cooperation in the area of higher education has indeed lasted for 40 years. The Soviet Union, despite itself experiencing post-war hardships, furnished Poland, which was, after all, destroyed by the Occupation and two wars, with extensive assistance in many areas, one being the formation of a cadre which Poland especially needed at that time. This was a course which developed dynamically. It is enough to say that in the span of 40 years, more than 17,000 Poles graduated from Soviet universities. Furthermore, several thousand individuals have earned doctorates and the title of doctor habilitatus.

We have educated and continue to educate for Poland, specialists in areas of vital importance in your country and to teach unique majors which are not offered in Polish universities.

[Question] Can we, therefore, speak of a stabilization in Polish-Soviet cooperation in this area?

[Answer] Yes and no. Allow me to explain. One can say with certainty that total volume has stabilized. Actually more than 3,100 Polish citizens are studying in the USSR. Among them are 1,700 undergraduate students, 500 postgraduate (doctorate) students and more than 400 interns. Furthermore, some 900

Russian-language teachers are improving their qualifications by attending periodic short-term courses at our universities.

We are prepared, as is slated in the coming 5-year plan, to accept annually some 500 undergraduate students from Poland for full academic studies in Soviet schools, some 150 postgraduate students and some 450 specialists as research and pedagogical interns. Furthermore, we would like to accept annually some 500 Russian major students to attend an intensive semester-long internship.

Personally, however, I see the possibility to expand the already established cooperation by undertaking new practices. I have foremost in mind the as yet undeveloped possibility of raising the qualifications of specialists, especially those who completed their graduate studies in the Soviet Union. The postgraduate level of education is well advanced in our country and composes a coherent system for raising and realizing the qualifications of cadres with a university education. I believe that it would, therefore, be worthwhile for Poles to take advantage of this system.

I am also of the opinion that we should develop so-called "partial studies". I have an idea whereby your country's older students would come to the USSR to study for one to three semesters. A similar program could be initiated in Poland for Soviet students.

As you can see, one cannot speak of stabilization alone. One must search for new solutions, always increasing the quality of the cooperation between the USSR and Poland in preparing the cadre for the needs of tomorrow.

[Question] The Soviet education system is currently undergoing reform. How can one characterize its significance?

[Answer] This problem is far-reaching and touches every aspect of Soviet life. The upcoming 27th CPSU Congress will confirm the fundamental course in the socioeconomic development of the USSR for the years 1986-1990 and to the year 2000. CPSU Central Committee General Secretary M.S. Gorbachev stated in regard to this that "a significant improvement in the socioeconomic sector must be realized before one can avail himself of the achievements made by the academic-technical revolution and profit from the socialist form of management according to current conditions and needs". The problem, therefore, is based not so much on accelerating the speed of the nation's economic development as on improving the quality of that development. Therefore, one needs to take a different approach toward development. One must push ahead in areas of the utmost importance to reconstructing the country's economy, take full advantage of the efficacious form of government and organization, and intensify the work of fully solving the problems of society. This is not just a struggle to increase productivity but to improve quality as well.

Clearly, national education must play a role in this process. We must reform the school system in the same spirit it takes to modify behaviour and reshape work habits in every sector of the country.

The chief aim of reforms in liberal arts and professional schools is to place them on a new level of quality adequate to meet the problems of accelerating

socioeconomic and research-technical development in Soviet society on the eve of the 21st century. Educational reform at this level assumes such cardinal changes as integrating comprehensive and mandatory liberal arts high schools with comprehensive training of youths in a profession, modernizing the instruction-education process, increasing the role of the school as the center of social education for children and young people, tightening the bonds between the school and family, and the school and work establishment. These structural changes also include securing the material means necessary for a school system to function.

The direction of educational reforms characterized here demand a profound restructuring of the higher education system. The need for significant changes in the educational system, especially in the training of an engineering and technical cadre, has already developed. Therefore, we will place great emphasis on reforming university programs and, in particular, in preparing undergraduates with a liberal arts education. Also imperative is the reformation of the training process, the stimulation of study methods, the utilization of information and the preparation of students to follow a life long course of self-improvement.

[Question] The key, in other words, is quality and work which shows a high level of efficiency and productivity.

[Answer] Yes, exactly. Furthermore, accelerating the rate and increasing the scale of growth in every sector of the country. This opens new possibilities in our mutual cooperation as well. New prospects developed in this area after the visit of PZPR Central Committee First Secretary and Premier W. Jaruzelski to the USSR in May 1984. At that time, the Polish and Soviet governments signed the "Long-term agreement for economic development and mutual research-technical cooperation between the USSR and PRL extending to the year 2000". This will guarantee further development and place Polish-Soviet cooperation and friendship on a new level. A cooperation confirmed through many years and a magnitude of results. A friendship bound forever by the blood of 20 million Soviet citizens and 6 million Poles who lost their lives in the bloody struggle against Nazism. We must always remember this, especially in 1985 when the entire civilized world is celebrating the 40th anniversary of the victory over fascism.

I wish to conclude by thanking the editors of RZECZPOSPOLITA for initiating this interview and to say that I will be leaving Poland greatly moved by the charm of the country and with the confidence that our mutual cooperation in the area of higher education has a permanent foundation and great prospects for the future.

13090/12245  
CSO: 2600/170

DEVELOPMENT OF DETERGENT INDUSTRY EXAMINED

Bucharest REVISTA DE CHIMIE in Romanian Vol 36 Aug 85 pp 699-703

[Article by Dr Aristina Parota, Dero Enterprise, Ploiesti]

[Text] The present state of the detergent industry is reviewed. A comparison is drawn between production and consumption of synthetic detergents in developed western countries, socialist countries, developing countries, and Romania. An analysis of detergent manufacturing technologies indicates that the current energy crisis does not place restrictions on the detergents industry, because modern petrochemical processes make raw materials available through added crude oil value. The paper presents effects that can be obtained by implementing a proposed strategy for development and diversification of detergent production.

An essential characteristic of our era is the pursuit of the new, requiring priority attention to problems of maximum practical interest, so as to satisfy mankind's growing demand.

Technical progress thus appears as, and in fact is, a necessary condition for economic and social progress.

Detergents are one such new development that generates progress, and the growth of this development reflects the development of contemporary society, the consumption of detergents being an expression of society's level of comfort and development.

A plot (figure 1) of soap and synthetic detergent production over a 20-year period (1950-1970) shows a large growth in detergent production and a corresponding drop in soap production [1]. The plots follow the same curve for western European countries, Japan, and the United States.

The world production of detergents is dominated by the developed capitalist countries, as can be seen from the data in table 1 [2].

(A) PRODUCȚIE  
(x 1000 t/an)

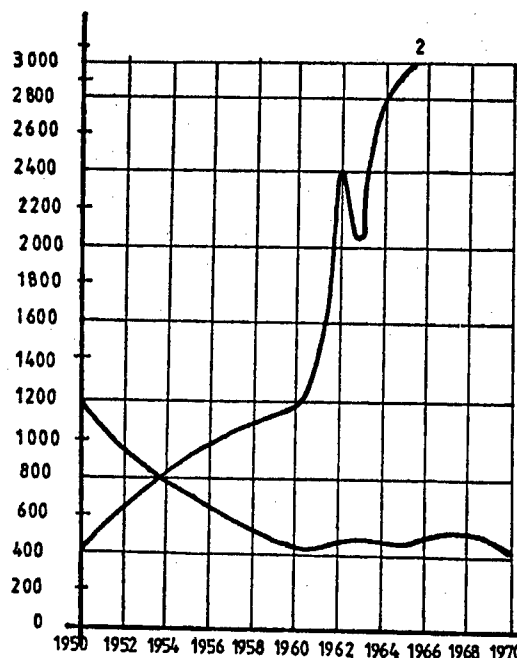


Fig. 1. Producția de săpun și detergenți sintetici în mai multe țări în perioada 1950—1970:  
1—producția de săpun; 2—producția de detergenți sintetici.

Figure 1. Soap and synthetic detergent production in various countries during 1970-1980.

Key: (1) Soap production  
(2) Synthetic detergent production  
(A) Production (x 1000 t/year)

During the 1967-1977 period, the world's detergent production increased from 6.4 million tons to about 12 million tons, for an average annual rate of about 6 percent. In recent years, due to the great energy and raw materials crisis that is facing mankind, the detergent production growth rate has slowed down to about 3 percent.

Liquid detergents have been used for a relatively short time and have gained ground more rapidly in the United States than in Europe: the United States production of liquid detergents represented about 20 percent of the total detergent production in 1980, and more than 21 percent in 1982.

In Europe, liquid detergent production represented only 1 percent of all the available detergents in 1980, although the percentage was higher in some developed nations (30.7 percent in Holland, 27 percent in Belgium, and 20 percent in France). In 1985, the production of liquid detergents throughout Europe is expected to be 25 percent of all the detergents produced.

Table 1. World production of synthetic detergents in thousand tons.

(A) Continente	1967	1970	1975	1976	1977	1980	Pondere in total (B) In 1980 %
Total mondial (C) din care:	6 420	8 480	10 230	10 750	11 600	15 800	100
Africa	70	90	110	120	140	154	1,2
America de Nord	2 600	2 850	2 900	2 910	2 980	3 878	25,7
America de Sud	230	280	420	450	520	575	4,5
Asia	535	800	1 030	1 200	1 300	1 430	11,2
Europa (inclusiv U.R.S.S.)	2 870	4 300	5 560	6 050	6 420	7 062	55,3
Oceania	115	160	210	220	240	264	2,1

Key: (A) Continents  
 (B) Percent of total in 1980  
 (C) World total, of which  
 Africa  
 North America  
 South America  
 Asia  
 Europe (including the USSR)  
 Oceania

In Japan on the other hand, as early as 1978, liquid detergents represented 30 percent of all the synthetic detergents produced during that year.

In socialist countries, the average annual growth rate of detergent production was 7 percent during 1970-1980, higher than that of the world as a whole.

Foremost among producers was the USSR, with a physical detergent production of about 825,000 tons in 1980, representing about 50 percent of the socialist countries' detergent production (table 2) [3].

With the exception of GDR, whose production is comparable to that of the major west European producers, the other socialist countries have until now devoted greater attention to the extensive development of detergent production. This production has been weighted toward powdered detergents, with liquid ones starting to be manufactured only in recent years.

The 825,000 tons produced by the USSR has placed it third in the world, following the United States and FRG.

An analysis of detergent production in developing nations also shows a trend toward a gradual replacement of soap with detergents, which are less expensive, being based on raw materials derived from petrochemistry, and are more economical for washing. The markets of these countries provide a good basis for selling surplus washing products from capitalist as well as socialist countries.

Table 2. Detergent production by countries and types in 1980 (thousand tons)

(A) Tara	(B) Detergenți sintetici			Total (F) agenți de spălare
	granula (C)	lichizi (D)	total (E)	
Albania (G)	lipsă date	—	—	8,2
Bulgaria	39	—	39,3	64,3
Cehoslovacia	56,8	1	57,8	93,7
R. D. Germană	91,6	10	101,6	127,9
Ungaria	76,3	5	81,3	101,4
Polonia	155,0	6	161,0	437,0
România	81,9	4,9	86,8	169,7
U.R.S.S.	lipsă date	—	825,0	1 765,0
Iugoslavia	162,1	—	162,1	182,7
China	lipsă date	—	257,0	2 057,0
Cuba	lipsă date	—	130,0	192,0
R. P. D. Core- cană	lipsă date	—	—	83,2

- Key:
- (A) Country
  - (B) Synthetic detergents
  - (C) Powdered
  - (D) Liquid
  - (E) Total
  - (F) Total washing agents
  - (G) Albania data not available
  - Bulgaria
  - Czechoslovakia
  - GDR
  - Hungary
  - Poland
  - Romania
  - USSR data not available
  - Yugoslavia
  - China data not available
  - Cuba data not available
  - North Korea data not available

The consumption of detergents is also growing as a result of technical progress; during the 1960-1980 period for instance, this consumption grew at an average annual rate of 5.1 percent (table 3) [4].

The class of products with the highest growth is that of liquid detergents.

Existing facilities and those expected to be started during the next few years, will lead to a world (except China) detergent consumption of about 31 million tons.

In 1980, the largest detergent consumer was the United States, with more than 29 kg/person, followed by northern, western, and southern (including Turkey) Europe, with 15.9 kg, and Latin America with 7.1 kg.

Table 3. World detergent consumption by product category, thousand tons

	1976	1983	Rata creşterii (A) %
(B) Detergent praf	8 700	13 800	4,3
Detergent lichid + pastă (C)	4 200	7 900	10,0
(D) Total detergenţi	12 900	21 700	6,3
Total produse spălare (E)	18 200	25 100	5,1

Key: (A) Growth rate  
 (B) Powdered detergent  
 (C) Liquid + paste detergent  
 (D) Detergent total  
 (E) Total washing products

Table 4. 1981 detergent consumption in some socialist countries, kg/person

Country	Consumption
GDR	14.8
Hungary	10.5
Czechoslovakia	7.0
USSR	5.8
Bulgaria	5.2
Romania	4.4
Poland	4.0
Yugoslavia	4.0

Detergent consumption in the socialist nations is shown in table 4 [5].

In the developing nations, the average detergent consumption during the 1960-1980 period has increased from 0.5 to 2.2 kg/person.

The extremely complex phenomenon of detergent production development and consumption has also influenced the development of the detergent industry in our country.

Until 1955, only soaps were produced in Romania as washing products, while the textile and leather industries used sulfated vegetal oils and sulfonic acids derived from oil fraction refining.

Detergents began to be manufactured in Romania in 1957 at the Petrochemical Plant No 2, which is now the Dero detergent enterprise of Ploiesti, on the basis of an original process, whose active washing substance was alkyl aryl sulfonate in a synergetic mixture with sulfated secondary alcohols resulting from thermally cracked gasoline and diesel fuels. Romania's detergent production is shown in table 5.

Table 5. Detergent production in Romania, tons

	(A) Forma de prezentare	1960	1965	1970	1972	1982	1983	1984
Total MICh din care: (D)	(B) Granulați	1 900	17 000	31 300	53 400	86 000	97 000	95 000
	(C) Lichizi	—	100	1 000	2 600	5 500	6 600	6 500
Întreprinderea de detergenți Dero-Ploiești (E)	Granulați	1 850	12 000	20 000	22 000	40 000	35 000	33 500
	Lichizi	—	100	300	500	3 500	3 700	3 300
Întreprinderea de detergenți Timișoara (F)	Granulați	50	5 000	11 300	17 400	18 200	25 400	22 000
	Lichizi	—	—	700	2 000	2 000	2 900	3 000

Key: (A) Form of presentation  
 (B) Powdered  
 (C) Liquid  
 (D) Total Ministry of the Chemical Industry, of which:  
 (E) Dero-Ploiesti Detergent Enterprise  
 (F) Timisoara Detergent Enterprise

Liquid detergents appeared on the Romanian market in 1970 (about 1000 tons), offered by the Timisoara Detergent Enterprise, with a new installation of 4000 t/year being started at the Dero Detergent Enterprise in Ploiesti.

The major problems to be solved in the detergent industry and in the raw material industry for detergents, are associated with the world oil and energy crisis, and with the pollution of water and the environment.

The following actions are being taken to reduce the consumption of electricity and heat:

Continued improvement of technologies for conditioning powdered detergents, and introduction of new, high productivity methods with minimum methane consumption;

Mechanize unloading operations in the transportation of conditioning salts;

Expand the pneumatic transportation of detergents to packaging machines, to feed the rubber moving belt transportation system, which is a large consumer of electric power;

Create efficient technologies to wash burnt gases from atomizers, in order to recover heat and to protect the environment.

Of the many technologies existing throughout the world for the detergent industry, we are currently implementing the following with positive results in reducing the consumption of raw materials and energy:

A technology for manufacturing high concentration liquid detergents;

A technology for conditioning detergents by atomizing them over bulk additive salts to effect contact with active substances;

A technology for conditioning by atomizing over bulk salts, a mixture which is achieved by rotating the entire installation;

A technology for conditioning detergents in a fluidized bed;

A technology for mixed conditioning (atomization combined with fluidized bed).

In brief, these technologies make it possible to produce detergents without gas consumption, using 20-30 percent less electric power than current processes, and with lighter weight equipment which requires 50 percent less investment than conventional installations for powdered detergent production.

