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# STATE PLANNING OF IRON AND STEEL PRODUCT CONSUMPTION 1/

by

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## S U M M A R Y

The volume and structure of the steel products used, as well as the growth rate of utilization and the changes in its structure, are fundamentally determined by the general and industrial development level of the country concerned, and by the structure of its industry. When the various branches of heavy industry and machine building are developed, the growth rate of steel consumption exceeds the dynamics of industrial development. With the changes in industrial structure, with the advance of the telecommunications industry, instruments production, electronics, petrochemistry, the production of fertilizers and plastics, and road vehicle production, the growth of steel consumption will gradually lag behind the development of industry as a whole. With this, the internal pattern of the iron and steel industry will change, heavy sections and rails being gradually replaced by the production of plates, light sections, various finished products, etc., and the proportion of alloy steel will increase.

Steel consumption is further affected by such factors as geography, the size of raw-materials and energy resources, climatic conditions, population density, established relations with other countries, etc.

The state can play an important role in determining, influencing, and satisfying the demand for steel products. By reason of state ownership of the means of production in Hungary, the state controls the economic processes, using the rights of ownership. The basis of the central state control of the economy and the main instrument for implementing state economic policy is the development plan for the national economy. An organic part of planning consists of maintaining the natural (physical) balances, which are especially important in the iron and steel industry, where about 90% of the total output is planned in terms of physical units of measurement. The balances for individual product groups evaluate the resources available to the economy as a whole in comparison with the demands of the various branches. To this extent they co-ordinate production. On the other hand, the serve as a basis for macro-economic decisions and measures to determine implementation of the plan. In this field their role conforms with the general order of economic control. In the case of directive control, the provisions contained in the physical balances determine the relations between enterprises by means of direct instructions. If economic processes are indirectly regulated by the state (as is the case in Hungary), these balances determine the objectives, the achievement of which must be assured by applying individual elements of the central relgulation system and by shaping their extent.

The main instruments by which the state can influence demand for steel products are : regulation of investment activity (within this, the determination of budgetary investments and regulation of the part of the enterprises' profits to be used for investment), state credit policy, the central regulation of domestic product prices, etc. All these measures, acting mainly on a long-term basis, are complemented by the relatively short-term regulation of turnover, e.g. financial measures influencing the accumulation of stocks, conditions relating to the financing of working capital, the system of export-import licences relying on agreements on the exchange of commodities.

In all cases when the order of magnitude of domestic consumption does not permit the development of the iron and steel industry in all its vertical stages, through the putting into operation of plants with optimum capacities, the satisfaction of demands requires permanent international co-operation. Within the framework of international co-operation, the individual phases of the individual process units in the iron and steel manufacturing chain (plant and equipment producing different end-products) are built either temporarily or permanently in several countries. As a result of the exchange of products and sections, as well as of the distribution of production profiles among several countries, the restrictions on domestic production can be removed. A positive example of harmonization in this way is the activity of INTERMETALL.

## 1) Importance of the consumption of steel products, their role in economic growth [by K. Kemény]

The volume of steel production and the structure of metallurgical products has always been a characteristic and important factor of the technical standards of a given age. Technical progress demands more and more steel, and rising technical standards create the possibilities for developing and employing novel metallurgical methods. For example, it was the introduction of the mass manufacturing of metallurgical products that allowed large-scale railway construction and the wide use of steamships in the last century. And rapid progress in transportation contributed to the establishment of mass-manufacturing metallurgical works demanding huge quantities of basic materials. The interrelations of rising technical standards and metallurgical development resulted in the more than 600 million tons of steel production, and in a wide range of metallurgical products available in new, up-to-date forms and grades.

Between 1910 and 1968, world steel production grew roughly tenfold, and is now growing with lesser and greater fluctuations at an annual rate of 3,6% on its course set by technical world standards and human needs (Figure 1). Within that, Hungary's steel production is growing at a rate of 5 per cent p.a. and represents now 0,5 per cent of world output.

Generally speaking, the rate of growth is determined by increasing consumption, so we may say that a steel production of 600 million tons agrees with world requirements. This quantity amounts to an average consumption of 160 kg per capita. But, depending on technical standards, on the development

FIGURE Nº 1.

