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**SITUATION OF THE MACHINE TOOL INDUSTRY
IN MEXICO ^{1/}**

by

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BRIEF HISTORICAL OUTLINE

In the 1930's and 1940's efforts were made to begin the manufacture of machine tools, but they failed for want of manpower, technology, raw materials and markets.

There are now plants producing machine tools which have been in operation for a little more than ten years at the most: Hércules, producing drop forgers, which is the oldest (1959); Dreis and Krump Izná at Monterrey, Nuevo León, 1961; others established between 1963 and 1968, the major ones being the Fábrica de Máquinas y Accesorios (1965) and Endor (1968) in the Federal District, Industrial Lagunera (1965) at Torreón, Coahuila, and Talleres Ochoa (1968) in the State of Mexico.

ECONOMIC IMPORTANCE

Share in the country's medium-scale and small-scale industry

The share is very small: 0.02 per cent in terms of the number of establishments, 0.07 per cent in value of production, 0.07 per cent in persons employed and 0.05 per cent in wages, salaries and benefits paid. Average remuneration per worker is about the same.

Location and number of enterprises

The factories are situated in general near the centres of greatest industrial development. There are seventeen enterprises, seven of them based in the Federal District, two each in the State of Mexico, Coahuila and Jalisco, three in Nuevo León and one in Querétaro (see list I annexed).

Economic magnitude

Average investment per establishment is 7.1 million pesos and output 6.6 million (this includes "other categories" representing repairs made on machines belonging to other companies). In the smallest total investment is 620,000 pesos and in the largest it is 15 million. The plants producing lathes and presses have the largest total investment.

Main machine tools produced and degree of national integration

At the present time, both metalworking and woodworking machines are produced:

<u>Stock-removing machines</u>	<u>Metal-forming machines</u>	<u>Woodworking machines</u>
Centre lathes ^{1/}	Presses	Planers
Automatic lathes	Drop forges	Saws
Drilling machines ^{2/}	Shearing machines or guillotines	Edgers
Grinders	Bending and rolling machines	Lathes
Saws		Shapers
		Planers
		Borers

The proportions of these in the total value of output are as follows:

<u>Item</u>	<u>Share (%)</u>
The machine tools	100.0
(a) For metalworking	86.9
(1) By stock removal	54.1
(11) By forming	32.8
(b) For wood	13.1
I. Stock-removing machines	100.0
(1) Lathes	80.6
(a) Centre lathes	38.4
(b) Automatic lathes	42.2
(2) Drilling machines	15.6
(3) Grinders	3.8
II. Forming machines	100.0
(1) Presses, shearing, bending and rolling machines	71.4
(2) Drop forges	28.6

The degree of national integration in comparison with the total cost is 86 per cent in the case of centre lathes and 25 per cent in the case of automatic lathes. In regard to the raw materials, components and parts necessary to produce a lathe the figure is 71.1 per cent, i.e. only 28.9 per cent of the total inputs are imported.

^{1/} Bed up to 2 m and swing over bed up to 45 cm.

^{2/} With capacities of half an inch and up to one inch (diameter).

^{3/} With capacities of 5, 10, 18 and up to 30 tonnes.

Capacity, value of production and its share in domestic consumption

In 1965, the value of production was 13.9 million pesos and by 1966 it had risen to 53.4 million; the actual figures are perhaps slightly higher because some enterprises do not provide information on the subject. In 1965 domestic manufacture accounted for 2.7 per cent of total consumption, whereas in 1966 the figure was 8.8 per cent.

Capacity utilized fluctuated between 27 per cent and 100 per cent; the average is calculated to be 62.8 per cent. Plants producing lathes and drills show lower indices; those manufacturing machine tools for woodworking and some of those producing presses for metalworking are in the best situation in this regard. By type of machine tool, the relationship between domestic manufacture and total consumption is as follows:

NATIONAL PRODUCTION AND ITS SHARE IN TOTAL CONSUMPTION, 1966

Item	National production (millions of pesos)	Share in consumption (%)
Total machine tools	53.4	8.8
(a) For metal-working	46.4	8.4
(i) By stock removal	28.9	7.9
(ii) By forming	17.5	10.2
(b) For working of wood, etc.	7.0	17.5
Total lathes (*)	23.3	15.6
(c) Centre lathes	11.1	17.5
(b) Semi-automatic, turret lathes	—	—
(c) Copying lathes	—	—
(d) Automatic lathes	12.2	26.9
(e) Vertical lathes	—	—
(f) Other lathes	—	—
Total drilling and boring machines (*)	4.6	12.5
Total grinding machines (*)	1.0	7.9
Total presses, shearing, bending and rolling machines of all types (*)	16.0	19.4
Total drop forges (*)	1.5	5.2

(*) For metal.

SOURCE: Prepared on the basis of data from the statistical year books on foreign trade, Directorate-General for Statistics (DGE) and direct research.

