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Metals Industry in Latin America and
Possibilities for Complementarity *

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IDENTIFICATION OF SPECIFIC PROJECTS FOR THE PRODUCTION OF SEMI-FINISHED NON-FERROUS METALS IN LATIN AMERICA **

Prepared by

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* This meeting was organized by UNIDO together with the Government of Argentina.

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ABSTRACT

The objectives of this study were to analyze the present situation of the aluminium and copper downstream industries of Latin America for determining the possibilities of the regional complementaries and the opportunities of further developments in order to strengthen the cooperation in these sectors and to increase the national value-added of the non-ferrous metal industry.

The study evaluates the current situation of both aluminium and copper branches in Latin America especially in Argentina, Brazil, Chile, Peru and Venezuela.

The survey of installed capacities and production of semis indicates large excess capacities more or less in each country. The utilization of capacities of downstream sectors are as follow:

Table A-1
Utilizations of aluminium and copper downstream industries in the five countries

%

Countries	aluminium semis	copper semis
Argentina	57	71
Brazil	85	55
Chile	n.a	44
Peru	n.a	32
Venezuela	58	20

On the basis of figures above it is evident that an overall increase of capacities must not be proposed for the nearest future, because the forecast of demands does not show significant needs as compared to the relevant possibilities. In those cases where the bottle-necks are obvious, the investment projects and developments are already in progress to eliminate them (e.g. in case of Brazil). In other cases the study points out some of the most urgent measures to be taken.

In each country involved the necessary and possible developments are treated as "home affairs" and some reluctancy can be experienced in connection with regional cooperation. This should be resolved on the basis of mutual interests because the manufacture of semi-finished and finished products may probably prove a paying proposition, if linked with joint ventures with other countries, the latter buying back the fabricated goods made from raw material furnished by them.

State owned firms represent only a small part of the whole downstream side thus, it is difficult to utilize complementaries on the level of states. The existing different regional organizations (e.g. ALADI, CARICO, MSSA, SELA) have not reached practical results so far in the field of cooperation among parties. At the same time the private sector of each country especially those who are related to the transnational companies act every time following only their interest and possibilities.

As a conclusion the trade and industrial associations could take the task to find the ways and methods for promoting the matters related with the obviously existing complementaries of aluminium and copper downstream industries in Latin America providing possibilities for direct contact between the companies of different countries in the region. The first steps on this way are recommended in Chapter II.

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EXPLANATORY NOTES

The term "Latin American countries" refers to the countries of the geographical South and Middle America, with Spanish and Portugese languages.

"Upstream industry" means mining, production of alumina and concentrates metal production in smelter and refinery.
"Downstream industry" means the production of semi-finished products in foundries, rolling mills, extrusion plants, cast-rolling factories, forging plants and powder mills.
"Processing industry" means finished goods producing industries, the factories of consumer products of the downstream industry (e.g holloware production, firms producing transportation goods, cable works, etc).

Abbreviations used (mainly in tables):

tpy = tons pro year
Qu = quantity
V = value
n.a = non available
L.A = Latin America

A full stop "." is used to indicate decimals.
A stroke-line "/" is used to indicate "per".
A stroke-line between dates (for example 1979/80) means a fiscal year.

A dash between dates (for example 1970-79) indicates the full period, including the beginning and end years.
References to dollars /USD/ are to United States dollars unless otherwise stated.
Three dots " ..." indicate that data are not available or are not separately reported.
A dash "-" indicates that the amount is nil or negligible.
A blank indicates that the item is not applicable.
Totals may not add precisely because of rounding.
References to tons are to metric tons.
Milliards = billions = 1000 millions

Only in the Content:
A = Abstract
AN.x= Annex, where x is the number of the Annex

C = Content
E = Explanatory Notes
LT = List of Tables and Figure
LR = List of References
R = References
T = Tables

CHAPTER I

INTRODUCTION

The developing countries should develop metallurgical production capacities that are more in accordance with their market size and financial possibilities, especially when they are confronted with large financial debts, and a world decline in the demand of the traditional non-ferrous metals products.

The apparent advantages of constructing an optimum-sized plant are often not recognized in developing countries. Many large projects in these countries had problems relating to the long time of construction and great dependence - in general - on exports at a time of decline in the world demand as well as price deterioration. The production of semis and finished products offers greater flexibility in scaling down plant sizes and many possibilities to increase the horizontal integration at national and regional levels.

At the First Consultation on the Non-ferrous Metals Industry held in Budapest, between 30 November and 4 December 1987, the establisment in developing countries of small-scale units for the production of semi-finished and finished non-ferrous metals products for the domestic and/or subregional markets was recommended.

For implementing this recommendation, a regional expert group meeting will be convened in Latin America in 1989. This meeting aims at analyzing the possibilities of strengthening the co-operation basically between the main non-ferrous producers in Latin America, through an increase of their commercial relations, production and technological exchanges, i.e.:

- to increase the national value added of the non-ferrous metal products in Latin America through converting the non-ferrous primary metals into semi-finished and finished products,

- to identify possibilities of establishing new capacities in this area and to select of appropriate production technologies.

This study will be presented as a background paper at the above mentioned regional meeting.

The main activities carried out by a team of ALUTERV-FKI (HUNGALU Engineering and Development Centre, Budapest, Hungary) were as follows:

- Development of a methodology that could link the level and expansion of the demand of semi-finished and finished aluminium and copper products with the real possibilities of producing them locally in flexible small and medium-size plants.

- Identification of actual possibilities of commercial, production and technological complementarities between selected producers of aluminium and copper semi-finished products in Brazil, Argentina, Chile, Venezuela and Peru.

- Identification of concrete possibilities of developing new plants for the production of selected aluminium and copper semi-finished and finished products. Also, the identification of existing plants that need restructuring or rehabilitation.

- Identification of potential national partners for the development of the projects.

- Establishment of a framework for North-South and South-South co-operation that could make feasible the effective implementation of the projects of investment and programmes of technical assistance identified.

Members of the team:

Mr. Gróf, Tamás PhD metallurgist, Director
Mr. Éva, András PhD mechanical engineer, Adviser

performing a factfinding mission in South America, with the help in home office work mainly of

Mr. Fülöp, Sándor, MSc. mech. engineer, econ-engineer, Adviser
Mr. Gillemot, László, PhD mechanical engineer, Head of the Centre for Aluminium Application
Mrs. Hidvégi, Éva PhD mechanical engineer, Head of Information Centre of Aluminium
Mr. Taigiszer, Gyula PhD, mechanical engineer, Adviser.

The itinenary of the journey is contained in Annex 1.

CHAPTER II

RECOMMENDATIONS

In accordance with the actual production, the current developments, the demand forecasts and the general economic possibilities as well as the preliminary considerations for the complementaries of the aluminium and copper downstream industries (as detailed and explained in Chapters IV and V) the following activities are recommended to strengthen the regional cooperation of Latin American countries involved and to promote further complementaries which will give a more favourable position for their products.

In aluminium downstream industry:

- Establishment of a high capacity press-forging plant to supply the processing industry (mainly the automotive and machine branches) with forged parts. These parts have high accuracy and very favourable combination of mechanical properties thus they are suitable to replace die-cast pieces on several fields. As the Brazilian automotive and machine industries are the strongest in Latin America it would be advisable to erect the said plant in this country, e.g. as an integral part of CBA. The output of this plant should be about 3 million parts per annum (which will be about 1 thousand tons/year if the average mass of parts is in the range of 0,3-0,4 kgs). The total cost of this investment including machinery and installation can be estimated as high as 5.5 million USD. Beside domestic demand, the CBA will be able to satisfy the need of forged parts of the neighbouring countries.

- On the basis of the Venezuelan and/or of the Brazilian foil production a powder-pigment plant is to be proposed utilizing the foil scrap. Its capacity can reach 2 thousand tons annually. For such a plant the total investment cost is estimated to be 3 million USD. The aluminium pigments and powders are exportable products and they are used in pharmaceutical and chemical, automotive and machine sectors, applying them as raw material for several compounds, corrosion protective and decorating paints, additives for gas concrete in the building industry, etc. in an ever increasing quantity. Beside domestic demand this plant would satisfy that of Andean countries as well.

- For Peru it is proposed to establish a small foil producing capacity (2-3 thousand tons annual production). The aluminium foil in higher quantity could solve some acute problem in the domestic packaging industry and the rest of the production could be exported to the neighbouring countries, especially to Bolivia and Colombia. The foil-stock for the production can be bought from Venezuela. The plant could use second hand machinery.

- In connection with the long-range development project of the Venezuelan aluminium industry it is recomended to establish a R&D organization within the CVG acting in the whole range of the aluminium industry starting from mining to finished products manufacturing. For the downstream sector it would organize development activities from preliminary studies to technology transfer, adaptation and application of aluminium.

In copper downstream industry:

- In Brazil a huge amount of excess capacity for semis production exist, a part of it (machinery and equipment) could be utilized in joint ventures with Peruvian companies using raw material from Peru. By this way Peru could increase its output of copper semis while the copper supply of Brazilian idle capacities could be ensured for a long time.

- In spite of the high technological level of the Chilean primary copper industry the semis production and especially e.g. the strip manufacturing of the visited factories is somewhat retarded. It is suggested to partially replace the old hot rolling technology with a continuous cast rolling method. The product mix of strips has to be supplemented with Cu-Sn and Cu-Ni alloy ones and with special alloys for electronics and other high-tech applications.

- As for Peru the wire production from wire-bars recomended to be replaced with a continuous method. The technology and equipment could be either a General Electric made dip-forming equipment or an Outokumpu upcaster or just a small capacity Hazelett-Krupp caster with 30 thousand tons output annually.

- The product mix of Peruvian copper downstream industry has to be enlarged by introducing the production of semis of special alloys (e.g. Cu-Ni materials).

For both downstream industries

- It is necessary to establish a regional organization which provides a link among downstream industries of the countries and helps their project works with information, feasibility studies, technology transfers, etc. This has to be followed by a second step relying more on local initiative, i.e. setting-up a technical development body with a great variety of duties ranging from laboratory tests, design and use of new products, introduction of new alloys and technologies (coordinating R&D activities) to techno-economic consultancy for the costumers, staff training, etc. A body-named for example Technical Advisory and Marketing Centre could be organized within the aluminium and copper associations of each country.

- The competitiveness of both downstream industries could be increased by scrap recycling. For this reason it is advisable to organize the collection and separation by types and origins of aluminium and copper scraps in each country. The price of scraps must be determined on those conditions which are advantageous for both the collection and the utilization.

- The regional cooperation of aluminium and copper downstream industries could be strengthened by minimizing import duties (down to zero either) on the trade of semis among Latin American countries . Another way for promoting the cooperation could be the application of export incentives. By this way the utilization of excess capacities is urged as well ensuring economic advantages for the producers and increased quantity of semis for the processing industries.

Others

- Although the questions of alumina production do not belong stricly to the aluminium downstream industry they deserve some attention from point of view of profitability. All over the world there is tendency to use special aluminas and ceramic materials in ever increasing quantity. Alumina

plants are striving to indroduce new products of those types for ensuring their more economic operation. From this point of view it is advisable to investigate the possibilities of manufacturing special grade aluminas. Venezuela and/or Brazil can be considered suitable for producing these products not only for satisfying the regional demands but exporting to the developed countries, too.

- During the factfinding mission it was understood, that Latin American producers do not have sufficient knowledge about and contacts with the producers of other countries of the region. It is therefore highly recomended to organize forums for the regular and direct contact between the specialists of the copper and aluminium industries, respectively. These meetings could help in the better and faster flow of technical and commercial information, strengthen the contacts and promote the utilization of complementarities by the means of specialization, cooperation, joint ventures, etc.

- The drawing force for the downstream industries is the manufacture of finished products. From this point of view the basis of the further developments and complementaries of semis production could be established on the side of processing industry.
  The setting-up of finished product manufacturing facilities can be usually financed by domestic resources, even then the know-how has to be purchased from abroad. The processing plants may probably be economic if they are linked by joint ventures with firms of other countries which buy back the fabricated products made from raw material furnished by them. In connection with strengthening the link between the manufacturing and processing industries the activity of the Technical Advisory and Marketing Centre (mentioned above) is inevitably demanded.

- The training of technical personnel seems to be unsolved yet in many firms especially in smaller ones. To ensure their up-to-date level of knowledge it would be advisable to organize training programmes and visits of modern plants abroad for them. Regional and international organizations - first of all UNIDO - could help to collect demands, to determine possibilites and to promote the programmes both from financial and technical point of views.

CHAPTER III

DESCRIPTION OF APPLIED METHODOLOGY

A. NECESSARY INFORMATION

The identification of specific projects for the production of aluminium and copper semi-finished products needs an overall knowledge not only of the situation of these downstream industries, but the same of the upstream (primary metal), and of the processing industry, too.

Without an evaluation of the current situation of aluminium and copper industry within the economies of the countries of the region on one side and the world's situation of these industries on the other side the strategies of the developments can not be stated and understood, finally, proposals for specific projects can not be made.

In this study most of the data of the installed capacities and the production are as detailed as it was possible to collect. The sources and consumption of metals, their import and export balances as well as the main indicators of economies of the region (e.g. the GDP, growth of industrial production, population, inflation and discount rates, debts and debt services, international reserves, etc.) were collected mostly by desk-research (online from data bases, from printed materials, etc.)

The most recent data were collected on site, together with non-quantitative informations by interviews with UNDP and Ministry officers, bankers, representatives of professional organizations, chambers of commerce and of industry, factory managers and prominent experts. (The main groups of questions prepared prior to the journey are in Annex 2).

8. INVESTIGATIONS

The consumption trends of aluminium and copper give a possibility of extrapolation. This can be used as a first approach for the forecast of further consumption.

Usually, the per capita GDP and the per capita consumption of structural materials, such as aluminium and copper, follow similar trends. There are correlations between them, thus the regression method can be used to make a prognosis of the per capita material-consumption, taking into consideration that there are plans or predicts on GDP/capita in most cases. This regression method gives a second approach for consumption forecast, in this case the calculated per capita consumption figures multiplied by the predicted population.

The growth of consumption can be forecast on the basis of correlations with the growth of industrial production, too (third approach) and with the growth of investments (fourth approach).

The most possible values of consumptions can be stated on the basis of these four correlations, but not as a plain average. A careful evaluation of the results is required and it is necessary to match them with relevant development plans, strategies, macro-economic conditions, and with the findings of interviews being usually of non-quantitative nature.

Analyzing the domestic consumption, the foreign trade of the metals concerned and the installed and future production capacities of them, the consumption forecast and the demand for new capacities and for restructuring of the existing ones can be estimated. The location of new capacities must be carefully matched with the natural resources and infrastructures of the region. All inputs demanded the willingness and capabilities of parties involved, etc, have to be taken consideration.

Although only a very limited amount of time and resources were allocated for the preparation of the present study, the authors following the above methodology could identify some possibilities and make a few recommendations, but the realization of these suggestions will take long time and great efforts from those who will follow the recommendations of Chapter II.

CHAPTER IV

EVALUATION OF THE CURRENT SITUATION OF ALUMINIUM AND COPPER INDUSTRIES IN LATIN AMERICA

A. BACKGROUND INFORMATION

1. The present situation of the Latin American economies

Among the Latin American countries special attention was paid to Argentina, Brazil, Chile, Peru and Venezuela, in accordance with the Terms of Reference of the project prepared by UNIDO.

ARGENTINA

Although Argentina is a very rich country as far as the economic resources are concerned, during the past decade it has realized a very low economic growth only. In 1976, after the military takeover, the introversive economic development srategy - which has been followed over 30 years under the rule of the Peronist people's party - has undergone radical changes. The liberalization policy aimed at increasing the competitiveness of the over-protected home industry has failed to meet the expectations.

In the period between 1979-1981, sustaining of the excessively revalorized currency has resulted in considerable increase of imports, excess rate of accumulated liabilities and substantial outflow of capital.

In 1981-82, a grave economic recession has taken place in Argentina. Real value of GDP has decreased by 6.2 and 5.2 % respectively and the balance of payment on current account has turned into considerable amount of deficit.

When President Alfonsin took over the power, Argentina was in grave economic situation.

Although the economy reached a modest growth of 3.3 % in 1983, the inflation has almost doubled.

Deficit of the state-owned sector amounted up to 16 % of the GDP, the foreign exchange reserves decreased to 1 billion US dollars and the accumulated payment arrears exceeded the sum of 3 billion US dollars.

In 1985, the government of President Alfonsin introduced a rigorously strict anti-inflation program, with complete freezing of prices, introduction of new currency (1 austral = 1000 peso) and fixed rate of exchange (0.80 austral = 1 US dollar) included.

All the above measures made possible the execution of a commercial bank financing packet, which included on the one hand a loan in the sum of 4.2 billion US dollars, and on the other hand re-scheduling of amortization instalments due between 1982-85.

In spite of the fact that after introduction of the Austral-plan the inflation started to decrease, in 1985 the GDP has decreased by 4.4 % in real value. Among the reasons we can mention the negative effect of the price stabilization, the decreased corn production due to the floods, moreover the strict financial policy. A significant improvement can be seen in the deficit of payments on current account, it decreased to 0.954 billion dollars compared to that of 2.495 billion US dollars in the previous year.

In spite of the initial success of the Austral-plan, namely the decreased inflation and the fact that national economy in 1986 became able to get beyond the bedrock of 1985, the government had to face the renewed opposition of the trade unions. The losses of the state-owned enterprises made difficult to control the state debts. Because of the unsafe economic prospects and the high interest rates, the growth of investments was not enough to recover the losses of 1985.

The government gave effect again to the forced system of saving, when the companies were required to loan money to the state from their deposits lodged in the banks. A smaller rise in the taxes also was introduced with the aim to decrease the budget deficit of the state sector to 3 % of the GDP. The

exchange rate policy got modified to the extent that the formal official exchange rate was replaced by "commercial rate", while the parallel (non-official) rate was legalized in the form of "financial exchange rate". The Austral was depreciated by 25 % within two weeks. After that the banks are free to determine the interest rates for the deposits in their agencies. In consequence of the dramatic decrease in the surplus of the trade balance, the economic circumstances of Argentina turned for the worse.

BRAZIL

The economy of Brazil in the 70's has been characterized by quick growth, and the average growth of GDP in real value has attained 8.6 % a year. Main sources of this dynamic growth were the accelerated industrialization program by which the steel- and heavy industries and the processing industry of Brazil were established. In the exports, the share of finished products increased, mainly at the expense of the traditional agricultural products, such as coffee. Recently, the share of finished products in the exports exceeded 50 %. In spite of the development mentioned above, the Brazilian economy has been seriously affected by the oil price explosion, as major part of its energy requirement is covered by imported oil. Notwithstanding, smaller import restrictions for products other than oil were introduced only in the mid 70's, considering that the country - in possession of easily obtainable credits - was able to finance the large deficit in the balance of the current payments.