WORLD STEEL PRODUCTION

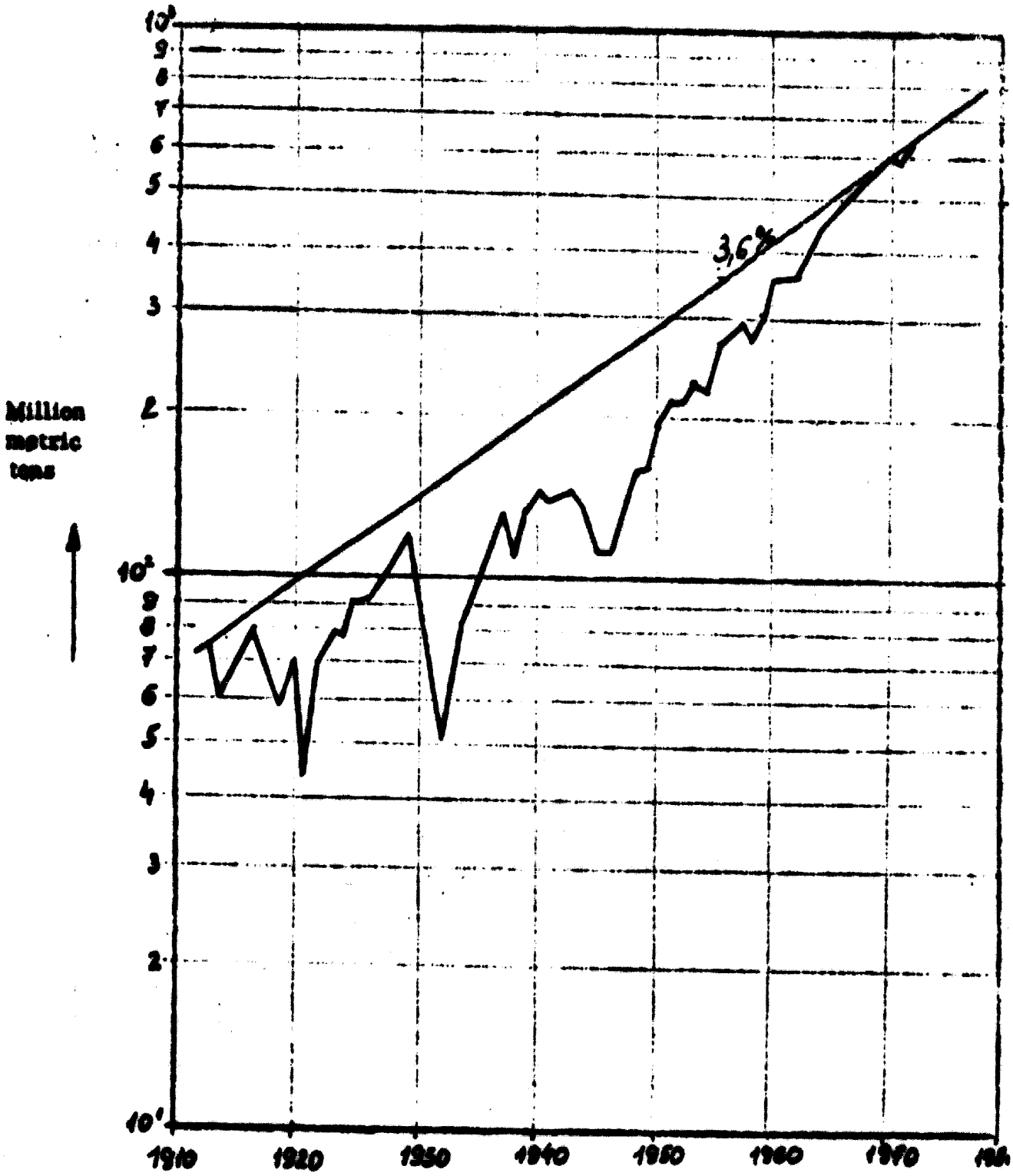
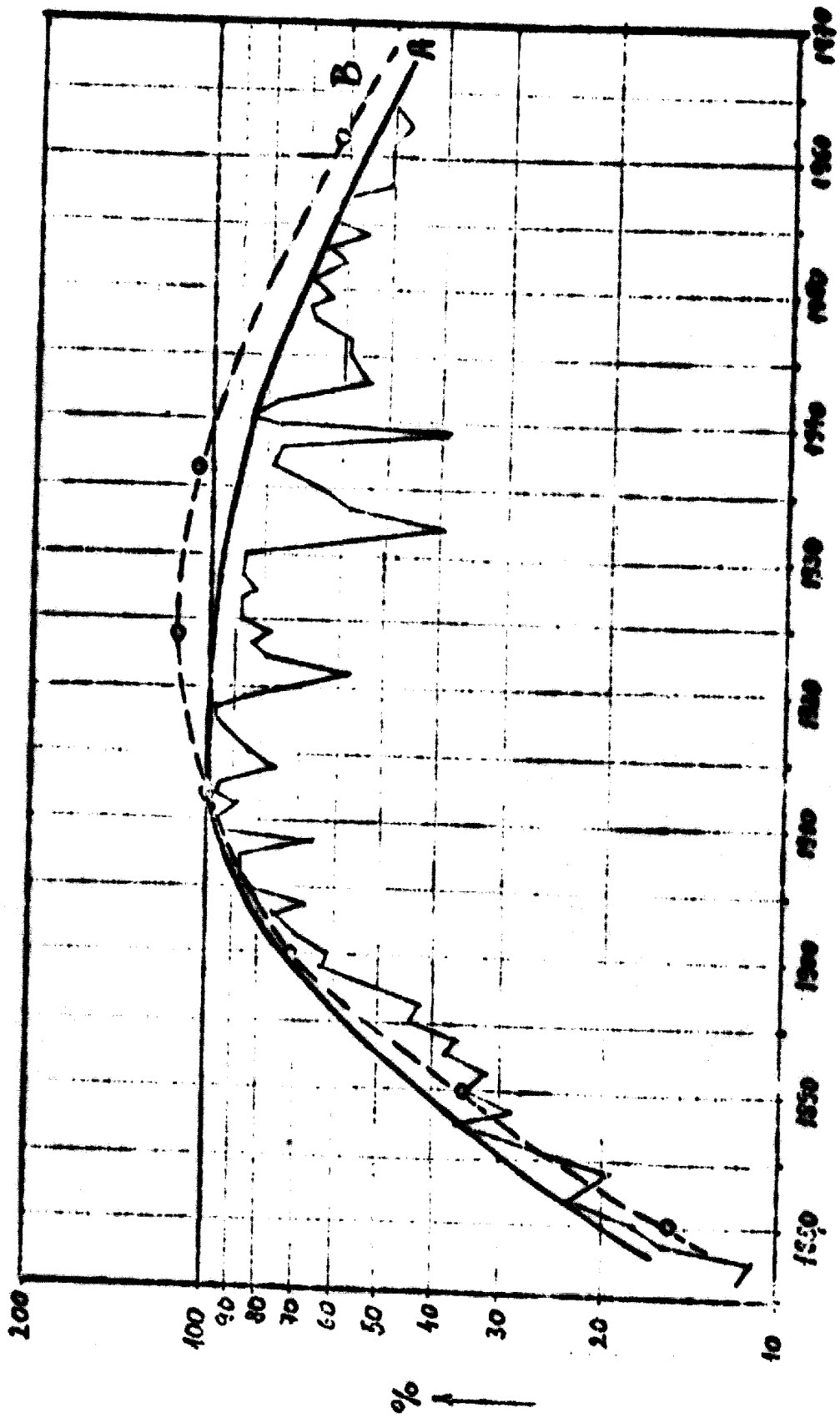


FIGURE Nº 2.