The principal raw materials for the detergent industry are chemified coal (Fischer-Tropsch and Oxosynthesis syntheses), chemified bituminous shale, chemified n-paraffins, advanced chemification, as well as molecular sieve extraction of n-paraffins from oil for alkylation into benzene, in order to obtain linear alkyl benzene, the most desirable surface-active agent for detergent conditioning.

Because Romania's future detergent production will grow by 1.8-2.0 times over current production, it is necessary to increase the basis of such raw materials as surface-active agents, among which linear alkyl benzene sodium sulfonate (LABS) will remain the major one, since agents with the most linear chains are highly biodegradable. This agent will gradually be replaced with the following active substances: fatty alcohol sulfonates (100 percent biodegradable), sulfonated n-paraffins, and sulfonated alphaolefins.

Also planned is the development of fatty acids production by oxidizing natural paraffin, thus making better use of the paraffin extracted from crude oil.

Next to surface-active agents, other important detergent components are water softeners, polyphosphates. Even though polyphosphates are the most efficient softening agents, their content is limited to no more than 20 percent due to their polluting effects, and in the future they are expected to be partially replaced with zeolites.

Up to now, 25 percent of the sodium triphosphate can be replaced without negative effects on detergent quality; still to be solved are technical problems in aluminosilicate synthesis, and in particular, packaging, transportation, and price problems (zeolites are three times as expensive as sodium triphosphate).

For conditioning salts, the trend is to use perborate activators to allow the liberation of free oxygen at low temperatures (35-40 degrees C). Tetraacetyl glycoluril and pentaacetyl glucose have been tried in our country, but these products have the disadvantage of high prices and are required in large amounts.

Under the present economic crisis, the selection of raw materials used for finished products becomes very important. In the development of detergent production, in addition to efficiency, the criterion for various possibilities is that of minimum energy consumption.

The following substitutes are therefore proposed:

Cardboard to be replaced with plastics for packaging, thus significantly reducing weight, improving weather resistance, lengthening package lifetime, and opening possibilities for reutilization;

Soap to replace 3-4 percent of the active substances that are expensive and in short supply (fatty alcohols, linear alkyl benzene), thus creating new compositions with strong washing power and reduced foaming;

Less expensive sodium carbonate to replace 8-10 percent of the sodium sulfate;

Sodium perborate to be partially replaced with sodium percarbonate.

The economic effect of these actions is estimated to be a net income increase of about 37 million lei/year for the entire detergent industry.

Technical improvements to existing installations in future periods, and the new, modern technologies to be implemented, will lead to a detergent production 3.3 times higher than the 1981 production.

In order to assure the raw materials basis for detergent production during the next period, it is necessary to hasten and reconsider some extremely important investments, as follows:

Build a powdered sodium metasilicate installation, needed for cold conditioning instead of liquid sodium silicate;

Develop the production of optical whiteners with high whitening power, which could also be used for liquid detergents;

Complete the work on sodium percarbonate stabilization, and develop its production as substitute for sodium perborate;

Speed up research for aluminosilicate synthesis, so as to build an industrial installation;

Improve the manufacturing of synthetic fatty acids for better quality.

The new technologies that will be developed and implemented will assure the development of future detergent production under the conditions of the current energy and raw materials crisis, deriving greater value from each ton of crude oil, reducing energy consumption, increasing labor productivity and economic efficiency, and expanding the exportation of technologies and products.

The development of detergent production will encourage improvements and better yields in the petrochemical industry by expanding secondary processing (separation of n-paraffins from distilled crude oil fractions for linear alkyl benzene, oxidation of the paraffin into fatty acids, and transformation of the latter into synthetic alcohols, alkylphenols, and ethoxylated and sulfated fatty alcohols, and so on), and will increase both the value and quantity of production by reducing the amount of processed crude oil (about 320,000 tons/year of crude oil which will no longer have to be imported due to advanced processing) thus reducing the country's currency effort.

At the present stage of the energy crisis, conditions thus exist for using better technologies and technical progress to create greater possibilities for developing the national detergent production on the basis of petrochemical raw materials.

#### Conclusions

1. An analysis of the detergent production and consumption in developed capitalist countries shows a slow production growth of 1-2 percent per year, large amounts of products on the market, and very high consumption per person, which can even impose limitations on the development of detergent plants.

The analysis also shows an increase in the production of liquid detergents, which became more accented with the world energy crisis.

2. The socialist countries have made efforts for constant production development to assure the population with minimum amounts of soap and detergent consumption. The demand is constantly growing and will be satisfied in the next periods by the construction of new production facilities.

3. Developing countries are a good basis for selling surplus washing products from capitalist and socialist countries.

4. Romania has obtained significant successes in developing the detergent industry by endowing enterprises with advanced technologies capable of yielding products of the best quality, products of high technical and qualitative levels which can best satisfy the demand of domestic and foreign customers, and which also have a very high economic efficiency.

5. Energy restriction is relative for detergent production since petrochemical technical processes create available raw materials through the value added to crude oil and natural gases in each processing and consumption sector.

#### REFERENCES

1. L. Flett, Soap and Sanitary Chemicals, New York, No 28, 1952, p 36.
2. Household and Personal Products Industry, New York, No 1, 1908, p 32.
3. Chemical Purchasing, New York, No 10, 1982, p 36.
4. Chemische Industrie, Bern, No XXX, Aug 1984.
5. Europa Chemie, Dusseldorf, 1982, p 16.

11,023

CSO: 2700/40

SCIENCE AND TECHNOLOGY

HUNGARY

MICROELECTRONICS CHIEF QUIZZED ON ABRUPT RETIREMENT

Budapest MAGYAR HIRLAP in Hungarian 19 Oct 85 p 9

[Interview with Mihaly Sandory by Ilona Kocsi: "Breaker Program"]

[Text] After several years' delay a government program in microelectronics was initiated in 1981, the Central Program for the Development of Electronic Components. Since that time the Microelectronics Company (MEV) has been started and its investments have proceeded by and large according to plan. Peripheral areas, however, have not kept pace. Then the news--or just the rumor--that the microelectronic government commissioner who is at the same time the chief director of the MEV, Mihaly Sandory, will retire this year. The layman immediately starts putting things together and suspects a scandal in the background.

"I would not speak of a scandal," began Mihaly Sandory. The first part of the government program will end this year, my task was its completion. I have done my duty, setting up the Microelectronic Company and the direction of the investments.

[Question] The assignment could have been continued.

[Answer] The program is well underway, we are past the initial difficulties and there is no further need for a government commissioner. This is my opinion and also that of the Ministry of Industry. The role of a government commissioner does not fit into the overall decision and directing process. This role is only beneficial in extraordinary circumstances.

[Question] But, according to rumors, you will not only end your role as government commissioner but also resign your position as director, and you are going to retire.

[Answer] I am not resigning, my contract will expire at the end of the year. In mutual agreement with the parent agency we have decided not to extend it. The new chief director is already here with the company. I hope that he will have an easier tenure, without personal antagonisms obstructing work.

[Question] How do you mean that? Is there bitterness associated with your retirement?

[Answer] There are many people in important, decision-making positions who look at me with a magnifying glass to see if I make a mistake. As long as they have created obstacles for my work only, I was able to ignore this. Now I feel that the interest of the company demands that I should not be its director. These words are not the result of being offended but of rational thinking. It also doesn't mean that I don't want to work. As a retired person and the holder of the State Prize, I can even choose between jobs. I might appear arrogant but I feel certain that I am among the 5 or 6 best trained engineers in electronics in Hungary. Being left without a job is not a problem for me.

[Question] Were the hostility and the attacks directed at the government commissioner or the chief director?

[Answer] This cannot be separated since both of my commissions have the same purpose: to create an electronics components base. One thing is certain: I have worked on very soft ground. It is a question of perspective and judgement whether at the end of this program they will behead me or if I will be glorified. The legal domain of the government commissioner is not defined. Regarding the same incident, it could be said that all is in order or that I have exceeded my authority. In the latter event, with all my errors, I might qualify for jail.

[Question] Why, what did you do?

[Answer] I tried to carry out the government program, sometimes by unusual means. Occasionally I violated regulations if the circumstances required it. Maybe this is why--to speak figuratively--they have not yet beheaded me, that is, I remained the government commissioner to the end of my chief director's contract. To give an illustration: to do a certain thing, the permission of a higher authority was needed. We asked for it but before we obtained it we already started the project. Time is very important everywhere, but especially in electronics. Over the years I have committed many similar irregularities, that's a fact. If I were a judge who adheres rigidly to the letter of the law and I had to judge my own activity, I could give myself 5-6 years of prison. Fortunately things are not proceeding in this direction. Tacitly even the directing organs accept the fact that in practice rules must sometimes be sidestepped or the losses or missed profits will be substantial. Of course, I have never behaved this way for my personal gain.

[Question] Many say that if the government commissioner would not have been Mihaly Sandory, the program would not be as advanced. You are recognized for your accomplishment.

[Answer] It was not easy to get this far. I can now state that the investment was made within the framework of the planned expenditures, even though with half a year's delay. But conditions were much worse than anticipated in the plan. To mention only one item, many imported machines were needed for the microelectronic installations the price of which was determined originally both in dollars and in forints. Finally only the forint fund remained, and because of the substantial appreciation in the exchange rate of the dollar we had some 300 million forints less at our disposal.

Sometimes good results are neglected but the people can point to you anytime for the errors committed. Now and then I get the feeling that in certain places more attention is being paid to small violations of the rules than to real results.

[Question] So the sum which after many years' debate had shrunk to one-tenth of its original size became even smaller. Was it the originally accepted program that was realized?

[Answer] Yes! Except on the technical front we had to take a much greater risk than planned. It does matter, however, where and what machines we are buying. Many have also accused me of designing an overly lean investment budget. If we calculate a bit more liberally and write in one and one-half times the planned amount, we would have gotten our funds even with the deterioration in the rate of exchange. I take the responsibility for this accusation. In theory I could have gone to the Council of Ministers for more money as there were weighty arguments for this, but finally the planned technical level could be reached even without this recourse. Now it is important to preserve this level. In microelectronics you have to change the manufacturing tools every 3 to 4 years. True, this is the pace of the Japanese, and in Western Europe change comes only every 5 to 6 years, but we have to keep these time spans in mind and continually have to carry on development activity as well. Larger investments are planned only for the final 2 years of the Seventh 5-Year Plan.

[Question] Will there be money for this? You have often emphasized at various forums that money is only a third-rate consideration in your branch of work. General educational background and expert knowledge are the most important.

[Answer] This is still true. We couldn't even use our tools fully in the year after the investment was made. We are moving only slowly up the learning curve. Often I feel that we bought a Mercedes but we can't drive it yet in traffic. Regarding money, my opinion is that the manufacture of microelectronic components is an area where at certain intervals greater investments have to be made from a central fund. This, from a consideration that the beneficiary of the development is society at large, the users of electronics and the manufacturers. One doesn't need selective regulation but periodic concentrated development efforts.

[Question] With the establishment of the microelectronics program, has our position relative to the international level been improved, or have we only kept the gap from widening?

[Answer] One cannot answer this question in general. There are some areas where one does not have to speak of falling behind. One of the tasks of the leadership is precisely to find those areas where we can set the pace. Surely it sounds unbelievable, but it is true: we started working with system-oriented circuits (BOAK) earlier than the Japanese. We get about a third of our profit from this group. True, we can sell only a fraction of these in Hungary. In this area most of our profit does not come from components but

from semi-manufactured pieces. Our circuit-designing equipment would stand up even in Silicon Valley.

[Question] Let's return to the chief director and government commissioner positions. You worked in one of the centers of excellence of research, the KFKI Central Physics Research Institute as deputy chief director, and on top of this you became the government commissioner. Was it worth while to switch from being a researcher to a leading industrial manager?

[Answer] Whether yes or no, didn't occur to me at all. When I became a government commissioner I had to think of such a change. In the KFKI I worked in an area where I was responsible for production worth a thousand million forints a year. I learned that other than high level basic research, research makes sense only if it turns a profit for the economy of the country. What caused a great deal of worry was that I could not work under conditions that I would have desired. For example, it would have been better to select more rigorously the 40-50 leading members of the company. My original suggestion was to relieve of their duty all directors above the level of department heads with a single administrative order. Shortly afterwards an examination should have been made to decide who should be reappointed and who should not be. Such a decision would have affected about 200 people. After listening to short but convincing arguments, I saw that in our world such an idea is an illusion. Parenthetically I could add that my problems arose largely from unsolved personnel questions.

[Question] Well, this idea of yours could not have been very popular. You probably made some enemies within your own company too.

[Answer] Not with this plan, because it was not taken seriously by anyone except myself. But I have certainly made enemies with my other decisions.

It is the function of the government commissioner to play the role of a judge in debatable cases. Whoever you decide against will always be offended and might even become your enemy. To accomplish my mission, I have taken responsibility for making unpopular decisions. There is a legal suit against me on this account now.

[Question] Have they sued the government commissioner?

[Answer] Yes, the Technical Physics Institute. As the person responsible for investments and as the government commissioner, I thought that to administer the government program we needed one of the buildings of the Institute. Obviously this was counter to the interests of the Institute. Now the courts have to decide whether I was within my rights or if I exceeded the limits of my authority. The court will not have an easy time, nor did I have it easy.

[Question] You were undoubtedly well compensated with high salaries for your two jobs.

[Answer] Financial considerations don't interest me particularly. I speak four languages fluently, if I need money, I can earn it. I didn't get a special salary for being the government commissioner. My successor at the

KFKI, for example, earns much more than I did. But this has never bothered me. I was interested in the job, that is why I took it on, especially since several experts thought that it would be impossible to succeed. I decided to show the world that it can be done.

Photo captions [photos not reproduced]

1. Miklos Sandory was born at Gyergyoszentmiklos on 24 June 1930. He finished his four elementary grades in Romania and eight gymnasium grades in Hungary, and obtained his diploma from the Technical University in Hungary in electrical engineering. Between 1955 and 1983 he worked in the Central Physics Research Institute in various positions, since 1978 as deputy chief director. Afterwards he became chief division head in the Ministry of Industry for half a year. For the last two years he has been the chief director of the Microelectronic Company. In between, since June, he became government commissioner for microelectronics. Already in the KFKI he received the State Prize and the gold edition of the Work Medal.

2. August: Festive moment in Hungarian microelectronics. The new production line has started up and the trial manufacture of bipolar integrated circuits has begun at the MEV.

12929/12846  
CSO: 2502/10

SCIENCE AND TECHNOLOGY

HUNGARY

#### CYCLOTRON TO BE OPERATIONAL BY NOVEMBER

Budapest NEPSZABADSAG in Hungarian 29 Oct 85 p 10

[Article by Jozsef Goz: "The First Hungarian Cyclotron"]

[Text] The greatest scientific investment of the current 5-year Plan is ready to be commissioned in Debrecen, in the Nuclear Research Institute of the Hungarian Academy of Sciences. Thorough deliberations preceded the almost 300 million forint investment; among other events, 10 years ago already there was a meeting of scientific researchers, physicians, industrial and agricultural experts in whose work the nuclear accelerator--which did not then exist in Hungary--could possibly have been used. (This article has been prepared with the utilization of the research publications of ATOMKI).

#### Selection

The selection of the type of accelerator was made with future applications and opportunities in mind. Initially the possibility existed that the experienced Debrecen group would build a cyclotron of its own design. This would have occupied the mental and physical resources of the experts to such an extent that they would have fallen behind with other important research activities. The best choice was the U-103 MGC isochronous cyclotron developed in the Jefremov Institute of Leningrad. This apparatus is small (the number 103 refers to its size in centimeters) but even so it produces many times the research opportunities of the present Van de Graff generator. A proton stream of approximately 20 million electron volts emerges from the cyclotron with 5 to 10 times more particles in the beam than is obtainable from the present Van de Graff generator.

What will the first Hungarian cyclotron be used for? According to current plans, one-third of the capacity will be devoted to basic nuclear physics research, the other two-thirds will be used for research in other branches of science and for solving practical problems. Such problems are the examination of materials, the production of isotopes and various irradiation procedures.