After the second oil price explosion at the end of the 70's and the substantial rise of international interest rates, Brazil was still able to maintain the imports at the previous level and could fulfil its obligations for redemption of debts.

External problems of Brazil was accompanied by the deep recession of the national economy, the acceleration of inflation, and - as further credits were limited by the foreign creditors - re-scheduling of debts amortization became necessary.

The banks were hesitating to grant even short-term credits and Brazil was compelled to approach IMF for loan, as result of which the first agreement on a stand-by credit was concluded in February 1983. Under the strict conditions stipulated by IMF, a considerable hold-back in imports was attained, a decrease to one third by 1983 expressed in dollars as compared to that of 1980.

During 1984, as result of the cheaper oil import, the increasing domestic production of oil and the quick growth of exports to USA, Brazil could achieve in the current payments a positive turn compared to the situation two years before. Additionally, a considerable increase of GDP in real value was also experienced, for the first time since 1980. Due to the inflation higher than 200 %, the connection of Brazil with IMF turned for the worse, and the lack of an agreement on re-scheduling the reimbursement of the long-term credit has darkened the development of economy in 1985, too.

The expansive economic policy of the new administration replacing in early 1985 the military government has resulted in quick growth of GDP and rate of inflation. The accelerated inflation forced the introduction of the Cruzado plan (February 1986) based on the wide-range freezing of prices.

Depreciation of the Cruzado in the second half of 1986 has brought about considerable decrease in the volume of exports. Due to the more active domestic demand, however, the imports started to steadily increase. Thus - in spite the reasonably decreasing oil prices - the surplus of the foreign trade balance in 1986 has decreased to 8.3 billion from 12.4 of 1985. It is not surprising that the prices started to rise quickly after resolution of the restrictions and in November of 1986 the Cruzado plan fell into oblivion.

CHILE

After the military coup, the economy of Chile got a radical change in the midst of the 70's. A thorough modernization of the economic and social systems began basically by taking advantage of private initative and focusing all the State's efforts on those areas which by their very nature could not be handled by private sector. The results of the new strategy

became evident after some years as shown by the increase of GDP values. Nevertheless there were difficulties in the Chilean economy originated from problems intrinsic to the process begun in 1973 as well as from economic crises of 1975 and 1982 - namely the sharp drop in the terms of its trade and the increase of its foreign debt because of the growth of international interest rate during the first years of this decade. In the last four years the economy has reached a stable position and since 1984 the GDP has increased at a steady rate, at a faster rate than at any time in the past. This has been achieved despite of economic recession created by the foreign debt and unfavourable external conditions. Chilean economy has been integrated into the world trade, the export has been increased and diversified. At present Chile is a country oriented to exports: selling 1343 kinds of products to 112 countries on the contrary to the 1971 figures when the number of product types was 412 and the purchasing countries less than 60.

Beside mining - the farming, livestock, fishing and industrial production represent nearly 60 % of its total export. The investment rate was more, than double from what is was in 1973. Between 1984 and 1988 foreign capital has entered to invest over 2.6 billion US dollars. In connection with the foreign investment it is interesting to note that Chile is a pioneer in the development of the debt conversation system. Since the beginning of these conversions in 1985 more than 1.2 billion US dollars has been invested.

PERU

Peru is one of the poorest countries in Latin-America: the GDP per capita is less than half of that in Argentina. In the first part of the 70's, the GDP in real value has increased fairly evenly - by 6.5 % a year in average, - a considerable rate of growth. In the middle of the decade, the economic stability got tottering and the average growth during the 8 years before 1983 has been as low as 1.8 %.

1983 was the year of crisis, the volume of GDP has fallen back by 11.8 % due mainly to the decreased production of agriculture.

As the number of population is increasing by 2.5 % per year, the GDP per capita has fallen back to the level experienced before the 60's.

Peru is relatively rich in mineral resources, mainly in copper, zinc and oil.

The share of industry - the extractive and processing branches together - in producing the GDP is 36 %. After 1981, the processing industry has been seriously affected by the imports liberalization, the decreased domestic demand and financial effects of the restrictive measures taken in favour of the economic stability. As to the exports, the greatest importance is given to the mining products : in 1984 the non-ferrous metals and mineral oil accounted for 60 % of the exports. Since 1987, Peru is net exporter of energy carriers, its mineral oil production exceeds 150.000 barrels per day.

VENEZUELA

In the 70's Venezuela has attained quick economic growth, during this period the average increase of investments was 13 % per year. This remarkable expansion was made possible by the investments of the great profits gained through the quick increase in price level of the oil exports. After the year of 1978, however, the economy started to stagnate or in certain years some fall-back was also experienced. After such a long period of expansion, certain slackening can in any case be expected, but certain structural problems also added to the slowdown.

Among the examples, failure of exports diversification can be mentioned on the first place. Venezuela failed to accumulate capital by utilizing its rich and varied resources of raw materials. In 1984, contribution of oil-mining and processing to GDP was 20 % and its share in export earnings amounted to 90 %, providing for two-third of the state receipts. In the past decade, the agriculture of the country has been neglected, so for the time being the economy is forced to considerable imports of food.

In February 1983, the government - while at continuous decrease of oil prices repayment of a debt in sum of 17 billion US dollars fell due - stopped a number of great investment projects although with some delay, and introduced treble system of exchange rate in favour of imports restraint.

The government announced moratorium for redemption of capital and started negotiations with the foreign creditors to work out a program for debt re-scheduling.

As a result of these measures the imports of goods has fallen almost the half, and by 1984 the balance of the current payments turned for the surplus of 5.3 billion dollars from the deficit of 4.2 billion dollars in 1982. By the end of 1985, the foreign exchange reserves grew up to 13.7 billion US dollars.

The negative side of the economic balance is loaded with severe problem of unemployment, according to official data it is 12,5 % (the real value is 20 % as estimated): moreover the low investment activity especially in the public sector, "optimism" of the business circles concerning the future is at the bottom, the per capita income is as low as in 1976. On the contrary to other Latin American countries, the inflation rate is maintained at a two-digit level thanks mainly to the price-control applied for the most important products.

Since 1986, the traditonally strict budget- and financial policy of Venezuela has been mitigated with the aim to give impetus of increasing demand through widening the budget expenditures and official rising of prices. The budget deficit produced this way is planned to be compensated partly by increasing the taxes, partly by loans, and in the recent past by inflationary monetary policy and by additional revenues originating from currency devaluation.

Further on it is interesting to note that the government is reluctant to handle the "tricky" questions of the exchange- and interest rates policy. At present there is nothing to suggest that the goverment is working on unification of the exchange rate system. The interest rates are also fixed and no change has been made since 1984-85.

The present inflation rate of 36 % per year and the negative real interests are not incentive for the domestic saving, but have stimulating effect on the capital outflow.

Summary of data collection

The most important data collected of these Latin American economies are as follow:

In Table T-1 the populations of the countries are shown. in Table T-1. According to the figures, the Latin American market and manpower are really enormous, potentially.

The GDP-s in US dollars are summarized in Table T-2. The international reserves, the rates of inflation and the exchange rates are collected in Tables T-3...7. The picture is not too encouraging.

The foreign trade of the countries plays a very important role in their economies. Naturally the bigger countries are more inward-oriented, but as it can be seen from Table T-8, their imports exceeds their exports in each case.

The debt of the countries is steadily increasing and the investments stay at on a low level (Tables T-1, T-9...10). The per capita GDP follows the recession periods sharply (see Table T-11).The ratio of fixed asset investments to GDP is steadily decreasing in every country in question (Table T-12). No similarity in the growth of industrial production can be seen among the countries (Table T-13).

2. Prognosis of expansion

The population of the region is expected steadily to increase in the near future. The expected growth is according to Table T-14.

The forecast growth rate of GDP is not so steady and different forecasts show different figures, too (Table T-15). The prognosis for the growth of industrial production (Table T-16) and for the debt and debt services shows a more

optimistic picture (Table T-17), similarly to the expected growth of investments on fixed assets.

In Argentina in 1988 decreased rate of economic growth can be expected. This is explained on the first place by the anticipated changes of economic policy and by the higher inflation rate, which vill further decrease the confidence of the consumers and the investors. Although the inflation tends to decrease again in the subsequent period, this will be only a moderate reduction, so the prospects will remain uncertain.

As considerable growth in the exports of Argentina cannot be reckoned with, the government will be forced to rise the budget expenditures giving new impetus to the economy. The running expenses of state are expected to increase by 4 % in 1989, and within this range the capital investment by the state will be increased by 6 %. As a result, the growth rate of GDP will amount to 3.6 %, while the growth in the private sector investments will be as low as 4.8 %.

The higher rate of inflation and the higher interest rates to be expected from the new financial liberalization, will adversely affect the investment decisions.

The state sector can hardly become a drawing force of the economic revival. Argentina will be in continuous need of inflow of new foreign capital and probably this can be realized only on fulfilment of the terms stipulated by IMF.

After the fall-back in 1987, term of trade will get more favourable for Brazil. Paying capacity of the country, however, will be adversely affected by the increase in the international interest rates expectable between 1988-89 making more difficult the fulfilment of debts repayment.

In the period between 1988-92, an average annual growth of 4.9 % is expected in real value of GDP. This will be attributed mainly to the increasing domestic demand, as only a slight increase of exports can be anticipated in the years to come because of the slackening world trade activity. In 1988 the inflation will accelerate and the rate of the economic growth will decrease in lack of a uniform economic policy and the fruitless efforts exercised to decrease the budget deficit.

Although a moderate growth of consumption and the state investment can be reckoned with, the industrial production will hardly increase in real value. In line with this a decrease of stocks and increase of imports are expected.

The uncertainity considering the exchange rate policy also plays a great role in the growth of imports.

In 1989 an appropriate economic policy can provide the conditions to restore the high-rate growth of GDP and a price level lower than that of now, although the inflation in any case is expected to be around the level of 100 - 200 %.

The government strives for attaining a substantial surplus of the trade balance. In the middle-run, however, the increase of investments is given preference. This way, the investments are expected to increase from 1988 which can result in a relatively high growth rate of imports. The close relationship between the imports and the investments presumably will strengthen further in case of production at full capacity, and a shortage of investment goods will be experienced. The imports are expected to make out 6-7 % of the GDP, and the capital investments will grow over the level seen before 1981 amounting to 24 % of GDP in nominal value.

Although the Chilean economy to be appears the most stable among the Latin American countries, nowadays there are uncertanities in connection with forecasts. The main reason of it is the political situation. On the plebescite held in October, 1988 President Pinochet could not get the majority of votes therefore a new one is due to come in the next year which will make possible for the different political parties to take part in the processes and to get in power. As a result of becoming more democratized society, new ideas and conceptions are expected in the economy and ways of development.

Among the different views there are some which show close similarity to others. From the economic point of view the conceptions agree in a steady rate of increase of the GDP's real value by 5 - 6 % annually. The rate of inflation is expected around 20 %. In connection with the export the emphasis is on the products of copper industry in the future, too, but there is a strong demand for increasing the export

of other industrial products. The main directions of investment in the copper industry are in the production of concentrates and blisters without considerable expansion of copper semis manufacturing.

In Peru in 1988, the GDP is expected to increase by 2.5 % in real value, as - due to the rectifying government regulations - a decrease of demand and consequently a declined economic output are to be anticipated. As far as the different branches of industry are considered, mining will be - in spite of the favourable price conditions - disadvantageously affected by the decrease in oil exploitaton, moreover by the lack of new facilities that could be introduced and joined into the existing chain of production.

Production growth in the processing industry will be limited by the expected narrowing of demand and the import controls. On the demand side, slackening investment activity is expected due to the further decrease in trust of business circles. Smaller investments will be attractive only in the areas raising productivity or in the fields of export-oriented branches of industry assuring quick refunds.

The different measures effectuated so far, the exchange rate adjustments, increase of the interest rates, price modifications will result in higher and higher rate of inflation.

Beginning from 1988 private investments are stimulated by the debts capitalization program in Venezuela. Certain foreign debts can directly be capitalized, but can also be sold at the secondary market or can be exchanged for goods on stocks with other Venezuelan companies. During the forecast period, monetary system and money supply of Venezuela will expand accordingly. The multinational companies most probably will make profits from this debts acquittal system, from which they can undertake new investments. It is also supposed that the new government would withdraw subsidy from several state-owned companies and try to incite the remittance to home of about 30 billion dollars deposited by the private sector in different foreign banks.

3. World's situation of aluminium and copper industries

The developments in the non-ferrous metals sector, among them in the aluminium and copper industry were affected by the structural changes in the world economy that occured in the last decade.

In the mid-1970's there was a strong deterioration of economic conditions in the developed market economies, which had a negative impact on economic growth in the developing countries, too. The volume of exports of the developing countries, which in most cases are mainly raw materials, was reduced, the terms of trade deteriorated, the prices of raw materials decreased (eg. 15 per cent in 1982 only). Besides the increase in interest rates as a consequence of the monetary policies of the major developed countries generated a difficult financial situation in the developing countries, creating a serious obstacle to the implementation of their programmes of investment in the non-ferrous metals industries (e.g the interest payments of developing countries increased to 30 % from 14 % in 1980 since 1976).

There was some recovery from the depths of the 1980-82 recession, which has slowed again in 1985. In 1989, a world economic recession can be expected, as the USA will pursue more stringent budget and financial policy than previously with the aim to decrease the budget deficit. So much the more it is expected because there is no other state capable to take over the drawing force from the USA, or able to produce a growth rate high enough to compensate the decreased growth in USA. Consequently, the world economic growth will come to a standstill and only a 2 % increase in the world trade can be expected in 1989. After the economic upturn of 1987 following the agreement on the exploitation restriction in the OPEC countries, the oil prices are expected to fall again and rising prices can only be reckoned with in the period of the world economic recovery of 1991-1992. As for the prices of other raw materials, after the decline of 1987 they are expected to rise in 1989, however, some falling trend will be experienced again. On the contrary, prices of the processed goods are expected to rise continuously. The exchange rate of the dollar is expected to decrease further on, but at smaller rate than in the past two years.

This is in connection partly with that the American and international rates of interest are anticipated to rise during the period till the year of 1989, after that, however, they are predicted to fall again.

In aluminium industry the production of the total world fell in 1982 and rose again in 1984. The world's production and consumption figures in mid - 80s are in Table T-18. In our decade the aluminium prime metal has become a commodity and a significant portion of the world's smelting production moves between unrelated producers. The industry makes production decisions based mostly on terminal market price and government policy.

The annual growth of smelter capacities and their operating rates in the given years are shown in Table T-19 and the change of prices and production costs of the prime metal in Table T-20, the price trends of LME cash settlement for aluminium in Table T-21.

The real impact of this movement on the production of aluminium is that market share of the integrated producers decreased, and the production levels became more stable (the operating rate of smelters was 86-98 % in the last three years!).

The integrated producers are even less important in the production of semis, although there is a tendency that most major integrated aluminium companies strive to continue their efforts to supply significant amounts of downstream processing needs internally.

The price level of semis compared to primary aluminium prices nearly the same in different countries (see Table T-22).

In order to make comparison of break-down of consumption in Latin American countries, an average of shipments to different end uses, and a prognosis for change is shown in Table T-23 for Europe and for the world.

Prognoses and forecasts on smelters capacities, operating rate, production and prices changes are shown in Tables T-24...25 and consumption versus industrial production in Table T-26.

The copper industry is very sensitive to the developments in the economy, especially in the industrial sector. The production of unwrought copper continued to increase in 1980-81-82 despite the decrease in consumption, which is declined by 4.5 % in 1980 and again in 1982. The stocks increased and the prices decreased as a result of the economic recession and the continuons increase in stocks. Developing countries made efforts to make up for the drop in prices by increasing output.

The production and consumption of refined copper in the nearest past is detailed in Table T-27, and the price trends of LME cash settlements in Table T-28.

The expected capacities of Western world refineries will reach 9 770 thousand tons, the consumption 9 250 thousand tons in 1990. From 1990 to 2000 the primary copper consumption will grow by 30 %, but the recycled one nearly by 50 % at the same time.

In the last decades the growth rate of the world consumption of refined cooper seems to slow down.

Between 1950-1981 the growth rate amounted to 3.4 %. Within this period of time: it was 4.6 % in the 1950s, 3.5 % in the 60s and 2.1 % in the 70s within the circle of the non-socialist countries.

Much of the growth of production took place outside established centres of production. Accordingly, the share of major companies in the USA and Europe fell from 93 % to 45 %. In 1950 over the half of the world's output was supplied from North American mines. Six companies, four of them in the USA, accounted for most of the value added in the world by the industry. From mines in the Western USA and Latin American subsidiaries, US firms accounted for two-thirds of the world supply and most copper fabricated products.

By contrast, these firms in 1983 smelted less than a fifth of the world consumption. New centres of production and smelting exist in the Pacific Basin (Australia and Japan) and within the USSR, while nationalised companies manage expanding industries in Africa (Zambia and Zaire) and Latin America (Chile, Mexico and Peru). Thus, currently over half the

sources of new refined metal enters world trade. The developing countries supply most of the incremental tonnages behind the remarkable expansion of the world industry. Instead of one dominant centre, today there are four major fabricating centres.

There will be an accelarated growth in the next 20 years outside the USA. By the year 2000, the "rest of the world" demands are expected to double. On a regional basis, the annual growth rates required will range from 8-10 % in Africa and Latin America to 4-6 % in Japan and the Centrally Planed Countries. The USA and Europe, in contrast, are expected to grow at 2-3 %, well below the world's average rate of 4.6 %.

Copper consumption is affected by several factors. A further increase - beside its favourable properties - can be explained by the fact that while in the 60s the copper price has increased by 3 % p.a. in real value, in the 70s annual price decrease of 1 % can be observed, so copper became a relatively cheap metal.

The growth of copper consumption in various countries is very well explained with the theory of "intensity of mineral use " (IU). Defined as an economy's apparent consumption of copper devided by its gross national product (GNP), IU rises in the early stages of industrialization as a function of GNP per capita, but peaks and falls at higher level of GNP per capita. Thus the shape of an economy's IU curve would form an inverted IU with less developed countries on the rising portion and advanced economies on the falling portion.

So in medium- and low-industrialized countries the copper consumption is increasing with the GNP, the development of industry and standard of living. From copper consumpiton point of view, the highly developed countries, although at different points of time, but got saturated. In the USA, this saturation set in before the Second World War, while in the West European countries it took place about the end of the 60s or in the early 70s.Thereafter the copper consumption per unit product of industry shows a declining tendency.

The present prices of copper semiproducts are shown in Table T-29.

B. SURVEY OF INSTALLED CAPACITIES AND THE PRODUCTION OF SEMIS

The Latin American countries have different levels of reserves of minerals and structural characteristics of non-ferrous metals production. Common point is that the development of this sector is outward-looking. They use their primary resource export revenues to import machinery and technology from outside the region for their industrial sectors, and in most cases consumer goods, too. The manner in which the non-ferrous metals industry developed corresponds to the requirements of the world market, rather than to domestic necessities or basic regional needs.