Technology and expenditure on research

What production there is is carried out on the basis of limited experience and no advanced technology. There is no expenditure on research; in general, producers copy foreign techniques which are considered obsolete at home. For lathes, Czechoslovak and

Spanish techniques are developed which are regarded at the international level as of second category and fourth category respectively. In general, the machinery used in this branch is antiquated. Cincinnati American (a United States concern), producing presses, and Endor (French), using automatic lathes, are operating at more acceptable levels. There are projects for producing machines for which there is a higher demand using British, German and French technology.

Protection and incentive measures

Tariffs on products from foreign countries are of medium level and in the case of countries belonging to LAFTA they are practically nil. Prior permission is required for the import of machines which are already produced in Mexico, except in the case of LAFTA countries; the great majority of machines imported are not affected.

The industry benefits from the Law on New and Necessary Industries, with the tax allowances specified in this legislation. Plants are allowed when they begin activities to have low levels of national integration and they operate under the production programme regulations which offer the benefits of rules 14 and 6 (facility to import machinery, equipment and raw materials free of tax).

DEMAND

Principle machine tools in demand

According to a study carried out by an official body, the following were the main types of machine tools existing in the country during the period 1960-1964:

Lathes	27.3% of the total
Drills	10.3% of the total
Presses	18.1% of the total
Total	61.2% of the total

Stability of demand

In general, the demand for these products, especially those for working metals, is determined by the evolution of manufacturing activity, particularly in the engineering and metal industries, because the products are required for transforming iron or steel and converting it into sheet, bars, tubes, parts for machinery, etc.

In the period 1965 - 1966 the value of apparent consumption increased by 18.4 per cent rising from 514.2 million to 609.3 million pesos; this rise is significant because in 1965 there was a marked increase in prices as against the previous year.

Industrial development and the need to replace the present stock of machine tools, some of which are more than 40 years old, are factors which will have a decisive influence on future consumption.

DISTRIBUTION

Sales system and policy

A high percentage of national production is distributed by the manufacturer to the consumer, on the basis of orders: very few manufacturers accumulate stocks.

The distributors (ten large firms and twenty small firms) are situated predominately in the Federal District and purchase Mexican lathes in order to take advantage of the regulations on parallel purchase (régimen de concurrencia) (the Secretariat for Industry and Commerce (SIC) permits the import of three foreign lathes for each domestic lathe purchased). Transactions with foreign firms are more attractive and there are more extensive credit facilities.

The distributors purchase the machines abroad, on the basis of orders or to place on display (to the most limited extent possible in order to avoid idle assets). In importation based on catalogues (direct importation) they perform only liaison functions and receive a commission from the foreign producers fluctuating between 7 and 10 per cent; the purchaser pays cash and sees to the necessary formalities for the entry of the machinery. In most cases the selling is done by the distributor who purchases on his own account, and his commission amounts to up to 30 per cent; the client does not have to attend to the formalities and obtains credit for up to two years.

In some cases there are exclusive distributors for a given country who receive credit backing from the country concerned. Others work with local financing institutions.

MAIN DISTRIBUTORS OF MACHINE TOOLS, 1970

Name	Country represented
LEON WEILL	Various countries
ANDEX	Argentina
TECNICOS AROOSTAL	Germany
CAMEDEX	Spain
CONSULTEC	Mainly Germany
ERIC DE MEXICO	Czechoslovakia
DOROCO	USSR
MAQUINAS-HERRAMIENTAS	Italy, Spain and Brazil
MAQUINARIA INDUSTRIAL	Germany and Switzerland
AUTOMATIZACION MECANICA	France

SOURCE: Direct research.

Prices and profit margins

A lathe assembled and made in Mexico, compared with its similar Italian counterpart (Rivol) at the market price and delivered to Mexico, shows a differential of 40.4 per cent (73,000 pesos against 52,000 pesos); the latter includes tariffs and a 30 per cent profit margin for the importing distributor. In relation to the main countries of LAFTA, we are also at a disadvantage, without taking into account tariffs:

PRICES OF LATHES IN LAFTA COUNTRIES, 1969* (dollars)

	Argentina	Brazil	Chile	Mexico
Universal (centre) lathe with a bed of 1,500 mm	2,429	3,450	4,133	3,760
Materials and components	1,026	1,168	1,522	1,480

* Delivered.

Note: The data for Mexico were obtained by direct research and relate to a lathe of the same characteristics of which the price is 47,000 pesos.

SOURCE: Foundation for Latin American Economic Research (Fundación de Investigaciones Económicas Latinoamericanas).

High costs of components, parts and raw materials as well as extensive idle production capacity, among other causes, result in high prices and low profits; some manufacturers operate at a loss and others go out of business as a result of foreign competition.

MANPOWER

Employment and wages

In eleven of the seventeen enterprises in the branch the number of persons employed in December 1969 was 763, consisting of technicians, manual workers and office workers. Wages, salaries and social benefits amounted to 16.7 million pesos; the annual average per employee was 21,877 pesos.

Labour productivity

Average productivity per employee is 25,447 pesos, somewhat above that of small-scale and medium-scale industry but rather lower than that of large-scale industry. The enterprises with higher indices are those producing presses (shearing and bending machines) and automatic lathes. Those of lower productivity include some manufacturing wood-working machinery.