QUOTIENT OF STEEL CONSUMPTION AND INDUSTRIAL GROWTH : IN THE USA AND FRG



level of civilisation and the differences between living standards, consumption varies greatly by various countries and continents. In some countries, e.g. the United States of America, Sweden, West Germany, Czechoslovakia, Canada, the Soviet Union and Japan, per capita steel consumption exceeds 500 kg. At the same time, there are countries in Asia, Africa and South America whose population amounts to more than 50% of mankind, while steel consumption there is less than 20 kg per capita.

## 2) Factors determining the use, the structure and rate of use of steel products

Steel consumption depends on a number of factors in every country. It depends on economic development, on the level and structure of the industries, first of all on those of engineering, on the living standards and density of the population, on the density of steel-intensive service facilities (roads, railways, power lines, pipe-lines) and on many other factors.

But the closest correlation is found between steel consumption and the development stage and structure of the industries. For example, it is not by chance that the aforesaid countries show a 500 kg per capita steel consumption. These countries have traditions of large-scale industries, high industrial standards, and a considerable volume of heavy machinery production.

In his work "The Trend Line of Economic Growth and the Reconstruction Periods", Ferenc Jánossy has studied the correlation between steel consumption and the growth of industrial production, and has worked out the ratio of the volume indices of these two factors. Figure 2 shows the quotient of steel consumption and industrial growth in the United States and West Germany. The hulling curve of the

dots indicating the ratio shows a steep rise from 1880 till about 1915. Namely, in that period steel consumption was growing at a higher rate than industry itself. In both countries the large-scale development of transport facilities, the laying of the foundations of modern heavy industries and machine building, and the development of a modern armaments industry with its great demand for steel took place in that period. The production of forged steel and castings took an important place in metallurgy at that time. A considerable proportion of steel was produced in Thomas and Bessemer converters, and the steam-powered open mill trains were developed. In locating metallurgical plants, in this period the main viewpoint was the proximity of raw materials. Manufacturing plants were also located around the metallurgical ones and this is how the great industrial centres were born.

Between 1910 and 1940, the growth rates of industry and steel consumption practically coincided. It was in that period that the internal combustion engines gained ground in addition to steam engines, and that electric energy was widely introduced. The motor-car industry prospered; coal-based chemical engineering thrived, modern telecommunication engineering began to develop as a result of progress in radionengineering; in short, a change took place in the industrial structure and this required fewer but more diversified metallurgical products. Beside the mass manufacturing of rails, heavy sections and big forged pieces, products of intermediate and small section mills gained prominence. The consumption of flat steel increased, mass production of novel steel types, of special alloys started. Hegemony in steel production passed to the Siemens-Martin technology, the semi-continuous and continuous methods were developed in hot rolling.

Beginning in 1940, the descending branch of the curve indicates that the growth rate of industry accelerated in comparison to steel consumption. There were endeavours for a more intensive steel consumption, and for major structural changes of the industry at the same time. The use of steel-intensive steam engines was altogether pushed to the background, telecommunication engineering, the manufacture of instruments and electronics were gaining ground. The production of road vehicles assumed mass dimensions; the ratio of chemical engineering in the industry as a whole grew as a result of rapid progress in petrochemistry, in the production of plastics and fertilisers; mechanisation of working-processes and automation helped to eliminate hard physical labour and the development of the mass-products industries promoted the improvement of general living conditions. The making of steel-intensive conventional weapons lost its importance in the armaments industry.

Mass production in metallurgy at this time was the result of bigger smelting equipment and of making roll trains continuous and automatic. In steel production the oxygen-converter method began to supersede the Siemens-Martin technology. Within rolled steel consumption, the ratio of sheet steel exceeded that of steel bars, the ratio of alloy steel types was growing; metallurgical afterproducts such as wire, gauged steel, etc. were used increasingly; novel metallurgical products - light profiles, bent profiles, welded tubes, etc. - permitted the reduction of weight and modernisation of machinery and equipment. In locating metallurgical plants, coastal locations near the large industrial centres is given preference. The cheap water transport partly facilitates the supply of the metallurgical combine with raw material and partly helps the sale of metallurgical products on the world market.

As we have seen, the steel industry developed parallel with

industrial progress. Growing industries demanded more and better metallurgical products. Making use of transport and technical facilities brought about by industry the metallurgical branch created larger plants, up-to-date machinery and equipment. As a result of rapidly growing traffic, metallurgical production was no longer limited to the steel requirements of a given country: through the appearance of metallurgical products on the world market, production grew far beyond the national limits of the countries. Technical achievements in the industries, as well as economic requirements greatly affected the progress of metallurgical technology and its technical standards. The advanced machine building industry allowed the employment of ever bigger equipment, and achievements in physics and chemistry became embodied in metallurgy in more up-to-date facilities, in a better utilization of energy and material. The result of the interaction between industrial and metallurgical progress was a metallurgical basis that yields an annual steel production of over 600 million tons.

Advanced and averagely developed countries need no longer go through the way the present big industrial countries have covered. For their industrialization they either need not create a metallurgical basis which is highly capital-intensive, or they can build up this basis from the outset with such modern equipment as meets the best standards of our days. And this means that in these areas the rate of industrialisation can be accelerated, and that their starting large-scale industries can represent much more modern technologies and standards than were available to the present big industrial countries in the initial period of their industrialization. The metallurgical basis to be created provides for the up-to-date product pattern required by the manufacturing industries envisaged (alloyed steel, mass production of plates,

afterproducts, etc.) since the transitional needs related to infrastructure and industrial location (e.g. rails and heavy sections, etc.) can be procured from the world market.