1. Aluminium

As far as the countries in question concerned, only Argentina, Brazil and Venezuela have aluminium primary metal production (Table T-30).

In connection with the production of aluminium semis and the installed capacities the analysis of the five selected Latin American countries can be summarized as follows. However, it has to be mentioned again that there are uncertanities regarding the capacity figures. This can be explained by the fact that the semis production is highly diversified among the small and medium size factories beside the few big ones and their parameters are not known even to their Associations or the governmental officies. For this reason the data and figures were collected from different printed sources (yearbooks, reports, etc.) and on the basis of personal information, but it also happened sometimes that neither of them were available.

In Argentina the aluminium industry has a special position as in the country there are no known substantial resources of the raw material. They need imported alumina for the smelters of the only metallurgical plant (ALUAR, Puerto Madryn) in the country. The capacity and production of primary metal is about 150 thousand tons annually. From this quantity 110 thousand tons were manufactured in the downstream industry in

1987. The demand of the domestic market was as low as 70 thousand tons (sheet 17 500, foil 8 100, extrusions 15 100, cable and wire 10 600, castings 19 100 tons), thus the surplus semis (44 000 tons) were exported. The direct export is gradually decreasing year by year, due to the increasing demand from domestic semis manufacturing companies.The built-in capacities of the downstream are nearly two times higher than the actual production. The biggest capacity of this sector is the cable industry, it is able to produce 70 000 tons of wires and conductors. Extruding and rolling capacities are 60 and 50 000 tons respectively. In case of foil the maximum output is around 10 000 tons per year.

Brazil has the third largest bauxite reserves in the world. The aluminium plant ALUMAR is the largest project in this field of the region. ALBRAS, ALCOA Aluminio S.A., CBA and ALCAN Aluminio do Brazil have a total capacity of the current 850 000 tons, primary aluminium which can reach 1.5 million tons by 1995. 800 000 tons of this capacity will be used on the home market.

In the past few years there was a strong increase in the production and capacity of aluminium upstream industry which was not accompanied by the same scale improvement on the downstream side. In the period of 1986-87 the production of semis reached the level of about 440-450 thousand tons annually, from which only 30-40 thousand tons were exported and the decisive majority remained in the country. The cause of the trifling small export is in accordance with the Brazilian industrial policy where the supply of the domestic market is of first priority. From the total quantity of semis, rolled and extruded products represented 110-110 thousand tons respectively, except for foil which was 31 thousand tons in 1987. As to the drawn products, especially wires and cables the total annual quantity was 80 thousand tons. The production of castings was as high as 70 thousand tons per annum. The remaining 35-40 000 tons per year consisted of other semis, powders, paste, etc. The composition of exported semis was: rolled products 13 thousand tons, extruded, cast and drawn ones 8 thousand tons each.

The production of semis has been concentrated at three big firms. Beside these ones more than 70 small- and medium-size plants can be found in Brazil engaged in the downstream industry, but their production can be neglected in comparison with that of the big ones. These big firms are the ALCAN, the ALCOA and the CBA. Their cold rolling capacities are: ALCAN - 95 thousand tons per year, CBA - 50 thousand tons, ALCOA - 20 thousand tons. Considering the capacities of the smaller plants the total Brazilian rolling capacity is about 200 thousand tons annually. In the foil production the capacities are: CBA - 16 thousand tons, ALCAN - 15 thousand tons, ALCOA - 8 thousand tons annually, the total Brazilian. Foil manufacture is about 40 thousand tons pro year. In the field of extrusion the total capacitiy is estimated to 131 thousand tons from which the ALCAN, the ALCOA and the CBA account for annual quantity of 43, 47 and 20 thousand tons respectively. As to the drawing capacity the total Brazilian figure is about 130 thousand tons which is divided among the three big ones as 40 for the ALCOA, 28 for the ALCAN and 20 for the CBA. In this field there is another great producer named FURUKAWA. Its capacity is about 20 thousand tons annually. In relation with die-casting the Brazilian capacity reaches the value of 75 thousand tons per year. For the powder manufacture the ALCOA has a capacity of 18 thousand tons and for pastes the ALCAN's capacity is 12 thousand tons.

The production and capacity data it can be seen that the utilization of the manufacturing capacity is about 95 %. Considering the expected growth of demands it is evident that the increase of capacity might be considered inevitable in the near future, otherwise the downstream industry will get into unfavourable position.

As far as the aluminium industry of Chile is concerned, the situation is very similar to the Peruvian one. There are no resources for the aluminium production therefore their total need is satisfied by imports in form of ingots and semis.The annual aluminium demand does not reach the 6 thousand tons. Small firms with very limited capacities are involved in the downstream sector. The biggest firm producing semis is the MADECO. The known capacities are 1 thousand tons for rolling and another 1 thousand tons for the foil production. The extrusion capacity is about 1 500 tons.

In Peru there is no production of primary aluminium, the total demand is imported either in the form of ingots or in semis. This demand is very limited and it does not reach 6 thousand tons. In the downstream industry small- and medium-size factories are in operation, the biggest one among them is the METINSA. Various kinds of semis are produced, but in a very limited quantity. Only an extrusion capacity of 2.5 thousand tons is known. Other data are not available.

The aluminium industry of Venezuela operates in a uniquely favourable position as far as costs and the availability of the necessary resources are concerned: huge bauxite reserves, the absolutely lowest electricity prices of the world, low transportation and labour costs. The expected production in 1988 is 655 000 tons, and by the year of 2000 it will amount to 2 million tons. By the chance given by Venezuela, a new form of global vertical integration could take the place of the vertical integration practised within large (multinational) companies. The Venezuelan aluminium industry is characterized by the fact that the emphasis is on the upstream side.

Beside this, a quick development of the production of primary aluminium was accompanied by the capacity increase in the manufacture of semis. For the time being this capacity is about 400 thousand tons annually, but its utilization is rather low (nearly 50 %). The greatest part of the capacity is utilized in cable production. 230 thousand tons of wire and conductor can be produced, however the actual production of this sector is considerably lower. Capacities of extrusion and rolling are nearly the same about 50 thousand tons per year each. The capacity of foil production is 10 thousand tons now. Die-casting represents a rather high manufacturing capacity of about 70 thousand tons. In 1987 the total production of semis in the country was somewhat greater than 190 thousand tons. For this sector there, are no exact data available for theproducts mix and production capacities which can be explained by the very great number of the firms. As a matter of fact 495 manufacturing firms are involved in the downstream side of the aluminium industry and among them about 100 deal with rolling, 90 are engaged in extrusion, 81 work with casting, 43 produce wires and conductors and 32 process scraps. The activity of the remaining firms of 150

covers partially the finishing sector.

The scrap recovery still do not play a great role in South America (Table T-31). Beause of the financial situation (debts and severe debt services) the stocks are very low, thus the local sources of aluminium available for domestic consumption and for export are not much influenced by serap recovery and stock changes (Table T-32). Use of prime metal in the aluminium downstream industry is detailed in Tables T-33...35. The list of firms acting in the field of aluminium industry is attached in Annex 3.

2. Copper

While Venezuela and Brazil play a very important role in the aluminium production of the world, Chile and Peru are dominant in the copper industry of the world.

In Argentina there are no mineral resources of copper thus the raw material is imported from Chile (90 %) and Peru (10 %). In 1987 the total quantity of imported and recycled scrap provided a metal source of 64 thousand tons for the downstream industry. The semis produced are almost totally absorbed by the domestic firms for further processing. The product mix of semis is in conforming with the actual demand. In 1987 the product mix was: rolled products in 12 000, extruded and drawn tubes 12 000, electric conductors 30 000 tons. The actual capacities are somehow higher, for example the capacities of rolling, extrusion and drawing are 30, 20 and 40 thousand tons per annum respectively. On the basis of these figures and the actual productions the capacity utilization is about 70 %. The technical level of the upstream is up-to-date and in any respect it is able to satisfy the requirements of exports.

In Brazil refined copper is produced mainly on the basis of concentrates imported from Chile but at the same time a great amount of primary metal is also bought abroad. The total production of refined copper was 157 900 tons in 1987 and another 110 thousand tons of imported cathode supplemented it

for establishing the metal source of the manufacture of semis. In the past years several new projects with very similar characters were started up simultaneously in the downstream side of the copper industry resulting considerable excess capacities.Consequently the utilization of capacities is generally low, about 55 %. In 1987 the total quantity of semis was 260 thousand tons from which the decisive majority remained in Brazil and only a minor part (14 thousand tons) was exported mainly in the form of bars and tubes. Nearly half of the total quantity was used for producing rods and wires for the cable industry and about 100 thousand tons of it for rolling. The rest was processed by casting, powder metallurgy, etc. More than 190 firms are involved in the downstream but their exact parameters are not known even in their Association. There are only estimations for the capacities, as the total capacity of rolling and extrusion reaches the 200 thousand tons, while the output of drawing can be as high as 270 thousand tons. Beside the excess capacities the greatest problem of the copper downstream industry is the technical level. During the investments of new capacities it occured several times that old, second hand machines with out-of-date technologies were installed not capable to produce semis of high quality.

In Chile there are smelters in Chuquicamata, El Teniente and Salvador and refineries at Chuquicamata, and Salvador. Copper exports represent a main source of foreign currency, the development of copper processing is mainly oriented towards exports. The low operating costs in Chile can compensate to some extent the decrease in prices.

On the basis of the enormous mineral resources in the past few years Chile performed intensive developments in the mining and metallurgy. These developments in the upstream were not accompanied by a similar scale capacity improvement in the downstream side. It can be explained by the fact that cost of the pimary copper production is very low in Chile and at the same time the added value of commercial semis is rather low. The comparative advantage of the upstream and the extra transportation costs and duties of semis on the downstream resulted in the difference in the development level of the two sides and brought about the present situation - namely the upstream is outward, while the

downstream is inward oriented. The production figures of 1987 illustrate well this position, since total quantity of metal (concentrate, blister and cathode) was 1.400 thousand tons while that of the semis reached just the 50 thousand tons. From this about 17 thousand tons were exported (bars and profiles 12, tubes 3, plates 2.5 thousand tons mentioning only the more important items). It is interesting to note that beside semis export some kind of special semis are imported first of all from Brazil, however, its quantity is not too high. The limited domestic consumption and the moderate export together result in a low utilization of the manufacturing capacities of the downstream because being about 44 %. The total installed capacity makes it possible to produce 110 thousand tons of semis annually, from which rolling, extrusion and wire production represent 20, 30 and 60 thousand tons respectively. The number of the firms in the downstream is few and some firms (e.g. MADECO) dominate this branch.

In Peru, too, the mining and metallurgy is the most important source of foreign exchange, the copper export have produced in the past decades aproximately 20 % of the export earnings.

In Peru the strong side of the copper industry is the upstream since it produced concentrates, blisters and refined metals of 400 thousand tons copper content in 1987. From this quantity only 50 thousand tons got into domestic transformation producing first of all electric conductors (wires and cables). Two-three medium-size plants (CAPESA, METINSA, FAM) dominate the downstream. The total installed capacity is 110 thousand tons per annum, from which rolling and extrusion represent 30 thousand tons each and the remaining 50 thousand tons belong to drawing and wire processing sector.

In Venezuela, the situation of the upstream side of the copper industry is similar to that of Argentina, namely the total quantity of metal has to be imported in lack of domestic mineral resources. The metal is imported in the form of cathodes and wire-bars. Its quantity is over 20 thousand tons, from which 21 thousand tons of copper alloy semis were manufactured in 1987. Among the semis produced the electric

conductors (wires and cables) represented the greatest part - about 60 %. Rolled and extruded products took 20 % each from the total quantity. The manufacturing capacity of the downstream is estimated as high as 80 thousand tons annually. A considerable excess capacity exists in the cable industry having 60 thousand tons maximum output. In case of rolling and extrusion the capacities are 10 thousand tons per annum respectively.

The smelter and refined metal production in Latin America is found in Table T-36. The scrap recovery is shown in Table T-37 and a summary of these - the local sources of copper for domestic consumption and for export - is in Table T-38.

The production of semis in Table T-39 and the installed capacities of semi-finished copper products in Latin America (in the five countries under investigation) are summarized in Table T-40. The list of products and the firms involved in semi-finished copper production is in Annex 4.

The production figures in a more detailed form are shown in Tables T-41...42.

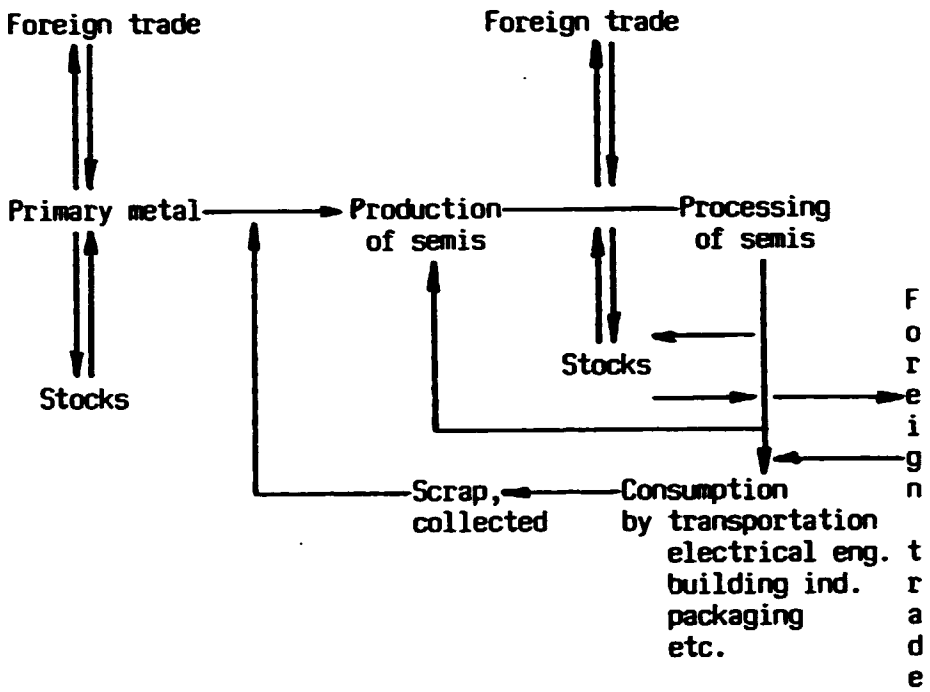
C. THE CONSUMPTION OF METALS

In this study the domestic production of primary metals, the balance of foreign trade and of stocks are understood as aluminium and copper consumption. /The export is deducted and the import is added./

The simplified material flow is shown in Figure 1. The statistics usualy try to follow the material flow with more or less success. The different interpretation of definitions of scrap, stocks and foreign trades results in not entirely equivalent consumption figures.

Figure 1

Material flows



The data used were obtained from the international, independent organizations and not from the national statistics supposing the same platform they stand in the same question in case of any country (the same methodology was applied in the previous chapters, too). In case when the available data were not complete the results of inquiries were accepted with a carefull evaluation.

According to experiences gained elsewhere and earlier there is always an endeavour to make a "smoke screen" on stocking and foreign trade on behalf of the interested parties. Nobody can blow it away entirely.

1. Aluminium

The consumption of primary aluminium in Latin America is summarized in Table T-43. The secondary materials added to it in Table T-44.

The per capita consumption is calculated (Table T-45).

The data collected for the preparation of the aimed prognoses, according to the methodology stated in Chapter III, are as follows:

- the trends of
  = per capita consumption (Table T-45)
  = per capita GDP (Table T-11)
  = growth of industrial production (Table T-13)

- the forecast for
  = growth rate of GDP (Table T-15)
  = growth of industrial production (Table T-16)
  = growth of population (Table T-14)

The data collected from secondary sources (printed materials) and from national ones during the fact-finding mission can not be considered sufficient for running the mathematical apparatus with exact and reliable results. (The time series are not long enough, some data are not available, etc.).

On the other hand, by omitting the details in some cases the correlation among consumption-GDP-industrial production were proven to be close enough for producing an extrapolation. In other cases the relationships were not significant (the details omitted again).

On the prognosis side of economical indices found, there are, for example, two different forecasts for GDP increments, none of which fits into the trends could be derived from the past. May be the authors of these forecasts were somewhat too optimistic, regarding to other main economical indicators discussed in Chapter IV, and they might have had some reason for it. The short term forecast for the industrial production shows such a divergency which by our estimation will not be followed by the consumption of aluminium, as it did not do

the same in the past, too.

The forecast for the growth of aluminium consumption, supposed to be a moderate one, neither too optimistic, nor pessimistic. It is summarized in Table 1.

Table 1
The expected consumption of aluminium in Latin-America
1000 tons

	1989	1990	1991	1992
Argentina	164-199	177-206	191-228	204-260
Brazil	543-550	577-596	610-645	644-708
Chile	6	6	7	7
Peru	5-7	5-7	6-8	6-9
Venezuela	198	214	230	246
Total of L.A.:	1046	1115	1184	1253

2. Copper

The consumption of refined copper is in Table T-46 and the consumption per caita is in Table T-47.

We tried to use the same methods as for aluminium to forecast of the copper consumptions of the different Latin American countries, in spite of the fact that in the case of aluminium this data did not prove the reality of wellknown relationships between consumptions and economic indicators. Du to the unsatisfactory results the method of correlation finally was not used to forecast the copper consumptions of these countries.

A near-future copper consumption was estimated by a simple time series analysis although the reliability of this method is very poor.

The future copper consumption of the given countries is summarized in the Table 2.

Table 2
The expected consumption of copper in Latin-America

1000 tons

	1989	1990	1991	1992
Argentina	45-55	45-55	45-55	45-55
Brazil	260-280	260-280	260-280	260-280
Chile	47	50	53	66
Peru	50	54	59	64
Others+	105-115	105-115	105-115	105-115
Total of L.A.:	518	537	557	577

nb: + including Venezuela

CHAPTER V

POSSIBLE COMPLEMENTARITIES BETWEEN PRODUCERS OF SEMI-FINISHED PRODUCTS IN ARGENTINA,BRAZIL, CHILE, PERU AND VENEZUELA

A. IDENTIFICATION OF POSSIBILITIES

1. Development projects of aluminium and copper downstream industries in progress or in pipe-line phase

During the fact-finding site work the following information were collected in connection with the investment and development projects of the downstream industries:

Aluminium

In Argentina the utilization of producing capacities of the downstream side is rather low therefore in their plans there are no further expansion plans in the near future.