RAW MATERIALS

Type of supplier

Raw materials are obtained from the nearest metallurgical enterprises; however, as demand takes the form of small individual orders, materials have to be bought from small or medium-sized producers at higher prices than from the large companies.

FINANCE

The amount and structure of capital investment

The total assets of eleven enterprises in the sector exceeded 94.7 million pesos in December 1969; their net assets were 63.7 million and their share capital 56.8, in other words, their accumulated reserves totalled 6.9 million pesos.

There is foreign majority participation; only in isolated cases is their domestic capital.

Sources of finance

Domestic credit is little used; most enterprises rely heavily on their foreign parent firms for expansion and investment in machinery and equipment; bank loans or advances against orders are obtained for minor operations and to provide working capital.

Degree of indebtedness

The total liabilities of the eleven enterprises that provided information were 31 million pesos in 1969, or 32.7 per cent, related to capital investments. The degree of financial independence is fairly acceptable and shows that there is a good measure of self-financing by capitalization (the enterprises have not grown through increasing their liabilities). The least indebted enterprises are those that are considered as foreign.

Capital investment per worker

The average capital investment necessary to employ one person is 124,114.00 pesos, not a very high figure when the structure of fixed assets characterizing this industry is considered. This index is calculated from the relationship between assets and the number of persons employed; the small enterprises showed 24,800 pesos and the large enterprises 191,033 pesos.

FOREIGN TRADE

Structure of imports and exports

The sector has no exports. The bulk of domestic demand for machine tools is supplied through imports; there are about 150 import tariff categories.

In 1963, the value of imports was 212.7 million pesos, as against 555.4 in 1969; the greatest growth was registered in 1964, 117.4 per cent, and in 1966 there was a decrease. Purchases have fluctuated owing to the inherent characteristics of these goods.

Structure of imports

Metalworking machine tools account for the majority of imports. They represented 74.3 per cent of the total value in 1963 and 90.5 per cent in 1969.

Among the eighteen types most frequently imported, all for metalworking, are lathes, grinders, sharpening machines and milling machines.

Between 1963 and 1969, total imports of machine tools increased by 168.9 per cent; the following table gives data regarding the principal types:

RELATIVE GROWTH IN THE PERIOD 1963-1969 IN IMPORTS OF
PRINCIPAL MACHINE TOOLS
(percentages)

	Increase in real terms (weighted)*	Increase in absolute terms
1. Grinding machines	76.1	404.8
2. Combination machines, all types	42.0	977.8
3. Lathes, all types	41.0	145.1
4. Milling machines	31.6	250.9

* On the basis of the relative share of the total (in 1963); in accordance with the Formula $\frac{A \times B}{100}$, when A is the simple percentage variation (absolute terms) and B is the relative share in 1963.

5. Planers, slotting machines and boring machines,	17.5	53.4
6. Drop forges, all types	10.3	171.0
7. Drilling machines, all types	8.0	111.2
8. Presses, all types (including drop hammers)	5.7	57.9
9. Mechanical saws, all types	1.7	72.1
10. Shearing and bending machines	0.6	21.7

SOURCE: Foreign Trade Yearbooks of the United States of Mexico; Directorate General for Statistics, SIC.

Purchases of spare parts from ~~foreign~~ countries amounted to 53.4 million pesos, almost equal to the value of domestic production of machine tools. It is considered that, combining this with the figures for machine tools, the total will grow at an annual rate of 10 per cent, at a conservative estimate.

Customs regime

Argentina and Paraguay impose higher tariffs on metalworking machines from third countries; in LAFTA, Mexico has granted generous concessions that put it at a disadvantage.

In woodworking machinery, Chile, Argentina and Paraguay grant the highest protection against third countries; Ecuador and Mexico the lowest. Within LAFTA, Argentina and Brazil have the greatest output and Mexico the least.

To a large extent, the legal system in the LAFTA zone is that importation is unrestricted, and only in a few cases is previous permission required; Mexico has established this requirement for the seven types of machine tools that it produces, as far as countries outside the bloc are concerned.

Supplier countries

In 1969, twelve nations accounted for 96.9 per cent of the total of machine tools purchased abroad; the principal supplier countries are the United States, the Federal Republic of Germany, France, Italy and the United Kingdom.

Brazil and Argentina occupied a significant place in the Latin American bloc; in 1969, our purchases from these countries totalled 17 and 8.6 million pesos.

PROJECTION OF THE VALUE OF PRODUCTION IN 1975

It is estimated that the total value of machine tools will be 97.2 million pesos, as against 62 million in 1971 (these data are based on eleven enterprises that provided information).

Making a breakdown by type, metalworking machine tools will account for 85.7 million pesos and woodworking machine tools for 11.4; in the first group, lathes will account for 48 million pesos, presses, shearing machines and bending machines for 27 million, drilling machines for 7.5 and lapping machines for 2.2.

PROJECTION OF DEMAND IN 1975

It is estimated, conservatively, that in 1975 Mexican purchases from foreign countries will increase to 855 million pesos; domestic production will be 97.2 million, so that total consumption would be 952.2 million pesos.