#### Examination of Materials

Such examinations can be very wide-ranging. These procedures make it possible to demonstrate the presence of contaminants in very small amounts or of

elements which can be demonstrated hardly if at all with other methods. Such elements are carbon, oxygen and nitrogen, important in biology and medicine, and beryllium and boron, important in nuclear energy science. With the cyclotron a trace element can be demonstrated if it is present in the sample to the extent of one part per thousand million.

One of the methods of nuclear analysis made possible with the cyclotron is charged particle activation analysis. It relies on irradiation of the sample with a charged particle beam consisting of any of the following nuclei: protons, deuterium, helium-3 or helium-4. As a consequence, isotopes with a half-life longer than 10 minutes are generated in the sample. When these decompose, radiation is formed and can be detected with instruments. The examined radiation is characteristic of the elements and of their percent distribution. For example, with proton activation analysis high purity samples of the following elements can be analyzed for the concentration of trace elements: beryllium, carbon, sodium, magnesium, aluminum, silicon, manganese, cobalt, terbium, holmium, thallium, bismuth, rhodium, and so on. The compounds and alloys of these elements can also be analyzed as can their solutions and even gaseous materials.

It hardly needs proving how important the production of high purity materials is these days. These are products that can be sold at a high price because the world market rewards the work needed for their manufacture. The precise measurements possible can verify the quality of a manufacturing technology and of the various phases of a purification process.

There are also technologies where pure materials must be doped with a certain quantity of foreign substances. For example, semiconductors which play a major role in modern microelectronics are produced in this way. With the help of the cyclotron the quantity of doping agent, the thickness of the condensed-vapor contacts on the surface, and many other parameters can be determined. Just for illustration, here are some investigations with the cyclotron: the behavior of trace doping agents in the metallurgy of polycrystalline silicon, the determination of oxygen in silicon and gallium arsenide, the examination of the contaminants of polycrystalline silicon and the determination of hydrogen in the amorphous silicon used for solar cells.

Thin layer activation analysis is used to examine wear, corrosion and erosive processes. Activation in this case is done with heavy charged particles. For example, the wear on the balls of a ball bearing can be measured by activating the balls down to a chosen depth. In various stages of the wear process the depth of the remaining activated layer can be measured. Decrease of this layer is proportional to the material lost by wear.

#### Isotope Production

The thickness of the activated layers varies between 10 and 100 micrometers and the size of the activated surface between a few square millimeters and a few square centimeters. If necessary, the whole sample can be activated. An examination of the worn off or eroded particles or of the remaining sample serves to indicate the extent of the corrosion or erosion having taken place during operational use of the material. One of the advantages of this

technique is that it makes possible non-destructive testing during actual operational use and that information is produced very rapidly about the wearing and corrosion processes, or of the protective measures aimed at their prevention.

With the aid of cyclotron, new possibilities have been opened up in Hungarian isotope production. A variety of isotopes can be made, especially those with short half-lives that, for precisely this reason, cannot be imported from abroad. Calculations show that the investment for the cyclotron would be recovered in a few years even if it were only used for the production of isotopes.

The isotopes produced in the cyclotron are frequently employed for the development and monitoring of modern metallurgical, foundry and chemical processes. Drug research and pharmacology also use isotopic tracer techniques. (The discovery and development of the isotopic tracer technique is associated with the name of Gyorgy Hevesi, a Nobel Prize-winning Hungarian who lived abroad.)

Isotopic tracers have been employed in medicine for some time: best known is the use of radioactive iodine for the examination of the behavior of the thyroid gland. With the help of the cyclotron it is now possible to use other isotopes with more favorable properties.

One of the major advantages of the elements that can be produced in the cyclotron is that they decompose with the emission of positrons. In this decomposition process two photons of equal energy are emitted in opposite directions and can be detected simultaneously. The energy and time equivalence allows a very accurate determination of position. The positron emission tomograph is based on this principle. This apparatus, coupled to a computer can produce cross-sectional images of the examined body part or organ. The most important difference between an X-ray tomograph and a positron emission one is that the latter has as its radiation source a radioisotope inside the body, which if well chosen, produces cross-sectional images of the desired organ only.

More than 20 isotopes can be prepared efficiently with the Debrecen cyclotron. Among these is an oxygen isotope of mass number 15, which has a half-life of 2 minutes. It can be used for oxygen-inhalation examinations in a location near the cyclotron, due to its short half-life. Gallium-167 is used in cancerous tumor diagnosis while thallium-201 nitrate plays an important role in the examination of the myocardium.

The radiation beam that has reached sufficient energy in the accelerator can produce changes in irradiated materials. It is known that radioactive beams cause mutations in living cells and that fast neutrons damage the structural materials of nuclear reactors.

#### Cyclotron Radiation

The fast neutrons and charged particles produced in the cyclotron can be used for the examination of the destructive process described above. In

radiographic examinations with the aid of the charged particle beam of the cyclotron, a 1-millimeter thick layer can be penetrated, or a thicker one with the accelerated neutrons of the neutron source.

One of the important medical uses of the rays of the Debrecen cyclotron is neutron therapy: the destruction of malignant tumor cells with neutron radiation. What makes this possible is that hypoxic (oxygen-deficient) cells can be destroyed more completely with fast neutrons than with high energy X-rays and gamma rays. Neutron radiation is effective even when the cells are not in the radiation-sensitive phase of division, and even the cells that don't divide for extended periods are damaged by fast neutrons. The chance of the reappearance of the tumor is less than in case of treatment with traditional sources of radiation. With this method of treatment the determination of the dose is very important: one has to exceed the level that will destroy malignant cells while staying below the level that causes general radiation damage to tissues. Because the optimal medically useful range between these two limits is very small, the effectiveness of the treatment depends at least as much on the appropriate dosimetric methods as on any other parameter of the neutron irradiation.

Irradiation is also used to produce biological mutations: irradiated seeds and bacteria are expected to produce better harvests and give greater yields.

Substances polluting the environment are generally present in low concentrations. This is another reason for the importance of nuclear analytical procedures. These can be neutron activation or charged particle induced X-ray or gamma-ray emission procedures. The pollution of natural waters, the changes in the trace elements in water supplies, foods and their constituents, the amount of lead in plants and the trace elements in atmospheric aerosols can all be examined satisfactorily.

Non-destructive nuclear analytical methods can also be used for the examination of minerals of low metal content that would otherwise not have been considered for utilization, or of waste piles that can be regarded as a potential raw-material resource. One big advantage is that the same sample can be examined by other methods as well, giving reliable data which can serve in the selection of the technology for resource recovery.

The diversity of the utilization of the Debrecen cyclotron can be seen readily. A variety of projects will be initiated and can be initiated by anyone in the Hungarian research community if his ideas can be turned into reality by use of the cyclotron. A scientific panel decides the fate of each research proposal. The Debrecen researchers have accumulated wide-ranging experience as concerns the possibilities for work with the cyclotron and also have significant practical experience. Work done at an institute in Turku, where there is a cyclotron identical to the one in Debrecen, was most useful.

12929/12846  
CSO: 2502/11

SCIENCE AND TECHNOLOGY

HUNGARY

SUPERIOR DEVICE FOR DETECTING FLAWS IN SEMICONDUCTOR CRYSTALS

Budapest NEPSZABADSAG in Hungarian 21 Nov 85 p 6

[Article by Katalin Magos: "Beyond the Embargo; One Cannot Stop in Research"]

[Text] The majority of record holders in sports strive for additional laurels after the first successes. This is why they undertake weekdays filled with hard training, building on the knowledge acquired with earlier work and on the experience obtained in competitions. And for all this--although it may fail--they enjoy moral and material support on the basis of their earlier achievements.

But what can a scientific research group do in a similar situation? If an instrument developed in the course of its work has become a leading product even internationally and it has reaped every formal success, does it have an opportunity for further research so that it can stay in competition while possessing the knowledge and market experience acquired?

In the research sphere, unfortunately, it is not at all certain that one will get the trust and "calorie money" for further struggles. It is futile for a device to prove in the "first round" that its technological level is higher than that of the embargoed foreign products inaccessible to us; it will not get a special track to stay in the forefront, to meet what the world level may dictate in addition. But if the technological level of a product here is to dictate to the world then the new idea must emerge at least 3 years ahead of the industrially developed countries.

"It Is Possible This Way Too"

If something succeeds it often depends on the fanaticism of some researcher, on an attitude of "just because," as happened in the case of the depth spectrometer developed in the Technical Physics Research Institute (MFKI) of the MTA [Hungarian Academy of Sciences], a device with more capabilities than the embargoed technology. Fortunately Dr Gyorgy Ferenczi, deputy chief of a scientific main department in the semiconductor physics department, believed in a successful continuation of a theme already begun which was at a higher level than the embargoed level in the first round. He did not want to lose the advantage of position achieved by the fact that the idea was well ahead of the

competition. Turning down the foreign offers he received, he stayed with his team.

But let us return briefly to the time of the success, to the 3 years already mentioned. Even our paper reported about it on 1 April 1983 under the heading "Attention Inventors: It Is Possible This Way Too" and the subheading "Success Story and Lessons of a Hungarian Invention." We wrote that an instrument had been developed without a peer in the field of modern semiconductor testing equipment (this remained true until 1983) to swiftly and automatically detect flaws in semiconductor crystals, an instrument more sensitive than earlier analytical methods--several ten hundred thousand times more sensitive. Siemens bought it, first an Austrian and then an American firm undertook to market it, Japanese customers appeared. Soon it turned out that in the course of carrying out a contract signed with a semiconductor combine in the GDR they had succeeded in developing at the MFKI an instrument without which one could not create a semiconductor industry. But the competition appeared on the scene soon after the international appearance of the Hungarian device; after an English and a Japanese firm the well known American electronics enterprise Hewlett-Packard also entered the competition.

#### Two Years Later

After more than 2 years we were curious how the deep level spectrometer had been able to stand up to the competition, for its electronics did not differ from the average domestic research institute level. Still they were better than those of the counterparts, with the results of many years of research work in it and the market experience thus far. Of course all this could be easily and quickly lost in the sharp competition struggle for we do not always have a system of conditions to remain in competition even in the case of such an outstanding theme. Independent of the--intellectual and material--value of the equipment the system of authorization is complicated. It makes practically no difference whether we are talking about a screw or an item worth a million forints; it takes at least 4 months--if everyone is ready to help--from specifying the part needed for the development until the order leaves the country. In the second place the institutes are not able to compensate in an outstanding way for outstanding performance, for the extra work. And as long as these conditions do not exist the leaders of an institution do not like to take risks by taking money from themes already paying well.

Finally the central office of the Academy gave help for the further development of the deep level spectrometer and for long-range basic research. They were able to make use of this quickly because while they had turned a large part of their energy to acquiring resources they did not abandon their research. Last year they could not sell any of their earlier devices for now the competition was offering something more reasonable. But the staff headed by Dr Ferenczi did not give up even without money and thanks to this they succeeded in making an even more capable device by the end of 1984.

#### IBM, Switzerland

The device, using a few new measurement principles, is computer controlled. With a possibility for six types of measurement they got well ahead of the

devices of the competition capable of one type. The proof of this is that with this second version they won the competition in a field in which Hewlett-Packard, among others, was a rival. Thus the device, already almost delineated, went to the Swiss research center of the American enterprise IBM where one can find experts from the best Western European research centers and universities. Seven new orders can already be attributed to it. And in Japan this device is at present the only Hungarian import product in the electronic instruments category.

But staying on the markets mentioned requires yearly model changes, not products which are the same frequently for 5 years as is customary here. Fortunately their fanaticism can be strengthened in this regard with money, and the manufacturing firm, Radelkis, is a good partner.

In addition to the constant minor modifications the members of the Ferenczi team can finally again turn to real basic research, with the money received from the Academy. The technologists are now expecting to get information about the quality of the contamination--Is there copper or iron in the material? With their present methods they can only make a guess, on the basis of activation energy, in addition to determining the quantity. To be certain they must then use another method, after having been given a tip. So the goal of the 4-year basic research period now begun is to work out a chemical identification method. They have placed the cross-bar high, but by continuing the hard training thus far they surely will not be defeated.

8984

CSO: 2502/18

SCIENCE AND TECHNOLOGY

POLAND

#### LASER-BEAM MICROTREATMENT OF MATERIALS

Warsaw ELEKTRONIKA in Polish Vol 26, No 1-2, Jan-Feb 85 pp 24-33

[Article by Wieslaw Wolinski, prof dr hab engr, Institute of Electronic Engineering, Warsaw Polytechnic Institute: "Laser-Beam Microtreatment of Materials"]

[Excerpts] Since the very first appearance of lasers there are studies made on the use of the radiation emitted by them for microtreatment of materials. Interest in this application is stimulated by the characteristics of laser radiation as well as by the diversity of available laser sources in terms of wavelength, emission power, pulse energy and pulse duration, repetition rate, and other parameters.

By proper selection of power or energy density one can generally achieve heating, melting, and evaporation (atomization) of any segment of the treated object. Depending on how long the radiation acts on the material, the process can be either adiabatic, with penetration of heat, or isothermal. These three modes of laser action are shown schematically on the diagram in Figure 1.<sup>1</sup> This diversity makes it possible to modify the process in several different ways. Modern technologies cannot do without laser-beam microtreatment, because it ensures high precision and reproducibility of parameters as well as high speed. It moreover can be automated while, relative to conventional methods of treatment, it results in a comparable or in some cases even lower production cost.

#### Manufacturing Operations Performed by Laser-Beam Microtreatment

Variously effected interaction of laser radiation and treated material facilitates the following specific manufacturing operations:

- drilling holes
- notching for partition, engraving, marking
- cutting, cutting out parts of intricate shapes
- joining parts (fusion, "welding")
- cleaning surfaces (degassing, atomization)
- depositing materials (sputtering, pyrolysis, photodissociation)
- doping with impurities
- alloy-plating or coating surfaces
- local reheating or remelting (altering the structure of materials)

These possibilities are already long known and widely realized. The operations are most often performed by micromachine tools with program control of the beam movement of the surface, using pulses of 0.5-50 J energy and 0.5-20 ms duration at repetition rates up to 200 Hz from Nd:YAG lasers. Any operation is successfully performed when the pulse parameters have been matched with the diameter of the action zone and the scanning speed. An example of conditions optimally matched for treatment of 100  $\mu\text{m}$  thick stainless steel tape is shown on the picture in Figure 8.<sup>6</sup> The drawing serves as basis for matching pulse duration and power density, to achieve optimization of the marking-drilling-fusing ("welding") process. An example of drilling by means of pulse trains is shown on the diagram in Figure 9.<sup>7</sup> Here holes have been drilled at a 30° slant angle to the surface of a 2.4 mm thick stainless steel sheet. More than hundred pulses will drill one hole 0.7 mm in diameter within 1.5 second. Tight tolerances within  $\pm 0.02$  mm on the hole diameter have been maintained here. Holes 0.3 mm in diameter through 1.5 mm thick sheet can be drilled at the rate of 10 per second. The same equipment is suitable for high-speed cutting and welding of parts,<sup>8</sup> as shown on the picture in Figure 11.<sup>9</sup> Typical machine tools with such performance characteristics are MS 25, MS 100, MS 300 manufactured by J.K. Lasers. For drilling holes in diamonds and in semiprecious stones as well as for drilling microholes 10-30  $\mu\text{m}$  in diameter in metals one uses pulse-pumped Q-switched lasers emitting radiation pulses of 0.2-1 J energy and 20-50 ns duration at repetition rates of a few hertz.

In Poland several types of laser drills were developed during the 1965-75 period by the Institute of Electronic Engineering (Warsaw Polytechnic Institute), by the Institute of Quantum Electronics (Military Engineering Academy), and at the Institute of Machine Tools and Machining. Equipment built at the Institute of Electronic Engineering (Warsaw Polytechnic Institute) included provisions for lengthening the laser pulse duration to 7 ms and not only drilling but also producing various metal-to-metal, metal-to-semiconductor and metal-to-"thin metal on dielectric substrate" joints. This equipment did not include beam control and programming, the pulse repetition rate did not exceed the 0.05-0.5 Hz range. It was built using ruby and neodymium-glass lasers. Despite their successful performance of various manufacturing operations such as prepunching holes in eyelets for wire pulling, or beading of synthetic fibers, forming microthermocouple junctions, punching holes 20-50  $\mu\text{m}$  in diameter in diaphragms, and many others, these machine tools have not been used anywhere for industrial production.