In Brazil the excess capacity is on the minimum level therefore many investment projects are in progress to eliminate the bottle-necks in the production.
At ALCAN the installation of a hot rolling mill (Japan-made IHI stand) is under way already. It will manufacture first of all can-stock material for substituting the whole imported quantity. The projected capacity is 30 thousand tons/year. This new plant and other further increase of cold rolling capacity will make ALCAN able to produce at least 140 thousand tons of rolled sheets and strips annually by the beginning of the 90's. In its long-range plan ALCAN is calculating with the construction of a new rolling facility of 500-600 thousand tons/year capacity.
ALCOA increases its output of rolled products by a further 20 thousand tons/year by installing two strip cast-rolling machines.
CBA will enhance its production of sheets and strips with the investment of a new hot rolling mill of 12-13 thousand tons

capacity per annum. As a result of the short-range developments the rolling mill capacity in Brazil will reach 300 thousandd tons annually in the years 1992-93.

As far as the foil production is concerned there are intensive development works in progress at ALCAN and CBA essentially, so within a short period of time an extra minimum of 20 thousand tons of foil will be produced.

In the field of extrusion considerable increase of capacities will not be performed in the near future. At CBA an installation of a new extrusion press is in progress which will give an additional 5 thousand tons capacity. The management of ALCOA estimates about 2 thousand tons increase of its capacity annually.

In the wire-rod production further increase of capacities can not be expected because the programme of electrification in Brazil has slowed down and the demand for electric conductors has remained on the previous level.

As refers to die-cast products we could not collect any information though this field appears most perspective among all within the aluminium industry. Supposingly the lack of information is caused by the highly diversified production as the firms acting in this area have the smallest average plant size in the downstream. The automobile and machine industries offer great possibilities for them, but the demand can not be predicted in advance.

In Chile according to the information collected on site there are no plans for further developments and increase of capacities in the neear future.

In Peru in spite of the limited domestic demand and the confined manufacturing possibilities there are projects for small scale enlargements, e.g. at METINSA for increasing the extrusion capacity by 2 thousand tons per annum.

In Venezuela the intensive development of the upstream, i.e. the increase of metal production will be accompanied with a considerable enhancement of the downstream, too.
According to the projects the rolling capacity will reach 150 thousand tons in the near future. The basic aim of developments is to replace the imported can-stock material - which is about 20 thousand tons - and to achieve even some export in form of finished products such as cans. This project will also allow to increase the quantity of foil-stock. The foil producing capacity will be double of the present one of 10 thousand tons/year. According to the plans increase can be expected in the die-casting area too, where about 1 million pieces a year are to be produced within a short period of time.
For the time being the greatest manufacturing capacity is in the wire-rod production and no further increase on this field is due to come.
In case of extrusion only a 3 thousand tons capacity growth can be expected for the next years. All of the above mentioned investments and developments are intented mainly to increase the export of semis.

Copper

In case of Argentina the first priority is the efficient utilization of the present capacities. There are no data for developments to be expected or in progress.

In Brazil the utilization of present capacities of the downstream side is rather low, therefore no further enlargements can be expected in the near future. Exchange of machinery could be imagined at most.

In Chile a characteristic way of development is to establish joint ventures with foreign firms. An evident example of those is the joint venture among CODELCO, MADECO and a Chinese firm for production of 10 thousand tons of copper tubes annually. The Beijing Tubing Company is located in China, Chilean partners are providing the know-how and the management in the factory. Workers were taught at MADECO - and there is a good possibility to use Chilean copper as raw

material.
CODELCO has two other joint ventures, with a German and with a French firm. These companies do not enlarge direcly the capacity of the Chilean downstream industry but they increase the output of this sector in an indirect way.
At MADECO there are projects for further developments (e.g. production of CuNi alloys and coinage strips) and a moderate increase of capacity. MADECO together with COCESA (41 %) and COVISA (18 %) set up a new company for the production of wire rods. The company (Colada Continua Chilena S.A.) purchased a Krupp-Hazelett continuous caster (10 million US dollars), and will produce up to 40-50 thousand tons/year of wire-rods by 1989. These new projects will serve to extend the export activity, too. At COPLASA a dip-forming equipment is under installation for the continuous casting of wire-rod of about 30 thousand tons annually.

In Peru there were plans to increase the downstream capacities considerably, but during the last years the realization of these projects was postponed due to the instable political and economic situation as well as in the lack of sufficient capital. At the firm COBRES-LAMINADOS capacity increase of 3 500 tons was planned in the rolling sector. METINSA projected a new 10 thousand tons/year rolling and extrusion capacity.

In Venezuela information and ideas for further developments of copper downstream industry could not be obtained.

2. Foreign trade of aluminium and copper

The evaluation of the current situation of aluminium and copper industry was given in Chapter IV. A survey of installed capacities and the production of semis, the consumption of basic aluminium and copper materials and their forecast on the short run were shown in paragraph IV. B-C. The next logical step is to analyse the foreign trade of the countries in aluminium and copper.

Aluminium

The foreign trade of unwrought aluminium of the selected countries (Tables T-48...49) shows, that the import of the producers (Argentina, Brazil and Venezuela) is negligible. Chile and Peru obtain their demand by imports. Table T-50 shows, that the import of aluminium from outside of the Latin American region is also negligible, thus there is not much to propose in increasing the complementarities among the countries of Latin America in commerce of basic materials.

The foreign trade of semis of the Latin American countries in values are detailed in Tables T-51...59. The exports of extruded and drawn products exceed their imports. The selected countries do not import extrusions. The import of rolled products of the countries of the region is much more than the export of them.

First of all Venezuela imports more rolled products than exports, and even the whole export of the other countries does not give a provision for that import in the period in question.

The overall situation of foreign trade in foils is the same. The countries of the region import more foil than they export. Brazil is the largest exporter, but in the last 2 years Brazil's import has exceeded the export, too.

Even though if presently there are only limited possibilities for co-operation among Argentina, Brasil, Chile, Peru and Venezuela in the framework of existing installed capacities of semi-finished aluminium products, in the future a vast field cooperation could be found if via improvement of the flow of information, already. In the planning phase of development projects a great emphasis could be put on the possible complementarities, first of all in case of rolled products, inclusive foils.

Copper

Chile is the main supplier of Latin American countries for basic copper materials. Argentina, Brazil and Venezuela cover their refined copper needs mainly from Chile (Table T-60).

Beside this, Brazil imports unrefined copper, from Peru, too, (Tables T-61...62), and Brazil is the only country importing copper from outside of the region, mainly from Zaire. (Table T-68).

The export-import figures for the basic materials can be found in Tables T-63...68. Evidently there is nothing to add as a proposal on the traditional commercial complementarities developed within the region.

Although Chile is a netto exporter of copper, its export in bars, shapes and wires is decreasing since 1982, and the exports of rolled materials and tubes, pipes are not significant. The exports of semis of Peru remained on the same level in this decade.

The balance of exports of the region is negative in bars, shapes and wires as well as in tubes and pipes. There is really a need to increase the portion of more value added copper materials in the exports of the countries, and first of all to speed up the development of the semi-finished copper production. The foreign trade of Latin America in copper semis is shown in Tables T-69...77.

3. Complementaries, general remarks

In connection with the complementaries some facts and thoughts mentioned earlier as well as the experience of the fact-finding mission to the site (see Annex 5) are to be considered thoroughly during the annalysis of the possibilities. These considerations can be summarized as follow:

- In each country involved the necessary and possible development plantsreated as "home affairs".

- State owned firms represent a triflingll part of the whole in the downstream side,thus it is difficult to organize complementaries on the level of state. At the same time the private sector acts every time aiming only at its own interest and possibilities. The private firms do their activity and developments, as well as enter into

cooperation according to the market economy, nevertheless an important element of their operation is the state control and or regulations, e.g. protection of domestic market, export incentives. For them only those complementarities are realistic, which bring extra profit to the company and are not against the existing rules and regulations of the country. In Latin America the financial position of each country is weak therefore they are not presently reluctant to support the establishment of cooperations. So far These companies it was and is more attractive to enter into cooperation and to find complementaries with firms of developed countries, as shown by examples of different joint ventures mentioned above.

- Cooperation and complementaries exist on the upstream side of both the aluminium and copper industries.At the same time in the downstream there are no examples of them.

- The different regional organizations (ALADI, CARICO, MSSA, SELA) have had no obvious results still in connection with the practical cooperation among the parties.

- Some Latin American countries do not attribute special importance to the regional cooperation much rather they are open outward from this region (e.g. Chile, Argentina). Among causes the most obvious are the transportation difficulties across the continent. The lack of transcontinental railways allows only sea transport for the raw materials and semis. On the other hand this mean of transportation is not convenient between the Atlantic and Pacific shores of the continent, since it needs the crossing of the Panama Chanal. The transportation cost between even neighbouring countries on different sides of the continent is comparable to those to another continent.

- The activity of different professional organizations (Chamber of Non-Ferrous Metallurgy, Association of Aluminium, etc./ can be characterized first of all with representation of the interest of firms against the state and they are not engaged in organization of cooperations between componies of different countries.

- Complementaries in the downstream can only be considered realistic if they are connected with a strong background of processing industry.It has basic importance to establish this background. Therefore it is necessary to analyse the production and consumption of finished aluminium and copper products to get a clear picture the about product sectors to be developed.

- During the upswing period of semis manufacture of the different countries parallel capacities were established due to the applied policy of selfsufficiency, autarchy and to the strive for higher independency of countries from each other. Because of the similar structure of the downstream sides of aluminium and copper industries of the interested countries, the semis producing firms of this region are present on the market often as competitors and this fact countereffects the wish for the cooperation and utilization of complementaries.

- The autarch tendencies in some countries of the region enforced the inward orientation of some producers. These companies are mainly interested in the domestic market and only the remaining capacity is exported, if it can suit the foreing costumers at all.

4. Proposed new capacities

Considering the demand forecasts, analysis of the existing capacities, the foreign trade and in general the economies of the countries the following new projects could be proposed for further analysis.

In the <u>aluminium downstream industry</u>:

- Establishment of a high capacity press-forging plant to supply the processing industry (mainly the automotive and machine branches) with forged parts. These parts have high accuracy and very favourable combination of mechanical properties thus they are suitable to replace die-cast pieces on several fields. As the Brazilian automotive and machine industries are the strongest in Latin America it would be advisable to erect the said plant in this country, e.g. as an integral part of CBA. The output of this plant

should be about 3 million parts per annum (which will be about 1 thousand tons/year if the average mass of parts is in the range of 0,3-0,4 kgs). The total cost of this investment including machinery and installation can be estimated as high as 5.5 million USD.

- On the basis of the Venezuelan and/or of the Brazilian foil production a powder-pigment plant is to be proposed utilizing the foil scrap. Its capacity can reach 2 thousand tons annually. For such a plant the total investment cost is estimated to be 3 million USD. The aluminium pigments and powders are exportable products and they are used in pharmaceutical and chemical, automotive and machine sectors, applying them as raw material for several compounds, corrosion protective and decorating paints, additives for gas concrete in the building industry, etc. in an ever increasing quantity. Beside domestic demand this plant would satisfy that of Andean countries as well.

- For Peru it is proposed to establish a small foil producing capacity (2-3 thousand tons annual production). The aluminium foil in higher quantity could solve some acute problem in the domestic packaging industry and the rest of the production could be exported to the neighbouring countries, especially to Bolivia and Colombia. The foil-stock for the production can be bought from Venezuela.

In the copper downstream industry:

- In spite of the high technological level of the Chilean primary copper industry the semis production and especially e.g. the strip manufacturing of the visited factories is somewhat retarded.

- It is suggested to partially replace the old hot rolling technology with a continuous cast rolling method. The product mix of strips has to be supplemented with Cu-Sn and Cu-Ni alloy ones and with special alloys for electronics anf other high-tech applications.

- As for Peru the wire production from wire-bars is recomended to be replaced with a continuous method.

- The technology and equipment could be either a General Electric made dip-forming equipment or an Outokumpu upcaster, or just a small capacity Hazelett-Krupp caster with approximately 30 thousand tons annually.

- Here it is also advisable to introduce the production of special alloys (e.g. Cu-Ni material).

- Regarding the fact that in Brazil a huge amount of excess capacity exist, a part of it (machinery and equipment) could be exchanged with raw material from Peru. By this way Peru could increase its output of copper semis, while the copper supply of Brazil could be ensured for a long time.

Others

- Although the questions of alumina production do not belong stricly to the aluminium downstream industry they deserve some attention from point of view of profitability. All over the world there is tendency to use special aluminas and ceramic materials in ever increasing quantity. Alumina plants are striving to indroduce new products of those types for ensuring their more economic operation. From this point of view it is advisable to investigate the possibilities of manufacturing special grade aluminas. Venezuela and/or Brazil can be considered suitable for producing these products not only for satisfying the regional demands but exporting to the developed countries, too.

- During the factfinding mission it was understood, that Latin American producers do not have sufficient knowledge about and contacts with the producers of other countries of the region. It is therefore highly recomended to organize forums for the regular and direct contact between the specialists of the copper and aluminium industries, respectively. These meetings could help in the better and faster flow of technical and commercial information, strengthen the contacts and promote the utilization of complementarities by the means of specialization, cooperation, joint ventures, etc.

- The drawing force for the downstream industries is the manufacture of finished products. From this point of view the basis of the further developments and complementaries of semis production could be established on the side of processing industry.
  The setting-up of finished product manufacturing facilities can be usually financed by domestic resources, even then the know-how has to be purchased from abroad. The processing plants may probably be economic if they are linked by joint ventures with firms of other countries which buy back the fabricated products made from raw material furnished by them. In connection with strengthening the link between the manufacturing and processing industries the activity of the Technical Advisory and Marketing Centre (mentioned above) is inevitably demanded.

- The training of technical personnel seems to be unsolved yet in many firms especially in smaller ones. To ensure their up-to-date level of knowledge it would be advisable to organize training programmes for them. Regional and international organizations - first of all UNIDO - could help to collect demands, to determine possibilites and to promote the programmes both from financial and technical point of views.

B. POSSIBILITIES FOR INCREASING THE COMPLEMENTARITIES IN PRODUCTION, COMMERCE AND TECHNOLOGY

In a number of Latin American countries the production of non-ferrous metals is essential to the normal operation of the national economy - the export of the metals is the principal source of their foreign exchange. In the aluminium and copper industries the mining and metallurgical sector, i.e. the upstream industry is outward-oriented. In case of copper Chile and Peru, in case of aluminium Venezuela, Brazil and Argentina are the examples for this phenomenon.

On the contrary, the downstream and processing industries are the mainly inward-oriented and besides, the links among the upstream, downstream and processing industries are loose.

In connection with the orientation of the primary metal industry and its exports two facts should be considered, namely

- the goal of the transnational companies is to obtain cheap raw material from Latin American smelters for their semi-production located outside of Latin America,

- the aim of the domestic industries and semi-producers is to get their raw material from domestic sources and utilize their capacity at full extent.

One way to solve the contradictions arising is to achive that:

- the transnational companies would leave at least so much primary metals and materials in the country of origin which can fulfill the domestic needs, and to let these to be processed locally to as high a grade as it is possible,

- the domestic downstream industry would try to link its activity the basic material purchasers also in order to to enable them to offer semiproducts needed in the country or for the export, keeping in mind at the same time the interest of the other sectors of the domestic economy.

Beside strenghtening the connections of domestic partners, the regional link should be improved, too.

It can be seen that in this decade the traditional investors - such as commercial banks and transnational companies - are not as much interested in basic material investments as they were before. The major sources of capital for development are the national private capital, the internal sources generated by domestic enterprises and the national and international public agencies.

In the downstream and processing industry the situation is not necessarily as severe as in the upstream industry, because the financing of new investments needs less capital per unit, and even smaller units can be feasible.

For developing the processing industry the availability of basic metal is one but not the only essential prerequisite. In finished product manufacture labour is considered more

important than that is in the production of semi-fabricated items. At the same time, as a rule, the absolute and specific value of installed manufacturing facilities, too, is lower. Moreover, the range of specifications is the widest, and prices are the highest at this stage. The price of plain mass-produced items may be the double and of more complex products even a multiple, of what the material may cost. The price of a finished item is to a lesser degree determined by its actual production costs than by its quality, the economies to be derived from its use, its general usefulness, and last but not least its novel and attractive design. Compared to products manufactured at other stages of integration, the serviceability and lifespan of finished items are extremely short. The organizatory and operational methods of finished product manufacture, along with the marketing of such items, are so different from the rest of products at other stages of integration that the large aluminium concerns of the world have been hesitating for a long time whether or not to enter into such ventures, preferring instead to exert indirect influence on their customers in this particular field, revealing no uniform pattern of a common business strategy.

Some of these great concerns are advocates of the so-called "pull" strategy, concentrating on the end-user, striving to win over a relatively wide strata of customers by convincing them of the advantages of aluminium finished product usage, and by creating thus fresh demand, "pulling away" direct semi-manufacture buyers, the producers of finished items.

Others apply the "push" strategy, concentrating alone on their direct and potential buyers, counting on their loyalty, "pushing" them and their products towards the market and the end-user.

Thus, presumably the large transnational companies would not intervene against the development of the local processing industries.

The setting-up of finished product manufacturing facilities can be usually financed by domestic resources. However, even then know-how has to be purchased from abroad. The manufacture of semi-finished and finished products may probably prove a paying propositon even more, if linked with

joint ventures with other countries, the latter buying back the fabricated products made from raw material furnished by them. Such transactions have to be governed by long-term agreements and arrangements as to division of labour, specifying the type of product the cooperating partner is prepared to accept. Before going ahead with investment, the first step has to be the appointment of a responsible organization with sufficient experience to deal with all financial and technological aspects of the project, which may also be regarded as the nucleus of future technical management and marketing after the implementation of the project.

The duties of this organization (feasibility studies, decision-making, etc.) do not substantially differ from those of other industries. Engaging the services of engineering firms and the purchase of know-how abroad, as well as the recruiting of specialists and the conclusion of joint venture arrangements, may greatly accelerate both preparatory work and the implementation of the project. This has to be followed by a second step relying more on local initiative: the setting-up of a technical development body with a great variety of duties ranging from laboratory tests, design of new products, techno-economic advice to customers, staff training, post-graduate studies and introduction of new technologies, up to suggestions as to the expansion of available capacities.

In Latin American countries not having certain basic materials, the main emphasis should be put on the development of processing industry first, and the further development of the semi-finished industry can be aimed only on this base, later in time. Thus in Chile and Peru, the further development of aluminium semi-production can follow the build up of their aluminium processing industry. In Venezuela and in Argentina the same order is proposed for the development of copper industry.

What are the means and implements of the development? First of all there is a need to strenghten the existing aluminium and copper professional organizations, assotiations.

Their activity of collecting, analysing of informations, to elaborate proposals for the interest of their members should be increased. It is advised to create their marketing and technical-economial advisory committee or organization.

