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Report

The Economist Intelligence Unit

INDUSTRIAL DEVELOPMENT SURVEY

BASIC METALS INDUSTRIES

December, 1970

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INDUSTRIAL DEVELOPMENT SURVEY

BASIC METALS INDUSTRIES

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ASIA

Economic Trends

The basic data covering production, employment and value added in the basic metal industries of Asia are presented in Appendices to this report.

Output. In economic terms, the basic metal sector has long been seen as one of the key sectors in development, and has been given correspondingly heavy emphasis in most national development plans. The result has been a relatively high rate of growth in output when compared with the other industrial sectors covered in this survey. This is particularly the case in Asia. As can be seen in Table 3, though output in this sector is still much smaller than in Latin America ($885 million, compared with $1,438 million in 1968) it has grown much more rapidly, by 120 per cent since 1960, compared with 72 per cent in Latin America.

Though there have been important developments in integrated steel works, notably in India, a very large part of this activity has consisted of fabrication of imported primary products, re-rolling of blooms and slabs, scrap furnaces etc.

Until recently, primary production of iron and steel in the developing countries of Asia was concentrated very largely in India, the only country with a market large enough to support a basic integrated steelworks of economic size. India's share of total output of primary steel in Asia was still over 75 per cent in 1969 and only Turkey, Taiwan and South Korea among other developing countries in Asia, produced appreciable quantities. Similarly, Asia's share of output of steel in the developing world as a whole has remained fairly constant, at between 40 and 50 per cent in the 1960-1969 period. Output of pig-iron, on the other hand, has not grown as fast as elsewhere, and in 1969 accounted for 48 per cent of the total,

compared with over 58 per cent in 1960. In terms of world output, Asia's share of production of ferrous metals is still very small indeed.

In certain non-ferrous metals, however, Asian contribution is more substantial. Malaysia is by far the world's biggest producer of tin, accounting for over 40 per cent of known world production outside China. The pattern of production of primary aluminium is somewhat similar to that of ferrous metals, with the Asian bloc accounting for a substantial share (over 36 per cent) of total output by developing countries, and with India accounting for the bulk of production within the bloc. Aluminium production has grown much more rapidly than that of iron and steel, as elsewhere in the world.

Zinc, lead, copper and nickel are all produced in various parts of the area, but nowhere do they account for more than a very small part of world supplies.

Employment

Employment in the basic metal industry, as can be seen from Table 5 has grown more rapidly in Asia than elsewhere in developing countries, and value added per employee has, in consequence, tended to fall (Table 2).

Trade. Basic metals are to a large extent produced in developing countries in substitution of imports, and exports are nil or negligible for most countries. Imports of ferrous and non-ferrous ingots and other forms of primary product for re-rolling and further fabrication are still substantial, due partly to the high cost of local low-volume production in relation to that of imported metal.

Consumption. There has been a relatively rapid growth in aluminium consumption (averaging 12.6 per cent per annum in the 1964-1969 period) a slightly less rapid growth in iron and steel, less rapid still in zinc, and a sharp fall in the early 1960's, followed by a recovery in consumption of copper and tin. This was due mainly to competition from aluminium in an important end-use for the two metals - cooking utensils. Growing requirements in other end-uses, particularly in electrical uses for copper, are mainly responsible for the renewed growth in the second half of the period.

Technological Trends

Types of Product. The basic metal industries in the various countries of Asia have developed in a variety of ways, and product trends are correspondingly varied; but the most important broad development to date has been the growth of small-scale fabricating activities: India still remains the only significant producer of crude steel in the area, and major rolling mills are still relatively few.

Typical products of partly fabrication are reinforcing rods, light sections, tubes, wire and extrusions of various types.

This line of development can be expected to continue, but emphasis is now moving towards integration "upstream", into semi-fabrication and primary production, helped by recent developments, such as continuous casting, which have significantly reduced the economic size of primary units. Integrated plants are now planned or under construction in Pakistan, Indonesia, the Philippines and Malaysia.

Value Added per Person. This is significantly lower in Asia than in Latin America and Africa, attributable to the higher proportion of output in the sector accounted for by relatively labour-intensive petty fabrication (in contrast to Latin America and Africa, where capital-intensive integrated primary production is more important). Compared with developed economies, the disparity in value added per head in Asia is high ($1,193 per head in Asia, $6,394 in developed market economies).