The possibility of notching or removing selected parts of a material by means of laser radiation has been realized in the electronic industry for manufacturing operations listed in Table 2. The information given in that table includes also the type of laser most suitable for any of these operations. Most common in use is equipment for trimming resistors and notching substrate wafers. According to published data, over 1000 trimming tools are now in operation worldwide and over 100 are sold every year. The best known manufacturers of this equipment are Teradine, Electro Scientific Industries, and Laser Optronics. The picture in Figure 12 shows the latest Teradine model A 325 machine tool<sup>10</sup> for resistor trimming in hybrid circuits, and the picture in Figure 13 shows the circuit for testing thin-film resistors trimmed with Electro Scientific Industries model 44 equipment.<sup>11</sup> Different notching patterns are distinctly

seen here. Various components labeled by Laser Optronics with their equipment (models 815-817)<sup>12</sup> are shown on the picture in Figure 14. Although many such components are shown here, they represent only a small fraction of the range of possible applications. The picture in Figure 15 shows a photograph of masks produced with Electro Scientific Industries equipment model 44 by reproduction of a master mask in a 10:1 enlargement. The picture in Figure 16 shows the cut through a redundant path of polycrystalline silicon leading to a damaged circuit component. Such operations are often performed in 64K and 256K random-access memories. Several machines for these operations have also been developed in Poland. At the same time, the Polish industry uses several imported machine tools for trimming, notching and drilling.

#### Laser Equipment Operating in Domestic Electronic Industry

The first domestically built equipment for trimming thin-film resistors in hybrid circuits has been put in operation in 1975 at the RADMOR Works, with an LG-4 argon laser built at the Institute of Electronic Engineering (Warsaw Polytechnic Institute). This equipment operates with manual scanning. There is now also in operation a duplex facility built at the RADMOR Works, with a single Zeiss ILA 120 argon laser powering both stands. One stand operates with manual scanning, intended primarily for functional trimming. The other stand, with a control table and type AKL-R-089 transistor-transistor-logic program module produced at the UNIMA Works, is designed to produce about 1000 resistors of meander configuration within 1 percent tolerance limits in 8 hours (Figure 17). A typical notch is 15-25  $\mu\text{m}$  wide and the cutting speed can reach 10 mm/s. Both the Institute of Electronic Engineering and the Institute of Electronic and Precision Equipment Design at the Warsaw Polytechnic Institute have jointly developed two machine tools for trimming the resistance of thin-film and thick-film resistors in hybrid circuits. Each includes a Nd:YAG laser with continuous pumping and stimulated pulse emission by acoustooptic switching at repetition rates of 0.5-40 kHz. The pulse duration is 0.2  $\mu\text{s}$ , the pulse power in the TEM<sub>00</sub>-mode is 1-5 kW and the average power of a pulse train is 1-3 kW. The laser part was developed at the Institute of Electronic Engineering, the rest of the equipment was developed at the Institute of Electronic and Precision Equipment Design.

The first of these machine tools, designated as TUL-L (Technological Laser Equipment for Laboratory), includes not only a laser with a beam focusing and precision deflection system but also a system for television monitoring of trimmed microcircuits with data display and for moving them with a drive control. The trimming notch is 20  $\mu\text{m}$  wide with the focal length of the objective set at 50 mm, it is variable in discrete 1  $\mu\text{m}$  steps, and the beam can scan an area of 100x100 mm<sup>2</sup> while cutting at a rate of 0.2-5.85 mm/s. This machine tool is already operating longer than half a year at the Industrial Institute of Telecommunication.

The second of these machine tools, designated as TUL-H and still in the setup stage, includes provisions for programmed plain and functional trimming of resistors. It differs from the first one by containing an additional control system on a microprocessor base with a central control unit and a micromonitor for smooth control of the drives as well as of the beam deflection at speeds

up to 10 mm/s. Its equipment includes also a circuit for resistance measurement by the current-voltage method with a set of contact electrodes. The accuracy of this resistance measurement is better than within 0.05 percent in the  $10\Omega$ - $1\text{ M}\Omega$  range and better than within 0.2 percent below 10 or above  $1\text{ M}\Omega$ .

Laser equipment for marking silicon substrate wafers so as to facilitate inspection and locating sites of product deficiency has been developed by the Institute of Optoelectronics (Military Engineering Academy). It uses a pulse-pumped free-emission Nd:YAG laser which emits pulses of 15-25 mJ energy at a repetition rate of 5 Hz with forced air cooling.

The entire head, mounted on a table with XY-sliders, is built as an attachment to a photolithographic machine. The table is moved by stepper motors and controlled by a microprocessor system which has been developed at the Department of Electronic Circuits (Military Engineering Academy). The maximum capacity of this equipment is 8 alphanumeric symbols in the form of a 4x7 dot matrix. Its productivity in making 5-digit marks is about 80 wafers/h. Already a year ago it was included in the production cycle at the TEWA Works.

In 1976 the Research & Development Center for Hybrid Microelectronics and Resistors in Krakow developed, jointly with the Institute of Machine Tools and Machining, a laboratory equipment for notching ceramic wafers to be partitioned. This equipment includes a continuous-duty molecular ( $\text{CO}_2$ ) laser delivering an output power of approximately 100 W, built in accordance with the design made at the Institute of Quantum Electronics (Military Engineering Academy). The laser beam is chopped by an external mechanical modulator into a pulse train, each pulse of 3 ms duration, with a repetition rate of 330 Hz. At a cutting speed of 2 cm/s one can attain a 50 percent overlap of action zones. The controlled XY-table can move at a maximum velocity of 1.3 cm/s. Another similar equipment has been adapted for industrial production and is already in the setup stage. Its controlled XY-table was built by the "Elektrotechnika" Cooperative in Zary near Jelenia Gora.

An equipment for trimming cylindrical resistors has been developed by the Institute of Quantum Electronics (Military Engineering Academy), in collaboration with the TELEPODEM Works in Krakow. The construction of 10 continuous-duty  $\text{CO}_2$ -laser units with a 6-20 W power rating, for operation with Simmler notching machine tools, has just been completed. The helical notch is 100-150  $\mu\text{m}$  wide. It has been possible to raise the upper resistance limit of 0.125 W resistors of 300 k $\Omega$  and of 2 W resistors to 10 M $\Omega$ , with an improvement of precision to within  $\pm 0.1$  percent and with a reduction of noise level.

#### BIBLIOGRAPHY

1. Hill, C., LASER AND ELECTRON-BEAM INTERACTION WITH AND PROCESSING OF SOLIDS (Gibbons, J.F., editor), North-Holland, 1981.
2. Bayer, E. et al., "Optical Feedback during Laser Processing of Materials," LASER '83. OPTOELECTRONICS IN ENGINEERING, 1984 p 259.

3. Bucholtz, J., "Fine Treatment with Laser Beam in Microelectronics for Processing of Masks and Integrated Circuits," LASER '83. OPTOELECTRONICS IN ENGINEERING, 1984, p 415.
4. Hill, C., LASER AND ELECTRON-BEAM TREATMENT OF ELECTRONIC MATERIALS (Andersen, C.L. et al., editors), Spring 1980 Meeting of Electrochemical Society, 1980, p 26.
5. Young, R.T. et al., "Semiconductor Processing with Excimer Lasers," SOLID STATE TECHNOLOGY, Nov 83, p 183.
6. Treusch, H.G. et al., "Metal Drilling with Lasers," LASER '83. OPTOELECTRONICS IN ENGINEERING, 1983, p 383.
7. SCHWAB, H.P. et al., "YAG-Laser Treatment Center," LASER ' 83. OPTOELECTRONICS IN ENGINEERING, 1984, p 399.
8. J.K. Lasers Co, Information Sheet: System 2000, 1983.
9. Haas Strahltechnik G.m.b.H., Information Sheet, 1983.
10. Teradine Co, Information Sheet: Model A 325, 1984.
11. ESI Co, Information Sheet: Model 44, 1983.
12. Laser Optronik Co, Information Sheet, 1983.
13. Swenson, E.J., "Some Present and Future Applications of Laser Processing - an Overview," SOLID STATE TECHNOLOGY, Nov 83, p 156.
14. Swenson, E.J., LASER ANNEALING OF SEMICONDUCTOR (Poate, J.M. and Mayer, J.W., editors), A.P. 1982, pp 10, 11, 56.
15. Auston, D.H. et al., "Dynamics of Q-Switched Laser Annealing," APPLIED PHYSICS LETTERS Vol 34, 1979, p 777.
16. Shibata, T. et al., "Silicide Formation Using a Scanning Continuous-Wave Laser Beam," APPLIED PHYSICS LETTERS Vol 36, 1980, p 566.
17. Craby, A.H. et al., "Laser Annealing of Ohmic Contacts on GaAs," APPLIED PHYSICS LETTERS Vol 38, 1981, p 562.
18. Bauerle, D. et al., "Laser-Induced Chemical Vapor Decomposition of C and Si," QE XII APPLIED PHYSICS B Vol 28, No 2/3, 1982, p 267.
19. Gerasimov, R.B. et al., "Laser-Induced Decomposition of Organometallic Compounds," QE XII APPLIED PHYSICS B Vol 28, No 2/3, 1982, p 266.
20. Boyd, J.B. and Wilson, J.I.B., "Oxidation of Silicon Surfaces by CO<sub>2</sub>-Lasers," APPLIED PHYSICS LETTERS Vol 41, No 2, 15 Jul 82, p 162.

21. Deutch, T.F. et al., "Laser Photodecomposition of Metal Films with Microscopic Features," APPLIED PHYSICS LETTERS Vol 35, No 2, p 175.
22. Beyer, P.K. et al., "Laser-Induced Chemical Vapor Decomposition of SiO<sub>2</sub>," APPLIED PHYSICS LETTERS Vol 40, No 8, 15 Apr 82, p 716.
23. Osgood, R.M. et al. "Localized Laser Etching of Compound Semiconductors in Aqueous Solution," APPLIED PHYSICS LETTERS, Vol 40, No 5, 1 Mar 82, p 39.
24. Jain, K. and Wilson, C.G., "Ultrafast Deep Ultraviolet Lithography with Excimer Lasers," QE XII APPLIED PHYSICS B Vol 28, No 2/3, 1982, p 206.
25. Levenson, M.D., "Application of Phase-Conjugate Wavefront Generation to Fine-Line Lithography," QE XII APPLIED PHYSICS B Vol 28, No 2/3, 1982, p 206 /??/.
26. Eggermont, G.E.J. et al., "Laser-Induced Backside Damage Gettering," SOLID STATE TECHNOLOGY, Nov 83, p 171.

2415/8918

CSO: 2602/7

NEW HEAVY ENGINEERING PRODUCTS PROFILED

SR-125 Air Compressor for Marine Engines

Warsaw PRZEGLAD MECHANICZNY in Polish No 17, Sep 85, pp 25-27

[Text] The SF-125 air compressor, a product of the H. Cegielski Metal Industry Plant in Poznan, belongs to the new family of one-, two-, and three-cylinder air compressors which are characterized by full uniformity of output over the range from 70 to 450 m<sup>3</sup>/h.

The increase in the technical value (useful qualities) of the above-mentioned air compressors previously produced, has been attained as a result of recent advances in design work and manufacturing technologies i.e.:

--thanks to low airflow losses, properly chosen clearances, and the properly chosen ratio of compression between the first stage and the second, very good values were obtained for mass and volume ratios and energy consumption.

--the use of replaceable cylindrical liners permit the regulation of the displacement volume of the first and second stages of compression, which allows compressors to operate at a final compression pressure of 1-4 MPa while preserving the optimal index of power demand;

--the introduction, in marine engines, of a water pump driven by a compressor improves motor reliability and conserves materials (the electric motor and the other elements of the automatic power supply and control system are not needed);

--the compressor is completely automated, the exhaust mufflers depress the noise level of the entire assembly, the use of a three-point flexible mounting platform shortens the installation time of the complex and decreases the vibration transmitted to the foundation, which is particularly important for vessels.

The majority of compressors are produced for marine applications, intended for starting large marine engines. The reduction of the energy use index to about 0.02 kw/m<sup>3</sup> at the current rate of production (250 units per year) and a mean use of 1000 hours at an average assumed output of 240 m<sup>3</sup>/hour yields a

savings of 1200 megawatt-hours. In the event that the compressors are used for industrial purposes (where the number of operating hours is greater), the benefits will be greater still.

The technical data for the SF-125 compressor: output--130 m<sup>3</sup>/h, pressure--3 MPa, rotational speed--1475 rpm, power of the drive shaft--34.2 kw, weight--580 kg, power index--0.19 kw/m<sup>3</sup>/h, mass index--3.22 kg/m<sup>3</sup>/h.

The compressor described received the gold medal at the 57th International Poznan Trade Fair in 1985.

#### RTA Marine Engines Licensed by Sulzer

Warsaw PRZEGLAD MECHANICZNY in Polish No 17, Sep 85 pp 25-26

[Text] In the H. Cegielski Metal Industry Plant in Poznan, on the basis of a Sulzer company license (Switzerland), the production of RTA marine engines was begun. These engines were fitted directly to the drive shaft of a marine propeller (they will be replacing two currently-produced types: the RND-M and the RLB).

These engines constitute a new generation of machines with a "super-long stroke" (the ratio of the stroke of the piston to the diameter of the cylinder is approx. 3). In spite of the extra long stroke of the piston the RTA engines do not require an increased disassembly height; they are shorter than those currently on the market; as a result, it is possible to increase the cargo capacity of the ship. Given such a long stroke, the uniflow scavenging of the cylinder is better, and this contributes to decreased fuel consumption. For the first time in the history of the development of drive engines, engines have been built with a thermal efficiency rating exceeding 50 percent.

RTA engines are characterized by robust construction, low stresses and loads -- in spite of the high maximum combustion pressures and optimal surface temperature--thanks to the open-port cooling system. A valve-controlled injection pump with a mechanism for varying the moment of fuel injection is used in these engines.

The exhaust valves, a product of the very latest technology, permit us to obtain optimal performance even during runs using low-quality fuel.

The basic effect of putting these engines into production is the reduction of operating energy consumption (the reduction in the use of fuel oil, and an increase in overall efficiency). As it turned out, the 6 RTA engine, in the course of 24 hours' operation at full throttle managed to save 1,200 kg of fuel in comparison to the 6 RLB engine.

The 6RTA58 is a diesel single-acting low-speed, two-cycle directly-reversible engine, supercharged by turbocompressors driven by exhaust gases at steady pressure coupled with lengthwise cylinder scavenging.

Technical data for the 6RTA58 engine: number of cylinders--6; cylinder diameter--580mm; piston stroke--1700 mm; engine power--9640 kw; rotational

speed--127 rpm; mean working pressure  $p_e$ --1672 kPa; unit weight--32 kg/kw;  
unit consumption of fuel--175 g/kw-h.

### New Boring Machine

Warsaw PRZEGLAD MECHANICZNY in Polish No 17, Sep 85 pp 26-27

[Text] The WIEPOFAMA Special Machine Tool Factory in Poznan, which is a consistent supplier of machine tools for a wide range of industries, has recently constructed an engineering wonder, special-purpose boring machine complex to produce pneumatic cylinders for DUMPCAR self-discharging railroad cars for the ZASTAL Zaodrzanski Metalworking Industry Factories in Zielona Gora. The complex is constructed of two machine tools LSP 491 and LSP 492, which are architecturally combined in a tandem arrangement featuring common electro-hydraulic control and which may be operated by a single worker.

The main axis of the machine tools can be elevated up to an angle of  $20^\circ$  from the horizontal. The use of such a machine configuration was dictated by the necessity of facilitating the removal of a large amount of shavings from the interior of a bored-out cylinder barrel. The fundamental parts of each boring machine (a clamping device, feed assembly, a borer spindle headstock with a roller-boring head) are affixed to a three-part, screw-operated diagonal base.

The workpiece is a pneumatic cylinder blank weighing 257.5kg, in which the rough and finished surfaces are to be bored for of an opening with a diameter of  $685.5^{+1.5}$ mm and a length of approximately 1050 mm. Thus, this is a workpiece of significant weight and dimensions; it is made of thin-wall rolled and welded sheet that is not too rigid. The LSP 491 and 492 boring machines perform do all the machining on the cylinder's working surface in one pass of a special roller-boring head, guaranteeing conditions of size, shape, and surface toughness indispensable for successful interaction with the piston and ring.