The second step would be to organize the regional federation of national professional associations neither as an independent organization nor as a part of existing regional organizations, like the UN Economic Comission for Latin America and the Caribbeans or ALADI, etc. (To give the optimal organization chart, the regulations of activity, the job description of personnel could be furnished upon special request.)

In view of installed capacities and their utilization as well as the consumption of aluminium and copper entirely new large investments can hardly be proposed on semi-finished products. This coincides with the fact, that nowadays the upstream and downstream industries are hardly able to accumulate enough reserves to finance new investments, or sometimes even to maintain production levels, and continue production.

The international public agencies, as the World Bank, the regional development banks (Inter-American Development Bank, European Investment Bank) do not willingly support mineral and metallurgical - and in general - large investments. At the same time the share of commercial banks in financing the projects like, is gradually declining.

For the development of processing industry, as the sizes of units, the financial requirements per unit are less than in the previous stages, and the rates of returns are higher, internal sources can be found easier. Local banks can supply national currency loans when the feasibility of a specific project is proven.

It has become clearly evident by the fact-finding mission of the members of the team, that in the private sector there is enough capital at home and kept abroad to finance medium and small size of establishments. The idea and the proven opportunity is what they need. This fact underlines the proposal put in paragraph B of this Chapter on the neccessity and usefulness of some marketing and advisory organization.

Table T-1
The populations of Latin America

millions

	1980	1981	1982	1983	1984	1985	1986	1987
Argentina	28.2	28.7	29.2	29.6	30.1	30.5	31.0	31.5
Brazil	121.3	124.1	126.9	129.8	132.7	135.6	138.5	141.5
Chile	11.1	11.3	11.5	11.7	11.9	12.1	12.3	12.5
Peru	17.3	17.8	18.2	18.7	19.2	19.7	20.2	20.7
Venezuela	15.0	15.5	15.9	16.4	16.9	17.3	17.8	18.3
Others	158.3	162.3	165.8	169.6	173.2	176.6	181.1	184.9
Total:	351.2	359.7	367.5	375.8	384.0	391.8	400.9	409.4

Based on: Monthly Bulletin of Statistics, UN, 1988, March.
nb: Rounded figures

Table T-2
The GDPs in purchase values

	1980	1981	1982	1983	1984	1985	1986
Argentina							
Australe, millions	28.4	54.7	147.6	682.7	n.a	n.a	n.a
Brazil							
Crusado, billions	12.6	24.7	48.1	118.2	388.0	1406.0	3688.0
Chile							
Peso, billions	1075.0	1273.0	1239.0	1558.0	1893.0	2577.0	n.a
Peru							
Sol, billions	5599.0	9496.0	15318.0	28718.0	65098.0	n.a	n.a
Venezuela							
Bolivar, billions	254.2	285.2	291.3	290.5	347.5	372.0	403.9

Based on: Monthly Bulletin of Statistics, UN, 1988.

Table T-3
The GDPs in US dollars of 1970

billion US dollars

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Argentina	34.735	34.142	35.828	31.051	33.134	33.380	31.299	29.668	30.580	31.203	29.830	31.500	32.400
Brazil	71.748	78.180	81.825	79.428	84.492	90.592	89.157	89.994	87.163	91.071	98.630	106.700	109.700
Chile	7.472	7.754	8.506	8.575	9.285	10.008	10.561	9.074	9.009	9.580	9.810	10.300	10.700
Peru	9.979	10.181	10.175	10.124	10.542	10.947	11.373	11.413	10.173	10.657	10.838	11.700	12.200
Venezuela	15.848	17.179	18.352	18.736	18.987	18.609	18.553	18.680	17.630	17.346	17.155	17.680	18.200
Total:*	235.497	246.303	257.606	267.736	289.923	301.252	306.902	303.809	294.154	303.245	312.044	323.800	330.900

Source: Statistical Abstract of Latin America (till 1985), Vol. 26.
Los Angeles, UCLA, University of California, 1988.
nb: Data of 1986-87 are calculated. Total means the total of Latin America

Table T-4
The GDPs at market prices in US dollars of 1986
billion US dollars

	1985	1986
Argentina	69.313	73.261
Brazil	322.003	348.407
Chile	26.818	28.298
Peru	23.265	25.252
Venezuela	47.988	49.473
Total:+	812.298	842.997

Source: Statistical Abstract of Latin America Vol. 26.
Los Angeles, UCLA, University of California, 1988.
nb: Total means the total of Latin America

Table T-5
Exchange rate of national currencies to US dollars at the end of the year

national currencies per US dollars

	1980	1981	1982	1983	1984	1985	1986
Argentina	0.199	0.725	4.855	23.261	174.435	0.801	1.257
Brazil	65.50	127.80	352.67	0.98	3.18	10.49	14.94
Chile	39.00	39.00	73.43	87.53	128.24	183.86	204.730
Peru	0.342	0.507	0.990	2.271	5.696	13.945	13.950
Venezuela	4.293	4.293	4.293	4.300	7.500	7.500	14.500

Based on: Statistical Abstract of Latin America, Vol. 26. Los Angeles, UCLA University of California, 1988.

Table T-6
International reserves without gold
(reserves in IMF, foreign exchange and
special drawing rights) at the end of the period
billions US dollars

	1980	1981	1982	1983	1984	1985	1986	1987
Argentina	6.7	3.3	2.5	1.2	1.2	3.3	n.a	n.0
Brazil	5.8	6.6	3.9	4.4	11.5	10.6	5.8	n.a
Chile	3.1	3.2	1.8	2.0	2.3	2.5	2.3	2.4
Peru	2.0	1.2	1.4	1.4	1.6	1.8	1.4	0.9
Venezuela	6.6	8.2	6.6	7.6	8.9	10.3	6.4	6.0

Based on: Monthly Bulletin of Statistics, UN, 1988.
Statistical Yearbooks

Table T-7
Rates of inflation

%

	1984	1985	1986	1987	1988+
Argentina	n.a	672	90	125	105
Brazil	197	227	145	240	236
Chile	n.a	20	20	20	28
Peru	110	163	78	85	159.7
Venezuela	12.2	11.4	11.6	28.1	36

Based on: International Data of Economy, KOPINT,
Budapest, 1988
nb: + forecast

Table T-8
Significance of foreign trade
(E=export/GDP, I=import/GDP)

%

		1980	1981	1982	1983	1984	1985	1986	1987
Argentina	E	7.1	9.5	17.0	14.0	12.9	15.5	11.5	n.a
	I	10.2	13.3	21.1	17.5	16.1	17.0	15.1	n.a
Brazil	E	9.3	9.8	8.3	11.7	14.4	12.8	10.6	9.9
	I	14.5	14.1	14.1	15.0	14.5	13.9	10.8	10.8
Chile+	E	n.a	n.a	22.5	21.5	24.7	27.2	26.5	31.3
	I	n.a	n.a	22.2	16.0	22.7	21.1	18.3	23.3
Peru	E	28.2	21.0	20.7	23.6	24.2	26.0	16.0	10.1
	I	28.6	30.4	29.4	30.3	26.7	27.1	21.5	14.8
Venezuela	E	32.9	36.9	29.7	25.7	38.2	34.1	22.4	37.5
	I	31.4	30.3	35.0	18.8	27.0	27.6	26.3	37.4

Based on: International Data of Economy, KOPINT, Budapest, 1988
+ Banco Central de Chile - Baletin Mensual, Jul. 1988.

Table T-9
The gross domestic investment
billion US dollars, values of 1986

	1980	1985	1986
Argentina	64.400	56.840	61.613
Brazil	236.085	254.494	290.773
Chile	22.647	21.381	22.197
Peru	19.418	14.449	21.103
Venezuela	42.584	42.971	n.a
Total:+	630.189	640.923	n.a

Source: Statistical Abstract of Latin America Vol. 26. Los Angeles, UCLA, University of California, 1988.
nb: Total of Latin America

Table T-10
Debt and rates of debt service
(D=debt, billion USD, R=rate of debt service %)

		1985	1986	1987
Argentina	D	n.a	50.8	52.4
	R	n.a	24.7	56.4
Brazil	D	104.4	109.0	116.0
	R	36.0	28.9	27.3
Chile	D	19.3	19.4	19.1
	R	26.2	n.a	n.a
Peru	D	13.7	14.5	21.5
	R	10.2	18.0	16.1
Venezuela	D	66.4	53.7	93.7
	R	36.9	46.0	37.3

Based on: International Data of Economy, KOPINT, Budapest, 1988

Table T-11
Per capita GDP
in constant USD of 1970

	1980	1981	1982	1983	1984	1985	1986	1987	1986+
Argentina	1183	1090	1016	1033	1037	978	1016	1028	2361
Brazil	746	718	780	671	686	727	770	772	2525
Chile	901	935	789	777	805	811	837	843	2306
Peru	633	639	627	544	555	550	579	589	1250
Venezuela	1240	1197	1229	1075	1027	992	993	995	2762
Average:	858	853	827	783	790	796	808	808	2140

Based on: Tables T-1...4.
nb: + at market prices, 1986 USD

Table T-12
Fixed-asset investment to GDP

%

	1980	1981	1982	1983	1984	1985	1986	1987
Argentina	22.2	18.7	16.4	16.6	13.6	12.1	12.6	n.a
Brazil	21.8	21.1	21.1	17.0	18.9	18.5	18.0	18.8
Chile	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Peru	17.1	20.4	21.8	18.3	16.5	14.2	n.a	n.a
Venezuela	31.7	24.5	24.1	19.0	13.7	15.4	19.2	20.3

Based on: International Data of Economy, KOPINT, Budapest, 1988.

Table T-13
Growth of industrial production

%

	1984	1985	1986	1987
Argentina	n.a	-7.3	10.5	4.5
Brazil	5.9	9.0	12.1	5.0
Chile	9.8	1.2	8.0	6.5
Peru	3.4	1.9	12.1	9.3
Venezuela	-3.1	0.3	5.8	-0.6

Based on: International Data of Economy, KOPINT, Budapest, 1988.

Table T-14
Expected growth of populations of Latin America

millions

	1988	1989	1990	1991	1992
Argentina	32.0	32.5	33.0	33.5	34.0
Brazil	144.9	148.2	151.5	154.9	158.4
Chile+	12.7	12.9	13.1	13.3	13.5
Peru+	21.2	21.7	22.3	22.9	23.5
Venezuela	18.8	19.4	20.0	20.6	21.2
Total:++	418.3	427.3	436.0	444.8	453.5

Based on: extrapolation of trend and others off International Data of Economy, KOPINT, Budapest, 1988.
+ Banco Central de Chile - Baletin Mensual, Jul. 1988
nb: ++ Total means total of Latin America

Table T-15
Forecast of growth rate of GDP

%/year

		1988	1989	1990	1991	1992
Argentina	a.	2.7	3.6	-0.5	2.8	4.2
	b.	2.8	2.6	1.6	2.4	3.1
Brazil	a.	2.8	4.5	4.7	5.5	6.1
	b.	2.7	4.8	3.1	5.1	4.9
Chile	a.	n.a	n.a	n.a	n.a	n.a
	b.	3.9	4.8	2.5	3.0	3.4
Peru	a.	n.a	n.a	n.a	n.a	n.a
	b.	n.a	n.a	n.a	n.a	n.a
Venezuela	a.	2.3	1.8	2.4	3.6	4.0
	b.	2.6	1.9	1.8	2.7	2.3

Based on: a. International Data of Economy, KOPINT, Budapest, 1988.
b. Statistical Abstract of latin America, UCLA, University of California, Jul. 1988.

Table T-16
Prognosted growth of industrial production

%/year

	1988	1989	1990	1991	1992
Argentina	0.6	0.6	0.6	0.6	0.6
Brazil	1.2	4.9	5.6	6.2	6.7
Chile	n.a	n.a	n.a	n.a	n.a
Peru	n.a	n.a	n.a	n.a	n.a
Venezuela	-0.2	3.5	2.1	5.1	5.2

Based on: International Data of Economy, KOPINT, Budapest, 1988.

Table T-17
Debt and rate of debt service (five year outlook)
(D=debt in billion USD, R=debt service rate %)

		1988	1989	1990	1991	1992
Argentina	D	54.7	57.7	59.3	60.1	60.8
	R	53.0	70.0	53.2	43.7	44.7
Brazil	D	115.8	116.1	116.5	116.2	115.8
	R	39.6	49.5	36.0	33.0	29.3
Chile	D	n.a	n.a	n.a	n.a	n.a
	R	n.a	n.a	n.a	n.a	n.a
Peru	D	n.a	n.a	n.a	n.a	n.a
	R	n.a	n.a	n.a	n.a	n.a
Venezuela	D	35.3	35.1	35.5	34.1	34.3
	R	38.0	29.2	30.2	28.3	24.2

Based on: International Data of Economy, KOPINT, Budapest, 1988.

Table T-18
World's production (p) and consumption (c) of primary aluminium

million tons

	1985		1986		1987	
	p	c	p	c	p	c
Western countries	12.3	12.7	12.3	13.0	15.2	10.8
Eastern countries	3.2	3.5	3.3	3.6	n.a	n.a
Total of the World	15.5	16.2	15.5	16.6	n.a	n.a

Source: Metallstatistics, Frankfurt, 1987.

Table T-19
Yearly change of smelter capacities of the World

%

	1980	1981	1982	1983	1984	1985	1986	1987
Growth of capacity	0.6	5.5	0.2	-0.8	1.4	-1.3	4.2	3.4
Operating rate of them	95.0	88.0	75.0	78.0	89.0	86.0	86.0	87.0

Based on: Evolution or Revolution, Chase Econometrics, 1987.

Table T-20
Change of prices and production costs of primary aluminium

%

	1980	1981	1982	1983	1984	1985	1986	1987
Cost of production	14.3	8.4	2.1	-4.5	2.2	-7.4	-1.4	7.6
LME cash price	10.7	-28.9	-21.4	45.1	-13.0	-15.6	13.8	9.5

Based on: Evolution or Revolution, Chase Econometrics, 1987.

Table T-21
Price trends of LME cash settlement for aluminium

Pounds/metric ton

Year	Average	High	Low
1980	766.53	931.19	611.55
1981	623.51	677.23	569.29
1982	567.00	618.00	505.50
1983	952.67	1113.00	616.50
1984	932.50	1122.50	782.00
1985	812.79	1043.50	645.50
1986	784.75	890.00	722.00
1987	956.30	1311.00	759.00

Based on: World Metal Statistics, Frankfurt, 1987.

Table T-22
Relative prices of aluminium semis
(FRG and UK, in 1987)

%

Type of semis	Alloy	State	FRG	UK
Sheet	Al99.5	1/2H	100	100
	AlMg3	1/2H	106	106
Coils, bonds	Al99.5	1/2H	98	111
	AlMn	1/2H	99	102
Slags			110	110
Rod, extruded	Al99.5		114	115
	AlMgSi		132	135
drawn	Al99.5	H	125	125
	AlMg3	H	167	166
Tube, extruded	Al99.5		125	125
	AlMgSi		127	127
drawn	Al99.5	H	162	163
	AlMg3	H	241	243
Foils	Al99.5		195	197
Wire rods	Al99.5E		69	69
Wires, drawn	Al99.5E		138	131

Based on: Price Information, KOPINT, Budapest, 1987.
Price Info, Prognos AG, Basel, 1987.

Table T-23
The break-down of aluminium consumption in Europe
(average of France, FRG, Italy and UK)

%

Shipments to	1987	1990	1995	2000	World average+
Transport	20.1	19.7	19.9	19.7	22.8
Electrical Engineering	6.6	6.4	6.1	6.3	10.6
Constuction	12.8	12.6	12.6	12.5	22.9
Packaging	8.3	8.7	9.6	10.3	n.a
Mass products (consumer's)	5.0	4.8	4.8	4.8	6.6
Others (the rest)					

Based on: Evolution or Revolution, Chase Econometrics, 1987.
nb: + estimated for 1987.

Table T-24
Forecast for change of smelter capacities

%

	1988	1989	1990	1991	1992
Growth of capacity	2.76	2.19	1.86	1.31	1.55
Operating rate of them	88	85	82	84	85

Based on: Evolution or Revolution, Chase Econometrics, 1987.

Table T-25
Forecast for change of prices and production costs of primary aluminium

%

	1988	1989	1990	1991	1992
Cost of production	3.0	7.8	3.0	6.0	7.7
LME cash price	3.0	-19.4	-14.2	17.0	12.0

Based on: Evolution or Revolution, Chase Econometrics, 1987.

Table T-26
Forecast aluminium consumption and industrial production changes in the world
(short run)

%

	1988	1989	1990
Industrial production	4.0	2.2	2.1
Aluminium consumption	-1.7	0.3	4.4

Based on: Evolution or Revolution, Chase Econometrics, 1987.

Table T-27
World's production (p) and consumption (c)
of refined copper

million tons

	1985		1986		1987+	
	p	c	p	c	p	c
Western countries	7.3	7.5	7.5	7.7	6.7	6.6
Eastern countries	2.4	2.3	2.4	2.4	n.a	n.a
Total of the World	9.7	9.8	9.9	10.1	n.a	n.a

Source: Metallstatistics, Frankfurt, 1987.
+ World Bureau of Metal Statistics, USA, 1988.

Table T-28
Price trends of "Grade A" copper

Pounds/metric ton

Year	Average	High	Low
1975	556.81	626.00	498.00
1976	782.40	936.50	576.50
1977	750.25	903.00	638.50
1978	710.50	780.50	611.50
1979	934.08	1110.00	765.00
1980	941.75	1375.00	765.00
1981	865.55	1036.00	754.00
1982	846.14	933.50	684.50
1983	1048.84	1153.00	905.00
1984	1031.19	1140.50	942.00
1985	1103.02	1303.00	915.00
1986	965.07	1027.50	865.00
1987	1080.16	1720.00	869.00

Based on: World Metal Statistics, UN. 1988.

Table T-29
Price of copper semi-finished products,
1988

DM/metric ton

Product	Average
Wires	6200
Profiles	4800
Sheets	7600
Bonds	7900
Tubes	6300

Table T-30
Production of primary aluminium in Latin America
1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	140.5	136.4	137.8	139.9	150.7	155.1
Brazil	299.1	400.7	455.0	549.2	757.3	845.0
Venezuela	273.6	335.2	386.0	403.0	423.0	430.8
Subtotal:	713.2	872.3	978.8	1092.1	1331.0	1430.9
Mexico	43.3	39.7	44.0	42.7	37.0	71.5
Total:	756.5	912.0	1022.8	1134.8	1368.0	1502.4

Source: World Metal Statistics, Apr. 1988.

