UNITED NATIONS
ECONOMIC COMMISSION FOR LATIN AMERICA
TECHNICAL ASSISTANCE ADMINISTRATION

LIMITED
ST/ECLA/CONF.4/L.D-21
1 October 1956
ENGLISH
ORIGINAL: SPANISH

LATIN AMERICAN MEETING OF EXPERTS ON STEEL MAKING AND TRANSFORMING INDUSTRIES

Sao Paulo, Brazil
15-28 October, 1956

DEVELOPMENT PROSPECTS OF THE METALLURGICAL INDUSTRY IN CHILE

study presented by

Max Nolff, Consultant,
Chile

to the Secretariat of
the Economic Commission for Latin America

Part D: DEVELOPMENT PROBLEMS OF LATIN AMERICA'S MECHANICAL AND METALLURGICAL INDUSTRIES

(Note: This document has not been proof-read by the author and may be revised prior to the publication of printed proceedings)

55600623

DEVELOPMENT PROSPECTS OF THE METALLURGICAL INDUSTRY IN CHILE

By Max Nolff

I

POSSIBILITIES OF SUBSTITUTION

During the second world war, most metallurgical products were in short supply in the world markets. This situation was especially pronounced in the case of Chile, because of its distance from the supply centres, and because it did not possess its own means of transport for bringing the goods to the country.

These circumstances stimulated the substitution of imported articles by domestic products.

In the late forties, with the war over and the supply situation normal again, Chile had to decide, in many fields, whether to import the manufactured product, or the raw materials for the domestic manufacture of these same articles. Decision was made in favour of the latter, and imports were prohibited of such items as the domestic industry was capable of manufacturing in sufficient quantity to meet the home demand, without considering whether the quality and price would be satisfactory or not.

This protectionist policy, and the later entry into operation of the Huachipato iron and steel plant were decisive factors in the development of the metallurgical and mechanical industries during the period 1946-1955.

There remains, however, much room for further action in the process of import substitution. The volume and value of imports of mechanical and metallurgical products from 1948 to 1953 is shown in Tables 1 and 2.

According to Table 1, substitution only reached 31,500 tons between 1949 and 1953, but in fact it was much greater. Domestic deliveries of the Compañía de Acero del Pacífico (CAP) in 1953 were 114,648 tons of bars, sheet and tinplate, rising to 170,000 tons in 1954 and 1955. More than 70 per cent of this amount was raw material for industries, mainly in substitution for products of the primary and secondary metallurgical industries.

/Table 1

Table 1

CHILE: VOLUME OF IMPORTS OF METALLURGICAL PRODUCTS

(thousands of tons)

Products of:	1949		Annual average 1948-52		1953	
Iron and steel industry	105.5	43.4	76.3	40.3	72.9	40.2
Primary metallurgical industry	54.5	22.5	38.6	20.4	25.9	14.3
Secondary metallurgical industry	7.3	3.0	6.3	3.3	7.9	4.4
Heavy mechanical industry	74.2	30.6	66.3	35.0	71.6	39.6
Light mechanical industry	1.3	0.5	1.9	1.0	2.6	1.5
Totals	242.4	100	189.4	100	180.9	100

Source: Yearbooks of Foreign Trade of the Dirección General de Estadística.

Table 2

CHILE: VALUE OF IMPORTS OF METALLURGICAL PRODUCTS

(millions of dollars)

Products of:	1949		Annual average 1948-52		1953	
Iron and steel industry	21.0	17.0	14.1	13.7	17.0	14.0
Primary metallurgical industry	13.7	11.1	9.8	9.5	9.0	7.4
Secondary metallurgical industry	8.8	7.1	8.3	8.1	10.6	8.7
Heavy mechanical industry	78.0	63.0	66.5	64.8	80.5	66.3
Light mechanical industry	2.3	1.8	4.0	3.9	4.4	3.6
Totals	123.8	100	102.7	100	121.6	100

Source: Yearbooks of Foreign Trade of the Dirección General de Estadística.