Investment Trends

Industrial Capacity. As indicated above, the investment trend in the basic metals sector in Asia is towards the heavier end of the industry, towards primary production (integrated steelworks) and heavy rolling mills. A large part of this will take place in India, where there are plans to extend most of the existing works, plus a new plant at Bokaro. There are also plans for integrated steelworks, at various stages of development, in Pakistan (both East and West), Malaysia, Indonesia, Ceylon (where a new plant has recently been completed), South Korea, Thailand and the Philippines.

LATIN AMERICA

Economic Trends

Output. Though production in the basic metals sector has not grown as rapidly in Latin America as in Asia (by 40 per cent 1963-66, compared with 91 per cent in Asia), Latin America remains by far the most important part of the developing world in basic metal production, accounting for some 57 per cent of total value added in the sector by developing countries in 1966 (see Table 3). Primary production of iron and steel on a large scale has been long established in Brazil, Morocco, Chile, Argentina and Colombia, joined by Venezuela in 1966. In many countries of the area, local production now supplies 80 per cent or more of steel requirements, and Latin America accounts for 54 per cent of total steel produced in developing countries.

In non-ferrous metals, Latin America accounts for 100 per cent of developing world production of nickel, 77 per cent of lead, 53 per cent of zinc and 43 per cent of copper production. Its share is less important in tin and aluminium production.

Employment. Employment in the basic metals sector has risen in Latin America in the six years to 1966, but rather more slowly than in Asia and Africa - by 3.6 per cent a year on average, compared with 7.6 per cent in developing countries generally. This reflects to a large extent the greater emphasis in Latin America on capital-intensive activity as opposed to the development of labour-intensive activities which have featured in Asia.

Trade. Like other developing areas, Latin America is still a net importer of many basic metal products, though Mexico, Argentina and Brazil are to a large extent self-sufficient in most of the basic steel semis. Indeed, Brazil has an exportable surplus of flat products, and Argentina of other steel products. In the following table, the role of imports in domestic consumption of steel in 1965 is compared with the 1960 position:

Proportion of Steel Imports
in Total Domestic Consumption in 1960 and 1965
(imports as % of apparent consumption)

	1960	1965
Argentina	82.5	46.7
Brazil	13.8	5.7
Chile	14.9	22.4
Colombia	55.6	44.1
Mexico	15.0	10.1
Peru	70.8	76.7
Uruguay	92.7	79.7
Venezuela	90.8	47.6

Source: Long-term trends and problems of the European Steel Ind. ECE.

Consumption. Consumption of steel has grown more rapidly in Latin America, and in other developing countries, than in developed market economies in the 1960-67 period, at an annual rate of growth averaging 6.5 per cent (compared with 5.3 per cent in developed countries).

Trends in consumption of non-ferrous metals have been mixed. Copper consumption in 1969 continued to recover from a declining trend to 1967. The trend in aluminium consumption has been strongly rising in the 1964-1969 period, averaging over 11 per cent a year, compared with 8.5 per cent on developed market economies. Consumption of other non-ferrous metals has grown more slowly.

Technological Trends

Types of Product. The product mix in Latin America is somewhat similar to that found in Asia. Concrete reinforcing rods and light sections are the most widely produced products, together accounting for 35 per cent of total output in the area in 1965. In tonnage terms, a larger share of output - 43 per cent - is accounted for by plates and sheet, produced in 1965 in Argentina, Brazil, Colombia, Chile and Mexico - countries in which the steel industry is most developed.

Value Added Per Person. This is substantially higher in Latin America than in Asia, due mainly to the greater emphasis upon relatively capital-intensive primary production. Productivity rose by nearly 30 per cent in the period 1960-1967. This compares with 21 per cent in Asia, and is virtually identical to trends in developed market economies.

Investment Trends

Industrial Capacity. In the five years to 1965, steel making capacity in Latin America has grown from 5.9 to 11.2 million tonnes, and its share of the world total from 1.4 per cent to 2.1 per cent. The industry has not, of course, developed at a uniform pace in all the countries of the area, though development has been more evenly distributed than it has been in Asia. The industry is at its most fully developed in Brazil, Mexico, Argentina, Venezuela and Chile; Colombia, Peru and Uruguay lag some way behind the leaders, but have made significant progress in the past 15 years; among the remaining countries the industry is largely at an embryonic stage of development.

In non-ferrous metals, investment has to a large extent gone into the maintenance and modernisation of existing facilities, and net capacity has remained substantially the same.

Prospects and Plans

Major developments are planned in the steel industries of Mexico, Brazil, and Argentina. In the following table, the additions which these developments will make to productive capacity in these and other countries in Latin America are summarised.