Beside the quantitative and qualitative standards of industries, there are numerous other factors that affect a given country's steel requirements considerably. Such factors are, for example, geographical features, climatic conditions, population density, political environment and aims, and so on.

The influence of these factors on steel consumption may be characterized by the following conclusions:

As concerns geographical features, it is not unimportant whether the road and electrical network of a given country has to be established in flat or mountainous areas. Nor is it unimportant in this respect how inhabited settlements, sources of raw material, and the industrial bases processing raw material, are situated in relation to one another, how they are accessible from road and waterway networks that are easier to construct, or possibly from the coast.

Geographical features greatly influence also the economic structure of a country, they influence the optimum ratio between agriculture and industry. Within agriculture, they also affect the possibilities of mechanisation. All these factors may have a substantial influence on the steel requirement of the given country.

Sources of raw material and energy practically determine the structure of the industry to be developed. The steel requirement is different if a large amount of iron ore and cokeable coal reserves are available, and different again if, say, the preconditions for developing aluminium metallurgy or the chemical industry are given.

In connection with the climate, it must be mentioned that there exist essential differences between territories in a cold or a warm climate in respect of housing, maintaining industries, constructing traffic, water and steam networks.

For example, the density of population determines the order of magnitude of per capita road, railway, electrical, gas and water networks.and there may be substantial differences in this respect. If these objects serving infrastructural purposes already exist, and all that is to be done is their natural replacement and maintenance, this determines steel requirement in a certain way; but this requirement is different if a given country has yet to build up all these facilities.

Neither are a country's relations established with its neighbours unimportant in respect of steel consumption. Such relations determine economic cooperation and also affect the means and the extent deemed expedient for ensuring the given country's defence. The steel requirement determined by the war industry of a country which - for political or economic reasons - wishes to secure for itself a certain power position in the given area, differs from the requirement of a country which wishes to concentrate its domestic economic potential mainly on the development of its national economy.

The steel requirement of a given country is often determined in such a way that the per capita steel consumption of an economically comparable country is set as the aim. In my opinion, this can be regarded as a correct method only if it is possible to select a country where the development level and structure of industry, as well as the other factors acting on steel consumption, are similar. Generally speaking, it may be stated that the economic growth of a country, including industrial progress and rising living standards, goes along with the

growth in steel consumption. Consequently, in a steadily developing country also the steel requirement grows almost steadily. But, owing to domestic endowments, the rate of growth differs from country to country. The conclusion is that it is not expedient to compare the trends in steel consumption of a given country with those of another. The basis of comparison can only be the domestic economic environment which determines the growth rate of steel requirement, where the amount of steel meeting such requirement can be put to use with adequate economic efficiency for serving production and accumulation.

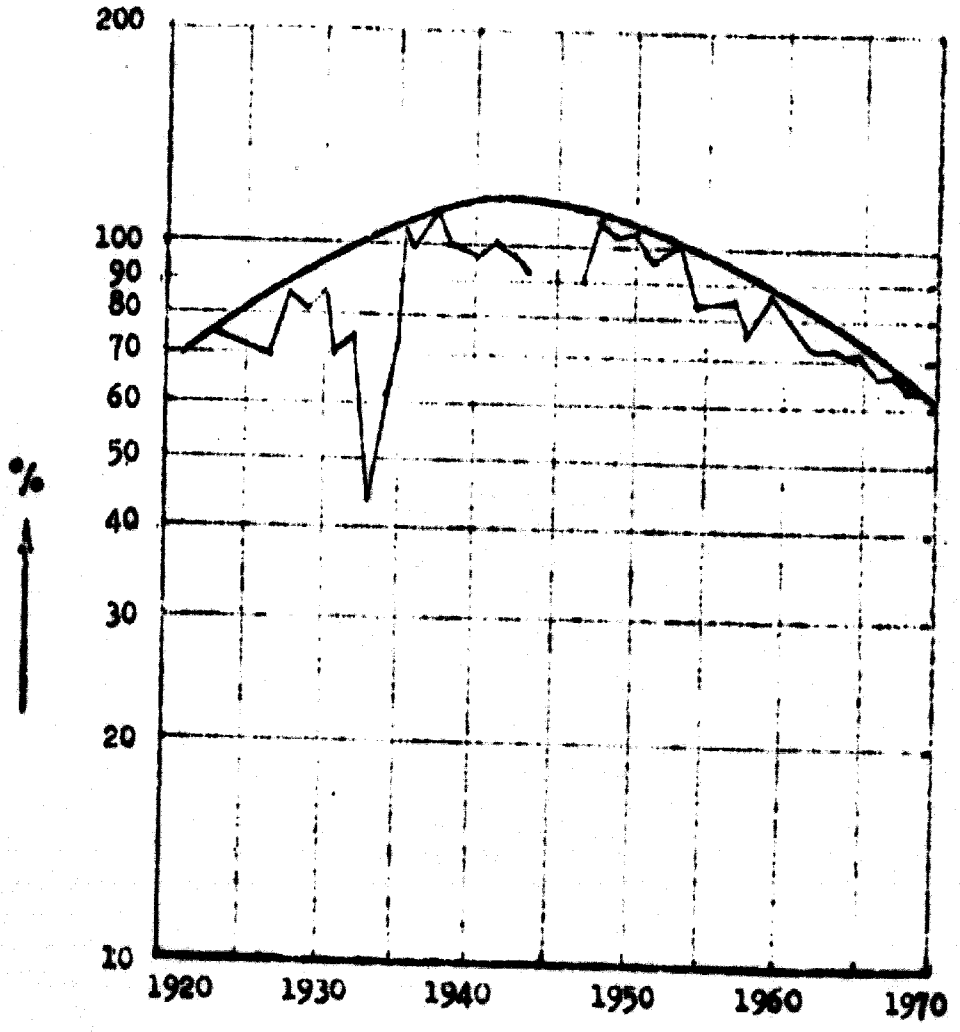
The ratio of Hungarian steel consumption to industrial growth is shown in Figure 3. In this country the ascending slope of the curve lasts till about 1938, i.e. steel consumption grew faster in that period than industrial production. This is explained by the one-sided policy of that time which practically concentrated industrial development on the machine building industry only.