/On the

On the other hand, it must be pointed out that the consumption of metallurgical products increased considerably during this period. This was because the establishment of new industries caused parallel new requirements for capital goods, especially machinery, raw materials and spares. This can be appreciated clearly in Table.1, where the increase is seen in imports of products of the secondary metallurgical industry (from 6,298 to 7,941 tons) and those of the heavy mechanical industry (66,345 to 71,594 tons) in relation to the annual average for 1948-1952.

An increase in the products of the light mechanical industry can also be seen, from 1,909 to 2,637 tons, although not for the same reason, but more probably because of the greater power of consumption of the population, stimulated by the inflation, or to greater import facilities in these items.

The notable trend in the products of the heavy mechanical industry towards a greater share in total imports of metallurgical products is a clear indication of the industrial development experienced in the country.

Table 3

CHILE: PRICE INDICES OF METALLURGICAL PRODUCTS

Products of:	1949		Annual average 1948-1952		1953	
	$/ton	% of average	$/ton	% of average	$/ton	% of average
Iron and steel industry	200	39.1	185	34.1	234	34.8
Primary metallurgical industry	252	49.3	254	46.9	348	51.8
Secondary metallurgical industry	1,194	233.7	1,318	243.2	1,336	198.8
Heavy mechanical industry	1,050	205.5	1,002	184.9	1,125	167.4
Light mechanical industry	1,852	362.4	2,098	387.1	1,683	250.4
General averages	511	100	542	100	672	100

/It may

It may be seen that the value per ton, with the exception of the light mechanical industry, increases by an average of 31.5 per cent. This is not, as might at first be imagined, due to a variation in world prices, but to a change in the quality of imports. In the iron and steel industry, simple rolled products have been substituted, and each year there is an increase in imports of special steels, which are more costly. Similar conditions apply in the primary metallurgical and heavy mechanical industries. Domestic manufacture had begun of the more common and simpler appliances and machines, and imports continued of the special types, but now in greater quantities, because of new requirements for raw materials and machines for the recently installed industries. It is interesting to note that many Chilean and foreign importers, unable to continue their normal activities, financed or assisted in financing substitution industries.

Table 3, and the comments on the increased consumption of metallurgical products, indicate that substitution has been greatly accelerated during recent years. It could have been greater if two large consumers had not refrained from purchases of domestic materials. The large mining enterprises, and State or semi-State enterprises to a lesser degree, continued to import the major part of products which were already being satisfactorily manufactured in the country.

In the case of the large mining companies, there are two reasons for this: (a) the outlay of the copper and nitrate companies was much greater when buying in the country, because the dollars to make such purchases were sold at a much lower rate than that prevailing in the free market, and (b) the purchasing agents of these companies preferred to continue to buy from known foreign suppliers, whose methods and specifications they understood.

The State or semi-State enterprises, in addition to obtaining preferential exchange rates in some cases, were also granted long-term credits, especially for purchases of machinery or heavy equipment.

In order to appreciate in which items substitution is possible, they will be separated into two groups. First, imports will be shown for the years 1949 and 1953, and for the annual average for 1948-1952, by value and physical volume. Secondly will be shown those items where substitution is

/possible with

possible with existing installations, or with small additional investments, and finally those which require considerable investments if substitution is to be achieved. The evaluation of substitution possibilities will take the form of a broad estimate only.

IRON AND STEEL INDUSTRY

Imports from this industry are shown in Table 4, which indicates clearly that there has been considerable substitution, due to the output of Huachipato. The fact that imports in this sector in 1949 were 43.4 per cent of the total of metallurgical products, and had only fallen to 40.2 in 1952, does not contradict this statement, since the consumption of special steels and shapes not manufactured in the country had increased very considerably.