Expansion of Steelmaking Capacity in Latin America, 1966-1975
(crude steel capacity in thousands of tons per annum)

Country	1966-1970	1971-1975	Total
Argentina	-	2,650	2,650
Brazil	-	4,450	4,450
Chile	-	600	600
Colombia	-	500	500
Mexico	1,050	-	1,050
Peru	250	-	250
Venezuela	-	600	600
	1,300	8,800	10,100

Source: R. Suarez, "Present Status and Future of the Iron and Steel Industry of the Latin American Countries", presented to the Second Interregional Symposium on the Iron and Steel Industry, Moscow, 1968.

AFRICA

Economic Trends

Africa has the least developed basic metals sector of the three developing country areas. Though petty fabrication of iron and steel and of copper and other non-ferrous metals has a lengthy history in many parts of the continent, it is not until quite recently that large-scale operations have been established. The Republic of South Africa is excluded from this chapter, and included among the developed market economies, in line with the grouping of statistical data.

Output. Small-scale production of steel from ore takes place in Rhodesia, Algeria, Morocco, U.A.R. and Tunisia. Elsewhere, the ferrous metals sector is represented by scrap furnaces, re-rolling facilities and light fabrication (galvanised sheeting, reinforcing rods etc.) based on scrap and imported steel. Semis production has grown more slowly in Africa than in other developing countries, and in 1969 Africa accounted for only 1.5 per cent of total output in developing market economies, compared with 2.3 per cent in 1960.

Africa's share in developing countries' output of non-ferrous metals is more substantial, with 55 per cent of copper (both Zambia and Congo being major suppliers to the world market) and a third of aluminium produced in 1969.

Overall, its share in terms of value added in the sector is put at 7.3 per cent of developing countries in 1968, compared with 11.4 per cent in 1960.

Employment. Somewhat surprisingly, the data presented in Table 5 indicate that there has been a decline since 1965 in the numbers employed in the sector, from 29,000 to 27,000 in 1967.

Trade. With the local basic metals sector relatively undeveloped, imports supply a much larger share of demand in Africa than in Asia or Latin America (in 1965, 91, 48 and 32 per cent, respectively). Imports consist to a very large extent of steel semis. Uganda is a small but notable exception to this rule, supplying over three quarters of its steel requirements locally.

In non-ferrous metals, Africa is a substantial net exporter, accounting for over 12 per cent of world exports.

Consumption. This has, like production, growth more slowly in Africa than in other parts of the developing world, Africa's share of total steel consumption in developing countries, in consequence, has fallen from over 10 per cent in 1960 to 7.3 per cent in 1967.

In non-ferrous metals, which account for the bulk of basic metals production in Africa, primary products, such as copper wirebar, predominate.

Technological Trends

Value Added Per Person. This emphasis on primary production of non-ferrous metals is reflected in an exceptionally high level of value added per employee. Indeed, as shown in Table 2 , in this respect Africa leads the world.

Prospects and Plans. In the steel sector, there are plans in varying stages of advancement in most countries of the area. Integrated works are planned or under construction in Algeria, Congo Kinshasa, Liberia, Mauretania, Morocco, Nigeria, Rhodesia (extensions to existing plant), Tunisia, Uganda and Zambia. Most are relatively small-scale developments, with capacities of less than 300,000 tons per annum. However, in many projects the poor economics of small-scale production are offset by those of new techniques such as continuous casting.

Developments in scrap furnaces and re-rolling facilities are planned or under construction in Algeria, Central African Republic, Congo Kinshasa, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Libya, Malawi, Morocco, Mozambique, Nigeria, Rhodesia, Senegal, Tanzania and Tunisia. There are, therefore, few countries in which some form of development in the basic steel industry is not taking place, and over the next ten years the hitherto somewhat sluggish rate of growth in steel output in Africa is likely to quicken.

In non-ferrous metals expansion is also likely to continue, led by renewed growth in the copper industry of Congo (Kinshasa).

DEVELOPING COUNTRIES - SUMMARY

Hitherto , the economics of steel production have tended to confine major developments in steelmaking to India and a few Latin American countries. In other countries the basic metals sector is relatively undeveloped, as far as iron and steel goes, and there is still heavy reliance on imports. In normal circumstances such imports, the products of larger-scale production in developed countries, will be far cheaper than the home-made product. But as imports they are, of course, a drain on scarce resources of foreign exchange; and importing countries are vulnerable to the cyclical shortages to which the steel industry is prone (there is, for example, a shortage at present of merchant reinforcing rods). At the same time, the economics of primary production of steel are changing, with technological developments (such as continuous casting), and small-scale production is becoming less expensive. These factors are tending to improve steel's position in the development plan priorities of many countries. It is not, of course, without competitors in this - in many countries, agricultural development now receives, if it has not always done so, prior attention - but the coming decade is likely to see past growth-rates in ferrous metals activity exceeded in developing countries generally, and in Africa in particular.