Breaking down by principal types, the first place will be taken by metalworking machine tools with 869.7 million pesos, followed by woodworking machine tools and finally machines for working stone and similar materials.

COMPARATIVE ANALYSIS OF PRODUCTION AND DEMAND IN 1975

According to data recorded, domestic manufacture will provide 10.5 per cent of the total consumption of machine tools, if present conditions do not alter; assuming favourable circumstances the figure would reach 15 per cent.

Breaking down by principal types, domestic production will account for 9.8 per cent of the demand for metalworking machine tools, 23.1 per cent of woodworking machine tools, 21.1 per cent for lathes and 24.3 per cent for presses, shearing, bending, and rolling machines.

PRINCIPAL OBSTACLES IN THE SECTOR

Producers consider that the principal problems are related to the deficient quality and scarcity of raw materials, the lack of skilled manpower and a disadvantageous competitive situation as the result of high prices and low quality.

The distributors consider that better quality machine tools are obtained from the Federal Republic of Germany, France and the United Kingdom, those of domestic origin being unsatisfactory as regards technology, quality and materials used, in addition to their high price.

Consumers, have a marked preference for machines from the United States of America, the Federal Republic of Germany and the United Kingdom; the lowest priced machines come from Italy and France. They consider that machines of domestic origin are of low quality because the enterprises show a tendency to save on manpower and equipment.

Civil servants connected with the sector indicated that some of the characteristics of national producers were inexperience, meagre capital and inadequate installations.

CONCLUSIONS

This industry dates back to plants installed in 1932, 1934 and 1944, which were not able to survive owing to deficiencies of manpower, technology, raw materials and the inadequacy of the market. The new generation, which began in 1959 with a factory for drop forges and one for presses, now numbers seventeen enterprises (the newest installed in 1968), which are not very large in size and are therefore classified as between small-scale and medium-scale plants. Despite the importance that it represents, it has been hampered mainly by the following factors:

- (a) Backward technology and some inadequate raw materials, resulting in poor quality of the products,
- (b) Inadequate means of production,
- (c) The lack of good management, resulting in bad organization of the plants,
- (d) Restricted sales channels, since the distributors prefer foreign machine tools from which they gain greater profits,
- (e) High costs and excessive prices, largely caused by the failure to achieve economies of scale and by the more sophisticated internal processes in ancillary industries,
- (f) The lack of incentives for the introduction of better techniques, in production, management and organization,
- (g) Negative environment owing to foreign competition, the attitude of consumers and distributors.

As a result of the above factors, this industry still fails to cover needs, which were 650 million pesos in 1970; the value of its output for that year is estimated at 75 million (in the body of the study, the figure of 53.1 was given, but this figure refers only to the eleven enterprises that provided information).

Thus, the development of our industry in general and of the mechanical engineering sector in particular has been sustained on the basis of imports of machine tools coming mainly from the United States (37.3 per cent), the Federal Republic of Germany (20 per cent), the United Kingdom (6 per cent) and finally France (10 per cent) and Italy (7 per cent), which have gained in importance.

Of the 15 types required, only fourteen are produced domestically (seven for metalworking and seven for woodworking); it would not be economic to produce them all, since many of them, taken individually, represent a very small market.

Also our imports of spare parts for machine tools are high. As the result of negotiations at LAMTA level, Mexico has the lowest tariffs of the zone, so that Brazil and Argentina benefit by their greater degree of progress in the manufacture of this type of product.

The present manufacturers, under the pressure of the problems I have commented on, have uncertain prospects, although not in all cases.

It is estimated that in 1975, if conditions do not change, the sector will scarcely account for 10.7 per cent of domestic needs, and that, taking a very optimistic estimate, the figure would reach 15 per cent. The highest degree of domestic participation would be in automatic lathes (with little national integration), engine lathes, woodworking machines, as well as presses and bending machines for metals.

According to calculations, it will be necessary to buy from abroad machines to the value of 4,135 million pesos from 1970 to 1975, as against 3,047 required between 1963 and 1969; this means that imports, although increasing at a moderate rate, will reach figures of some 350 million pesos per annum from 1975, since total consumption will be around 1,000 million pesos per annum, owing to the increasing growth that will occur both in the basic metallurgical industry and in the automotive industry and the mechanical engineering industry in general.

The capital investment in this industry should be supplemented and increased, under conditions that would eliminate the problems commented on. Above all, a regional plan should be worked out for the co-ordinated development of the machine tool industry in Latin America, taking as the starting point an authentic regional diagnosis in this field.

Targets should be fixed that range from the elimination of the problems of the industry operating at the moment to the total or national satisfaction of future requirements for these goods and those of auxiliary and related industries.

It is considered that perhaps the creation of joint enterprises (government and private) among several Latin American countries, with adequate technical support from specialized agencies and the advanced nations, could solve the problems of scale and backward technology in the enterprises.

It is also considered desirable to set up a Latin American institute for the technological development of machine tools, with the support of the governments and industrialists concerned.