The beginning of the downward phase of the hulling curve is seen in the period between 1945 and 1950, i.e. industrial growth accelerated in comparison to steel consumption.

This is the result of the socialist industrial development policy. The production of precision and telecommunication engineering is becoming more important in Hungarian industry; the ratio of heavy machinery production is decreasing. The diesel and the long-distance bus programmes are proclaimed for supporting modern transport schemes. Remarkable results have been achieved in Hungary in the development of chemical engineering, including especially the pharmaceutical industry. Reduction of specific steel consumption was promoted also in this country by metallurgical progress, especially by the creation of the Danube Iron Works producing a novel type of flat steel.

FIGURE Nº 3.

QUOTIENT OF STEEL CONSUMPTION AND INDUSTRIAL GROWTH IN HUNGARY



The trend outlined in the diagram may be reckoned with also in the coming period. The consumption rate of metallurgical products will increasingly depart from the rate of industrial growth.

Hungary is poor in raw materials. We have no substantial iron ore or cokeable coal basis for developing our steel industry. We obtain the basic materials for our iron and steel making from the CMEA countries, first of all from the Soviet Union on the basis of long-term contracts.

To define long-term demands with relative accuracy requires highly circumspect work. If requirements are overestimated, the national economy has to make unjustified sacrifices (domestic development projects, ensuring the countervalue for basic materials to be supplied by force of long-term contracts, etc.). And if demands are underestimated, metallurgy does not support a balanced development of the manufacturing industries.

Consequently, when long-term requirements are to be defined, all factors that may substantially affect steel consumption must be taken into account. The aforesaid interaction between ferrous metallurgy and industry should not be referred to the past only, it must be taken into account as an efficient means also for shaping the future. For example, a country like Hungary which does not have the raw material basis necessary for developing metallurgy, should preferably shape an industrial structure in which the steel-intensive branches are developed at a slower rate than those in which metallurgical products only represent an insignificant part. In addition to such a gradual alteration of the industrial structure, it should be taken into account that there are efforts to improve specific material consumption resulting from the modernization of various products, that changes are to be expected in the structure of metallurgical products, that substitute materials (aluminium,

plastics, glass) are employed increasingly, that the mechanical properties of steel products are improving, etc. In developing therefore the Hungarian iron and steel industry, great emphasis is laid on the harmony between changes in product pattern and those in industrial structure. We want to create the possibility that the share of alloyed steel should reach 10-12 per cent in utilization and that of plates 48-52 per cent. We prefer development of the production of fine rolled goods, fine plates, light and bent sections, gauged steel and welded tubes.

If we succeed in suitably influencing these factors in the national-economic plans, we may increasingly take into account the trend that the dynamic growth of industry as a whole can be ensured with a steel supply increasing at relatively slower rate.

In shaping the long-term plans of the national economy, we wish to pay due regard to what has been said in the foregoing; as a consequence, we may attain higher industrial standards with a substantially lower per capita steel consumption than is the case with other advanced industrial countries of a different industrial structure.

The result of the afore-mentioned tendencies is the saturation of steel consumption, which means that per capita steel consumption no longer increases substantially beyond a given level of industrial development (it only fluctuates on a relatively high level). For example, in the United States of America, per capita steel consumption was as high as 624 kg in 1952, which is more or less the same as present consumption. Our calculation is that the saturation limit in Hungary will be 450-500 kg per capita. We wish to develop our metallurgical capacity, to determine the related international cooperation accordingly, and to influence the consumption of metallurgical products by various means in this sense.

Next we wish to deal with the methods applied in Hungary by the state for planning demand and for influencing the satisfaction of demand for steel.

3) The role of the state in defining, influencing and satisfying demands [by I. Berendik]

The calculations relating to the growth of consumption, to the trends in the growth rate and the structure, are not merely of prognostic nature. Through the state ownership of the means of production, the state - exercising the rights of the owner - controls the economic processes. The basis of the central state control of the economy, the principal means of realizing the economic policy of the state, is the development plan of the national economy. It lays down the principal economic targets, shapes the economic-political attitude. It determines the rate of economic development, the tendencies of economic growth, the targets of economic development, the principal national-economic proportions, the preconditions and requirements of economic equilibrium, the key tasks of investment, development policy and technological development, the principal proportions of participating in the international division of labour, its fields, methods, etc.

a) The role of natural (physical) balances in assessing, influencing and satisfying demands

Natural (physical) balances form integral parts of economy-wide planning; they express in natural units of measurement the resources available to the various groups of products, and to the economy as a whole (resources meaning home production and imports); on the other hand, they express the requirements of various economic branches, as well as export possibilities. The natural balances make possible to study, in physical terms the level, rate and structure of industrial production, the

material foundations of investments, the harmony between purchasing power and commodity reserves. In this way these balances help us in coordinating the plans relating to the development of various branches of the national economy, in assessing the conditions of demand and supply, in taking measures for establishing and maintaining a balance between demand and supply.

The role of these balances is especially important in ferrous metallurgy, where - by observing 20-25 product groups - about 90% of the production of this branch are planned in physical terms. (Among these products are e.g.: hot-rolled steel bars, unalloyed steel plates, hot-rolled steel tubes, cold-rolled steel strip, tin-coated plates etc.) So these balances of metallurgical products present the proportions between resources and needs, and in this way provide extensive assistance for exploring the equilibrium requirements of interrelations, proportions (or disproportions) existing between the growth of metallurgy and the growth of industries processing metallurgical products.