In non-ferrous metals the developing countries are already major suppliers to world markets in copper, zinc, tin etc. Production in tonnage terms can be expected to grow with increasing demand, both overseas and at home, and a higher proportion of value (within the limits of the sector) is likely to be added in countries of origin.

DEVELOPED MARKET ECONOMIES

Economic Trends

Output. The developed countries, taking these to include North America, Western Europe, Yugoslavia, Japan, Israel and South Africa, still account for a massive two thirds of the world total of value added in the basic metals sector. The proportion has declined slightly, from 68 to 66 per cent, in the 1960–1968 period, due mainly to the faster growth-rate achieved in centrally planned economies. However, in volume terms, in terms of primary production of the various metals, the developed market economies have an even bigger share of world output, and one that has, in many metals, declined hardly at all over the study period. The salient figures are set out in the table below.

Developed Market Economies' Share of World[a] Primary Metal Production

	1960	1969
Pig-iron	63.1	62.3
Steel	70.8	69.9
Aluminium	80.0	74.8
Copper	49.0	50.7
Zinc	73.0	74.3
Tin	34.8	36.1
Lead	65.2	69.5
Nickel	70.4	68.1

a Excluding China, N. Korea, N. Vietnam.
Source: U.N. Annual Abstract of Statistics, World Metal Statistics.

It can be seen from the table that the only metal in which the developed economies' share of output has fallen to any great extent in the 1960–1969 period is aluminium, in which the centrally planned economies have made rapid progress. They have still a long way to catch up in this metal, however; at nearly three quarters of world output in 1969, the developed economies' share of primary aluminium production is the largest in any of the major metals.

Among the developed economies, the country with the fastest growth-rate, in almost every direction, has been Japan. By 1965 Japan had overtaken West Germany as the second largest steel producer in the group; in 1969 it produced almost twice as much steel as West Germany, and nearly two thirds as much as the U.S. The U.S. is still by a long way the major producer of aluminium, accounting for over half of output among developed economies; but here too, Japan's contribution has increased rapidly, to the point where it is likely to overtake Canada as the second largest producer within the next five years or so.

Employment. As can be seen from the data presented in Table 5 , employment in basic metals production has remained virtually static in the developed market group. In Europe, indeed, there has been a decline in employment since 1963, offset by slight increases in North America and elsewhere.

Trade. In general, as the UNECE's World Trade in Steel and Steel Demand in Developing Countries points out (p. 47), trade in steel is influenced more by the supply/demand situations in industrialised countries than by those in developing countries; in other words, it is a relatively unimportant feature when compared to internal activity.

Among developed market economies, the U.S. is a major net importer of ingots, semis and finished products in steel, to the extent of 6.1 million tonnes in 1969 (imports 10.2 million, exports 4.1 million tonnes). The bulk of imports came from other developed countries (Europe and Japan); in trade with the rest of the world, the U.S. is a net exporter, to the extent of 1 million tonnes in 1969. The other two main trading groups within the bloc, the ECSC and Japan, are both major net exporters. The position in 1969 for the major members of the bloc is summarised in the following table.

Trade in Ingots, Semis and Finished Products by Developed Economies in 1969
(units : million tonnes)

	Imports		Exports		Net Exports	
	Total	External	Total	External	Total	External
U.S.	10.2	0.5	4.1	1.5	-6.1	1.0
ECSC	22.6	1.4	31.7	4.2	9.1	2.8
Japan	0.1	0.1	12.6	6.4	12.5	6.3
U.K.	2.1	0.3	3.2	1.0	1.1	0.7
Total External Trade		2.3		13.1		10.8

Source: The Iron and Steel Industry in 1969 OECD 1970.

In most non-ferrous metals the position is quite different, the developed countries being major net importers from developing countries of primary metals such as copper and zinc.

In 1968, for example (the latest year for which reliable figures are available), imports of blister and refined copper by the developed countries from the rest of the world totalled 2,044,500 tonnes, and exports 742,700 tonnes.

Consumption. In 1969 apparent consumption of crude steel in the developed countries rose to 355.1 million tonnes, giving an average annual growth-rate since 1960 of 5.6 per cent. This is also, by no coincidence (steel consumption having an intimate relationship with economic activity generally), in line with economic trends in the group of developed countries on a whole. Over three years to 1969 growth in steel consumption has been accelerating: the year-to-year increases in 1966-67, 1967-68 and 1968-69 were 3.9 per cent, 6.3 per cent and 9.7 per cent respectively. However, it seems probable that since 1969 consumption has failed to sustain this acceleration.