After the setup of the workpiece with the help of two servomotors, all the operations related to the fastening and stabilization of the cylinder are performed automatically. All the machine operator has to do is mount and dismount the workpiece and control the operation from the control panel by pushing the right buttons. The direction of tool rotation is such that the torque generated by the machining forces resulting from the force of grinding causes the workpiece to be pinned firmly to the fixed base.

The design of the headstock permits the exchange of the first pair of gears; this allows four different rotational velocities of the spindle: 38, 47, 67, and 84 rpm.

The feed unit bed is a welded construction to which, with the help of screws, tempered steel guide rails are attached. The leading guide rail is prismatic. The complex work table moves along these guide rails. The movement of the table is limited by a hard bumper placed on the axis of the complex.

A trapezoid-shaped screw (Tr 65 x 10) is used in the screw gear, braced lengthwise on one side with the help of roller bearings and ball bearings in the joint fastened to the feed assembly bed. The other end of the screw is supported in nuts. One of the nuts chiefly bears the load from the resistance of the feed mechanism; conversely, the other, which is a sliding nut, serves to offset the play between the working nut and the bolt. This play is eliminated automatically and hydraulically. The slack is taken up only when working movements are made. During rapid movements the nut is disengaged. There is the possibility of regulating the pressure and, hence, even the force generated by play regulation as a function of the load. It is possible to regulate the pressure from 5 to 35 MPa, which corresponds to a strength of 1410-9900 N. The nuts are lubricated from a centralized system.

The combined LSP 491 and 492 machine tools have a separate cooling and chip disposal system. Included in this system are the following: a coolant reservoir with an 870-liter capacity, a conveyor belt and cart for the chips, a wiring guideway, a unit running coolant through the spindle, and a shielding unit and a special overflow bucket. The installation of the cooling system is completed with a model SK 6 centrifugal pump with an operating capacity of 150 l/min.

At the work station a special spray gun is installed; if the need arises, this sprayer can be used to deliver a manually directed stream of extra liquid to flush chips during machining operation. The cooling system uses the ER 10 emulsion. Moreover, the machines are equipped with apron housings made from oil-resistant rubber and other kinds of safeguards against the splashing of the coolant.

The boring head performs a full range of machining jobs consisting in the rough and finish boring and rolling polishing of the cylinder's interior surface. The boring head is a steel housing with three tool holders for rough and finishing work and three burnishing rollers. All the operations are carried out simultaneously with the same performance parameters (speed of rotation, feed rate).

For rough work three cutting tools, separated by 120 degree intervals are used in this way, the machining allowance is distributed equally between the three of them. The finishing work tool holder is positioned 14.5 mm behind the tip of the roughwork tool. This is the commercial holder made hR 179.17-1275 model. Next, the three burnishing rollers are located 123 mm beyond the tip of the finishing blade. The rollers rotate in circular fashion along the surface of the cylinder being machined, and they are kept tight against the surface by springs whose tension is regulated.

The rollers are mounted in balanced housings which permit continuous contact with the cylinder's surface regardless of irregularities in its shape. In the neutral position the displacement of the rollers is limited and mounts to plus 2 mm along the radius of whatever the diameter dimensions of the work-piece happen to be.

After the completion of the rolling, the exit of the rollers from the work zone, and the head stops spinning, the rollers have to be rotated by a crane

(each one separately) to an angle of 30 degrees. This is to ensure that there is no chance of contact between the rollers and the finished surface while the head is being withdrawn. Before the machining of the next cylinder is begun, the rollers will have to be returned to the initial work position. The settings for the cutting tool holders as a function of the desired dimensions for the workpiece are made using a specially designed calibrator.

Technical data for the combined LSP 491 and LSP 492 machine tools: number of machines operating in the complex--1 + 1; number of machine operators--1; space occupied--19.3 m<sup>2</sup>; machine dimensions--2750 x 2900 x 6650 mm; machine weight--12 tons; overall power rating of installed engines--35 + 35 kw; oil pressure in clamping device--50 MPa; maximum cutting depth during boring--3 mm; time to complete one cylinder--27.3 minutes.

12929/12469  
CSO: 2602/3

SCIENCE AND TECHNOLOGY

POLAND

INSTITUTE DEVELOPS PAS-80 ALL-PURPOSE SIGNATURE ANALYZER

Warsaw POMIARY AUTOMATYKA KONTROLA in Polish No 7, Jul 85 pp 169-171

/Article by Andrzej Hlawiczka and Maciej Nowinski: "PAS-80--Programmable Signature Analyzer System Working with a Microcomputer"/

/Excerpt/ The signature analysis of errors designed by the renowned Hewlett-Packard /1/ is a relatively new, brilliant in its simplicity and effectiveness method of testing digital equipment and systems both in the manufacturing process and in service. It may be used to test simplest elements as well as complex digital equipment and systems. For micro-processor (microcomputer) systems, this is, practically speaking, the only effective method of testing and diagnostics available now. Its use, especially with complex systems, allows for radical reductions in a diagnostic database. It may be used in manual, semi-automatic, and automatic testing.

The signature analysis of errors allows for testing with the maximum probability of an error gone undetected not greater than 0.015 percent, regardless of the length of controlled binary strings. Giving up on 100 percent accuracy in error detection allowed for an incredible simplification and standardization of the equipment and of the methodology of testing and diagnostics. The price for it is allowing for the possibility of failure in error detection, which, however, is of extremely low probability.

The equipment needed for signature analysis testing consists of a control signal and test impulse generator T and a signature analyzer AS. If the equipment tested includes in its structure a system that functions as a test generator, then only a signature analyzer is needed. When test impulses must be generated by the system T, e.g., while testing integrated circuits, the analyzer must be supplemented by such a system.

Production testing of digital elements and equipment usually requires automation. Then, the signature analyzer should be adjusted to a micro-computer that controls testing. The adjustment amounts to the ability to program automatically analyzer jobs and to read automatically measured signatures.

Such a programmable signature analyzer, called PAS-80, supplemented by a test impulse generator T, has been designed at the Institute of Electronics of the Silesia Polytechnic School and is currently being put into production by the Industrial Automation Equipment Plant (ZUAP) in Sosnowiec. The analyzer meeting the general requirements for this type of equipment and performing its function is characterized by a few original solutions that expand its scope of applicability and improve parameters of its use.

#### PAS-80 Function and Architecture

A programmable signature analyzer PAS-80, the modular structure of which is shown in Figure 1, (not shown here), consists of the following basic functional modules;

- a control system;
- a three-valued data serial streams compressor;
- a signature display;
- a status generation system;
- a programmable address decoder;
- a logical probe;
- a test impulse generator.

#### Conclusion

The programmable signature analyzer PAS-80 has been subject to a series of tests and experiments at the Institute of Electronics and at the ZUAP, where it was used to test a dedicated CRYSTALDIGRAF NC microcomputer /6/. Other hardware and software for digital systems testing used in the experiments that had been designed at the Institute of Electronics were the following:

- a system emulator /3/;
- a system emulator linked with PAS-80;
- a stimulator /2/ working with PAS-80;
- hardware and software built into K that facilitated testing and working with PAS-80.

An inexpensive automatic tester for electronic equipment, called MASTER-83, was built based on a 8080 microprocessor. The structure of the MASTER-83 system is shown in Figure 5, (not shown here). It consists of a ZX-81 personal computer, a CRT monitor, a tape recorder with a diagnostic

documentation library on tapes, a programmable signature analyzer PAS-80, and a test impulse stimulator. The MASTER system allows for testing systems that are not fit for signature analysis testing and does not require a qualified operator or knowledge of the system tested.

#### BIBLIOGRAPHY

1. Guidelines for Signature Analysis. Understanding the Signature Measurement. Hewlett-Packard AN 222-4.
2. Hlawiczka A., Huetter L., Pack R.: Stymulator do analizy sygnaturowej uszkodzen w systemach z P 8080. /A Stimulator for Signature Analysis of Errors in P 8080 Systems/. POMIARY ANALIZA KONTROLA, 1983, No 6.
3. Klawiczka A., Jura J., Sakok J.: Testowanie systemow mikroprocesorowych z pomoca emulatora układowego sprzezzonego z analizatorem sygnatur. /Testing of Microprocessor Systems by means of a System Emulator Coupled with a Signature Analyzer/. POMIARY ANALIZA KONTROLA, 1985, No 2.
4. Hlawiczka A.: Compression of Multiple-Valued Data Serial Streams by means of Parallel LFSR Signature Analyzer. /Materials from the Conference "Fault-Tolerant Computing Systems," Bonn, West Germany, September 19-21, 1984/.
5. Hlawiczka A., Kubica H.: The Method of Increasing the Probability of Detecting Errors for Signature Analysis. /Materials from the FTS and D 81 Conference, Brno, September 1981/.
6. Hlawiczka A., Nowinski M., Jezewski J.: MIT 80--Jednokartowy mikrokomputer do oceny jakosci zeliw /MIT 80--A One-Card Microcomputer for Cast Iron Quality Evaluation/. ZESZYTY NAUKOWE POLITECHNIKI SLASKIEJ, No 752, Seria Automatyka, Z.66, 1983.

12607/12276  
CSO: 2602/12

SCIENCE AND TECHNOLOGY

POLAND

## NEW SOFTWARE FOR CDC, RYAD INTERCOMPUTER COMMUNICATION

Katowice ENERGETYKA in Polish No 7, Jul 85 pp 296-298

/Article by Marek Frydryszak: "A System for Intercomputer File Transfer"

/Excerpt/ One of the characteristic features of the computers used by power industry enterprises is their incompatibility, which is due differences in their types and manufacturers. Differences in storage organization, length of (computer) words and ways of representing data hamper intercomputer communication among units using different equipment.

This problem is of particular importance in case of the National Power Distribution Control Center (PDM), which uses a CDC 3170 computer that is incompatible with ODRA computers used by districts. Besides, the computer has been used for several years now and is not reliable enough for PDM purposes. Thus, major CDC programs have been or are going to be installed on a R-32 computer located in the same building and owned by the Power Industry Data Processing Center (CIE). If the CDC breaks down, routine calculations performed on a regular basis can be done by the emergency system, provided that the files normally processed by the CDC will be copied onto the R-32.

The problem of computer replacement without a downtime is not only unique to power industry. Crucial in such situations is the ability to effectively install on a new computer the files processed by the old one.

In this article, the problem of intercomputer file transfer has been defined and a solution to it proposed based upon the INTER-SAVE system designed by the author /1/. The system enables the CDC 3170 and R-32 computers to communicate using magnetic tape. Since the conception behind it is by no means computer-specific, it may easily be extended by adding modules to communicate with other types of computers.

The INTER-SAVE system used for gradual transfer onto the R-32 computer of PLANDO, NORMAL, and other system files has turned out to be a very effective and convenient tool. It was used to transfer large binary files of complex structure like, e.g.

--the source file for the ON-LINE distribution control system database /2/;

--the files that describe the status of 750/400/220/110 kV networks with 1,700 nodes and 2,200 branches, indispensable for the GANE programs [3] and part of the PLANDO system to run on the R-32 computer;

--the files that describe reduced networks, necessary to run other modules of the NORMAL system, the TRAN network balancing program [5] the LOST stability checking program [6], and the 'fast' version of the GANE program.

After the full implementation of the emergency software package on the R-32, the INTER-SAVE system is going to be used cyclically to backup at regular intervals on magnetic tape more important files residing on the CDC disks, which will make it possible to continue calculations on the R-32 computer when the CDC breaks down.

#### BIBLIOGRAPHY

1. Frydryszak M.: Instrukcja obsługi systemu INTER-SAVE. [Operating Instruction for the INTER-SAVE System]. Opracowanie wewnętrzne CIE-SZ71, Warszawa 1983.
2. Frydryszak M.: Instrukcja obsługi bazy danych ON-LINE. [Operating Instruction for the ON-LINE database]. Opracowanie wewnętrzne CIE-SZ73, Warszawa 1984.
3. Kerner A.: Metoda wyznaczania rozplywow mocy w duzych sieciach elektroenergetycznych. [A Method of Designating Power Distribution in Large Electroenergetic Networks]. ENERGETYKA 1979, No 7 (Biuletyn IEn).
4. Kerner A., Waclawiak G.: Metoda prognozowania bilansow wezlowych w dobowym planowaniu pracy systemu elektroenergetycznego. [A Method of Forecasting Node Balances in 24-hour Task Planning for Electroenergetic System]. ENERGETYKA 1984 No 11 (Biuletyn IEn).
5. Kerner A.: Sieci zastepcze w obliczaniu stanow ustalonych. [Replacement Networks in Fixed States Calculation]. ENERGETYKA 1983 No 11 (Biuletyn IEn).
6. Kerner A., Frydryszak M.: Program LOST badania stabinosci lokainej systemu elektroenergetycznego. [LOST - A Program for Checking Local Stability of an Electroenergetic System]. Opracowanie PDM. Warszawa 1983.

12607/12276  
CSO: 2602/12

AUTOMATION OF RAILROAD TRANSPORTATION SYSTEM DISCUSSED

Bucharest STIINTA SI TEHNICA in Romanian No 7, 85 pp 8-9

[Article by Eng Vasile Olievschi]

[Text] The dynamic nature of transportation, the area over which controlled units (railroad stations, depots, switchyards) are scattered, as well as the great interdependence of their activities, have required that each problem be formulated at the level of the entire railway system.

Given these premises, it was determined from the start that the planned information systems be simultaneously introduced in all transportation units whose performance must meet the requirements imposed by automatic data processing. Once this principle was established, the transportation field was automated in successive stages concurrent with a progressive endowment of computer equipment and personnel training. The transportation field must satisfy demands that vary with time and space, and which place in operation many facilities and human resources. These specifications require that the information system provide a communication channel and a response channel, both of them operating in parallel.

An analysis of the information system has shown that the volume of data being transmitted increases more rapidly than the traffic volume. This information transmission process (reports or decisions) involves many transportation units, organized in a hierarchic structure of several levels. The best performance of the transportation system necessarily depends on the circulation of information. More than in any other branch of the national economy, decisions for immediate or future actions require the consideration of very diverse information.

Decision making information transmitted by telephone is delayed, reflects events that occurred hours earlier, is very approximate due to verbal communication and manual processing, is unsystematic and inconclusive, and is expressed by average values that conceal errors which cannot be traced. The

gap between modern railway rolling stock and the rudimentary endowment of the information system, prevented control of the transportation process and rational utilization of facilities. As a result of these realities, the central objective for the introduction of automation had to be an improvement of the information system in two simultaneous directions) the use of mathematical methods and simulation techniques for adopting strategic, long term decisions; and implementation of real-time transportation monitoring for adopting operational decisions.

First among the achievements obtained with automatic data processing for adopting future decisions, is the planning and optimization of the transportation field. Monthly, annual, and five-year plans are currently being drawn with computers for the entire railway network. Each railway station and each economic unit that requires transportation, carries out its activities according to plans formulated by computers. Naturally, planning of the transportation volume and necessary railway cars cannot be efficient without optimizing the requirements of economic units.

Optimization has established the volume of goods to be handled by each transportation sector and has eliminated crossed or uneconomical transportation, while efficiently using existing railway car resources. Automatic data processing has formulated optimum transportation models impossible to achieve by any other means, while providing conditions for reducing by about 50 percent the personnel in the ministry's units, personnel which previously worked solely on monthly planning tasks.

In establishing orientations for the development of the railway network, formulation of the investment policy for developing the transportation capabilities of the network requires laborious studies and the consideration of many variables which cannot be optimally analyzed without computer simulation. Simulation models are currently being used to develop existing railway stations, create new stations, build new railways, and double or electrify existing ones. The models analyze both the planned developments and their influences on the load of the entire existing railway network.

An important task of the transportation personnel is to establish an optimum plan for forming trains as a function of the volume of goods and travelers that must be transported, and of traffic concentration points. The computer has proven to be an irreplaceable instrument for establishing train formation stations, the number of operations and locations (car linking and unlinking) for each train, and the number of trains in each direction, while optimizing the utilization of transportation capabilities and resources.

Another area in which the computer has become an instrument routinely used by technical scheduling personnel, has been to calculate the travel times of trains as a function of each section's specialty and of energy-efficient speeds. The computer calculates schedules for freight, passenger, and electric trains of various tonnages.