Table 4

CHILE: IMPORTS OF PRODUCTS OF THE IRON AND STEEL INDUSTRY

		1949			Annual average 1948-1952			1953		
		tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton
A1a	Pig iron and billets	2,176	242	113	2,271	244	107	912	157	172
A2c	Bars and shapes	53,475	11,402	213	33.787	6,647	197	30.715	7.041	229
A2d	Plate and sheet	24,103	4,658	193	14,593	2,595	178	8,401	1,705	203
A2e	Tinplate	9,793	1,989	203	5,756	1,492	259	654	166	254
A2g	Rails	8,784	1,199	136	11,633	1,283	110	12,663	3,670	290
A2h	Mill balls	5,707	1,130	198	6,208	1,200	193	17,807	3,702	208
A3a	Ferro-alloys	265	54	204	990	236	238	741	213	287
A3b	Unspecified special steels	323	103	319	335	98	293	205	59	288
A3b2	Special tool steel	120	60	500	447	125	280	478	118	247
A3b3	Stainless steels	275	187	680	289	194	671	286	198	692

/Although the

Although the field of substitution of iron and steel products was considerably reduced by the output of Huachipato, it might be convenient to commence manufacture of the following:

a) with present installations, or with small additional investments: welded shapes (automatic arc welding); various painted, galvanized or metalized sheets and plates, and perforated or ornamental, either rolled or pressed, and twisted double bar. 1/

b) with large investments: rolled shapes and rails (always assuming that some can be exported); thin sheet, strip and tinplate (a reversing mill is to be installed in Huachipato, and also semi-continuous mills, which will allow the items to be rolled to their final thickness, and coiled); larger dimension thick plates, for shipyards and railway wagons (will be obtained from the Huachipato reversing mill).

According to the 1953 figures, some 40 per cent of imports could still be substituted in this sector, to a value of approximately 7 million dollars.

PRIMARY METALLURGICAL INDUSTRY

Imports in this group in recent years are shown in Table 5. It may be seen that substitution from 1949 to 1953 has been more than 50 per cent; this has been specially noticeable in wire products, cast tubes, screen and wire cloth, and containers.

The fact that the average value per ton has risen from 234 dollars in 1948 to 348 dollars in 1952 shows that substitution has been made in the most common products. In the case of wires, for instance, all the common types have been substituted, but not the special ones, such as spring steel and others, whose value is much greater than the common types.

It may be said that substitution has been achieved as far as possible in the primary metallurgical industry, and any further progress, except in certain cases which will be mentioned later, will depend on increases in consumption of the items.

1/ Two plants for making twisted steel, for building, were installed in 1955.

/Table 5

Table 5

CHILE: IMPORTS OF PRODUCTS OF THE PRIMARY METALLURGICAL INDUSTRY

	1949			Annual average 1948-1952			1953		
	tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton
B2 Wire	18,782	3,566	190	12,405	2,194	177	1,923	520	270
B3a Cast tubes	7,056	719	102	4,550	457	100	2,987	454	152
B3b and c Seamless and welded steel tubes	18,950	5,101	269	14,202	3,586	252	14,630	4,411	302
B3d Castings	320	51	159	203	41	202	102	46	451
B3e Malleable iron fittings	1,221	901	738	1,065	775	728	776	600	773
B4a Cable and wire rope	1,444	621	430	1,575	649	412	2,034	945	465
B4b Screen and wire cloth	1,396	532	381	901	428	475	519	302	582
B5a Tanks and containers	1,395	402	288	775	297	383	904	581	644
B5b Blackplate containers	902	360	399	429	185	431	155	88	568
B5c Nails, screws, nuts	3,036	1,480	487	2,446	1,166	477	1,831	1,046	571
Totals	54,502	13,733	252	38,551	9,778	254	25,861	8,993	348

With existing installations or with small additional investments, the following could be amplified: welded tube and pipe; screen and wire cloth; tanks and some types of nails, screws, nuts, bolts, rivets and similar.

With fairly large investments, complete substitution could be achieved in cast tubes, and malleable iron castings; for the former a complete mechanized foundry would be necessary, and for the latter a new plant.

Table 5 shows that more than 50 per cent of the volume, and a similar percentage of the value of imports consisted of seamless or welded tube and pipe. Of approximately 600 tons of seamless tube consumed annually, some 400 tons could be replaced by high pressure welded tube. Tubing for

/electrical installations ...

electrical installations is also included in the figures; this has been almost completely substituted during 1954 and 1955. A large part of the imports of tubes and piping is for the big mining enterprises, and some semi-State organizations, such as the Empresa Nacional de Electricidad S.A. and the Empresa Nacional de Petróleo, and many of these items could be substituted, with an approximate value of 4 million dollars.