The developed economies consume rather less iron and steel than they produce. In some non-ferrous metals, the reverse is the case. In copper, for example, they account for nearly 80 per cent of world consumption compared to their 50.7 per cent share of production. The group also consumes substantially more tin and zinc than it produces.

In aluminium the developed countries are self-sufficient, but substantial quantities are traded within the area (Canada and Norway being the principal exporters). Consumption has grown more rapidly than most non-ferrous metals, at an annual rate averaging 8.5 per cent in the past five years, compared to 2.2 per cent for copper.

Technological Trends

Types of Product. Most of the countries included in the group have steel industries producing a full range of products, and trends in output have naturally followed those in the major consuming sectors - motor vehicles and other consumer durables, shipbuilding, building construction, capital goods etc. Among European countries, thin sheet and hot-rolled strip have over the past nine years led the field with annual growth-rates averaging between 7 and 8 per cent, followed by universals and heavy plate. Tinplate, wire rod and sections have also been in demand, but growth-rates have been more sluggish, at around 4 per cent annually. By comparison, growth in all products in Japan has been explosive. Tinplate and blackplate, the slowest-moving product, has averaged over 8 per cent growth since 1960; while the fastest-growing sectors, thin sheet and hot-rolled strip, shot up at rates averaging over 18 per cent annually. Thin sheet and sections were the main growth sectors in the U.S. and Japan.

Non-ferrous metals are less versatile (polymorphous might be a better word) than steel, and there has been less development within the overall output trend than there has been in the steel industry. For the future, it is possible that production of non-ferrous metals (particularly copper) in powder form for fabrication by sintering techniques may become important.

Value Added Per Person. From the figures set out in Table 2 it can be seen that productivity in the sector as a whole has been improving steadily, at a rate averaging 4.3 per cent over the eight years to 1968. Within the socio-economic group, productivity in Europe, as can be seen in the table, is significantly lower than elsewhere.

Investment Trends

In Europe, the period opened with an investment boom in the steel industry. This came to an end in 1963, and for the next five years in most countries investment declined. A recovery began in 1968, and this has since continued; but the levels of investment are still well below those of eight years ago.

In the U.S., by contrast, 1969 marked a slight falling-off in what had hitherto been a generally rising trend of investment. In Japan, investment has continued to increase at a rate (28 per cent in 1969) far above the other countries in the group.

Prospects and Plans

Two broad trends have been observed[1] in the steel industries of the developed market economies, which are likely to persist over the next five years and possibly the next ten years. Among established steel producers, there is a trend towards large-scale integrated steelworks, and away from smaller shops and works without steelmaking plant. Among newer producers (notably Japan), growth in larger units has been accompanied by growth in smaller enterprises. In either case, there has been an increase in the number of large works: in the ECSC countries and Japan, for example, there were only two steelworks with capacities larger than 3 million tons a year in 1961. The number had risen to 10 in 1966 and to 18 in 1969.

1 See The Iron and Steel Industry in 1969, OECD 1970.

CENTRALLY PLANNED ECONOMIES

Economic Trends

An observation which applies to virtually every part of this chapter and which may therefore be made at the outset, to avoid constant repitition is the enormous preponderance of the U.S.S.R. among the centrally planned economies (if China is excluded). The Soviet Union's share of almost every total quoted in the tables which follow comes to 70 per cent or over, and the disparity in size with the next largest in the bloc has no parallel in the other two blocs.

Output. As a group, the centrally planned economies have increased their production of basic metals in value turns at a faster rate than any other. The index of output by value shown in Table 4 implies an average annual growth-rate of nearly 5 per cent, compared with 3.5 per cent for developed market economies. Even so, the group's output, as shown in Table 2 is still only half that of the developed economies. The contribution of the bloc to world output (excluding that of China) of the various major metals in tonnage terms is summarised in the following table.

Production of Basic Metals in Centrally Planned Economies 1960 and 1969 (per cent of world production)

	1960	1969
Pigiron and ferro alloys	33.8	33.6
Steel	26.5	26.6
Aluminium	16.0	20.4
Copper	15.8	16.3
Zinc	20.6	18.7
Lead	21.6	20.9
Tin	20.0	17.5
Nickel	27.0	31.6

Apart from the increased share of aluminium output and, to a lesser extent, copper, the table shows little change in the planned economies' share of output. It follows that the highest growth-rate in output value referred to above must have arisen from increased unit value of products.