But the role of physical balances is not exhausted in the coordination of production. They play an important part in shaping decisions and measures which determine the implementation of plans. Their role in this field is adapted to the general order of economic control. In an earlier phase of planned economy, the needs and the resources serving their satisfaction - as defined by the natural balances - reached the enterprises in the form of compulsory instructions. In the national-economic balances dealing with given steel products, it was laid down on the basis of the assumed production structure of the user branches and on the basis of aggregate norms of expected consumption, what quantity, size and grade of steel products they might make use of, and from what sources they were allowed to procure them. The estimates of the balance appeared - through the intermediate controlling bodies - in

the enterprises in the form of compulsory instructions. Thus the physical balances distributed the steel products available from home production or imports by means of administrative methods, and regulated the relations between suppliers and customers in a directive manner.

As a result of the reform of planning and economic control, the natural balances lost their function of officially distributing products. The present economic system starts from the assumption that if the general equilibrium conditions of economic growth are ensured, the official, administrative intervention of the central planning bodies is necessary only in exceptional cases, and only to a relatively limited extent. Therefore, under the present circumstances of control the national economic plan defines no partial tasks for the economic units. Based on the national plan, a regulating system is being shaped under which the financial interests of enterprises agree in their chief aspects and trends with the interests of the national economy as a whole. In this way it is to be expected that decisions reached in the enterprise sphere, the economic processes taking shape there, agree in their tendencies with the course and rate of development laid down in the national plan.

Consequently, the calculations contained in the physical balance do no more mean - in their majority at least - direct commands to the economic units. And so the balances are a basis not for directive control, but for economic regulation. They define the targets, whose fulfilment must be ensured, by employing the various elements of the regulating system, through determining the correct extent of the regulators that specially act on the turnover of given products. (At the same time, the balances provide a footing for exploring as to where, what degree and what type of administrative regulation may exceptionally be necessary in the field of product turnover.)

The physical balances fulfil this function first of all in the course of annual planning. Within the scope of medium- and long-term planning work, the following functions of these balances are of importance:

- laying the foundation for decisions relating to the formulation of domestic development courses, defining concrete investment targets. In the distribution of the means of state investments, as well as in the course of shaping regulators that determine the magnitude of development funds accumulating in the various branches and belonging to the sphere of enterprise decision, it is of importance to ascertain - on the basis of the natural balances - the order of magnitude of domestic demands to be met, and, generally, what is the state of equilibrium if the resources and consumption sides of the balance are confronted.

- laying the foundations for conceptions relating to international cooperation. Planning in physical terms plays an important role in the preparation of plan-coordination and gf agreements on the international exchange of goods with the CMEA countries. It permits one to decide in what fields and to what extent the possibility is given for intensifying international cooperation, or where this necessity arises. Physical balances supply important information for developing the various forms and methods of international cooperation. This function of the balances is getting more and more important as the integration processes between the CMEA member countries proceed and foreign trade as well as cooperation with the other countries expands.

b) Means of the state for influencing demands

The state, as the owner of the means of production, is in

command of several economic means in whose possession it can exert a decisive influence on the trends of domestic demands for steel products. The first to be mentioned among these is the state regulation connected with investments.

Over a longer range the trend in the demands for steel products is basically determined by the rate and course of economic development, by the structural changes of the economy as a whole, but particularly of industry, i.e. in the last analysis by the volume and distribution of investments. The amounts available for investment, their distribution among the productive branches, is determined by the state bodies directing the national economy. State-financed major investment projects are listed by items in the national economic plan and, based on separate decisions, the plan defines the central development programmes which ensure a speedy realisation of the principal targets of technical progress; the extent of budgetary allocations and subsidies to be given to enterprises for investment purposes are also laid down in the plan with a detailed statement of purposes and sums.

The other source of investments is the development fund of enterprises. But the enterprise incomes, and the funds to be created from them for investment purposes, are regulated by the state through financial means in such a way that the volume and structure of the own funds of enterprises available for development purposes should agree with the intentions laid down in the plan.

The credit policy of the state is a further means of influencing enterprise development conceptions. The conditions of granting credits, the preferences and restrictions employed in the course of realising the credit policy, are determined centrally. Credit facilities existing within relatively wide limits are distributed by the central bodies among the branches of the national economy, and for concrete development purposes of major importance.

Through the state regulation of investment activities it may be expected that the extent, development rate and internal structure of the production of steel-consumer branches will coincide in their tendencies with the concepts of the national plan.

A further important means of influencing demands by the state is the state price policy and the central control of the domestic prices of products. The home price of metallurgical products is limited by official regulations. The central determination of the price level, the relative prices of metallurgical products to one another and to other products, the necessary modification of these price proportions and of the various factors affecting price trends (such as customs duties, turnover tax, state price subsidies, etc.) according to the conditions of demand and supply, offer possibilities to the central bodies directing product turnover to influence demand according to the national plan.

Means of the state for determining demand over a longer range - such as the regulation of investment activities, regulation of enterprise incomes, prescriptions relating to the distribution of incomes, the central price policy, etc. - are complemented by relatively short-range regulation, such as financial measures affecting the building up of reserves, prescriptions relating to the financing of circulating funds, the system of export-import licences relying on commodity-exchange agreements.

These methods of regulation are usually adequate for influencing the demand for steel products, for keeping them within the predetermined limits. But there may emerge cases in which the maintenance of the demand-and-supply equilibrium cannot be expected in a given field from the employment of general economic means of regulation valid for the economy as a whole, and where

special regulation acting directly on a given product is not desirable for some reason. In such cases the state can enforce the fulfilment of plan targets by the employment of exceptional administrative measures, i.e. instructions, by setting quotas. Out of central interests these give preference from resources of limited availability compared to demands, to a definite sphere of consumers; they fully meet the demands of the latter, and concentrate shortages to fields which are the least problematical as concerns central interests.