Table T-31
Scrap recovery of aluminium in Latin-America
1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	6.0	7.0	7.5	3.6	3.6	3.6
Brazil	37.8	39.1	47.9	44.8	48.0	50.3
Venezuela	10.0	15.1	15.0	15.2	15.8	15.8
Subtotal:	53.8	61.7	70.4	63.6	67.4	67.7
Mexico	25.8	15.1	15.0	15.2	15.8	15.8
Others	1.3	1.2	1.2	1.2	1.2	1.2
Total:	90.9	77.5	86.6	80.0	84.4	84.7

Source: World Metal Statistics, 1988. Apr

Table T-32
Local sources of aluminium in Latin-America

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	146.5	143.4	145.3	143.5	154.3	158.7
Brazil	336.9	439.8	502.9	594.0	805.3	895.3
Venezuela	283.6	355.2	400.0	413.0	433.0	440.8
Subtotal:	767.0	938.4	1048.2	1150.5	1392.6	1494.8
Mexico	69.1	54.8	59.0	57.9	52.8	87.3
Others	1.3	1.2	1.2	1.2	1.2	1.2
Regional stocks	125.0	74.0	135.0	121.0	99.0	54.0
Total sources:+	962.4	1068.4	1243.4	1330.6	1545.6	1637.3

+ Without import, available for consumption and for exports, and for stocking again

Table T-33
Production of aluminium semis (s) and castings (c)

1000 tons

		1982	1983	1984	1985	1986	1987
Argentina	s	55.6	65.0	92.4	72.5	107.6	109.5
	c	12.0	16.0	11.3	8.4	16.1	
Brazil+	s	271.3	272.9	272.4	305.4	362.8	353.7
	c	58.3	62.0	70.8	84.8	100.3	76.9
Chile	s+c	n.a	n.a	n.a	n.a	5.0	5.9
Peru	s+c	n.a	n.a	n.a	3.7	5.4	5.5
Venezuela++	s	n.a	n.a	n.a	162.4	n.a	193.3
	c	n.a	n.a	n.a	13.1	n.a	

Source: + World Metal Statistics, Apr. 1988.
++ Monografia Industrial del Aluminio,
Sector Manufacturero de Venezuela, Nov. 1987
Metal Statistic, Vol. 74. 1987

Table T-34
The sortiment of aluminium semis in South America
(the break down of production)

1000 tons

	1980	1981	1982	1983	1984
Extruded and drawn products					
shapes, bars	93.5	87.5	95.1	101.9	111.1
tubes, pipes	29.7	9.6	3.3	3.5	3.5
wires	1.9	2.3	2.2	2.1	2.0
Subtotal:	125.1	99.4	100.6	107.5	116.6
Rolled products (plates, sheets, foils) foils)	239.9	242.5	269.9	294.6	321.6
Total:	365.0	341.9	370.5	402.1	438.2

Source: Industrial Statistics Yearbook, UN. 1986.

Table T-35
Installed capacities for aluminium semis in Latin America, /1988/

1000 tons

	sheets	foils	extrusions	drawn	Total
Argentina	50	10	60	70	190
Brazil	200	40	131	132	503
Chile	1	1	n.a	n.a	n.a
Peru	n.a	n.a	2.5	n.a	n.a
Venezuela	50	10	30	93	183
Total:	301	61	223.5	295	880

Based on: interviews
nb: the list of producers are in the Annex 3.

Table T-36
Production of primary copper in Latin America,
smelter (s), refined (r)

1000 tons

		1982	1983	1984	1985	1986	1987
Brazil	r	45.3	88.6	86.2	120.8	146.9	157.9
	s	9.6	58.7	47.3	80.6	101.0	119.0
Chile	r	853.0	834.0	880.0	884.0	943.0	954.3
	s	1047.0	1059.0	1098.0	1089.0	1124.0	1100.0
Mexico	r	77.7	76.0	83.7	115.5	81.5	120.4
	s	61.7	66.9	70.4	71.1	58.9	101.4
Peru	r	225.0	195.0	219.0	227.0	226.0	226.0
	s	323.0	296.0	331.0	354.0	335.0	261.0
Total:	r	1201.0	1193.6	1268.9	1347.3	1397.4	1458.6
	s	1441.3	1480.6	1546.7	1594.7	1618.9	1633.4

Source: World Metal Statistics, UN. 1988
World Bureau of Metal Statistics, USA, 1988.

Table T-37
Scrap recovery of copper in Latin America
secondary, refined (s),
direct scrap used by manufacturers (d)

1000 tons

		1982	1983	1984	1985	1986	1987
Brazil	s	36.0	25.0	25.0	27.0	31.0	33.0
	d	24.0	17.0	16.0	17.0	21.0	21.0
Mexico	s	13.0	6.0	10.0	12.0	13.0	18.0
elsewhere	d	80.0	51.0	52.0	52.0	61.0	59.0
Total:	s	49.0	34.0	35.0	39.0	44.0	51.0
	d	104.0	68.0	68.0	69.0	82.0	92.0

Source: World Metal Statistics, UN. 1988.

Table T-38
Local sources of refined copper in Latin America
(for production of semis and for export)

1000 tons

	1982	1983	1984	1985	1986	1987
Brazil	81.3	113.6	111.2	147.8	177.9	189.3
Chile	853.0	834.0	880.0	884.0	943.0	954.3
Peru	225.0	195.5	219.0	227.0	226.0	226.0
Mexico	90.7	82.0	93.7	127.5	94.5	138.4
Stocks:	n.a	n.a	n.a	n.a	n.a	n.a
Total:+	1250.0	1224.6	1303.9	1386.3	1441.4	1508.0

nb: without import

Table T-39
Produc ion of copper semis in Latin America

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	50.0	42.7	51.2	41.0	58.8	63.8
Brazil	249.3	148.4	189.2	196.1	254.9	260.0
Chile	32.8	24.4	35.3	25.7	36.4	48.0
Peru	21.0	20.3	26.4	33.3	38.8	35.0
Venezuela	n.a	2.0	5.0	6.0	11.0	21.0
Mexico	97.0	94.0	116.0	82.0	108.0	n.a
Total:	(405.1)	331.8	423.1	384.1	507.9	(427.8)

Note: copper and copper content of copper alloys

Table T-40
Installed capacities for semi-finished copper in Latin America,
/1988/

1000 tons

	rolled	extruded	drawn	Total
Argentina	30	20	40	90
Brazil	200		270	470
Chile	20	30	60	110
Peru	30	30	50	110
Venezuela	10	10	60	80
Total:	380		480	860

Based on: interviews
nb: the list of producers are in the Annex 4.

Table T-41
The sortiment of copper semis produced in South America
(the break down of production)

%

	1980	1981	1982	1983	1984
Bars, rods, sections	7.6	7.8	9.5	7.6	6.6
Tubes, pipes	23.0	21.6	25.5	31.6	28.3
Wires	55.9	60.4	50.0	46.2	50.9
Plates, sheets	13.5	10.2	15.0	14.6	14.2

Based on: Industrial Statistics Yearbook, Vol. II. UN. 1986.

Table T-42
The utilization of capacities of copper semis production in 1987

%

	percent
Argentina	71
Brazil	55
Chile	44
Peru	32
Venezuela	26

Based on: interviews

Table T-43
Consumption of primary aluminium in Latir-America

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	62.9	80.4	101.2	80.9	121.3	142.0
Brazil	288.1	270.6	294.8	347.5	423.7	425.0
Chile	n.a	n.a	n.a	n.a	5.0	5.9
Peru	n.a	3.0	3.0	3.7	5.4	5.0
Venezuela	47.9	89.0	130.3	147.0	135.0	135.0
Others	82.6	87.8	104.0	112.3	93.6	93.1
Total:+	481.5	530.8	633.3	691.4	784.0	806.0

Source: World Metal Statistics
nb: + contains data of Chile up to 1985

Table T-44
Consumption of primary and secondary aluminium in Latin-America

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	68.9	87.4	108.7	84.5	124.9	145.6
Brazil	325.9	309.7	342.7	392.3	471.7	475.3
Chile	n.a	n.a	n.a	n.a	5.0	5.9
Peru	57.9	109.0	144.3	157.0	145.0	145.0
Venezuela	57.9	109.0	144.3	157.0	145.0	145.0
Others	109.7	104.1	120.2	128.7	110.6	110.
Total:	562.4	613.2	718.9	766.2	862.6	886.9

Source: previous tables

Table T-45
Per capita consumption of prime and secondary aluminium in Latin-America

kg/capita

	1982	1983	1984	1985	1986	1987
Argentina	2.36	2.95	3.61	2.77	4.03	4.62
Brazil	2.57	2.39	2.58	2.89	3.33	3.36
Chile	n.a	n.a	n.a	n.a	0.41	0.47
Peru	n.a	0.16	0.16	0.19	0.27	0.24
Venezuela	3.64	6.65	8.54	9.07	8.15	7.92
Others	0.66	0.61	0.69	0.73	0.61	0.60
Regional average	1.53	1.63	1.87	1.96	2.15	2.17

Source: previous tables

Table T-46
Consumption of refined copper in Latin-America

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	50.8	43.8	45.0	39.3	45.0	48.0
Brazil	249.3	148.4	189.4	197.1	254.9	260.0
Chile	32.8	24.3	35.3	25.7	36.4	48.0
Peru	21.0	18.3	24.1	36.5	38.8	38.0
Others+	94.0	96.7	107.5	127.9	86.7	108.0
Total:	447.9	331.5	401.3	429.2	461.8	502.0

Source: Metallstatistic, Frankfurt, 1987
nb: + including Venezuela

Table T-47
Per capita consumption of refined copper in Latin-America

%

	1982	1983	1984	1985	1986	1987
Argentina	1.74	1.47	1.50	1.29	1.45	1.52
Bazil	1.96	1.14	1.36	1.45	1.84	1.84
Chile	2.85	2.08	2.97	2.13	2.96	3.84
Peru	1.15	0.98	1.26	1.85	1.92	1.84
Others	0.52	0.52	0.57	0.66	0.44	0.53
Regional average+	1.22	0.88	1.05	1.10	1.15	1.23

Source: previous tables
nb: + including Venezuela

Table T-48
Foreign trade of unwrought aluminium
of Latin American countries. Exports

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	67.6	57.0	30.1	70.8	34.8	12.0
Brazil	6.7	116.4	147.9	179.1	323.5	430.9
Venezuela	208.6	292.2	179.1	382.9	275.5	302.8
Total	282.9	465.6	357.1	632.8	633.8	745.7

Based on: World Metal Statistics, UN. 1988.
World Bureau of Metal Statistics, USA. 1988

Table T-49
Foreign trade of unwrought aluminium
of Latin American countries. Imports

1000 tons

	1982	1983	1984	1985	1986	1987
Argentina	-	0.3	1.0	-	-	-
Brazil	10.8	3.0	4.6	2.6	1.1	2.2
Venezuela	1.3	0.3	0.3	0.4	2.6	n.a
Total	12.1	3.3	5.9	3.0	3.7	n.a

Based on: World Metal Statistics, UN. 1988.

Table T-50
Imports of aluminium (and alloys) outside of the region

1000 tons

	1983	1984	1985	1986	1987
Brazil					
from FRG	0.3	-	0.1	0.1	0.4
from Italy	1.7	1.6	0.3	-	0.3
from USA	0.1	0.3	0.2	0.6	0.1
Colombia					
from Canada	4.0	2.3	2.1	0.9	2.3
Total:	6.1	4.2	2.7	1.6	3.1

Sources: World Metal Statistics, UN. 1988.

Table T-51
Foreign trade of aluminium semis
of the Latin American countries in values.
Exports of extruded and drawn products

million USD

	1982	1983	1984	1985	1986
Argentina	2.1	1.9	3.8	5.3	12.0
Brazil	4.4	31.8	72.5	15.9	13.4
Venezuela	15.4	10.2	58.8	66.8	71.1
Costa Rica	0.3	0.1	0.1	0.3	0.2
Ecuador	1.0	0.8	-	0.8	0.7
El Salvador	1.3	0.8	0.5	0.3	0.3
Mexico	0.3	0.1	0.8	0.5	0.3
Total:	24.8	45.7	136.5	89.9	98.0

Sources: International Trade Statistics,
Yearbook 1986. Vol. II. UN. 1988

Table T-52
Foreign trade of aluminium semis
of the Latin American countries in values .
Imports of extruded and drawn products

million USD

	1982	1983	1984	1985	1986
Columbia	8.9	10.9	8.8	5.0	0.8
Cuba	-	0.2	0.5	13.7	14.8
Trinidad-Tobago	3.2	2.8	3.9	2.6	2.9
Total:	12.1	13.9	13.2	21.9	18.5

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-53
Foreign trade of aluminium semis
of the Latin American countries in values.
Balance of exports and imports of extruded and drawn products

million USD

	1982	1983	1984	1985	1986
Exports:	24.8	45.7	136.5	89.9	98.0
Imports:	12.1	13.9	13.2	21.9	18.5
Balance:	12.7	21.8	123.3	68.0	79.5

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-54
Foreign trade of aluminium semis
of the Latin American countries in values.
Exports of rolled products except foils

million USD

	1982	1983	1984	1985	1986
Argentina	8.3	7.7	9.8	6.6	7.7
Brazil	1.4	11.8	26.6	7.8	6.6
Venezuela	-	1.5	11.1	2.1	4.6
Costa Rica	1.4	2.0	3.7	1.7	0.1
El Salvador	4.6	4.0	3.2	4.3	-
Mexico	0.1	0.4	3.0	1.4	0.7
Total:	15.8	27.4	57.4	23.9	19.7

Sources: International Trade Statistics,
Yearbook 1986. Vol. II. UN. 1988

Table T-55
Foreign trade of aluminium semis
of the Latin American countries in values .
Imports of rolled products except foils

million USD

	1982	1983	1984	1985	1986
Brazil	2.8	3.3	6.8	8.1	3.3
Venezuela	44.5	27.8	50.3	38.1	66.6
Cuba	0.4	0.8	8.0	22.7	25.0
Guetamala	10.1	6.3	6.4	2.0	0.4
Jamaica	3.5	5.1	7.7	2.1	1.3
Mexico	67.6	8.7	35.3	33.1	35.3
Total:	128.9	52.0	114.5	106.1	131.9

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-56
Foreign trade of aluminium semis
of the Latin American countries in values.
Balance of exports and imports
of rolled products except foils

million USD

	1982	1983	1984	1985	1986
Imports:	128.9	52.0	114.5	106.1	131.9
Exports:	15.8	27.4	57.4	23.9	19.7
Balance:	-113.1	-24.6	-57.1	-82.2	-112.2

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-57
Foreign trade of aluminium semis
of the Latin American countries in values.
Exports of foils

million USD

	1982	1983	1984	1985	1986
Brazil	10.5	13.0	4.3	11.1	6.3
Chile	0.1	0.1	0.1	0.1	0.1
Venezuela	-	-	-	0.1	0.2
Columbia	0.2	0.2	0.1	0.2	0.1
Costa Rica	-	1.4	1.1	1.8	1.9
El Salvador	-	0.2	0.2	0.2	0.3
Mexico	-	-	-	-	0.1
Uruguay	0.1	0.1	0.1	0.6	0.6
Total:	10.9	15.0	5.9	14.1	9.6

Sources: International Trad Statistics,
Yearbook 1986. Vol. II. UN. 1988

Table T-58
Foreign trade of aluminium semis
of the Latin American countries in values .
Imports of foils

million USD

	1982	1983	1984	1985	1986
Brazil	2.9	2.0	2.7	6.7	6.6
Chile	14.2	5.1	6.6	5.3	5.9
Venezuela	12.5	7.6	10.5	11.0	4.4
Trinidad-Tobago	5.1	5.2	6.0	5.0	1.8
Total:	34.7	19.9	25.8	28.0	18.7

Sources: International Trade Statistics,
Yearbook. 1986. Vol. II. UN. 1988.

Table T-59
Foreign trade of aluminium semis
of the Latin American countries in values.
Balance of exports and imports of foils

million USD

	1982	1983	1984	1985	1986
Exports:	10.9	15.0	5.9	14.1	9.6
Imports:	34.7	19.9	25.8	28.0	18.7
Balance:	-23.9	- 4.9	-19.9	-13.9	- 9.1

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.
nb: There are very big lacks of foils

Table T-60
Foreign trade of copper among Latin American countries.
Refined copper

1000 tons

From to	1980	1981	1982	1983	1984	1985	1986
Chile							
Argentina	40.3	26.9	36.1	31.6	38.2	28.9	48.2
Brazil	128.1	104.7	128.1	31.1	70.6	51.7	87.0
Colombia	1.4	1.2	0.4	0.2	-	-	-
Mexico	3.2	24.2	4.7	-	4.0	14.2	2.8
Venezuela	-	0.2	0.3	-	0.4	0.8	2.5
Subtotal:	173.0	157.2	169.6	62.9	113.2	95.6	140.5
Peru							
Argentina	-	-	-	-	-	-	2.5
Brazil	-	-	-	-	0.5	-	0.5
El Salvador	-	-	-	-	1.0	-	-
Mexico	1.0	-	-	-	1.0	4.5	-
Venezuela	-	-	-	-	-	-	7.0
Subtotal:	1.0	-	-	-	2.5	4.5	0.5
Grandtotal:	174.0	157.2	169.6	62.9	115.7	100.1	141.0

Sources: Metallstatistik, Frankfurt, 1987
Indec Argentina, 1987
Instituto de Commercio Exterior de Venezuela, 1987.

Table T-61
Foreign trade of copper among Latin American countries.
Unrefined copper

1000 tons

From to	1980	1981	1982	1983	1984	1985	1986
Chile							
Brazil	-	-	21.8	2.2	11.4	19.2	18.0
Mexico	1.5	3.6	4.2	-	-	6.9	2.6
Subtotal:	1.5	3.6	26.0	2.2	11.4	26.1	20.6
Peru							
Brazil	-	-	-	-	-	9.2	16.7
Subtotal:	-	-	-	-	-	9.2	16.7
Grandtotal:	1.5	3.6	26.0	2.2	11.4	35.3	37.3

Sources: Metallstatistik, Frankfurt, 1987

Table T-62
Foreign trade of copper among Latin American countries.
Total shipments

1000 tons

From to	1980	1981	1982	1983	1984	1985	1986
Chile							
Argentina	40.3	26.9	36.1	31.6	38.2	28.9	48.2
Brazil	128.1	104.7	149.9	33.3	82.0	70.9	105.0
Colombia	1.4	1.2	0.4	0.2	-	-	-
Mexico	4.7	27.8	8.9	-	4.0	21.1	5.4
Venezuela	-	0.2	0.3	-	0.4	0.8	2.5
Subtotal:	174.5	160.8	195.6	65.1	124.6	121.7	161.1
Peru							
Argentina	-	-	-	-	-	-	2.5
Brazil	-	-	-	-	0.5	9.2	23.7
El Salvador	-	-	-	-	1.0	-	-
Mexico	1.0	-	-	-	1.0	4.5	-
Venezuela	-	-	-	-	-	-	7.0
Subtotal:	1.0	-	-	-	2.5	13.7	33.2
Grandtotal:	175.5	160.8	195.6	65.1	127.1	135.4	194.3

Sources: Metallstatistik, Frankfurt, 1987
Indec Argentina, 1987
Instituto de Commercio Exterior de Venezuela, 1987.