Employment. Total employment in basic metals production, and indices illustrating trends since 1960, are set out in Tables 1 and 5. From these, it can be seen that, like the developing countries but in contrast to the developed market economies, employment has taken on a steadily rising trend through the period.

Trade. To a greater extent than either of the two other blocs, the centrally planned economies are self-sufficient in steel, and trade little with other countries. Within the group, however, there has been a substantial growth in trade in steel. In 1965 this accounted for 11.1 per cent of world steel, compared with 8.1 per cent in 1960.

Like the developed market economies, however, the planned economies are substantial net importers of certain non-ferrous metals, notably copper.

Consumption. With little outside trade in iron and steel, it follows that trends in apparent consumption have followed those of production. This is not the case in many non-ferrous metals, where imports play an important part in supplies and Aluminium consumption has increased at an average 6.9 per cent annually over 5 years to 1969, or at a slightly lower rate than the 8.3 per cent world rate. Copper consumption has grown more rapidly than elsewhere, by an average of 4.5 per cent, compared with 2.8 per cent in developed market economies. A possible reason for this is that substitution of copper by aluminium in electrical products has not proceeded as far as in the developed market economies.

Technological Trends

Range of Products. The basic metals sector is very fully developed in each of the constituent countries of the bloc, and a full range of ferrous and non-ferrous products is produced. However, there are significant differences in the product pattern from that found in most developed market economies, as the following table illustrates.

Steel Industry Product Patterns in the U.S.S.R. and in Developed Market Economies
(per cent of total output)

Products	U.S.S.R. Economies[1]		Developed Market Economies[2]
Tube semis	5.6		3.7
Rail track mats	4.4		1.3
Heavy sections)	37.8		(8.0
Light sections)			(20.4
Strip	8.7		7.5
Sheets < 5 mm	21.1	< 3 mm	27.6
Sheets > 5 mm	11.7	> 3 mm	18.1
Wire rod	8.7		8.8
Wheels, centres etc.	1.1		0.2
Other rolled products	0.9		4.4
Total hot rolled products	100.0		100.0

Notes: 1 1967 Source: UNECE
2 1969 Source: OECD.

The main differences which emerges from the above table are the higher proportions of sections and rail track and other material in the U.S.S.R. (43.3 per cent, compared with 29.9 per cent) and the correspondingly lighter emphasis on flat products.

Plans and Prospects. In the U.S.S.R. in particular, and in the bloc as a whole, the prospect is one of continued steady growth. Activity in the U.S.S.R. steel industry in the first six months of 1970 was running between 5 and 7 per cent ahead of the 1969 level. Longer-term prospects should be regarded in the

context of the change in investment emphasis, from heavy industry and capital goods, towards agricultural development and consumer goods. This will not produce rapid changes in product patterns, but in the longer term it seems probable that flat products will increase in importance at the expense of heavy sections and rail products. In non-ferrous metals, there is likely to be continued rapid growth in aluminium production and use, and a corresponding slackening in demand for copper.

WORLD SUMMARY

In value terms, activity in the basic metals sector has grown at an annual rate averaging exactly 4 per cent in the eight years to 1968 in the world as a whole[1]. As might be expected of a sector so central to the economic life of most nations, this is closely similar to GNP trends.

Within the global total, the developed market economies have had, on average, the least growth rate, averaging some 3.5 per cent. Within this group again there are wide differences in national growth rates, with Japan's basic metals industry roaring ahead at rates of 15 per cent and over, and at or near the other end of the scale the United Kingdom, where growth has been hardly noticeable by comparison. In spite of their modest overall average growth, the developed economies still account for a massive 62.5 per cent share of the total.

The developing countries, starting from a much smaller base - only 4.2 per cent of world output in 1960 - have had a more vigorous rate of growth, averaging 4.2 per cent per annum. Within the group, the Asian countries generally, and India in particular, have developed most rapidly, and the African countries least. The coming decade, however, is likely to see an acceleration in activity in Africa.

The fastest average growth rate of the three major socio-economic groupings has been achieved by the centrally planned economies, at 4.9 per cent over the 1960-1968 period. Physical output of basic metals within the group has grown much more slowly than this, from which it follows that growth has largely been in terms of unit value added.