The influencing of demands is carried out for the most part by economic means which are taken into account in the national-economic plan, and in certain cases by means of complementary administrative measures. Determination of the system, form and extent of special regulators affecting the turnover of given products is based on a definite set of assumptions. These regulators induce the expected effect only if the various factors acting on turnover develop according to the assumptions. Yet these factors are in incessant movement, and it may happen as a consequence that a regulator defined correctly in the course of planning later produces an effect contrary to expectations. Operative measures may become necessary for relaxing tensions which emerge during the execution of the plan and could not have been foreseen in the period of planning (e.g. putting into operation productive capacities at a time other than laid down in the plan, forces of nature, essential shifts in domestic or foreign market prices, difficulties of imports, or other reasons).

A continuous observation of demand-and-supply conditions, information to be drawn from these, disclose the necessity of taking measures. For preventing tensions, or for relaxing existing tensions in such cases, the organs of the state directing the economy can intervene in the developing processes by means of various measures affecting prices, finances, credits

and circulation, by an operative modification of the economic regulating system, in order that the meeting of demands should be smooth and continuous, that it be in conformity with the aims set in the national economic plan.

c) The alternatives of meeting demands

When the order of magnitude of demands has been outlined on the basis of the national-economic development plans, two alternatives may be considered for meeting demands: the increase of domestic metallurgical production, or the importation of metallurgical products. (Needless to say, it may happen in the course of planning that the order of magnitude of existing demands would require such an extent of metallurgical investment, or increase of imports, as would exceed the available material resources of the country. In such a case, the development estimates of branches using metallurgical products must be revised, and such a development rate or structural changes of consumer branches must be laid down at which the emerging demands can be brought into agreement with available resources. In the following we speak of this latter case.)

Decisions on the development of metallurgical production are in most cases influenced by objective factors such as available natural resources, possibilities and costs of providing raw material through imports, the capital-intensity of development, the harmony between the optimum scale of production units to be put into operation and domestic consumption, and so on.

In the following we shall exclude from our deliberations the two extreme cases in which

- all conditions are given for a rapid, fully vertical development of metallurgy and the demands of the processing branches can be satisfied with domestic metallurgical products,

- no condition whatsoever can be provided for the development of metallurgy, and the increasing demands must be met entirely by imports.

We start from the premise that the basic materials necessary for development (iron ore, coke, and coking coal) can be ensured from domestic sources or imports in relatively economical ways, and that the capital required for development is available to an extent proportionate to general economic development. But even under such circumstances, the problem exists in many countries that the order of magnitude of home consumption does not permit the full-scope development of metallurgy by putting into service production capacities of optimum size.

If the order of magnitude and the distribution of consumption demands differs from the technical optimum of production, this impedes

- the creation of harmony between the successive vertical phases of metallurgy,
- the shaping of sound proportions between the various types of rolled steel (bars, plates, tubes, etc.),
- the most economical variability of sections (sizes, grades) to be milled on various roll trains.

The solution of these problems is usually impossible by employing the conventional methods of foreign trade, within the limits of foreign-trade exchange of commodities, or this would not be safe enough if longer periods have to be taken into account. Hence the most economical establishment of harmony between production and demands requires the lifting of the constraints of domestic production in the framework of international production cooperation and specialisation.

One form of production cooperation might be a scheme whereby certain vertically related phases of metallurgy are being built up temporarily, or possibly lastingly, in different countries. In Hungary, for example, the capacity expansion of roll trains milling finished products was effected at a quicker rate in the 60's-in order to meet the demands on steel products as soon as possible - than the expansion of the preceding phases. Namely, had we wanted to base the increase of finished products on domestic semi-finished products supply, this would have required an enlargement of the entire metallurgical capacity in all its vertical phases. On the one hand, this would have delayed the putting into operation of finished-goods capacities, and, on the other hand, would have involved additional investment burdens which would have drawn excessively on the country's economic resources. It was an economically more favourable solution to obtain semi-finished products from neighbouring countries within the scope of international production cooperation until the domestic vertical equilibrium was established. The countervalue of imported semi-finished products was provided by the working roll trains putting out finished products. This solution was advantageous also for the cooperating partner, because it temporarily made possible to satisfy increasing domestic demands without setting up new roll-trains to produce finished goods, and merely by building up the first vertical phases of metallurgy.

A problem of different nature may arise in the case where there is an overall agreement between domestic production capacities and demands, but there is no harmony between the capacity of individual roll-trains and the demand for goods that can be produced by the given roll trains. (E.g. there is excess of bars and section steels and a simultaneous shortage of the same extent in plates, or vice versa.) If there is

lasting international production cooperation and a coordination of production conceptions, this contradiction can be resolved. It is, namely, conceivable that a given country puts into operation a plate roll train which is optimal from the technical point of view out in excess of domestic demands, while another country does the same in respect of bar steel production capacity. In this case the volume of bars and plates production in excess of domestic demands can be exchanged on a mutual basis.

The third type of tension may result from the circumstance that the demands raised toward a given roll train appear in such a wide distribution in respect of the size and grade of the products that this impedes the establishment of the technically optimal number of products to be turned out by the given roll train. At present the number of the types of rolled goods used in the industries may be put at about 15-20 thousand. The turning out of products in such a rich assortment permits an economical exploitation of production only if the production volume reaches an order of magnitude of several 10 million tons. In the case of countries with a smaller production capacity, the satisfaction of domestic consumption demands by such a wide assortment can only be solved if the number of types produced by a given roll train is increased to maximum. But this involves that for a large number of products the quantity produced in one production period drops below the economical level, and that the ton/hour output index shows unfavourable values for the given capacity. International production cooperation provides the possibility for the partner countries to specialise in the production of types that can be manufactured by given roll trains with the most favourable technical indices, and to satisfy their demands through compensating, mutual deliveries, through the exchange of products.