TABLE 1

THE VALUE OF PRODUCTION AND APPARENT CONSUMPTION OF MACHINE TOOLS IN MEXICO, 1963-1975

(Million pesos)

Year	Value of production		Imports (b)	Apparent consumption (a + b)
	(a)	(b)		
1963	—	212.7	—	—
1964	—	462.5	—	—
1965	13.8 (*)	500.4	514.2	514.2
1966	10.8 (*)	402.6	421.4	421.4
1967	19.2 (*)	427.1	446.3	446.3
1968	27.6 (*)	426.8	514.6	514.6
1969	53.4 (*)	555.4	608.8	608.8
1970 (**)	53.1	600.0	653.1	653.1
1971	61.2	660.0	721.2	721.2
1972	70.7	580.0	650.7	650.7
1973	72.5	680.0	752.5	752.5
1974	88.3	760.0	848.3	848.3
1975	97.2	855.0	952.2	952.2

* Estimates.

** From this year onwards, the figures are projection.

SOURCE: Our calculations, based on direct investigation and data from the Foreign Trade Statistical Yearbooks, Directorate General for Statistics, SIC.

TABLE 2
IMPORTS OF MACHINE TOOLS, BY GENERAL CLASSIFICATION, 1963-1969
(Millions of pesos)

General classification	Imports (Millions of pesos)							Relative share of total (%)	
	1963	1964	1965	1966	1967	1968	1969	1963	1969
MACHINE TOOLS FOR METALWORKING									
(a) Operating by stock removal	158.0	378.4	478.0	346.3	373.6	446.9	502.9	74.3	90.5
(b) Operating by formation	107.0	287.9	314.8	229.3	283.4	293.2	336.0	50.3	60.5
(c) Others (combination)	48.7	87.6	111.6	100.9	109.3	130.0	154.5	22.7	27.9
	2.7	2.9	1.6	15.6	5.4	21.7	12.4	1.3	2.2
MACHINE TOOLS FOR WORKING STONE, CERAMIC PRODUCTS, CEMENT, GLASS (CORD) AND OTHER HARD MINERAL MATERIALS									
	4.6	6.0	30.2	13.9	36.4	9.7	14.5	2.1	3.5
MACHINE TOOLS FOR WORKING WOOD, CORK, BONE, EPOXITE, PLASTICS AND OTHER SIMILAR MATERIALS									
	20.9	30.4	26.9	24.8	34.2	30.2	33.0	9.9	6.0
OTHERS (MISCELLANEOUS)									
	7.6	13.5	15.4	17.6	6.0	--	--	3.6	--
ADJUSTMENT^{1/}									
	21.7	34.2	--	--	--	--	--	10.2	--
TOTAL IMPORTS OF MACHINE TOOLS	212.7	462.5	500.4	602.6	437.1	496.9	555.4	100.0	100.0

^{1/} Includes machine tools classified as tools in the Foreign Trade Yearbooks of 1963 and 1964.
SOURCE: Foreign Trade Yearbooks of the United Mexican States, DEE, S.C.

TABLE 3

PRINCIPAL MACHINE TOOLS IMPORTED AND THEIR SHARE IN TOTAL IMPORTS, 1943-1969
(Millions of pesos)

TYPE OF MACHINE TOOL	1943	1964	1965	1966	1967	1968	1969	1963	1965	1969
								%	%	%
I. FOR METALWORKING										
(1) Lathes	31.7	84.6	117.3	95.0	80.3	97.5	128.9	24.3	25.4	22.7
(2) Grinders, tool grinders, etc.	14.0	32.6	51.9	47.6	41.8	64.2	73.6	7.5	10.4	14.1
(3) Milling or cutting machines	16.1	36.5	51.2	43.0	45.3	51.2	55.5	7.5	10.2	10.2
(4) Planers, slotting machines and boring machines	6.5	22.9	21.2	16.5	19.5	23.4	21.7	3.0	4.2	5.9
(5) Sawing machines (saw)	4.3	6.4	6.9	3.7	4.5	4.0	4.8	2.0	--	0.6
(6) Combination machines, jig boring machines, tapping machines, threading machines	4.8	14.9	22.1	19.8	26.5	26.1	27.2	2.3	4.2	4.9
(7) Drilling machines	7.6	44.0	46.2	17.2	37.2	30.8	25.3	3.6	9.2	4.7
(8) Eccentric presses	8.9	19.6	15.4	12.3	12.8	12.3	12.7	4.2	3.1	2.5
(9) Wire drawing machines	0.2	2.5	6.8	3.4	4.3	10.5	10.5	--	1.4	1.9
(10) Bending machines	4.0	4.4	7.2	13.5	8.2	6.5	6.9	2.6	1.4	1.2
(11) Machines for cutting or perforating (except shears and drills)	9.4	7.7	4.6	3.0	3.3	2.0	3.0	4.4	4.9	1.6
(12) Shears or guillotines	4.6	2.9	2.2	10.0	7.2	12.9	6.0	2.2	1.6	1.1
(13) Drop forges	10.0	12.4	11.7	15.9	13.5	18.1	27.1	4.7	2.3	4.9
(14) Rollers for manufacturing springs	0.2	0.6	1.4	2.7	3.2	1.4	6.1	--	0.7	1.1
(15) Machines for manufacturing washers, nuts, screws, etc.	2.1	6.5	9.2	3.6	15.9	8.9	19.1	1.0	1.8	3.5
(16) Combination machines used in	0.9	6.1	9.6	7.4	5.0	8.9	8.5	0.4	1.9	1.5
(17) Presses, except eccentric presses	2.1	13.4	27.5	9.1	8.7	15.3	14.5	1.0	3.5	2.6
(18) Machines for manufacturing	2.7	2.9	1.6	13.6	6.3	8.6	3.2	1.3	0.3	0.9
TOTAL^{1/}	194.1	361.9	419.8	392.6	366.0	467.6	461.6	72.2	83.9	83.1