This distinction leads to an observation which is worth making about the nature of activity within the ISIC Basic Metals sector. In some countries activity is largely confined to the primary production of metal from locally produced ores. A large part of value added in Africa comes within this heading. At the other end of the

1 Excluding China, N. Vietnam, N. Korea.

range of activity defined by the ISIC sector comes fabrication into basic shapes and forms. Among developed economies, activity of this kind predominates, and the developed economies tend to be importers of smelted non-ferrous metals from developing countries of steel semis. This feature of world trade in metals (which is not, it should be said, a dominating element in world trade, which consists to a very large extent of exchanges within the developed market economy group) is likely to change in the coming decade, to the extent that the value added in developing countries is expected to increase. As a result copper, for example, may leave Africa in the form of wire as well as simple wirebar; and the coming decade will see the establishment of small-scale steel works in a number of developing countries. This second development has been facilitated by recent developments in ferrous metallurgy, notably by such developments as continuous casting, which eliminates at a stroke some of the more expensive items of standard steelworks equipment. Other developments, notably in smelting (direct reduction) are likely to accelerate this trend in improving the economics of small-scale steel production.

APPENDIX

Table 1 . Industrial Employment in Basic Metal Industries by Region and Socio-Economic Grouping

(unit: '000)

	1960	1963	1964	1965	1966	1967	1968
1. Asia	419	599	654	676	674	689	
2. Latin America	343	360	385	388	457	408	
3. Africa	16	22	25	29	28	27	
4. Developing Countries[a] (Adjusted total)[c]	815	1,027	1,114	1,144	1,213	1,177	
5. Europe	2,585	2,625	2,661	2,701	2,639	2,531	2,507
6. Developed market economies	4,592	4,663	4,788	4,895	4,894	4,767	4,753
7. Centrally planned economies	1,923	2,111	2,174	2,238	2,288	2,360	
8. World	7,330	7,801	8,076	8,277	8,395	8,304	

a Total of 1+2+3. b Total of 4+6+7. c Including estimates for countries for which data is unavailable.

Table 2 . Value Added Per Person Engaged in Basic Metal Industries by Region and Socio-Economic Grouping

(U. S. $ per person)

	1960	1963	1964	1965	1966	1967	1968
1. Asia	983	1,058	1,036	1,062	1,184	1,193	
2. Latin America	2,431	2,847	3,067	3,159	2,792	3,139	
3. Africa	9,937	6,454	6,200	5,448	6,250	6,740	
4. Developing Countries[a]	1,711	1,753	1,807	1,837	1,856	1,928	
5. Europe	3,602	3,601	4,001	4,150	4,183	4,425	4,951
6. Developed market economies	4,922	5,318	5,905	6,107	6,263	6,394	6,893
7. Centrally planned economies	4,773	5,533	5,801	6,099	6,460	6,737	
8. World[b]	4,526	4,907	5,312	5,515	5,680	5,858	

a Total of 1+2+3. b Total of 4+6+7.

Table 3 . Output by Region and Socio-Economic Grouping in the Basic Metal Industries (1960-1968)

(Unit: mn US$)

	1960	1963	1964	1965	1966	1967	1968
1. Asia	402	634	678	718	801	822	885
2. Latin America	834	1,025	1,181	1,226	1,276	1,281	1,438
3. Africa	159	142	155	158	175	167	182
4. Developing countries[a] (adjusted total)[c]	1,395	1,801	2,014	2,102	2,252	2,270	2,505
5. Europe	9,313	9,453	10,648	11,210	11,038	11,201	12,414
6. Developed market economies	22,605	24,798	28,276	29,896	30,656	30,482	32,763
7. Centrally planned economies	9,179	11,682	12,613	13,650	14,782	15,901	17,152
8. World[b]	33,179	38,281	42,903	45,648	47,690	48,653	52,420

a Total of 1+2+3. b Total of 4+6+7. c Including estimates for countries for which data is unavailable.

Table 4. Indices of Basic Metal Production
(Value index, 1963 = 100)

	1960	1964	1965	1966	1967	1968
Asia[a]	69.0	119.3	122.5	139.4	168.9	190.7
Latin America	81.4	115.2	119.6	124.5	125.0	140.3
Africa[b]	111.9	109.1	111.2	123.2	117.6	128.1
Developing Countries[ab]	77.5	111.8	116.7	125.0	126.0	139.1
Europe	98.5	112.6	118.5	116.7	118.4	131.3
Developed Market Economies	91.2	114.0	120.6	123.6	122.9	132.1
Centrally Planned Economies	78.5	107.9	116.8	126.5	136.1	146.8
WORLD[c]	86.7	112.1	119.2	124.6	127.1	136.9

a. Excluding Japan. b. Excluding S. Africa. c. Excluding China, N. Vietnam, N. Korea.
Source: UNIDO.