In order to solve all the three types of problems, Hungary has for some fifteen or twenty years practiced bilateral co-

operation with several CMEA countries. The expansion of this cooperation has increasingly raised the necessity of making this cooperation multilateral. For a better satisfaction of needs arising in the field of metallurgical products, for developing more efficient forms of cooperation between the metallurgical industries of the various countries, for a more rational exploitation of given production capacities and for improving the technical and economic standards of production, INTERMETALL was set up in 1967 upon an initiative of Hungary. Several European CMEA countries take part in the work of INTERMETALL.

It is among the tasks of INTERMETALL to organize the exchange of metallurgical products between the member countries, to organize the optimum exploitation of temporarily free capacities in given countries, to draw up recommendations for making available basic or semi-finished products necessary for this purpose. This joint enterprise is engaged in operative activities for mobilising frozen stocks of rolled steel, and makes possible their utilisation through organizing mutual information.

It is among the tasks of this joint organization to draw up suggestions for coordinating the modernization of investments and existing equipment, for avoiding duplication or production capacities, and for expanding capacities that do not meet the domestic needs of the member countries. In addition to coordinating the development estimates of the member countries, the responsibility of this body is to develop joint methods for the optimum exploitation of existing production equipment, for coordinating the detailed assortment structure of plans relating to metallurgical production, for coordinating development programming. The Complex Programme of the CMEA, relating to the integration of the member countries, created favourable conditions for making the activities of INTERMETALL more efficient.

A further expansion of cooperation, a higher degree of integra-

tion, is incorporated in the recommendations now in progress which envisage the expansion of metallurgical capacities through the joint efforts of the member countries concerned.

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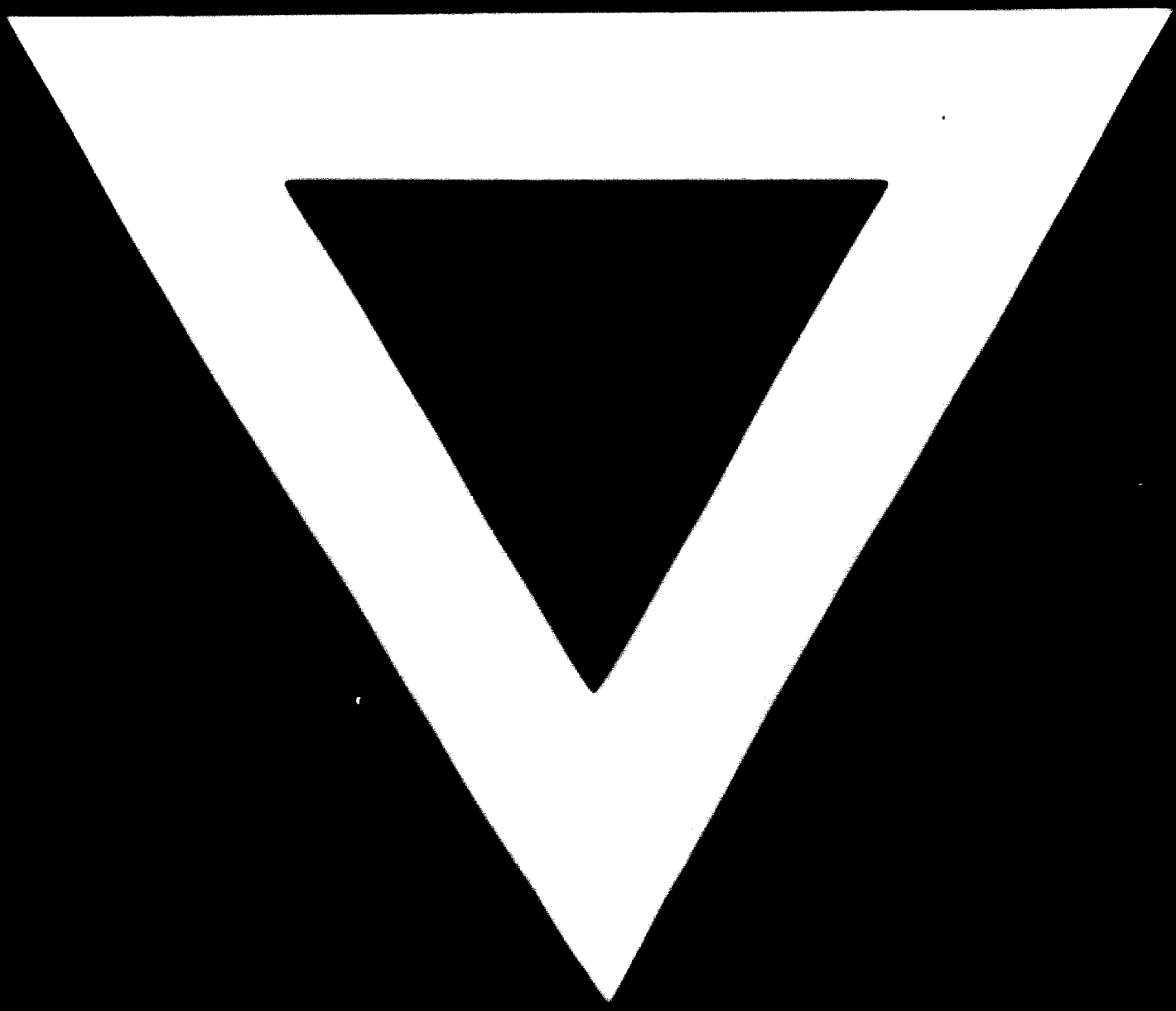
The instruments used for assessing, influencing and satisfying needs are applied in Hungary under such conditions where the means of production are in state ownership both in metallurgy and the user branches. Nevertheless, it follows from the nature of these instruments that certain elements of the control system can be also applied in cases when the scope of state ownership is narrower and embraces only the metallurgical plants or part of them.



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