Table 3 (continued)

TYPE OF MACHINE TOOL	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Relative share of total		
													%	%	%
II. MACHINES FOR TURNING STONE AND OTHER MATERIALS															
(1) Cutting machines	4.2	3.7	3.3	3.7	2.4	2.9	2.0	2.9	2.4	2.0	2.3	2.0	2.0	0.7	0.6
(2) Polishing machines	--	--	2.4	2.6	2.5	2.0	--	--	--	--	--	--	--	0.3	0.9
(3) Marble cutting machines (weight exceeding 20,000 kg)	--	--	--	1.0	0.5	1.0	--	--	--	--	--	--	--	--	0.3
TOTAL	4.2	3.7	5.9	6.3	4.4	6.0	12.9	2.0	4.4	2.0	2.3	2.0	2.0	1.0	1.5
III. MACHINES FOR WORKING WOOD, PLASTICS AND OTHER SIMILAR MATERIALS															
(1) Presses	25.0	26.7	34.2	24.4	26.6	24.4	24.6	24.0	24.6	24.6	24.0	24.0	24.0	1.0	1.3
(2) Planing machines, sanding machines	2.3	2.6	7.4	7.1	13.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	1.6	1.7
(3) Drilling machines	--	--	0.7	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.1	0.1
(4) Lathes	0.2	0.7	1.0	1.2	1.7	1.8	1.3	1.3	1.7	1.8	1.3	1.3	1.3	0.2	0.2
(5) Saws (cutting machines)	1.8	3.6	3.2	3.7	7.5	3.3	3.7	3.7	7.5	3.3	3.7	3.7	3.7	1.0	1.0
TOTAL	29.3	37.6	45.5	37.4	50.3	37.3	37.3	37.3	50.3	37.3	37.3	37.3	37.3	3.9	4.3
GENERAL TOTAL	177.3	202.2	445.2	208.3	378.7	411.9	492.5	83.3	437.1	408.8	353.4	100.0	100.0	89.0	89.7
TOTAL IMPORTS	212.7	462.5	500.4	402.6	637.1	408.8	353.4	100.0	437.1	408.8	353.4	100.0	100.0	100.0	100.0

1/ The difference is accounted for by the remaining machines, for which there were small individual reports.
 SOURCE: Prepared using data from the Foreign Trade Yearbooks, DEU, SIC.

TABLE 4
IMPORTS OF SEPARATE COMPONENTS AND PARTS FOR MACHINE TOOLS, 1965-1969
 (Thousands of pesos)

Sub-division	1965	1966	1967	1968	1969
DAAB A.- Machines or tool holders	25,362	17,309	19,595	20,164	21,362
DAAB B.- Copying devices	3,227	1,310	600	544	530
DAAB C.- Separate components or accessories	13,393	27,008	26,422	24,405	31,931
Sub-total (A)	61,972	65,322	66,707	68,113	53,423
DAAB/AT IMPORTS OF MACHINE TOOLS					
Sub-total (B)	209,400	682,600	437,300	604,800	555,400
Share of F accounted for by A (C)	29.6	11.8	28.9	9.3	9.6
ICIM IMPORTS OF MACHINE TOOLS, SEPARATE COMPONENTS AND PARTS					
	992,372	467,922	679,087	511,203	604,803

SOURCE: Prepared with data from the Bureau Foreign Trade Statistical Yearbooks, BIL, S.I.C.

TABLE 5 (continued)

- A = Duty applicable to outsider countries.
 B = Duty applicable to LAFTA countries.
 LS = Legal status.
 FT = Free trade.
 PL = Subject to prior permit (prior licence).
 ST = Specific tax per kg or pound, expressed in the currency of the relevant country.
 AVT = Ad valorem tax (includes "others with equivalent effect").
 (*) Exists only for the category "other metalworking machine tools" and amounts to 620.00 per kg for outsider countries and 52.00 for LAFTA countries.
 (**) Negotiations have not been carried out.
 (1) The taxes are expressed as an average of the total for this type of machinery.
 (2) Prior permit is required for only seven types of machine tools (which are domestically produced).
 (3) Of the twenty-one types of machine tool falling into this category, eleven can be imported free of duty (including those which are domestically produced).
 (4) Of the twenty-two types, there have been negotiations concerning only seven, namely planing machines, with sawing machines, milling machines, automatic milling machines and machines classed under "others for woodworking".
 (5) There have been negotiations on only five of the existing twenty-two types.