The solution of a large number of problems in the railway transportation branch has led to the creation of a vast data bank which contains information that is useful in more areas than the Ministry of Transportation and Telecommunication (MTTc). MTTc's computer center has planned, implemented, and used on its own equipment, information systems for other branches of the national economy or international organizations with which we collaborate. A specialized system for foreign trade was designed and is now being used to route import/export traffic through the railway networks of European countries, along paths that are optimized for currency. Systems have been designed to automate scheduling and records for large capacity containers and for cars in the joint pool of CEMA nations.

Design of a real-time computer system for railway transportation management was started in 1972. Given the computer equipment capabilities of that time, it was decided that the building of such a system requires a large number of terminals, located in major stations and interconnected through a communication network to a powerful central computer. In 1975, the system began to be tested on a zone covering about 25 percent of the CFR (Romanian Railways) network, using imported computer equipment. By 1980, this zone was extended to more than 100 terminals located in large railway stations. At the same time, the system expanded its functions by monitoring foreign railway cars entering and leaving through border stations, and the traffic to the port of Constanta. The monitoring of foreign car activities provides decision making organs with information about the railway transportation of exported and imported goods, and controls the foreign cars rolling on the CFR network, as well as the Romanian cars abroad. The flow of goods toward Constanta is controlled on the basis of information about train traffic, the kind and quantity of transported goods, and their exportation destination. To control the utilization of railway cars, the system offers on demand, information about car loading and unloading, trains in circulation, as well as identification of trains and cars on the network.

The system was built to meet information requirements for efficient management by means of the following: direct involvement of users in all stages of creation; prefacing the implementation of the system with organizational measures at all levels, under the direct responsibility of managers; and implementing the system gradually, in stages.

The introduction of the real-time system has fundamentally changed the existing information flow of the railways, eliminating the intermediate steps of information transmission and transcription. Under the conditions offered by the system, the railway stations which generate input data have acquired special responsibilities. The accuracy and usefulness of the information depends on data collection procedures and on the timely entry of the data into the system. The personnel has gradually learned that the usefulness of the system can be demonstrated only if it is supplied with correct data. Our specialists have gained extensive practical experience in using modern methods of data base design and utilization by writing powerful management and user

interface software. The system's operation has also disclosed its limits: no matter how powerful, a central computer has a limited data transmission, processing, and storage, capacity; since all the system's components cannot be backed up, interruptions in operation must be expected; the number of terminals is smaller than the number of points at which data for the system must be generated; and maximum reliability cannot be assured even by backing up all the hardware.

The appearance of Romanian minicomputers and terminals has made it possible to improve real-time transportation management. Using all the experience acquired with remote processing, the system began to be redesigned in 1982 to use domestic computer and data transmission equipment. The software and hardware specifications of the Romanian equipment have led to a modular design for the system, by installing CORAL-4030 minicomputers at all hierarchical levels, namely at major basic units (large stations, switchyards, railway yards, ports, combines, large enterprises), at regional railway centers, and the MTTc Computer Center.

Two minicomputers are installed at each basic unit involved in automatic transportation management, and are connected to 10-20 terminals located at the major points of data generation and collection. These systems supply the information necessary for consistent and efficient management of activities in each part of the station, as well as control all switching (control of switches and switching speed).

Two CORAL-4030 minicomputers are located at each regional railway center, supplied through terminals with data from stations, and connected through intermediate speed lines with the other minicomputers. Regional centers monitor the activity of locomotives, of foreign cars, and of specialized cars for various products (cement, tar, molasses, large containers, and so on).

The design of these systems raised special problems. The design team formulated a terminal concentrator program package which allows several users to work at the same time, with formal validation of messages. A data base management system was formulated for data storage and processing, which allows the description and utilization of network data structures, simultaneous access by several users, cancellation of the effects of any program with error termination, and complete protection of the data base against software and hardware interruptions.

This type of system has already been implemented in stations (Videle, the Galati Complex), at some combines (Galati Steel Combine, Borzesti Petrocontrol Combine, AZOMURES enterprise), at the port of Constanta, and so on. Also under implementation is the monitoring of foreign cars over the entire railway network, using a distributed data base for the first time. To be sure, much remains to be done toward the unified management of transportation, using computers at all the hierarchical levels involved.

Cybernetic islands have been created to implement remote processing systems at basic units (switchyards, railway centers, ports), where decisions are taken with the help of computers. All conditions exist for the number of these cybernetic islands to increase as transportation units are endowed with new computer equipment.

The next stage is to interconnect the computer equipment operating in the railway minicomputer network now being created. This will lead to a continuous exchange of information among all units of the Ministry, as well as with other sectors of the national economy, assuring an enormous computer power which will enable the formulation of complex decisions from instant knowledge of all the factors which can influence transportation.

11,023

CSO: 2700/38

SCIENCE AND TECHNOLOGY

ROMANIA

USE OF MINICOMPUTER IN RAILROAD TELECOMMUNICATION

Bucharest STIINTA SI TEHNICA in Romanian No 7, 85 pp 9-10, 35

[Article by Corneliu Cosovanu]

[Text] The complex developments in microelectronics known as the second industrial revolution, are spectacularly manifest in both the processing and transmission of information. The constantly lower prices of increasingly powerful computer equipment have led to the wide dissemination and greater user friendliness of this equipment.

Based on similar technologies, telecommunications has developed together with the dissemination and distribution of computer resources, achieving a processing-telecommunication symbiosis, known as "teleinformatics."

Modern telecommunication technology has made it possible for distributed data processing resources, located at great distances from each other, to be interconnected and integrated into one unit for user availability.

The problem of interconnected distributed computer resources also arises for the railways, which are currently endowed with CORAL-4011 and 4030 mini-computers located at all regional railway centers. In addition to these, the major basic railway units will be endowed with minicomputers for the efficient management of railway operations. Railway minicomputers are now using, and will implement in the future, remote processing applications as part of the Remote Processing Information System for the Railway Transportation of Goods. Data is introduced and information is obtained from terminals installed in railway stations, at traffic and movement control stations, and in regional centers.

The transportation of goods between senders and receivers relies on a large number of stations, and for each railway car, from loading to unloading, requires the parallel traffic of a large amount of information. In turn, the latter requires a constant exchange of information among railway minicomputers, achieved by their network integration.

The computer/minicomputer network concept, increasingly disseminated through the most diverse areas of activity, has been adopted by the majority of the world's developed railways.

The Romanian Railways (CFR) network creates conditions for an exchange of information with other sectors of the national economy through the National Computer Network (RENAC/RENOD), or with other railways through the International Data Transmission Network (HERMES) provided by the International Railways Union. The minicomputer network is the physical support which integrates into a single unit the remote processing applications that belong to the same computer system, but are implemented on distributed processing resources. The integration is designed so that the data is introduced only one time and reused for any application, independently of the location of the minicomputer on which the application is implemented; the resulting information can be obtained at all levels of the transportation management process, such as stations, traffic control points, as well as regional and central locations.

In order to satisfy these requirements, terminal users must be given access to processing facilities for data input and information retrieval; to data processing, such as validation, error flagging, memory storage, output processing, and so on; and information transfer among the various resources of the minicomputer network.

Users have access to applications implemented on terminals, which are located in stations, traffic control points, regional centers, and at CFR, consistent with the hierarchical structure of transportation management. The terminals are connected by low speed telegraph lines to minicomputers which serve as terminal concentrators.

For its necessary general functions, the railway minicomputer network has the following components: a communication network composed of nodes, specialized minicomputers located at regional centers, and interconnected by intermediate speed transmission lines; and subscribers to the communication network, as well as terminal concentrators and processing minicomputers connected to nodes. Depending on their position in the network, and on the demand, some minicomputers serve the multiple functions of terminal concentrators and processors. These minicomputers are located in basic units for applications of local interest, and at the Computer Center for applications regarding the railway network as a whole.

The design of the minicomputer network with the communication network as a distinct component has a number of advantages, such as: applications implemented on computer resources are independent of the configuration of the communication subnetwork; new computer resources (minicomputers and computers) can be connected for other applications; the communication subnetwork can be developed with new nodes and lines, and by increasing the transmission speed, without affecting the applications that use it; good reliability for data transmission can be assured since interrupted connections between two nodes do not affect the network's operation, and since the dropping of one node merely disconnects its subscribers.

As we have mentioned, users have access to remote processing applications on the minicomputer network through messages on terminals, which are coded by types of input and output, and within each type, by the nature the data entered and information retrieved. All the messages are structured by lines, each line being composed of data fields with well determined functions. User access to applications requires the completion of successive functions both in terminal concentrators and in process minicomputers interconnected through the communication network.

The terminal concentration function includes: management of low speed lines which interconnect terminals, and data collection from messages arriving from each terminal; validation of line format and of each field in the format, and format error signaling to terminals; assembling message lines and transmitting them to application programs through the communication network; receiving output messages from application programs and sending them to terminals.

The building of a railway minicomputer network is a highly complex project involving various items of computer equipment and software which must be assembled in an operational whole.

Since railway transportation is a continuous process, the railway minicomputer network must also operate continuously. Given the large variety of equipment involved, particular attention must be devoted to reliability through good product quality, optimum installation, and by backing up major components. The complexity of the problems and their novelty make it necessary to schedule the installation in stages so that the minicomputer network will develop gradually from existing equipment. The stages are determined by available equipment and are characterized by the overall configuration of the network and the function specialization level of the minicomputers. Using a small number of terminals in the first stage, the load on regional minicomputers will be relatively low, allowing them to fulfill the multiple functions of terminal concentrators, processing, and communication nodes. In this stage, carried out in 1985, regional minicomputers are connected to a process minicomputer dedicated to applications at the level of the entire railway network, through a central communication node. The communication subnetwork to separate node functions on specialized equipment, is the second stage, planned for 1986 as a distinct component of the minicomputer network. Following completion of this stage, it will be possible to develop the minicomputer network by connecting new resources, increasing capacities, and adding new applications.

A large number of hardware, software, and telecommunication specialists from many units contribute to the building of the minicomputer network. The equipment is produced at the Computer Factory and at the Enterprise for Peripheral Equipment; the communication software (MININET) for terminal interconnection is written by the Computer Technology Institute; and the connecting lines for terminals and minicomputers are supplied by the specialized directorate of the Railway Department. As general contractor of

the minicomputer network, the Computer Center of the Ministry for Transportation and Telecommunication oversees the formulation of general concepts, the implementation of remote processing applications, and together with regional computer centers, the current utilization of implemented applications.

To the best of our knowledge, this minicomputer network places our country's railway at the level of those in developed European countries, with information technology becoming a wish come true, an everyday tool, for our railway workers.

11,023

CSO: 2700/38

SOCIOLOGY

HUNGARY

UNEMPLOYMENT PROBLEMS, FACTS IN THREE POORER COUNTIES

Budapest HETI VILAGGAZDASAG in Hungarian 21 Sep 85 pp 34-36

[Article by Endre Babus: "Tomogram"--boxed material as indicated]

[Text] In two Hungarian cities the proportion of unemployed jobseekers amounts to between 2.5 and 3 percent of the potential work force. This is the conclusion that we may draw from a recent report of the State Office of Wages and Labor Affairs. The facts clearly show that shortages and surpluses can co-exist in the labor market, for regional and structural reasons.

It is hardly necessary to sound an alarm, and it would be misleading to exaggerate this phenomenon. But no matter how insignificant the number of persons unable to find employment in Hungary at present may seem, the situation of this stratum will soon require an institutional solution.

During a single month, in July of this year, the number of unemployed jobseekers in Hungary rose by 344, to a total of 3,182. Of course, the figures released by the State Office of Wages and Labor Affairs (ABMH) reflect only the reports of the employment offices. The unemployed who did not seek help from the placement service are not included in these statistics. If we include also these unemployed, then the group of jobseekers--according to the estimates of some experts--would be two or three times greater than the figures released by the ABMH. And it is likewise true that while manpower surpluses are encountered in a few regions, in most districts of Hungary the manpower shortages remain significant, although their scale is diminishing: at the end of July, the enterprises informed the employment offices of 57,877 vacancies.

In any event, the monthly reports that the ABMH has been releasing since 1982 are helping to dispel a misconception of old standing: that the great demand for manpower, as reflected in the national statistics, excludes automatically and everywhere the possibility of oversupply in the labor market.

Unemployment is rising primarily in the northeastern regions of Hungary--in Borsod, Hajdu, and Szabolcs Megyes--but unemployment problems are appearing in some microregions as well. The situation is the most critical in two towns in Szabolcs Megye, namely in Nyirbator and Kisvarda. There, according to the figures released by the ABMH, the number of unemployed jobseekers at the end of July was, respectively, 201 and 293. This equals between 2.5 and 3 percent of the local potential labor force. In Kisvarda this manpower surplus,

Vacancies and Jobseekers in 109 Towns and Cities in Hungary on 31 Jul 85, per ABMH Report