Table 5. Indices of Employment in Basic Metal Production
(1963 = 100)

	1960	1964	1965	1966	1967	1968
Asia[a]	69.9	109.2	112.9	112.5	115.0	
Latin America	95.3	106.9	107.8	126.9	113.3	118.7
Africa[b]	72.7	113.6	131.8	127.2	122.7	
Developing Countries	79.4	108.5	111.4	118.1	114.6	
Europe	98.4	101.3	102.8	100.5	96.4	95.5
Developed Market Economies	98.5	102.7	105.0	105.0	102.2	101.9
Centrally Planned Economies[c]	91.0	102.9	106.0	108.3	111.7	
WORLD[c]	94.0	103.5	106.1	107.6	106.4	

a. Excluding Japan. b. Excluding S. Africa. c. Excluding China, N. Vietnam, N. Korea.
Source: UNIDO.

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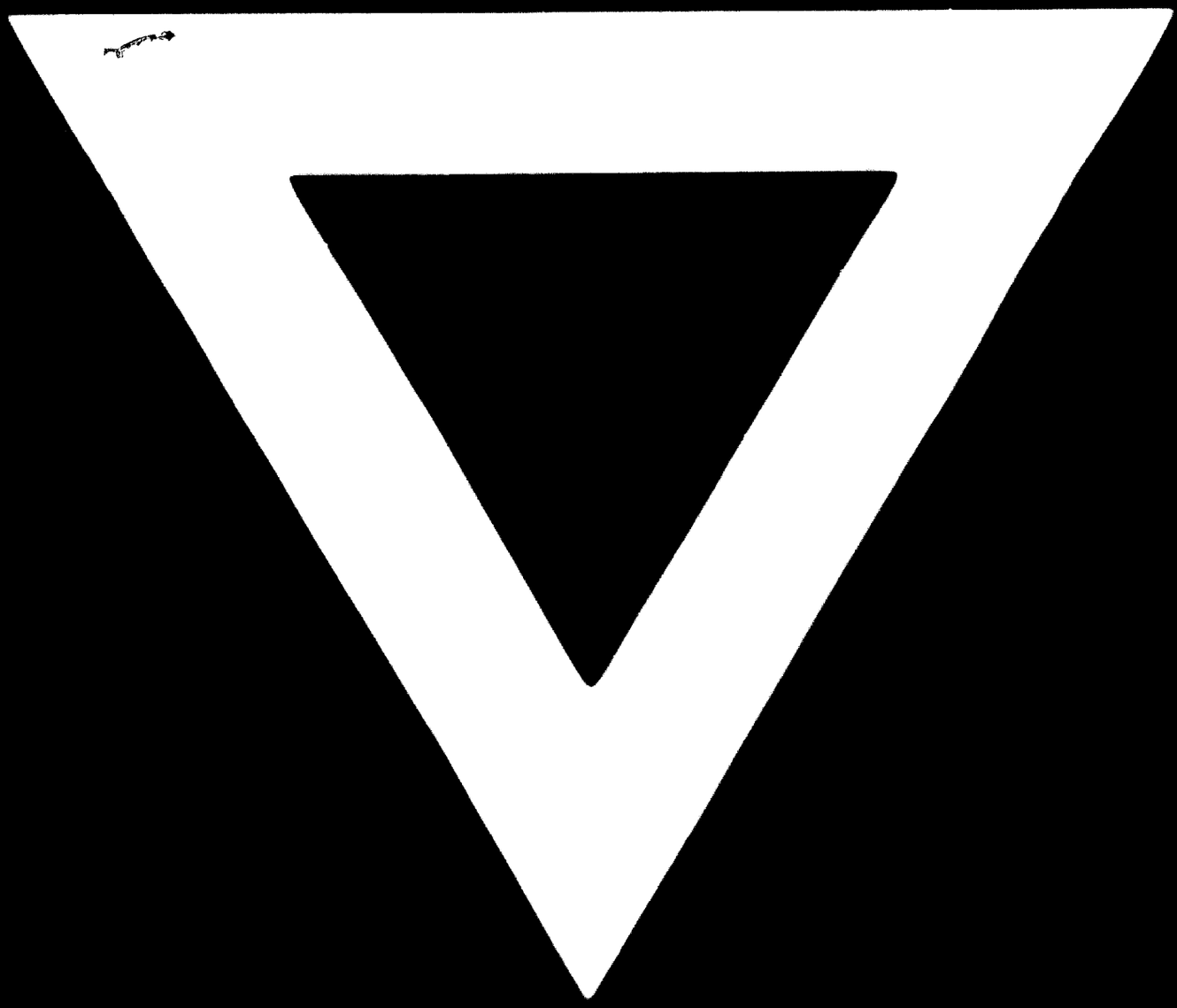

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