SOURCE: Prepared with data from the consolidated list of concessions granted by the contracting parties to the Treaty of Montevideo, Mexican Inter-Secretariat Committee for the Latin American Free Trade Association, 1960.

TABLE 6
IMPORTS OF MACHINE TOOLS, BY COUNTRY, 1945, 1948, 1949 and 1950
(in millions of pesos)

Country	Relative share of the total (%)			
	1945	1948	1949	1950
United States of America	204.0	154.7	214.2	48.8
Federal Republic of Germany	104.0	86.8	115.1	19.9
United Kingdom	64.6	25.3	37.5	6.5
Czechoslovakia	20.0	11.1	21.7	3.7
Italy	18.3	20.3	20.0	6.7
Spain	17.1	17.6	18.3	3.2
Switzerland	12.1	11.3	15.9	2.7
France	6.9	20.6	24.9	9.8
Belgium	6.2	4.7	11.9	2.1
Brazil	4.0	6.7	14.5	2.9
Japan	3.4	26.9	3.9	0.6
Argentina	2.0	2.0	0.6	1.5
All twelve countries	622.6	627.9	821.2	93.9
Remainder	32.1	21.6	18.0	3.1
Total imports ^{1/}	654.7	649.5	839.2	100.0

^{1/} Includes automatic tools and machine tools. The total therefore differs slightly from that given in other tables.
SOURCE: Prepared with data from the Foreign Trade Statistical Yearbooks of the United Nations States, 1951.
not yet available.

TABLE 7
 EXPORTS OF UNITED STATES BY COUNTRY, 1968 and 1969
 (Millions of pesos)

Country	Relative share		
	1968	1969	1969 (%) (1)
United States of America	37.2	24.0	31.7
Germany	28.9	28.2	17.8
United Kingdom	14.9	11.8	12.7
Czechoslovakia	8.9	10.3	7.5
Spain	8.7	6.0	7.4
France	6.9	24.9	4.2
Belgium	1.3	2.9	3.0
Italy	1.2	4.3	2.7
Brazil	2.8	18.7	2.4
Poland	2.4	0.3	2.0
Japan	0.8	1.3	0.4
Argentina	1.7	1.3	1.4
All twelve countries	208.6	128.5	94.3
Remainder	7.7	2.4	6.7
Total exports	112.3	128.9	100.0

1/ Only for manufacturing.
 SOURCE: Prepared with data from the Foreign Trade Statistical Yearbooks of the United States, 1968.

LIST No. 1

ENTERPRISES, THEIR LOCATION AND TYPES OF MACHINE TOOLS WHICH THEY PRODUCE, 1969

<u>Name of enterprise</u>	<u>Location and year of establishment</u>	<u>Types of machine tools produced</u>
Fábrica de Máquinas y Accesorios, S.A. Av. 7 No. 168 Col. Granjas San Antonio.	Distrito Federal (1965)	Metalworking lathes with beds up to 2 m.
Industrial Logunera, S.A. Carret. Torreón-Matamoros Km.2	Torreón Coahuila (1965)	Metalworking lathes: beds of 1 m.
Verastegui, S.A. Prol. Calz. Emilio Carranza y Lasalle	Saltillo Coahuila (ND)	Planers, Sawing machines, edgers, lathes, wood moulding machines and tenoners (all for woodworking).
Maquinaria Butrón y Cía. S. de R. L. Calz. Sto. Tomás No. 100 Col. Atzacapotzalco	Distrito Federal (1963)	Planers, sawing machines, edgers, wood moulding machines, lathes (all for woodworking).
Maquinaria Occidental Mexicana, S.A. Monte Morelos # 225 Col. Loma Bonita Apartado Postal 1310 Of. en el D. F. Sr. Rincón Alvarez Natal No. 625 Z.P. 1. 519-86-66	Guadalajara Jalisco (ND)	Drop forges, drilling machines (for metalworking).
Cía. Vimalert de México, S.A. Av. Sara No. 443 Col. Guadalupe Tepeyac.	Distrito Federal (ND)	Drillers with medium capacity and a diameter of up to 1 inch (for metalworking).
Endor, S. A. Serapio Rendón No. 112	Distrito Federal (1966)	Automatic lathes (for metalworking).
Eléctrica Universal, S.A. Km. 15-100 Carret. México-Laredo	Santa Clara México (ND)	Grinders (for metalworking).
Paramount, S.A. Av. 7 No. 205 Col. Granjas de San Antonio	Distrito Federal (1966)	Grinders (for metalworking).