SECONDARY METALLURGICAL INDUSTRY

Imports in this group represent some 3 per cent of the volume and approximately 8 per cent of the value of total imports of metallurgical products, which indicates the high degree of substitution obtained. Imports in this sector are given in Table 6.

Table 6

CHILE: IMPORTS OF PRODUCTS OF THE SECONDARY METALLURGICAL INDUSTRY

		1949			Annual average 1948-1952			1953		
		thousands of tons	thousands of dollars	$/ton	thousands of tons	thousands of dollars	$/ton	thousands of tons	thousands of dollars	$/ton
C9a	Boilers, steam machinery	2,436	3,137	1,288	1,811	2,955	163	3,220	5,049	1,568
C14a	Metallic structures, bridges, etc.	483	372	770	253	149	589	482	177	367
C14b	Sanitary appliances	87	49	563	35	20	571	196	116	592
C14c	Heating equipment	748	191	255	326	88	270	54	21	389
C15a	Hand tools	776	1,757	2,264	806	1,357	1,684	663	1,327	2,000
C15b	Metallic furniture	179	176	983	105	113	1,076	67	134	2,000
C15c	Agricultural tools, including spades, etc.	340	272	800	290	224	772	96	95	990
C16a	Padlocks and fasteners	50	119	2,380	52	131	2,519	21	48	2,286
C16b	Lamps, lanterns, etc.	10	38	3,800	15	52	3,467	23	84	3,652
C16c	Chains of all types	332	219	660	389	226	581	521	313	601
C16d	Ornamental and similar small items	853	1,501	1,760	835	1,678	2,009	841	1,803	2,144
C17a	Cutlery and tableware	671	560	835	959	772	805	1,474	1,080	733
C17b	Enamelled steel ware	81	78	963	56	74	1,321	65	63	969
C17c	Ovens, stoves and heaters	226	68	301	270	180	667	137	113	825
C17e	Beds and bedsteads	9	7	778	12	8	667	4	2	500
C18b	Needles, pins, buttons and other stamped goods	53	213	4,019	84	271	323	77	182	2,364
Totals		7,334	8,757	1,194	6,298	8,298	1,318	7,941	10,607	1,336

/The fact

The fact that the volume and value of imports was greater in 1953 than in 1949 does not in any way signify that there has been no substitution in this sector. This is shown by the establishment of many industries making metallic furniture, stoves, heaters, kitchen stoves, metallic structures, tools, etc.

The maintenance or increase of the figures only shows that domestic consumption of the products of the primary metallurgical industry has increased considerably. The Compañía de Acero del Pacífico's deliveries of sheet, the principal material used in the manufacture of these items, was nearly 5 times greater in 1955 than in 1950.

At the same time, an increase is seen in imports of boilers and steam machinery, which is again an indication of greater industrialization.

In the secondary metallurgical industry, import substitution is still possible, with existing installations or with small additional investments, in the following: Boilers and steam machinery; metallic structures; chains, with the exception of transmission chains, and certain types of ornamental and small materials.

In this sector there are no manufacturing activities, which have not already been attempted, which would require large investments.

On the basis of the 1953 figures, 20 per cent of imports could still be substituted to a value of 2 million dollars.

HEAVY MECHANICAL INDUSTRY

The greatest percentage of imports of metallurgical products at present come from the heavy metallurgical industry. All items in this group are production equipment. The greater availability of these goods, whether of foreign or domestic manufacture, has a direct incidence on the economic development of the country. Imports of these goods are shown in Table 7.