	(1) Betöltetlen munkahelyek		(2) Munka-keresők		(3) az 1984. július 31-i állapothoz képest, százelekben		(4) az 1984. július 31-i állapothoz képest, százelekben		(5) az 1984. július 31-i állapothoz képest, százelekben			
	száma	aránya	száma	aránya	száma	aránya	száma	aránya	száma	aránya		
Ajka	232	11	86,9	73,3	123	5	79,1	83,3	645	14	80,6	100,0
Baja	526	38	74,9	146,2	75	23	77,3	95,2	4	27	—	128,0
Balassagyarmat	134	8	106,3	114,3	305	23	66,8	69,7	128	46	132,8	127,0
Balatonfüred	22	6	31,4	130,0	972	29	67,0	170,0	45	46	132,4	106,3
Barcs	31	17	142,0	100,0	29	19	50,9	107,4	277	13	111,5	100,0
Békés	103	24	114,4	200,0	19	23	95,0	109,0	91	4	66,1	100,0
Békcsabab	872	12	89,0	80,0	306	13	98,4	71,4	836	6	100,5	85,7
Berettyóújfalú	2	39	100,0	121,9	373	11	88,8	21,2	73	—	130,9	—
Bonyhád	32	14	70,6	107,0	118	40	62,7	105,2	138	21	84,7	123,5
Budapest	15 610	56	86	—	413	293	84,1	102,0	25	1	96,1	100,0
Cegléd	73	50	98,6	102,0	249	16	111,2	114,3	2211	5	112,3	100,0
Celldömök	228	8	76,7	133,3	80	22	103,9	95,6	143	10	150,5	125,0
Csongrád	104	17	85,2	120,8	65	8	76,6	80	507	91	83,3	130,0
Csorna	64	5	128,0	125,0	82	—	—	—	412	1	86,5	100,0
Debrecen	2 449	178	98,8	145,9	118	9	104,4	50,0	175	13	97,7	142,8
Dombóvár	50	14	79,0	93,3	35	23	71,0	143,0	16	7	53,3	42,8
Derec	962	1	111,0	100,0	185	—	—	—	28	24	84,8	75,0
Dunakeszi	180	—	—	—	80	4	470,5	50,0	2	—	—	—
Dunaújváros	959	—	—	—	200	118	105,6	83,7	2 169	84	136,7	99,0
Eger	1 211	2	55,4	100,0	48	47	94,1	75,8	87	34	110,0	108,0
Encs	16	26	—	123,3	224	17	119,1	425,0	1 617	55	101,6	100,0
Esztergom	649	—	—	—	2 041	40	95,3	62,5	693	—	69,2	—
Erd	70	66	131,6	90,4	139	33	98,5	86,8	104	38	97,2	158,0
Fehérgyarmat	78	75	56,0	127,0	41	1	132,2	100,0	279	19	86,9	95,0
Gödöllő	255	23	98,4	328,5	303	2	107,8	100,0	334	93	55,7	157,6
Győr	1 085	16	97,8	160,0	91	47	137,0	112,0	831	—	37,6	—
Győr	1 969	5	100,9	164,0	207	17	105,0	121,4	5	18	101,8	99,3
Gyula	393	13	103,7	166,7	90	2	57,7	100,0	53	17	79,1	188,8
Hajdúbagos	58	36	90,6	124,1	61	201	72,6	93,5	38	10	17,4	66,7
Hajdúhadháza	51	11	100,0	100,0	1 067	82	84,3	126,2	334	9	107,3	64,2
Hajdúszoboszló	133	—	—	—	162	82	103,2	122,4	73	22	143,0	85,0
Hatvan	461	—	—	—	515	10	62,3	123,1	340	1	100,0	100,0
Heves	162	64	96,4	91,4	127	133	118,7	100,8	1 115	62	95,5	101,6
Hódmezővásárhely	438	—	—	—	122	18	110,9	105,9	211	77	13,2	10,3
Jászberény	403	8	139,4	160,0	220	4	91,7	40,0	29	8	76,3	57,1
Kalocsa	35	6	92,1	66,7	319	15	82,0	107,1	128	3	154,2	300,0
Kaposvár	787	19	102,6	135,7	3 208	50	93,7	263,2	57 877	3 182	89,2	112,1
Kapuvár	123	5	79,1	83,3	185	23	71,0	143,0	16	7	53,3	42,8
Karác	74,9	38	74,9	146,2	80	4	470,5	50,0	28	24	84,8	75,0
Kazincbarcika	134	8	106,3	114,3	200	118	105,6	83,7	2 169	84	136,7	99,0
Kecskemét	22	6	31,4	130,0	48	47	94,1	75,8	87	34	110,0	108,0
Keszthely	31	17	142,0	100,0	224	17	119,1	425,0	1 617	55	101,6	100,0
Kiskőrös	103	24	114,4	200,0	2 041	40	95,3	62,5	693	—	69,2	—
Kiskunfélegyháza	872	12	89,0	80,0	139	33	98,5	86,8	104	38	97,2	158,0
Kiskunhalas	2	39	100,0	121,9	41	1	132,2	100,0	279	19	86,9	95,0
Kisújszállás	32	14	70,6	107,0	91	47	137,0	112,0	334	93	55,7	157,6
Kisvárd	73	50	98,6	102,0	207	17	105,0	121,4	5	18	101,8	99,3
Komárom	228	8	76,7	133,3	61	201	72,6	93,5	53	17	79,1	188,8
Körmend	104	17	85,2	120,8	1 067	82	84,3	126,2	38	10	17,4	66,7
Kőszeg	64	5	128,0	125,0	162	82	103,2	122,4	73	22	143,0	85,0
Kézdivásarmány	2 449	178	98,8	145,9	515	10	62,3	123,1	340	1	100,0	100,0
Lénárt	50	14	79,0	93,3	127	133	118,7	100,8	1 115	62	95,5	101,6
Lent	962	1	111,0	100,0	122	18	110,9	105,9	211	77	13,2	10,3
Maklár	180	—	—	—	220	4	91,7	40,0	29	8	76,3	57,1
Márca	959	—	—	—	319	15	82,0	107,1	128	3	154,2	300,0
Mátészalka	1 211	2	55,4	100,0	3 208	50	93,7	263,2	57 877	3 182	89,2	112,1
Ménfőcsanak	16	26	—	123,3	185	23	71,0	143,0	16	7	53,3	42,8
Miskolc	649	—	—	—	80	4	470,5	50,0	28	24	84,8	75,0
Molnás	70	66	131,6	90,4	200	118	105,6	83,7	2 169	84	136,7	99,0
Mór	78	75	56,0	127,0	48	47	94,1	75,8	87	34	110,0	108,0
Mosonmagyaróvár	255	23	98,4	328,5	224	17	119,1	425,0	1 617	55	101,6	100,0
Nagykanizsa	1 085	16	97,8	160,0	2 041	40	95,3	62,5	693	—	69,2	—
Nagykőrös	1 969	5	100,9	164,0	139	33	98,5	86,8	104	38	97,2	158,0
Nagylók	393	13	103,7	166,7	41	1	132,2	100,0	279	19	86,9	95,0
Nyírbátor	58	36	90,6	124,1	303	2	107,8	100,0	334	93	55,7	157,6
Nyíregyháza	51	11	100,0	100,0	91	47	137,0	112,0	5	18	101,8	99,3
Órsháza	133	—	—	—	207	17	105,0	121,4	53	17	79,1	188,8
Ózdi	461	—	—	—	90	2	57,7	100,0	38	10	17,4	66,7
Paks	162	64	96,4	91,4	61	201	72,6	93,5	73	22	143,0	85,0
Pécs	438	—	—	—	1 067	82	84,3	126,2	340	1	100,0	100,0
Pécs	403	8	139,4	160,0	162	82	103,2	122,4	1 115	62	95,5	101,6
Pécs	35	6	92,1	66,7	515	10	62,3	123,1	340	1	100,0	100,0
Pécs	787	19	102,6	135,7	127	133	118,7	100,8	1 115	62	95,5	101,6
Pécs	438	—	—	—	122	18	110,9	105,9	211	77	13,2	10,3
Pécs	403	8	139,4	160,0	220	4	91,7	40,0	29	8	76,3	57,1
Pécs	35	6	92,1	66,7	319	15	82,0	107,1	128	3	154,2	300,0
Pécs	787	19	102,6	135,7	3 208	50	93,7	263,2	57 877	3 182	89,2	112,1

Key:

1. Vacancies
2. Jobseekers awaiting placement
3. Number
4. Percent of number on 31 Jul 84
5. Total

very significant for Hungary, exists since last year when the Tungsram Corporation laid off the 220 workers of its local light source factory, and the Hunnia Hybrid Cooperative Farm Partnership laid off its 50 workers. In Nyirbator, on the other hand, there were no major layoffs. The town traditionally has been providing few job opportunities for its residents.

There were over 100 unemployed jobseekers of record in each of the following three Hungarian cities: Debrecen (178), Ozd (133), and Mateszalka (118). In eleven other provincial centers (Pecs, Oroshaza, Szekesfehervar, Hatvan, Tata, Erd, Nyiregyhaza, Fehergyarmat, Szolnok, Szekszard, and Veszprem) there were between 50 and 100 jobseekers of record at the end of July.

Unemployment in most of the listed localities is structural: jobseekers are unable to fill the often many vacancies, for a variety of reasons--due to a lack of skills, for example. But there are a few localities in Hungary where the number of vacancies falls short of the number of jobseekers even in an absolute sense. In addition to Ozd and Nyiregyhaza as already mentioned, that is the situation at present in Tiszafured, Berettyoujfalu, Satoraljaiújváros, Sarospatak and Encs.

There is every indication that Szabolcs-Szatmar among the 19 megyes has the most serious unemployment problems. The history of this megye also reveals what serious consequences result from failure to create enough jobs in a region. The megye now has a population of 578,000. Since the war, every fourth family--about 190,000 persons in all--have moved to other regions in Hungary. This emigration is still continuing: between 1,000 and 1,400 Szabolcs-Szatmar Megye residents, mainly young people at the start of their careers, will be leaving their place of birth, looking for work. Gabor Juhasz, chief of the megye council's labor department, explains: "Investment in Szabolcs-Szatmar Megye has always been lower than in the other regions of Hungary, except in a few years. At the same time, our birthrate is about twice the national average."

According to the ABMH report, the number of jobseekers in Szabolcs-Szatmar Megye was 793 in July. According to the figures compiled by local public administration, however, the number of unemployed jobseekers was 3,600, or more than four times higher. Here again the difference between the two figures stems from the fact that only a fraction of the jobseekers came to the four employment offices operating in the megye. Incidentally, the situation has been steadily deteriorating in recent years. The number of persons gainfully employed dropped by 1,200 the year before last, by 1,840 last year, and by 2,780 in the first half of this year. At the same time, agriculture in the megye is regarded as the "employer of last resort." The local agricultural cooperatives and state farms admit to a disguised unemployment of about 3,000. The situation in Szabolcs-Szatmar Megye now, on the eve of the new five-year plan, is the same as it was at the beginning of the 1980's: the number of unemployed jobseekers 5 years from now could reach 7,000 or 7,500. This level of unemployment had already been predicted for 1985, but in the first half of this decade unemployment was finally reduced to half this level, with aid from the central government. During the past four years the megye received 97 million forints from central resources (from the central fund for regional

development, for example) to create jobs. According to the regulations, the grants could not exceed 20 percent of the cost per investment project. Such grants have been or are being used to build the Nagykallo plant of the Hungarian Cloth Factory (Magyar Posztogyar), the Nyirbator plant of the Quality Shoe Factory (Minosegi Cipogyar), and the new plant in Fehergyarmat of the Iklad Industrial Instrument Factory (Ipari Muszergyar).

"If we wish to avoid a rise of the surplus manpower in the megye to twice its present level, the limit on grants to establish local industries will have to be raised to 40 or 50 percent of the investment cost per project," muses Gabor Juhasz. According to the labor department chief, Szabolcs-Szatmar Megye is attaching great hopes to the National Planning Office decision that a development plan must be drafted for the economically underdeveloped regions. The eastern part of our easternmost megye--in other words, the Tisza levee, the Szatmar plain, and the South Nyir Region--has the greatest need for new industries and for the development of the industrial infrastructure.

In addition to its territorial dimensions, the social aspects of the problem of rising but unquestionably local unemployment also deserve attention. The declining job opportunities affect primarily the handicapped, the unskilled, the workers whose employment record shows that they quit their last job, and the persons under police supervision. The proportions of Gypsies in all these categories is conspicuously high. The situation of workers left without jobs is the more serious in that they lose not only their wages, but also their sick pay, family allowances and child-care allowances; because in Hungary these benefits are not social entitlements for the time being.

The ABMH is of course seeking also other solutions to alleviate the problems of unemployment, besides finding job opportunities abroad, introducing assistance for retraining, and other measures. The idea perhaps closest to realization is the introduction of public work projects for those who are unable to find other work. The plan at present is to employ such workers for sanitation work, materials handling or park maintenance, for example, and to pay their wages partially or entirely from the state budget. According to some reports, this form of employment, when finally introduced, will be tried out first in Baranya and Szolnok Megyes.

In any event, the situation of unemployed jobseekers in Hungary can be termed rather contradictory at present. For the 15 June 1957 Decree of the Minister of Labor is still in effect. It calls for paying unemployment compensation to workers unable to find jobs. Pursuant to this decree, unemployment compensation may be paid, for example, to urban residents who at their place of residence or in its immediate vicinity are unable to find work corresponding to their skills and physical condition. The amount of unemployment compensation is 30 percent of pay, but at least 300 and not more than 600 forints [a month]. However, the local council may pay unemployment compensation over a period of 6 months at most, from an appropriation that the Ministry of Finance provides for this purpose.

This decree is still in effect, but--as the ABMH has confirmed--it is not being implemented anywhere at present. We wonder what would happen if some unemployed jobseeker were to claim unemployment compensation from the agency specified in the decree: the finance department of some municipal council?

SOCIOLOGY

GERMAN DEMOCRATIC REPUBLIC

EDUCATOR STRESSES IMPORTANCE OF DEVELOPING GIFTED STUDENTS

East Berlin JUNGE WELT in German 6 Sep 85 p 6

[Interview with Professor Dr Guenther Hellfeldt, director of the department of pedagogy and psychology at the Wilhelm Pieck University in Rostock, by Marion Klotz: "No One Is Ungifted"; date and place not specified]

[Text] What are skills? Are they innate? How does one recognize exceptionally gifted people? How do we deal with fostering them? Information is provided by Professor Dr Guenther Hellfeldt, director of the department of pedagogy and psychology at the Wilhelm Pieck University in Rostock, who has worked intensively for years in the area of fostering talent.

[Question] Do you consider yourself gifted?

[Answer] Yes, I would even say broadly gifted. I could have devoted myself to various areas. Skilled labor appeals to me very much, for example. I am an engine fitter and would have liked to have helped build ships. When I was in school I even wanted to become a graphic designer.

[Question] Why then did you devote yourself to pedagogy and psychology?

[Answer] Because looking into human behavior, motivations and actions, as well as passing along my knowledge to younger people, appeals to me. Besides, being gifted is not the same thing as being exceptionally gifted.

[Question] What do you mean by that?

[Answer] Every person has certain premises for achievement which enable him to achieve a great deal in one or several areas. Interest in something, diligence, ambition, pleasure in acting creatively--these are the decisive factors that contribute to developing a skill, which can indeed only come to fruition through intent, successful learning. OK, and as far as the exceptionally gifted are concerned, they distinguish themselves through totally and constantly high achievement in an area, as well as by being very imaginative and inventive or by easily carrying out nearly every task.

[Question] Even a mathematical genius in, say, a circus?

[Answer] Yes, why not? However, despite my esteem for the work of such people, it is not the focus of my interest. I am primarily interested in the broad development of skills for our scientific and technological offspring.

[Question] How many exceptionally gifted students do you think there are in our republic?

[Answer] That's not so easy to say. In a study conducted in 1981 and 1982 in 34 secondary schools with 10 grades in four districts of our country, a study group in our department established that class instructors described 19 percent of their students as exceptionally gifted, while the figure was 14 percent for school directors and 9 percent among students in the ninth grade describing their fellow students. In mathematical and statistical terms, this comes out to 16 to 25 percent of all students. These exceptional students, and primarily those gifted in scientific and technological areas, are of course of particular interest to us today, seen in societal terms. However, this does not mean that other talents are being thoughtlessly neglected. This would contradict the humanistic character of our socialist state.

[Question] Are skills innate?

[Answer] No. No one is gifted from the outset. It is up to parents and educators--to put it succinctly--to make their adolescents gifted. The formation of any gift begins with stimulating creative activity from the earliest age--with technical building blocks or guessing games, for example, which challenge the intelligence of children. If we want to develop talents, the very first thing we must do is teach the ability to think. The only things that are actually innate are certain anatomical and physiological conditions, which in some areas are quite essential. For example, the muscle structure of a dancer or the gripping range of the hands of a pianist.

[Question] Are there people with no skills whatsoever?

[Answer] Every child demonstrates some kind of skill, be it linguistic, mathematical, technical, organizational, in sports or in the visual arts. Initially, a skill often develops through the pleasure in carrying out a task, through the success achieved in doing so. Whereby of course the qualification must be made that levels of skills can be very diverse.

[Question] Is the stimulation of skills then an "invention" of our times?

[Answer] No. It was around earlier. But certainly not to the extent and with the quality seen today, and mostly only with the intention of the "sponsor" to himself receive praise. Take for example Johann Gottlieb Fichte. Born as the son of a ribbon weaver in 1762 in the town of Rammenau in Upper Lusatia he was fortunate enough to be sent to the Pforta School by the landowner Baron von Miltiz, who learned of the boy's talent from the town schoolteacher. Without the vision of his teacher and of this patron, Fichte could scarcely have become the world-famous philosopher that we know him as today.

[Question] How do we currently approach the stimulation of skills in view of the frenzy in scientific development and of the necessity to achieve maximum output in scientific and technical areas even more quickly than before?

[Answer] I would be happy if I could say that things are going well in this area. Unfortunately, however, it is precisely the technical and scientific areas with which we are still dissatisfied. In part, these skills are not at all being recognized.

[Question] And how can that be changed?

[Answer] Primarily through individual work with every student. The crucial point is thus not only help for boys and girls who have fallen behind, but also challenges for the best students through new and more ambitious exercises. I know that this is no easy task for a teacher in a day-to-day situation. And yet, I talk to my students about this again and again, in order that they in fact see the stimulation of skills as an essential component of day-to-day education work and not as an additional chore. In this way, for example, a student interested in physics can become involved in the preparation of the lesson by the teacher through being entrusted with a particular area that he must convey to his fellow students. I am particularly concerned in this sense with the examination phase of secondary school graduation, which includes practically all of the final semester. I think that this long period could be better used for the individual stimulation of our most talented students.

Of course, there are special classes and schools for exceptionally gifted students. For example, in Karl-Marx-Stadt the fourth special science and technology school in our country--with an emphasis on mechanical engineering--is currently being developed.

[Question] Professor Manfred von Ardenne once said that one could become a good researcher even with poor grades in German. What do you say to that?

[Answer] Yes, of course such people can make outstanding achievements. And yet, I am against stimulating a highly gifted student exclusively in his specialized area. It is precisely they who need a very solid Marxist-Leninist background, extensive knowledge of history and geography, and languages as well. After all, many of them are our future leaders.

[Question] It is also especially important to promote skills outside school, in study groups, in student organizations and in specialist groups.

[Answer] Absolutely. This is why I very much welcome the fact that our youth organization has set a goal of forming 1,000 new study groups--especially in electronics and electronics technology, in construction and in agriculture--before the 11th party congress of the SED. Through this, boys and girls can especially learn to master these areas more independently. And if a skill is to continue to develop, it needs incentives, it needs societal recognition. In competitive sports, this works our fine. On the other hand, the winner of

an international mathematics competition, for example, was not even publicly honored by his own school. We should not treat gifted young people like this.