Table T-63
Foreign trade of blister and anode copper
of Latin American countries. Exports

1000 tons

	1982	1983	1984	1985	1986	1987
Chile	198.7	224.3	210.5	190.1	199.4	
Peru	97.1	92.7	96.8	126.7	94.7	87.0
Mexico	9.5	11.9	15.1	-	19.0	
Total	305.3	338.9	332.4	316.8	313.1	

Based on: World Metal Statistics, UN. 1988.

Table T-64
Foreign trade of refined copper
of Latin American countries. Exports

1000 tons

	1982	1983	1984	1985	1986	1987
Chile	809.1	830.6	830.4	891.9	895.7	n.a
Peru	204.1	161.8	174.7	182.6	193.0	179.8
Total	1013.2	992.4	1005.1	1074.5	1088.7	n.a

Based on: World Metal Statistics, UN. 1988.

Table T-65
Foreign trade of copper
of Latin American countries. Exports

1000 tons

	1982	1983	1984	1985	1986
anode	305.3	328.9	322.4	316.8	313.1
refined	1013.2	992.4	1005.1	1074.5	1088.7
Total	1318.5	1321.3	1327.5	1391.3	1401.8

Based on: World Metal Statistics, UN. 1988.

Table T-66
Foreign trade of copper
of Latin American countries. Imports

millions

	1982	1983	1984	1985	1986
Brazil	204.7	56.4	107.2	77.5	107.8
Venezuela	2.5	2.0	5.6	6.4	10.7
Total	207.2	58.4	112.8	83.9	128.5

Based on: World Metal Statistics, UN. 1988.

Table T-67
Foreign trade balance of copper
of Latin American countries.

1000 tons

	1982	1983	1984	1985	1986
Exports	1318.5	1321.3	1327.5	1391.3	1401.8
Imports	207.2	58.4	112.8	83.9	128.5
Balance	1111.3	1262.9	1214.7	1307.4	1272.3

Based on: World Metal Statistics, UN. 1988.

Table T-68
Import of copper outside of the region

1000 tons

	1983	1984	1985	1986	1987
Brazil					
from USA	-	0.1	0.1	0.1	0.5
from Zaire	6.1	12.1	0.8	7.5	6.0
Total	6.1	12.2	0.9	7.6	7.1

Based on: World Metal Statistics, UN. 1988.

Table T-69
Foreign trade of copper semis
of the Latin American countries in values .
Exports of bars, shapes, wires

million USD

	1982	1983	1984	1985	1986
Brazil	3.8	7.9	54.1	20.5	23.9
Chile	59.5	19.7	21.7	15.0	16.2
Peru	17.9	13.0	13.7	20.9	22.1
Mexico	2.3	-	1.1	2.0	2.9
Total:	83.5	40.6	90.6	58.4	65.1

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-70
Foreign trade of copper semis
of the Latin American countries in values .
Imports of bars, shapes, wires

million USD

	1982	1983	1984	1985	1986
Venezuela	31.7	22.1	21.7	20.1	26.1
Colombia	20.1	18.7	19.7	20.1	26.1
Cuba	11.9	4.5	19.3	23.5	7.2
Ecuador	5.3	3.8	6.3	3.3	3.2
Mexico	....	18.4	24.8	28.3	28.1
Total:	69.0	67.5	91.8	95.3	90.7

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-71
Foreign trade of copper semis
of the Latin American countries in values .
Balance of bars, shapes, wires

million USD

	1982	1983	1984	1985	1986
Exports:	83.5	40.6	90.6	58.4	65.1
Imports:	69.0	67.5	91.8	95.3	90.7
Balance	14.5	-26.9	- 1.2	-36.9	-25.6

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-72
Foreign trade of copper semis
of the Latin American countries in values .
Exports of plate, sheet, strip

million USD

	1982	1983	1984	1985	1986
Argentina	0.1	-	0.6	0.7	0.6
Brazil	9.1	13.7	39.6	11.3	10.1
Chile	2.5	1.7	3.3	2.1	3.7
Peru	0.9	0.1	0.6	0.7	0.6
Mexico	1.8	-	1.7	2.2	2.3
Total:	14.4	15.5	45.8	17.0	17.3

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-73
Foreign trade of copper semis
of the Latin American countries in values .
Imports of plate, sheet, strip

million USD

	1982	1983	1984	1985	1986
Brazil	0.5	0.3	0.3	1.9	3.2
Venezuela	3.3	0.8	1.8	0.8	1.0
Colombia	2.3	2.1	1.9	2.7	1.0
Cuba	1.6	2.0	0.5	5.6	2.8
Mexico	-	1.3	3.0	11.2	4.0
Total:	7.7	6.5	7.5	22.2	11.2

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-74
Foreign trade of copper semis
of the Latin American countries in values .
Balance of plate, sheet, strip

million USD

	1982	1983	1984	1985	1986
Exports:	14.4	15.5	45.8	17.0	17.3
Imports:	7.7	6.5	7.5	22.2	11.2
Balance:	6.7	9.0	38.3	-5.2	6.1

Sources: International Trade Statistics,

Yearbook, 1986. Vol. II. UN. 1988.

Table T-75
Foreign trade of copper semis
of the Latin American countries in values .
Exports of tubes, pipes

million USD

	1982	1983	1984	1985	1986
Argentina	0.2	0.2	0.1	0.3	0.1
Brazil	6.5	5.9	20.6	6.7	8.4
Chile	5.8	1.8	2.1	3.0	4.0
Venzuela	0.5	0.1	1.0	1.0	1.0
Mexico	3.6	19.2	9.7	2.5	8.2
Total:	16.6	27.2	33.5	13.5	21.7

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-76
Foreign trade of copper semis
of the Latin American countries in values .
Imports of tubes, pipes

million USD

	1982	1983	1984	1985	1986
Brazil	5.3	1.5	0.9	4.3	2.8
Venezuela	7.5	2.3	4.8	4.4	5.0
Colombia	4.0	3.4	4.2	4.5	3.2
Cuba	5.8	5.2	7.2	11.1	6.0
Mexico	-	0.9	0.8	3.1	6.0
Total:	22.6	13.3	17.9	27.4	23.0

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

Table T-77
Foreign trade of copper semis
of the Latin American countries in values .
Balance of tubes, pipes export-import

million USD

	1982	1983	1984	1985	1986
Exports:	16.6	27.2	33.5	13.5	21.7
Imports:	22.6	13.3	17.9	27.4	23.0
Balance:	-6.0	13.9	15.6	-14.1	-1.3

Sources: International Trade Statistics,
Yearbook, 1986. Vol. II. UN. 1988.

ANNEX 1

ITINERARY
of Project No. UC/UD/RLA/88/123

Sept. 9th: Briefing in the UNIDO (Vienna)

10th: Travel to Brasilia via Rio

12th: 11 a.m. UNIDO office in Brasilia
3 p.m. Ministerio da Industria e do Comercio
13th: 10 a.m. Ministerio das Minas e Energia
3 p.m. Coordenadoria de Assuntos Internacionais do Ministerio da Industria e do Comercio
14th: 8 a.m. Travel to Sao Paulo
3 p.m. Banco de Desenvolvimento do Estados de Sao Paulo S.A.
15th: 10 a.m. Alcan Aluminio do Brasil S.A.
3 p.m. Associacao Brasiliera do Cobre
5 p.m. Alcoa Aluminio S.A.
16th: 9 a.m. Comphania Brasiliera de Aluminio
2 p.m. Travel to Caracas

19th: 3 p.m. Ministerio de Fomento
20th: 7 a.m. Departemento Comercial de la Embajada de Republica Popular de Hungria
10 a.m. Corporacion Venezolana de Guayana (CVG)
6 p.m. Sistema Economico Latinoamericano
22nd: 9 a.m. Fondo de Inversiones de Venezuela
3 p.m. CORDIPLAN
5 p.m. UNIDO office in Caracas
23rd: 7 a.m. Travel to Puerto Ordaz
9 a.m. CVG - Estudios Estrategias
11 a.m. Aluminio del Caroni S.A. Venezuela
3 p.m. Interamericana de Alumina C.A.
7 p.m. Travel to Caracas

25th: 7 a.m. Travel to Lima
4 p.m. Consorcio Minero S.A.
26th: 7 a.m. Departemento Comercial de la Embajada de la Republica P. de Hungria
8 a.m. UNIDO office in Lima
9 a.m. Empresa Minera del Centro del Peru S.A., Gerencia Comercial
1 p.m. Banco Industrial del Peru
4 p.m. Empresa Minera del Peru S.A.
6 p.m. Metales Industriales del Peru S.A.
27th: 11 a.m. Travel to Santiago

	28th:	9 a.m.	UNIDO office in Santiago
		3 a.m.	Comision Chilena del Cobre
	29th:	9 a.m.	Banco Concepcion
			Sociedad Nacional de Minera
		11 a.m.	MADECO
		7 p.m.	Travel to Buenos Aires
	30th:	10 a.m.	Departemento Comercial de la Embajada de la Republica P. de Hungria
		11 a.m.	UNIDO office in Buenos Aires
		5 a.m.	UNIDO office
Oct.	3rd:	9 a.m.	KICSA Industrial y Comercial S.A.
		4 p.m.	Camara Metalurgica de No Ferrosos
	4th:	3 p.m.	Subsecretario de Minera
		5 p.m.	Minera Tea S.A.
	5th:	2 p.m.	Aluar Aluminio Argentin S.A.
			Camara Metalurgica de No Ferrosos
	6th:	6 p.m.	Travel to Budapest via Frankfurt
Nov.	8th:	Debriefing in the UNIDO (Vienna)	

ANNEX 2

QUESTIONS TO BE CLEARED

at UNDP

- survey of the program and arrangements

- who will be the partners, what should be advisable to know about them ?
  = their activity and powers /sphere of authority/
  = what kind of information can they serve ?

- opinions about
  = the general economic situation and the future possibilities
  = the leading institutions of the industry
  = the Chamber of Industry, the professional organisations, the banks and the management of enterprises

- are there national plans and programs which can influence the development of aluminium and copper industries?

- statistical yearbook, industrial statistics and foreign trade ones. Are they able to obtain and transfer these materials for us ?

at MINISTRIES

- how does the ministry influence the development of aluminium and copper industrial branches ?
  = in what does it direct ?
  = in what does it co-ordinate ?
  = in what and how does it inform /input data from, output data where to/ ?

- what is the connection with the insterested parties in development /Chamber of Industry, professional organizations, investors, holdings, firms/?

- what do they know about the firms? /Data of production and capacity, development ideas/

- do they have plans for economy development ?
  = conception of growth
  = prognosis

- do they have macro-economic information about
  = the changes of GDP and prognosis for it
  = export-import activity of the country and foreign trade turnover of Al and Cu products
  = debt and debt service, prognosis for them
  = forecast for the investments of fixed assets
  = growth rate of industrial production, prognosis /especially for the branches/ ?

- do they have financial possibilities to urge the development ideas?

at BANKS

- their opinion about the willingness for investments in the country
  = in case of domestic partners
  = and foreign ones

- what makes a concrete investment idea to be attractive?
  = what is the desired internal rate of return ?
  = are there preferencies /especially in case of the Al and Cu industries / ?

- what kind of help are they able to give for the possible investors?
  = are they involved in the establishment of enterprises ?
  = their position in the firms of metal industry ?
  = how do they decide on solictiation of credit ?

- in what extent do they observe the general economic situtation and what is their prognosis ?

- what is the share of foreigners in the investments ? What are the rules of
  = equity or
  = profit and capital repatriation ?

- can they give information about
  = the GDP and its prognosis
  = the exchange rate
  = the discount rate /deposit rate, rate for long-term credit, commercial credit, investment loan and rate of operating capital/

= rate of inflation and expected trends
= money reserves, debts, debt services
= growth of industrial production /in branches/, expected trends of investments of fixed assets ?

at CHAMBER OF INDUSTRY

- their organization, operation and ways of working
  = what can they give their members
  = input and output information
  = their share in the promotion of developments /their iniciative role/.

- do they have information about
  = taxation order of firms
  = customs duties on Al and Cu semis /incitements, prohibitions, export duties, import duties/
  = prices of semis /domestic, CIF, FOB/
  = technical point of view of foreign trade /special firms, independent export/
  = foreign trade data ?

at PROFESSIONAL ORGANIZATION

- their organization, operation and ways of working
  = among semi-producers who are members and who are not /list of members/
  = what can they give their members
  = input-output information
  = how do they help the realization of development ideas of their members ?

- do they have information about
  = the questions /see above at the chamber.../
  = production data and capacities for Al and Cu semis
  = distribution of consumption among branches /consuming data/
  = particular data of foreign trade of semis
  = the level of manufacture /technical level of technology/ and the ability of each firm ?

- their system of connection in the country and outside.

at FIRMS

- profile of the firm, capacity, production

- number of employees /technical, administrative, skilled and non-skilled/

- list of products and prices /catalogue/

- their calculation system and details in connection with it
  - = cost structure /material, salary, overheads, transportation, energy, marketing, taxes, etc./
  - = profits in sales relating to working capital and fixed assets
  - = depreciation on building, machines and equipment
  - = rate of fixed assets and working capital
  - = dividents in case of shareholding company, ltd., or private owned one

- their development ideas, problems

- marketing system /domestic and foreign/. Connections, agents, etc.

ANNEX 3

The main producers of aluminium semis in the selected Latin-American countries

Countries/firms	Products: Rolled	Extruded	Drawn	Other
Argentina				
Kicsa I.C.S.A.	x	x		x
Camea S.A.	x	x		x
Soinco S.A.C.I.		x	x	
Ragor Industrial y Comercial S.A.	x	x		x
Pirelli Cables S.A.I.C.		x	x	
Cimet S.A.		x	x	
Electricos "E.C.A." S.E.		x	x	
Industria Metalurgica Sud Americana		x	x	
I.M.P.A. Cooperativa Limitada	x			x
Cablo Pampeana S.A.			x	
Industrializadora de Metales S.A.	x			
Industrias Electricas De Quilmes S.A.			x	
Magnesio Argentina S.A.	x	x		x
Marmicoc Argentina S.A.I.C.	x			x
Metalis S.A.C.I.F.I.	x		x	
Brazil				
Alcan Aluminio do Brasil S.A.	x	x	x	
Alcoa Aluminio S.A.	x	x		x
Comphania Brasiliera de Aluminio	x	x	x	
Furukawa Industrial S.A.			x	
Aluminio Empress S.A.	x			x
Laminacao de Metais Bianchi Ltda	x			
Aluminio Fulgor S.A.	x			
Ifema S.A. Ind.de Condutores Eletricos			x	
Inbrac S.A. Condutores Eletricos			x	
Pirelli S.A.			x	
Estamparia Caravellas S.A.	x			x

Countries/firms	Products Rolled	Extruded	Drawn	Other
Venezuela				
Aluminio del Caroni S.A.	x	x		
Aluminio Reynolds de Venezuela S.A.		x		x
Alambres y Cables Venezolanos C.A.			x	
ALCANVEN C.A. (Aluminio de Venezuela)		x		
Dominguez y Cia. La Victoria		x		
SURAL (Suramer.Aleacion.Laminad.S.A.)			x	
CABELUM			x	
PIVENSA	x			
Superenvases Envalic	x			
Antenas Venezolanas	x		x	
Chile				
MADECO	x	x		x
Vidrios y Aluminios Lirquen S.A.	x	x		x
Industrias Metalicas Chile S.A.	x			
Chile				
Alusa S.A.	x			x
Alumet Ltda		x		
ALUMCO (Aluminio para la Construc.S.A.)		x		
Peru				
Metales Industriales del Peru S.A.	x	x		
METINSA		x		
FAM	x	x		

ANNEX 4

The main producers of copper semis in the selected Latin-American countries

Countries/firms	Products			
	Rolled	Extruded	Drawn	Other
Argentina				
Cimet S.A.			x	
Guillermo Decker S.A.	x	x	x	x
Omica Saic		x		x
Industrial Pirelli S.A.			x	
Sotyl S.A.	x			
Cablo Pampena S.A.	x		x	
Electricos "E.C.A." S.E.	x	x	x	
Industria Metalurgica Sud Americana		x	x	
Multitubular S.A.	x	x		x
Facetyt S.A.	x		x	
D.G.F.M. Fabr.Militar de Vainas y Cond.	x	x	x	x
Industrias Electricas De Quilmes S.A.		x	x	
Trafilacion Wulfman S.A.	x	x		
Fonseca S.A.	x	x	x	
Metalis S.A.C.I.F.I.		x	x	
Brazil				
Caraiba Metais S.A.			x	
Eluma S.A.	x	x		
Siderurgia Fi-El S.A.			x	
Furukawa Industrial S.A.			x	
Fios e Cabos Plasticos do Brasil S.A.			x	
Ifema S.A.			x	
Cecil Langone S.A.	x	x		x
S.A. Marvin	x	x		x
Sao Marco Minas S.A.			x	
Termomechanica Sao Paulo S.A.	x	x		x
Pirelli S.A.		x	x	x
Laminacao Nacional de Metais S.A.	x	x		x
Alcoa Aluminio S.A.			x	
Metalurgica Brasiliera Ultra S.A.	x			
RCN Industrias Metalurgicas S.A.		x		

ANNEX 4

Countries/firms	Products Rolled	Extruded	Drawn	Other
Venezuela				
Alambres y Cables Venezolanos C.A.			x	
ICONEL (Ind.Conductores Elect.C.A.)			x	
Deformaciones Plasticas de Metales C.A.	x			
Electroconductores C.A.			x	
Ind. Venezolana de Cables Electricos			x	
METALEX (Fund.y Extrusion de Metales)		x	x	
Chile				
MADECO	x	x	x	
Armat Metalurgica Saic	x	x		
Industrias Metalicas Chile S.A.	x			
Cobre Cerrillos S.A (Cocesa)			x	
COVISA			x	
SORENA		x		
NIBSA				x
Peru				
Metales Industriales del Peru S.A.		x	x	
Triplec - Cables y Cond.de Cobre S.A.			x	
Capesa - Candados Peruanos S.A.	x	x		
Centromin Peru			x	
Inamesa - Industria Andina de Metales		x		

ANNEX 5

Report on negotiations

During the fact-finding field work in Latin America many institutions, organizations, offices and firms were visited to meet their representative(s) for discussing the questions which had been elaborated in advance in order to obtain appropriate information and data for this project. These questions were collected in a list given in the ANNEX 2. In sequence of the visits as shown in the ITINERARY (ANNEX 1) the basic observations, information and statements can be summarized as follow:

Brazil

UNIDO office in Brasilia
Partner: Mr.B.H.Koch - Programme Officer

The whole Brazil programme were organized according to our request. Many good information sources can also be found in Rio which was dropped out from the programme due to lack of time.