/Table 7

Table 7

CHILE: IMPORTS OF PRODUCTS OF THE HEAVY MECHANICAL INDUSTRY

		1949			Annual average 1948-1952			1953		
		tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton
D6a	Ball and roller bearings	251	813	3,239	276	843	3,054	529	1,466	2,771
D6b	Pumps of all types	607	949	1,563	677	1,005	1,484	616	1,080	1,753
D6c	Registers, for water meters, cocks, taps	685	824	1,203	453	658	1,453	686	1,299	1,894
D7a	Mining machinery for treating hard materials	1,548	1,789	1,156	1,942	2,143	1,104	4,376	4,839	1,106
D7a2	Mill linings	1,485	606	408	1,466	596	407	3,402	1,880	553
D7b	Oil refining machinery									
D7c	Machinery for transforming industry	22,933	28,759	1,254	20,534	23,409	1,140	16,320	21,767	1,334
D7c3	Machinery for commercial refrigeration	86	118	1,372	160	220	1,375	190	337	1,774
D7d	Building machinery	132	132	1,000	98	86	878	11	9	818
D7e	Lifting machinery and equipment	2,516	2,681	1,066	2,217	2,371	1,069	2,566	2,730	1,064
D7f	Machinery for mechanical industry	532	871	1,637	353	535	1,516	13	37	2,846
D8a	Tractors	2,960	3,011	1,017	3,737	2,720	728	4,475	5,068	1,133
D8b	Earth preparing machinery	2,160	1,059	490	1,577	772	490	3,218	1,877	583
D8c	Harvesting machinery	489	380	777	488	285	584	392	333	849
D8d	Agricultural products treatment machinery	2,825	2,276	806	1,929	1,603	831	2,184	2,216	1,015
D8e	Minor agricultural equipment	1,062	920	866	682	639	937	414	447	1,080
D9b	Internal combustion machinery	671	1,061	1,581	753	1,095	1,454	798	1,506	1,887
D9c	Hydraulic turbines, Pelton wheels	343	707	2,061	122	252	2,066	605	1,500	2,479
D10a	Electric generators	5,492	9,035	1,645	4,257	6,631	1,558	4,446	8,227	1,850
D10b	Other electrical apparatus and equipment	140	349	2,493	93	259	2,785	125	355	2,840
D11a	Steam locomotives	34	33	971	99	200	2,020	3,046	3,356	1,102
D11b	Diesel locomotives	2,348	3,233	1,377	964	1,305	1,354	1,021	1,301	1,274
D11c	Wagons of all types	11,450	4,157	363	6,594	2,548	386	6,719	3,613	538
D11d	Rail cars	32	68	2,125	51	113	2,216	912	2,018	2,213
D12a	Cars, lorries & spares	12,895	13,558	1,051	16,058	14,951	931	9,906	10,436	1,054
D12b	Bicycles, motorbicycles, tricycles	125	229	1,832	181	296	1,635	179	267	1,492
D13a	Animal traction vehicles	385	312	810	486	390	802	300	258	860
D13b	Small craft, dredgers	32	13	406	92	57	616	4,144	2,305	556
D14c	Goods hoists	17	27	1,588	6	11	1,833	1	2	2,000
Totals		74,235	77,970	1,050	66,345	66,503	1,002	71,594	80,529	1,125

/In this

In this group the same point must be remembered as in the secondary metallurgical industry, that the increase in import figures does not mean that there has been no substitution, but that domestic consumption has increased considerably. A clear indicator of the process of industrialization is the increased imports of ball and roller bearings, and of generators. On the other hand, the increase is also partly due to a fairly large 1953 import under item D13b. The heavy mechanical industry gives wide opportunities for import substitution. Examples are the manufacture of spares for industry, agriculture, and mining, some types of engineering equipment, especially heavy items, which are manufactured in small series, such as mining and industrial machinery, electric generators, small craft, etc.

Items which could be substituted are:

a) with existing installations or with small investment: almost all types of pumps; registers for water meters, cocks and taps; machinery for concentration plants; certain machines for the transforming industry, such as presses; printing machinery; textile machinery; for mechanical workshops, etc.; some types of agricultural machinery and spares; some types of car spares; railway wagons of all types; and animal traction vehicles.

b) with large investments: refrigeration compressors; agricultural machinery; electric generators; shipbuilding; some car spares such as piston rings.