[Question] Boys and girls also need contact with outstanding innovators, skilled workers and scientists. How can we encourage this?

[Answer] Researching and puzzling over things can ultimately only be experienced and comprehended through personal contact such as this. Naturally, such relations do not develop on their own. The members of the FDJ [Free German Youth] can themselves take responsibility for organizing them. A good example of this--as well as of the fact that new skills are always being added--is provided by Robotron Dresden through computer courses. Company engineers are involved here with some 60 interested students and are helping to develop skills in this area. This stimulating atmosphere is present in our schools and at the factories whenever educational collectives, sponsors and FDJ groups can talk together about pedagogic intentions and the students can themselves make suggestions.

12271

CSO: 2300/65

SOCIOLOGY

POLAND

TREATMENT OF RURAL THEME IN LITERATURE

Warsaw KULTURA in Polish No 17, 25 Sep 85 pp 1,4

[Interview with Julian Kawalec by Maciej Chrzanowski; date and place not specified]

[Text] When I looked towards the village from the fields, it did not stir, as if it were deserted. But I knew that somewhere in the orchards, behind the fence, in the barn or beyond the corner of a house there was watching with ancient, red eyed, rabbit-like vigilance the eye of the village and it sees me even if I do not see it.

Julian Kawalec: "Szukam domu" (Searching for a Home)

[Question] To what extent has literature in its representation of the so-called rural theme, reflecting the transformation of the post-war Polish village, documented its actual change?

[Answer] I believe that it has been extensive. Literature has depicted the problems of the village, its inhabitants, reality, culture and, in an indirect, artistic manner, of course, if authentic in its portrayal of the changes that have taken place. These changes were so violent, tremendous and so profound that writers were forced to realize its reality rather than creating a variation of it. After the war, perhaps the most significant, piercing, most moving events imaginable had in fact taken place in the countryside. The most pronounced example of this, however, is the movement of people, changes in their environment and lifestyles, that which is often referred to as progress. Similar occurrences had to become a subject of literature. The village, its environment, saw to this.

And so I have to confirm the truth of what you had asked. However, let us not forget that literature is an art form whose nature it is to systematically present the full view of the world in order to do this in an appropriate manner. Often the task is tedious, beginning from a first emotion which then leads to an orderly, rational reflection.

[Question] My question implies the charge sometimes put forward by critics that literature on rural themes is mythologizing, idealizing, that it does not have anything in common with the realities it supposedly portrays.

[Answer] Mythologizing, a myth. There is no truth in this whatsoever! It is warranted by reality itself, justified by everything on earth. A myth! How do I understand it? There exists a style, perhaps born of affection. Even if I am furnished with a mythological land, peasant, bread, work, I think of it as a sign of affection. Already in my early life, as a child, as a boy, I was accustomed to hard work. Whenever I had gone to the fields with my grandfather to plow, he went on the land as if he were walking into a church. Perhaps even with more respect. He prayed before the plow. He treated the land as if it were something holy. He did everything he could to replenish the land. When the field was plowed and harrowed and grandfather finished sowing the land, for sowing had to be done by someone with experience, he then backed away and examined the field. With his hands, he removed clods of earth from the balk and threw them on his plot of land, believing that each lump of earth effected growth. He considered the land to be a thing of praise, a thing of holiness. He imposed a higher value on the land because there was little of it, because it provided subsistence. It was seen as a type of deity, resulting in the myth that later reverted to literature. One should not consider mythology as being a demeaning factor, particularly when myths exist in life, are creative and carry ever changing meaning.

I cannot advise critics; they are individuals with their own points of view. It would, however, be ideal if they in fact could look at its source, asking themselves how the myth arose. A myth does not always fall from the sky or arise out of thin air. It is a flower rooted in actual experiences. All myths arise from childhood experiences. When a piece of bread fell on the floor or on the ground, one had to immediately pick it up and kiss it, begging its forgiveness. Father saw to this either with a stick or belt. We were taught to have respect for common things. After all, land is a common thing; to us it was dark in color, ash-like and silty. An agronomist could describe it more precisely. For the most part, the peasant knew that the land gave him life. That is why when the fields were covered with sheafs and the weather was good, the peasant went to work the fields even on Sunday.

[Question] Sir, you always use the past tense in speaking of rural life.

[Answer] Unfortunately, yes.

[Question] You provoke me then to ask my next question in this manner: is the rural theme only a form of intellectual sentiment, does it have anything in common with plebeian literature and with those values that are often attributed to it?

[Answer] I understand your doubts. Let us again return to mythology. During the war, the front stood near the area where I lived. Our village was liberated in July, the month when the harvest began. Even though the Germans were shooting at them from the other side of the Vistula River, near the mouth of the San River, overlooking our valley and village, the peasant men went to the fields to scythe. My father was one of them. There was a large haystack on his field and

when the schrapnel fell too thickly, he lay in it, covering himself. When the shooting stopped, he continued to scythe. He knew that a day of rest was not going to save him and his family but rather the result of the harvest. Such situations demand mythological treatment.

[Question] We again return to your childhood and again you use the past tense when speaking of the peasant way.

[Answer] I am returning to the days of my childhood because I am referring to my experiences. I often ponder the meaning of my work. Why do I write? In reality, a person writes of his own accord, yet I have my doubts. I can only say that I would like to tie the past with the present because a considerable amount of ills could be corrected or removed with the help of the past, a good past. I am speaking mainly of ethical values, morals, relation to work, thrift, respect for a hardworking person.

No one in the village laughed at anyone who was disfigured by hard work. It was prohibited, for this was a saintly person, one whose sainthood arose from his hard work. He was referred to as a worker, not in today's meaning of the word, but as one devoted to work.

I indeed write about these positive traits, even though they were not the only ones to be found in the countryside. Transmitting positive traditions would prove useful. The present should not loathe the past which has a bearing on tomorrow and influences the direction of dreams.

[Question] A certain cult often develops around the most straight-forward of occupations. They become glorified and placed above all others. I'm not sure whether this is the best plan of action for the future, a way of thinking making it possible for us to enter the 21st century.

[Answer] Yes, exactly.

[Question] This observation contains a certain paradox, a certain injustice, because in all practicality, only the rural them in literature has presented an ethos of peasant work, one which the worker or intellectual has not lived to see. Perhaps that is why the most highly anticipated publications are those concerned with the rural them. And with such a large following, increased demands are placed on this literature, readers do not, for instance, want to be satisfied with the presentation of simple contrasts between the city and village; for instance, in the village people work, but in the city, it is uncertain what they do.

[Answer] Please, this would be an exaggeration. This would only be said by dogmatists and schematists. A work ethos does in fact concern, as you have said, the simplest of work. But one can, after all, convey its practice and principles to all other situations. This does not only concern fully realizing a given task. A mental base is also important, as is philosophy. The philosophy that existed was as follows: grandson, if you do not work hard then you will never achieve anything; or, to achieve anything requires you to work hard. This could also be easily applied to other occupations, whether physical or intellectual. It is possible to work hard not only in agriculture, for as we both know, one can equally work hard in front of a desk.

Therefore, I do not see any limitations and hence continue to return to the past, to the order, past, present, future. Progress is not an automatic process. Sometimes I have to back up, even fail in order for it to be easier to move ahead in the future. I have an incentive, I have an example I can use to motivate myself. I am of another generation. You are young; perhaps this is why my words may sound like the grumblings of an old man. I do not think of myself as such, but rather as one who is cognizant of the future. It, however, angers and worries me that one could cast away good baggage along the road, apparently because of a sudden change in culture. One cannot relieve oneself of one's past with impunity. Culture is a continuous process, a series of events.

[Question] I fear, however, that some sort of intellectual sentiment is connected with this. I am certain that we are not speaking of the type of culture and personal philosophy which could shape the thinking of today's village.

[Answer] The contemporary village is of a different sort. It is as if it no longer exists. The village has undergone change. It has become wealthier and there no longer is a hunger for land. If we speak of economic factors, one can see many positive changes in the village. Beautiful homes (made of brick or cinder block) are to be found in the village where once there were only ones made of straw and wood. The peasant was waiting for civilization. He was never backward. He had always dreamt of owning machines but could never have them. Unfortunately, he bowed so low to the civilized lady that it is somewhat disquieting, because a peasant who forgets who he is becomes empty. He has no opportunity to reflect on his social position and therefore loses his identity. He knows more of the world than of himself.

[Question] Perhaps this is only transitory?

[Answer] I suppose it could be. The phenomenon, however, is troubling and exemplifies a departure from cultural interests. Currently, there is a drive to own more land. Villagers are buying more material goods in order to appease their hunger after a time of shortages. The village is saturating itself, even more so than in other areas, but its inhabitants continue to work hard.

Pre-war performers of Moliere and Fredro had to play in barns because there were no culture clubs. Today, the rural area is filled with them, often built by the people themselves, and people rejoice over them, but do not use them. They do not have the time or simply do not wish to have it. They work in industry or on the land and only think of becoming rich.

There is no such thing as a peasant any more. He is now called a producer, a term which he dislikes because it sounds as if he were a machine being turned on and off, on and off. At the very most, he will say that he is a farmer but not a peasant.

And the word peasant? Even if the word peasant is pejorative to some people, it is for all practical purposes a description of a certain type of person. It not only refers to an attachment to an occupation but also to a faith. Perhaps this was true at one time but now is not? No longer is there faith in the land, faith in a place, stubbornness, in the good sense of the word, and perseverance.

People now yearn to live in a new apartment building, in a small apartment. A boy from the village who decides to stay on his father's land, and there are not many, has a problem finding a wife because girls too are scurrying to live in apartment buildings.

[Question] Sir, you are a writer and not a sociologist on village life. Let us resume our discussion of literary output itself. What is in store for the future, what sort of artistic consequences will arise from these problems?

[Answer] These problems are inspirational. They create a feeling of sorrow, yet at the same time, one of joy. It is a feeling of ambivalence. I am pleased that the village is different from what it was, that it is prosperous and modern, though often ugly in appearance, pretentious and tending to imitate all urban social ills. Yet at the same time, it saddens me that it has changed, that rusticity, in the best sense of the word, could not be preserved. Again I am talking too much about the village itself. Let us return to literature.

[Question] In that case, let us try again. What next? What will result from this transformation? What will follow Mysliwski's "Kamieniu na kamieniu" (A Rock on a Rock) which is recognized as the culmination of a certain developmental stage in the rural theme?

[Answer] What next? There is still much that needs to be done.

[Question] How does it appear in your case? Where are you taking it?

[Answer] I will also continue in my work. My next book which is still in the writing stage consists of chaotic entries, points of reference, wanderings of the imagination from the past to the present, even into the future. The book is autobiographical and carries the title "Biadolenia" (Lamentations). The title may not appeal to everyone, but I will insist on its being called "Biadolenia". Let us say that the book discusses the past and the present, and provokes a kind of confrontation. I would like for this book to show the purpose for a mythological approach and its strong presence. Why did I write in such a way? Some believe that it was not because of some deeper motives but that it simply took my fancy. No, this was not the reason. I want to prove that myths have a deeper purpose, that their justifications lie in life, in the land which sustains them. Though imagination also plays a certain role, it does not constitute the core of the work. I treat this book as if it were already a certain recapitulation of my life.

[Question] Isn't it still too early for this?

[Answer] It seems that a person always likes to relate his life; apparently there must be some reason for this.

In this book, I did not give much thought to writing style, artistry, if one can term it that, or literary character. I even added journalistic passages. What will come of all this? Well, that will depend on your critic friends.

If the village and its inhabitants have found themselves in a transitory period then perhaps my works are also in such a stage, maybe the negative "literary"

form does indeed reflect this. The villager, the one who had left for the city, often wanted to scrape away his rusticity, his peasant origin. This was all unnecessary. He thought that this was of no use to him and even an embarrassment, when in fact it sometimes was to his benefit. His origins gave him his originality, his identity. He was interesting just as he was; yet he threw away his old knapsack, shed his peasant skin and tried to wear city clothes. They, however, did not suit him and he became a nobody; not this and not that. His appearance was comical. He became brutal in his desire to become a city person. He longed for power. He laid Persian rugs in his office, covered the doors with leather, had potted palms, legally purchased a rifle because, after all, he once poached. I can understand this but yet it does upset me, worry me and, at times, move me.

[Question] This type of compensation?

[Answer] Exactly. This is how we must understand it, as a compensation. This also acts as a means in bringing harm to himself and to others. If such a person loses his authenticity, then no one will accept him. He rejects his old surroundings and becomes a careerist who wants to succeed at all cost, even at the cost of others. He wants to be the pride of the village. I am critical of such an attitude, but at the same time do feel some pity for him. I grew familiar with this character. I tried to save him, my hero, but was not able to. I spoke to the characters in my book straightforwardly, addressing them in the familiar form, but they were not afraid. They slipped from beneath my pen. Life punished them.

We must rescue certain values or at least make an attempt to. It is not just because of the beauty of the past that we should do this. The goals are very practical. Do we not need good work? They are essential in attaining a full culture, making it versatile and flowing. The present can be described as an arrow pointing to the past and future but not as a justification to reverting to prejudice, to harming the village, to backwardness, but rather to return to valued traditions because they enrich. The poor, indigent village shaped things of value which should become known to the nation, to the country, in order for it to become habit.

After all, Poland is rural, irrespective of the number of people living in the city. It is rural, despite industrialization and a flight from the village.

[Question] Will this trend not end? Does the city continue to have much to offer?

[Answer] The trend will slow down. Today only empty ambition motivates a person to seek out the city because an easier and better life can be had in the country. Even reverse situations now exist. I know of people who returned to the country, motivated, of course, by a yearning to make money, which is normal for everyone wants to make more money. City people are even buying land. I know of Varsovians who are raising animals, splendidly I should add, in the Bieszczady mountains. They live magnificently, their life is superb. They have fallen in love with this new found lifestyle. Such cases exist.

[Question] These cases and trends are still beyond the rural theme's scope of vision. Did the rural theme not in fact get caught up in a pattern? Aren't its works better, more artistically perfect and more real, yet not representing a full picture. Therefore, isn't the rural theme characterized by diminishing cognitive values?

[Answer] Yes, perhaps you are right.

[Question] Has this literature become classicized?

[Answer] Perhaps it has.

[Question] Is it not threatened by a vicious cycle of repetition and self-imitation?

[Answer] Sir, there may be some truth in what you say but I believe that this drama should be treated somewhere else. Presently the aforementioned drama is not so obvious nor so spectacular. This drama is, however, worth tracing and using as a central theme in future novels, as would writing more books on the subject in an attempt to rescue positive rural traditions and values. The importance of rusticity has as yet not been fully penetrated. I believe that this task will never end. The subject will never be exhausted. To a responsible person, to a person with imagination, to a quick observer, this will continue to be a burning question. The countryside is alive. It is diverse, segmentalized and assumes different attitudes and gestures. It appears in a different light. It is possible to perceive this in Warsaw, Cracow, Paris. The same can be said of rusticity. It is difficult for me now to say what the new subject matter will be or the desired evolutionary course. I am, however, convinced that village life will continue to constitute a rich source of subject matter wherever it may be conveyed, even to the city.

I believe that the above mentioned task will be assumed by younger writers. They will do something with it. What? I do not know. I myself still have much to do.

[Question] Sir, do you see the possibility of a school of writing which will continue in this work? Is it not true that many gifted, young writers, who started out supporting and had a collective fascination with the rural theme, later quickly withdrew from it?

[Answer] Of course. Jozef Lozinski, as a matter of fact, and he made a wise decision. He once said to me privately that I had not finished something, that I had not resolved something. I answered him by saying that he was, after all, still young, talented and in good writing form and, therefore, he should complete this or move on and develop it. I told him that he should make it better, that he should patch up the holes, those holes which he found in my works. He should correct them and expand on them. A younger person, after all, has different experiences, he views things differently. I myself attempted to transmit only some of my experiences. I do not believe I would be able to write on all of them. Maybe forthcoming books will partly fill in these gaps such as my "Biadolenia" which is to be published by the People's Publishing House [LSW] and novels to be published by the State Publishing Institute.

13090/12245

CSO: 2600/144

END