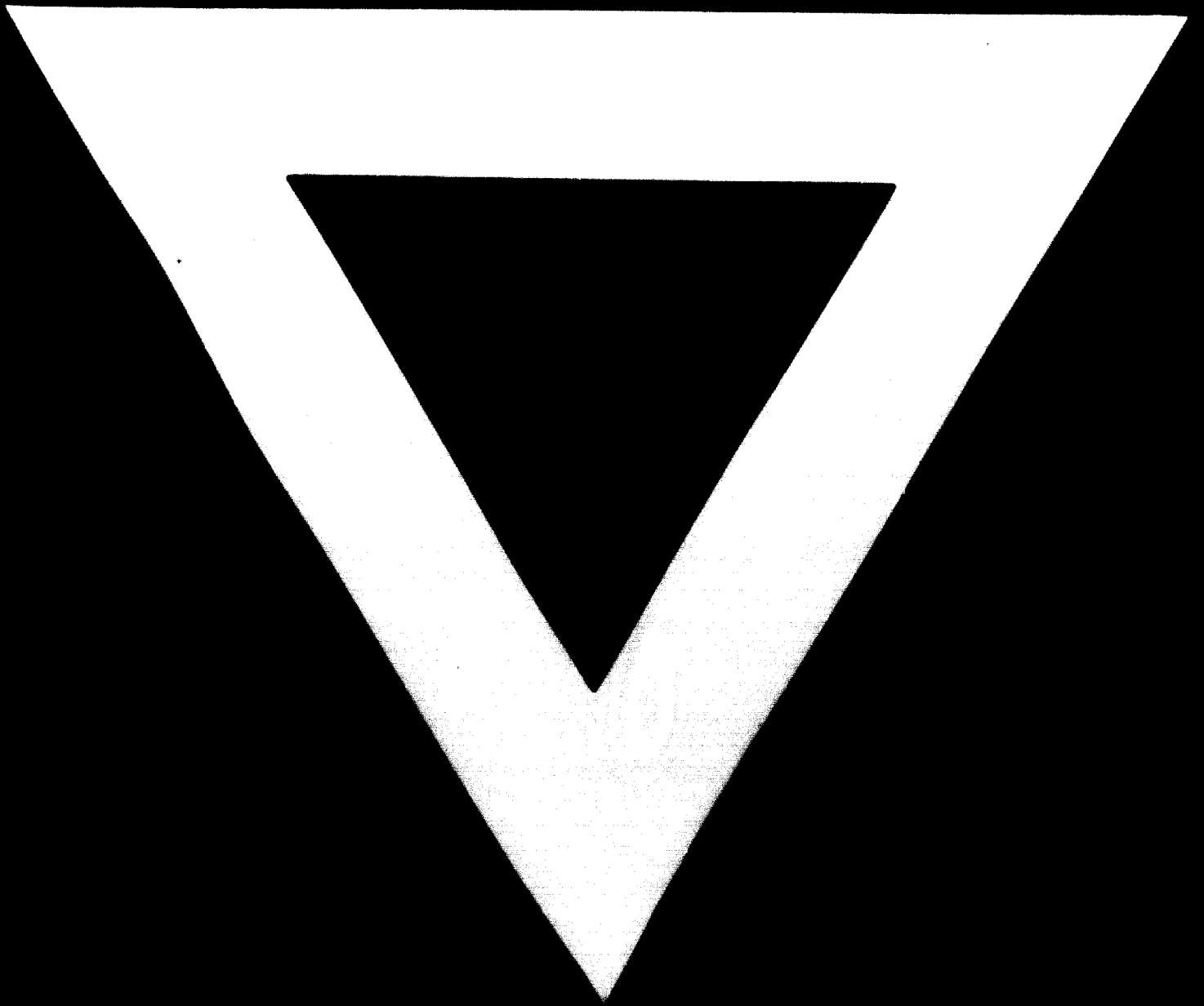


LIST No. 1 (continued)

<u>Name of enterprise</u>	<u>Location and year of establishment</u>	<u>Types of machine tools produced</u>
Talleres Ochoa, S.A. Km. 2 Carret. México-Laureo	Santa Clara, México (1958)	Sawing machines, wood moulding machines, edgers, small lathes, drilling machines, etc. (all for woodworking, some for metalworking).
Wysong de México, S.A. Nicanor Alvide No. 35, Mixcoac.	Distrito Federal (ND)	Shears or guillotines for metalworking.
Dreis and Krump-Izma, S.A. Madero Pte. #: 2703	Monterrey, Nuevo León (1961)	Shears and bending machines for metalworking.
Remiol, S.A. Calle 64 No. 420, Sector Libertad	Guadalajara, Jalisco (ND)	Shears and bending machines for metalworking.
Cincinnati Mexicana, S.A. (empresa Nueva) Of. en México: Insurgentes Sur #: 1748-504 Teléfono: 5 34-85-23	Querétaro, Querétaro. (1968)	Shears and bending machines for metalworking.
Hércules, S.A. Antig. camino a Culhuacán 239	Distrito Federal (1959)	Drop forges for metalworking (capacities of 5, 10, 18 and 30 tonnes).
Sociedad General de Maquinaria, S.A. (SOGEMA) Av. Tecnológico Sur No. 2413-B, Tels. 5 43-76-78 y 79	Monterrey, N. L.	Yarto metalworking lathes (beds up to 1 metre).
Máquinas Monterrey, S.A. 611 Poniente Col. San Nicolás de los Garza	Monterrey, N. L. (1964)	Presses, shears and bending machines (for metalworking).

ND- No date.

Source: Direct research.



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