On the basis of the 1953 figures, some 25 per cent of imports could be substituted, to a value of approximately 18 million dollars.

LIGHT MECHANICAL INDUSTRY

The volume and value of imports in this sector are comparatively the lowest, and depend upon the extent of availability of foreign exchange. Figures are given in Table 8.

/Table 8

Table 8

CHILE: IMPORTS OF PRODUCTS OF THE LIGHT MECHANICAL INDUSTRY

		1949			Annual average 1948-1952			1953		
		tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton	tons	thousands of dollars	$/ton
E15d	Typewriters, etc.	175	1,212	6,926	227	1,508	6,643	161	1,114	6,919
E15e	Scales, balances, platform scales	301	42	140	147	104	707	194	191	985
$E17c_1$	Electro-magnetic domestic appliances, unspecified	63	68	1,079	223	274	1,229	173	277	1,601
$E17c_3$	Refrigerators, freezers	398	462	1,161	519	628	1,210	863	1,095	1,269
E17g	Sewing machines	327	557	1,703	793	1,491	1,880	1,246	1,760	1,413
Totals		1,264	2,341	1,852	1,909	4,005	2,098	2,637	4,437	1,683

Source: Yearbooks of Foreign Trade.

There has been a strong protectionist policy in this sector, and imports of all appliances manufactured in the country have been prohibited, even though domestic production was not always sufficient or of adequate quality.

The fact that the standard of living of the Chilean people is extremely low compared with other more industrialized countries makes a considerable increase foreseeable in this sector, which includes durable consumer goods, as the national income rises.

The expansion during recent years is largely due to the inflationary process, which has stimulated purchases of this type.

Items which can still be substituted are:

a) with present installations, or with small additional investments: electro-magnetic domestic appliances; washing machines; polishers;

/liquifiers; mixers

liquifiers; mixers, and refrigerators with imported sealed units.

b) with large additional investments: refrigerators, including the manufacture of sealed units, and sewing machines.

On the basis of 1953 figures, 20 per cent of imports may be substituted, with a value of approximately 1 million dollars.

II

EXPORT POSSIBILITIES OF THE METALLURGICAL INDUSTRY

Throughout this study it has been seen that one of the limiting factors in the greater development of some sectors of the metallurgical industry has been the small domestic market, which in turn involves small production runs with unsatisfactory processes.

It has been possible to appreciate that in many cases the demand is smaller than the production capacity of one single plant of economic size, and since in certain instances there is more than one plant of the same type, the problem is further aggravated.

This situation occurs in various items, such as wire; nails, bolts and screws; cold rolled strip; steel tube and pipe; cast iron sanitary appliances; enamelled steel ware; locks and fasteners; metal furniture; iron and steel castings; railway equipment; floor polishers, fans, etc.

In spite of the fact that the domestic market has broadened considerably in recent years, it is undeniable that the Chilean metallurgical industry has, in certain items, an installed capacity far greater than the domestic market requires.

The question then arises if these productive factors could be employed in the manufacture of goods for export. Can the Chilean metallurgical industry compete in the world markets? Should the country encourage exports of metallurgical products? Which are the best markets for the Chilean products? What conditions do the industries require in order to be able to export?

An analysis of these questions may give an approximate picture of the export possibilities of the Chilean metallurgical industry, especially of iron and steel products.

Chilean exports of iron and steel in recent years comprise practically only the products of the Compañía de Acero del Pacífico, especially bars,

wire rod and sheet. Occasional exports have been made of piping, wire, metal furniture, household equipment, etc. Nevertheless, during 1941-1945 fairly large sales were made of metallic furniture, household goods and other products, to other Latin American countries.

Exports by the CAP in recent years were: 1951, 46,524 tons; 1952, 81,672 tons; 1953, 91,799 tons; 1954, 54,690 tons; 1955, 42,880 tons.

The industrialists maintain that the reduction almost to zero of exports to Bolivia, Colombia, Ecuador and Peru is due to the lack of an adequate policy for encouragement of exports. They add that, on the contrary, the exchange policy has penalized exports and aided imports, by the establishment of exchange rates below true parity. Also, in their opinion. the continuous changes in exchange and customs regulations have created an atmosphere of instability which is most damaging to foreign trade.

These industrialists also say that to win foreign markets represents a considerable investment, which no entrepreneur will undertake abroad without certain minimum conditions of stability.

At the beginning of 1955, the Asociación de Industriales Metalúrgicos (ASIMET) made a survey of 13 of the most important industries, of which 11 were transformers of iron and steel, in an attempt to establish the export possibilities of the Chilean metallurgical industry. The following essentials were required of the industries examined:

a) that they could be considered "standard" industries
b) that their products could compete in quality with similar foreign items, and that they met international or other requirements
c) that the firm possessed the necessary export organization, or that they had previously exported.

Products considered suitable for export from the industries surveyed were:

1. Primary metallurgical industry: all types of wire, screen and wire cloth; welded steel tube and pipe; solder and welding rod; nails, bolts, screws, rivets and similar.

2. Secondary metallurgical industry: boilers, pressure vessels, safes and office furniture; cast iron sanitary appliances; enamelled steel ware.

/3. Heavy

3. Heavy mechanical industry: valves; machinery for the preserved food industry; machinery for mechanical workshops and railway material.

4. Light mechanical industry: juice extractors and air extractors.

According to the survey, the total value of these exports could reach 12,145,000 dollars annually, using imported raw materials and spares to a value of 820,000 dollars, thus providing a foreign exchange income of 11,325,000 dollars. However, at least 40 per cent must be subtracted from the previous figure, to cover raw material which would have been exported in any case (CAP products and copper). This would leave a net annual increase of foreign exchange income of 6,780,000 dollars.

In the course of the same survey, ASIMET also enquired into the amount of investment in equipment and machinery which would be necessary for the industries to improve production and raise their capacity for export. Seven of the eleven industries examined gave a total investment in machinery and equipment of 915,000 dollars, which would produce an annual income of 3 million dollars, with an annual expenditure of 175,000 for imported raw materials and spares.

In order to achieve the indicated export figures, the industries stated that the following conditions were also essential:

1. A substantial raising of the exchange rate. The majority said that they needed a rate of between 360 and 400 pesos to the dollar, and only one expressed an ability to operate with a rate of 250 to the dollar.[2/] Without a certain elasticity, or liberty of disposal of the foreign exchange return, the entrepreneurs suggested that the industries should be allowed to use 50 per cent of the foreign exchange return for imports of machinery or other capital goods for the modernization of the metallurgical industry.

2. Better transport facilities, and lower freight rates.

3. Quicker handling of export permits, documentation etc., which would reduce or eliminate present difficulties and delays.

4. Adequate supplies of domestic raw materials from the basic industries.

5. Adequate electric power supplies.

2/ The official rate at that time was 200, and the free rate 350 pesos/dollar.

/One industry

One industry pointed out the necessity for the training of specialized labour, for the export industries. Others mentioned the advantages of a State credit organization for foreign purchasers, similar to those in various European countries.

The figures obtained by ASIMET in their survey confirm the points made in other parts of this study: that many sectors of the Chilean metallurgical industry have an installed capacity much greater than that required to meet the domestic market.

Nevertheless, if Chile is to become an exporter of metallurgical products, more than mere surplus installed capacity will be required; Chilean industry must also be able to deliver first quality products at reasonable prices. The displacement of European or United States products, with many years' prestige, is a long and difficult task.

Furthermore, Chilean industry must achieve a satisfactory degree of specialization and productivity, which at present exists in only very few cases, and must aim for perfection in only certain products, where optimum advantage can be taken of cost and quality factors.

Development of a government policy to encourage exports would be of the very greatest importance; action in this field has wide possibilities. Latin America is beginning to realize the importance of stimulating inter-regional trade. Certain European countries have demonstrated the possible advantages of customs unions, multilateral payment systems, etc. The solution of the problem of high freight rates, which limit inter-regional trade, is another important subject.