Ministerio da Industria e do Comercio
Partner: Mr. Antonio S.M. Mello - Coordenator Technico

An overall picture of the present state of the Brazilian industry, possibilities of involvment of foreign capital, priorities of the industrial policy, the activity and responsibilities of the Ministry were presented. It was noted that after finishing the nationalization programme of the 60'-s and 70'-s nowadays the most important aim is to improve the efficiency and competitiveness. For this reason the duties had been radically decreased and a liberalization of imports took place. A new industrial policy is expected to be introduced with a complexity in approaching the problems of development, trying to find out and eliminate the bottle-necks. There are five priorities, but the non-ferrous metallurgy does not belong to them. Several incentives are applied (tax refunds, reduction of custom duties) to promote the development of sectors of first priorities. Foreign capital is welcome mainly in the mining and primary metal sector, the downstream industry is intended to be dominated by smaller domestic private companies.

Ministerio das Minas e Energia
Partner: Mr. Frederico L.M. Barboza - Diretor

The scrap recovery has not been solved yet in Brazil. In the future firms having foreign capital will have to work in vertically integrated form. It means that mining concessions will be given only if the company will make investment in the primary metal sector, too. There are export incentives for semis. Debt service and inflation mean very hard trouble in the economy. The debt conversion to capital should give an appropriate solution for the further development.

Coordenadoria de Assuntos Internacionais do Ministerio da Industria e do Comercio
Partner: Mr. Ronaldo A.M. Silva

There is no special promotion on behalf of the government for increasing the cooperation among the Latin American countries. New initiatives are due to come for promoting the technology improvements. Priorities are out of the Al and Cu industries.

Banco de Desenvolvimento do Estados de Sao Paulo S.A.
Partners: Mr. Paulo H.S. Reboucas - Gerente
Mr. Arnaldo Rigonatti - Analista de Projetos

In connection with the development and financing problems of investments in the Al and Cu industries the National Development Bank should have given more useful information. The questions of interest rate, the preferencies, the rate of return, etc. were analysed. The role of the small banks in the developments and investments was evaluated. It was stated that domestic companies have access to beneficial financial resources, while the foreign companies have to use their own resources mainly. The Brazilian mining and primary metal projects can be financed under very preferential conditions.

Alcan Aluminio do Brasil S.A.
Partner: Joao Vailante

Scrap export is prohibited. 13 % Al scrap is used, the main source is the can recycling. Distribution of semis production among the biggest firms (Alcan, Alcoa, CBA), present and future capacities were examined. Hundreds of small firms and factories dealing with the manufacture of semis and finished aluminium products work in the country, their exact parameters (capacity, production, product mix, etc.) are not known even in the Aluminium Association of Brazil but it may be supposed their output should be neglected if compared to that of big ones. Trends in the consumptions of aluminium semis, and export possibilities towards Latin American and overseas countries were

discussed. Price problems hinder the increase of semis export - the government controls the minimum level of export price. The state tries to attract the foreign capital with special taxation and benefit systems of investments.

Associacao Brasileira do Cobre
Partner: Mr. Leone Aidelstain - Engenheiro

Refined copper is produced mainly on the basis of imported concentrates from Chile. Besides domestic production a great amount of primary metal has be to imported, too. About 50 % of the total manufacturing capacity is utilized only. Beside the excess capacity for semis another problem of the copper industry is the machinery. Several new projects were started simultaneously a few years ago including some old, second-hand machines with out-of date technologies which now are not able to produce semis of high (exportable) quality. There are signs of reprivatization of state owned factories in order to raise the efficiency. The task of the Association is to coordinate the activities of the firms to a certain extent, to negotiate price questions with the government, to manage the problems of standards, to organize exhibitions and to look for new fields of application.

Alcoa Aluminio S.A.
Partner: Mr. Andre P.L. Cangucu - Diretor da Divisao

The total capacity of semis production is 100.000 tons annually. Up to now the utilization is about 85 %. Less than 10 % of the output gets to export. The company can not export to USA due to some agreements with the mother company. On the Latin American market Peru, Chile and Argentina are the main buyers. A 5 % of average increase of the domestic market can be expected, which is in accordance with the growth of the population. The focus is on the primary metal production, notwithstanding the ALCOA diversifies its activity in the aluminium downstream industry and enters into the field of finished products. They anodize their profiles as requested, the value added of this operation is 15 %. On the domestic market there is a fixed price with correction for inflation, abroad they realize the actual LME price. For a longer period the domestic price follows the LME one as well. The firm has no long term contracts for delivery of primary metals..

Comphania Brasiliera de Aluminio
Partners: Mr.Marco A.G. Valente - Assist. Technico de Vendas
Mr.Diogenes Faria - Superintendente de Producao

Overview of the activity of the vertically integrated large firm. The quality of semis produced satisfies the export requirements. Continuous development is the programme in connection with extruded and rolled products. A new press and a hot rolling mill are the next steps in the investment.

Venezuela

Ministerio de Fomento
Partner: dr. Hector Mantilla

The total copper demand of Venezuela is imported in the form of refined metal and wire-bar. Exporting countries are Peru and Chile first of all, but about 10 % of the import comes from Zambia and other countries. The import duty is 0 % for Peru, 2 % for Chile and 10 % for Zambia. The majority of manufacturing capacity is in the cable industry. Beside this only limited capacities exist for producing rolled and extruded semis. Some kinds of semis are imported from the USA and Canada, at the same time copper cables in small quantities get also to export. In case of aluminium the ingot export is considerable. The forced export of primary metal often caused aluminium shortage on the domestic market.

Corporacion Venezolana de Guayana (CVG)
Partner: dr.Migdalia Martinez - Vice President of Corp.Plan

Although the Andes Agreement aimed to promote the trade and industrial cooperation among the parties practically it has not brought basic change in their relations. In connection with primary metals the export-import is considerable but as refers to aluminium and copper semis very limited quantities are in the trade. The basic cause of it is the parallel structure of manufacturing and processing industries of the neighbouring countries.
The CVG is responsible for the development of Guayana region. On the basis of development decided the CVG by the year 2000 this region will produce 2 million tons of primary aluminium. New bauxite mines, alumina capacities and smelters will enter into production. The energy sector expands with new power plants on the river Caroni. The purpose is the vertical integration which needs the enlargement of semis production. For the time being the annual capacity is 400.000 tons of semis and its utilization is about 50 %. An expansion is considered for a further increase of 200.000 tons capacity. The unit cost of primary aluminium production in Venezuela is the lowest in the world, it is 768 USD/ton.

Sistema Economico Latinoamericano
Partners: Mr.Ruben G. Llaguno - Director Alterno de Coperac.
Mr.Jorge G. Roda - Jefe de Proyectos

SELA promotes the regional cooperation in Latin America. Countries elaborate their own system of connection. Joint enterprises (multinational companies) are the best examples of cooperation. There are agreements among the members but the reality differs from the intentions. In connection with non-ferrous metals there is no role of SELA. The implementation of results takes very long time.

Fondo de Inversiones de Venezuela
Partner: Mr.Jose L. Leizaola - Gerente del Sector Industrias

Great efforts are devoted for the the development of aluminium industry. Vertical integration is the final purpose. On the basis of domestic bauxite and alumina production as well as one of the cheapest energy all over the world the up-to date aluminium industry will develop and by 2000 it will reach a total primary metal output of 2 millon tons annually. Beside the VENALUM and the ALCASA new plants will join the primary production such as ALUSUR, ALAMSA, ALUYANA, ALISA. Considerable growth of semis production will accompany the increase of ingot's quantity especially in connection with the rolling and die-casting fields. The cold rolling capacities of the strip and foil productions will reach the 150.000 tons per year. The increasing capacity and the improving quality will result that the total quantity of strips imported for can-body should be replaced by domestic ones. The die-casting capacities will be able to produce nearly 1 million pieces of automotive parts (wheels, pistons, rods, etc.). The extrusion and cable factories intend also to increase their capacity. The main purpose of all enlargements of semis production is to increase the export. The foreign capital is significant in the aluminium industry, it may be increased in the future even up to 80 %. All the big multinational aluminium companies such as ALCOA, ALCAN, REYNOLDS, etc. have their own interest in the different Venezuelan firms. For the capacity developments the domestic capital is not sufficient, they need foreign investment. The financial policy tries to create an attractive atmosphere for calling the outside capital in. The domestic and export prices differ from each other, the export follows the LME price while on the domestic market there are fixed ones. In connection with the export possibilities and complementaries within Latin America, Brazil and Argentina do not mean markets but competitors even as they have their own aluminium industries with similar structure and

surplus capacities. As refers to Peru and Chile they are interested first of all in the copper industry, from point of view of aluminium their total consumption is insignificant comparing to the Venezuelan output and only very slow improvement of cooperation can be imagined in the near future.

CORDIPLAN
Partner: Mrs.Diaz
This institution tries to organize technical cooperation with countries of different level of development. The basic working method is the exchange of experiences in the fields of science and technology. For the time being they have no project in connection with the aluminium industry.

Aluminio del Caroni S.A. Venezuela
Partners: Mr.Dixon Rosillon - Gerente de Operaciones
Mr.Jose Manuel Astor F. - GCIA Relaciones Publicas
Survey of the history of production and the technical features of the plant as well as the short and long term programmes for the further development. In the field of semis the most important investment will be a hot rolling mill for manufacturing can-stock. Site visit of pot-lines and continuous strip casting.

Interamericana de Alumina C.A.
Partner: Mr.Per Jongen - Gerente General de Operaciones
Survey of the production from the beginning up to now. Directions of the further developments especially in connection with the domestic bauxite supply. Technology improvements and capacity enlargement for the next 10 years. Visit of the production facilities.

Peru

Consorcio Minero S.A.
Partner: Mr.Max Moya Bendezu - Gerente General
The resources and the upstream side of basic metals for the Latin American countries have already been summarized in his study which has been surveyed. In Peru the aluminium industry is not significant, small firms manufacture the imported primary aluminium and the semis. The strong side of the copper industry is the upstream. The produced concentrates, blisters and refined metals have 400.000 tons copper content annually. From these only 50.000 tons get into domestic transformations producing first of all wires (30.000 tons/year). The low level of transformation can be explained by the lack of sufficient incentives on the added value. Efficiency is low in the

industry, the national economy has been in unfavourable position. There are no free sources of foreign currency neither for the developments nor for the spare parts or maintenance of the technical level. The private sector stopped its investment activity.

CENTROMIN, Gerencia Comercial
Partner: Mr.Pedro Andia Muller - Director

Besides refined copper the CENTROMIN produces semis for the cable industry. Its technology is based on wire bars, which is somewhat out-of-date comparing to the continuous casting method applied worldwide in the modern plants. According to the technology only small coils (100-150 kg) can be produced which are unfavourable for the further processing. The supply of the domestic market has priority therefore the CENTROMIN is basically inward oriented. The cable factories sell their products abroad.

Banco Industrial del Peru
Partner: Mr.Raymundo Dumler S. - Gerente Central Creditos

The foreign capital had a strong interest for investing in the copper industry even in the sector of semis for realizing a high amount of export but later they withdrew from it reasoned by the political and economic instability in Peru. The domestic private sector is also reluctant to invest. There were projects in the bank for financing the developments of the two big semis producing plants (CAPESA, METINSA) which aimed to increase the capacity and to improve the quality - all of these were export oriented, but suspended lately.

MINEROPERU
Partner: dr.Marina Sequeiros M. - Gerente Commercial

The MINEROPERU consists of different firms working in the upstream side of the copper and tin industry. Their final product is the refined copper and tin of 50.000 and 80.000 tons/year respectively. The domestic market gets about 4000 tons of electrolitic copper only, the rest goes to abroad directly (to Japan a quantity of about 18.000 tons) or in indirect way (through the Southern Peru Copper Corp. to the USA). They have not been interested in the semis production yet, though there had been projects for it they did not find sufficient capital for the investment. From the domestic part different semis of copper and brass are produced at the METINSA and the FAM. Prices follow the international trends nevertheless on the domestic market sometimes there are reductions. On the export there is an incentive of 10 % which can be used for buying imported machines in case of developments, reconstructions or

maintenance. In spite of this sometimes even this money can not be obtained due to the severe economic difficulties of the country.

Metales Industriales del Peru S.A. (METINSA)
Partner: Mr.Alfredo Barclay P.

The METINSA is one of the biggest semis producers in Peru manufacturing copper and brass as well as aluminium. Their raw materials are cathodic copper (max. 2000 tons/year) and wire bar. The aluminium billets for extrusion are bought from Venezuela. They produce a wide scale of variety of semis eg. bus bars, rods of copper and copper alloys, silver bronze wires, strips, extruded and drawn products as the most important ones. A part of the production is exported to everywhere in the world from the USA, and Singapore to Germany and the neighbouring countries. For producing strips and rods continuous casting technology is applied. The competitiveness on the export market could be increased, if higher amount of scrap were used in case of those products (e.g. free cutting brass) which does not need the use of virgin metal. The rolling capacity will be enhanced and there is a project for utilizing a part of the surplus strip to manufacture coins and keys.

Chile

UNIDO office in Santiago
Partners: Mr.Pierre Den Baas - Representante Residente
Mr.Thomas Reich - Asistente Pricipal de Programas

Survey of the general economic and political situation in Chile with special interest on the following plebiscite. Meeting with the representatives of mining and manufacturing sectors of copper industry as well as of state institutions.

Comite de Productores y Usuarios del Cobre y sus Aleaciones y su Promocion (in the UNIDO office)
Partner: Mr.Carlos Munoz V.

A study was elaborated for the sectorial development of Chilean copper industry. Up to now the upstream sector is much more stronger than the downstream one, therefore the upstream dominates the export, too. The domestic copper demand is satisfied by CODELCO on prices following the LME. Sometimes there is a copper shortage in the country due to the export obligations. Recycling of copper scrap is difficult, because there was a 10 % incentive on the export of scrap. The number of the factories in the downstream is few, and some firms monopolize this branch.

The product mix of semis is poor and in some cases it is much more favourable to import than to produce them.

Comision Chilena del Cobre
CODELCO
Ministerio de Mineria
Partners: Mr.Alberto Canal I. - Director
Mr.Enrique Schlotfeldt H. - Director Technico
Mr.Marco Fluckiger S. - Geologo
Mr.Peter Lowick-Russel A. - Ing.c.Industrial

40 % of the total national export earned by the copper industry. The emphasis is on the cathodes because the added value of semis is very low in comparison with the extra transportation costs and duties, only very special semis and products have higher one, these must be found. The private sector plays a dominant role, generally there is an agreement between the government and the private sector which gives a framework for the domestic supply and the price. In the last 15 years 1.6 billion USD were invested in the mining sector, the state promotes the foreign investments in the downstream by several preferencies. For the time being joint ventures with foreign firms are common in the practice (e.g. CODELCO has three: one in Germany, one in France and one in China). In semis export wires and cables represent the greatest quantity.

Banco Concepcion
Sociedad Nacional de Minera (SONAMI)
Parners: Mr.Humberto D. Contreras - Gerente Division Mineria
Mr. Alfredo Araya Munoz - Gerente

The present state of the Chilean copper downstream industry is not competitive with the products of Taiwan, Korea, etc. using high-tech equipment.
The SONAMI was organized by private mining companies to promote the activity of this sector. This embraces the protection of the common interests and at the same time the establishment of financial basis for the developments and investments. They produce concentrates basically, and have only one smelter for making blister. The total output of SONAMIS's firms is 300.000 tons annually.

MADECO
Partners: Mr.Clive N. Brinckmann R. - Jefe de Ventas
Mr.Gaston Larrondo B. - Gerente de Export.e Import.

This is the biggest firm producing copper semis and they manufacture aluminium, too. The basic aim is to satisfy the domestic demand, the rest of the produced antity gets to export. Almost all types of semis are made here.

They have two subsidiaries (ALUSA, ALUMCO) for manufacturing aluminium semis. In connection with aluminium the emphasis is on the extruded products but foils and solar heaters (as finished products) can also be found in their output. They buy aluminium ingots from ALUAR and ALCASA (from Argentina and Venezuela). In quantity the export market gets 55 % which in value is only 40 % of their production. The cause of the difference between the quantity and the value is the wire rod export on which there is a very low added value and its price is only a little bit higher than that of the primary metal. The main export market is the USA to where the cost of transportation is the lowest and its economy is much more open than of others.
MADECO is in partnership with CODELCO for joint venture of a Chinese tube plant. The company buys the raw material on the LME price. The main market of their wire rods is Latin America. For tubes they uses three grades (DHP, DLP, ETP) of copper. From brass tubes they produce 8.000 tons/year from which the local market takes about 5.000 tons. The rest goes for export, first of all to Latin America (except Brazil, Argentina, Venezuela). From the annually produced sheets of 6.000 tons about 3.500 tons get to export (their main market is the USA). The produced bus bars go also to the USA in about 1000 tons quantity. Scraps have not been processed yet besides their own ones. (There is not enough clean scrap available on the market.) In connection with the production of free cutting brasses and seamless tubes they have monopolistic position in this region. It is planned to start production of CuNi alloy and coinage strip. No special alloys are produced yet.

Argentina

UNIDO office in Buenos Aires
Partner: Mr.Perez-Salgado

Survey of the general economic situations of Argentina. The efficiency of public sector is low, there are intentions for reprivatizing the state owned firms in the manufacturing sector. The export oriented mentality replaces the inward inclined management in the industry. There are already examples for establishing joint ventures with foreign (Italian and Japanese) firms. The economic situation and the problems (e.g. high amount of debt, increasing inflation) do not create attractive atmosphere for the private sector to invest in the industry.

KICSA Industrial y Comercial S.A.
Partner: Mr.Luis O. Mina - Manager of Export Sales

The total production is 24.000 tons annually though their capacities could result much higher figure. These capacities are as follow: 34.000 tons of billets and slabs, 15.000 tons of rolled products, 6.500 tons of extrusions and 2.500 tons of foil annually. The ALUAR is the parent company, it supplies the ingot quantity demanded. 60-65 % of the production goes for export. The main markets are the Latin American countries (without Brazil and Venezuela), USA, Japan and Germany. Their prices are in accordance with the LME ones. Besides one hot rolling and three cold rolling mills they have two extrusion presses and a painting line for the profiles. They are moving now into the field of die-casting of automotive parts.

Camara Metalurgica de No Ferrosos
ALUAR
Partners: dr.Mauricio Trzewik - Presidente
Mr.Francisco Pate - Gerente

The primary aluminium production of the industry has been fluctuating about 150.000 tons/year for a long time. It is turned out by ALUAR only. There are plans to increase the capacity up to 210.000 tons annually. In relation with this question the most serious problem is the energy supply. The domestic market consumes 45 % of the total aluminium production. The aluminium downstream industry produces the whole scale of semis, from which the domestic consumption is rather limited, thus the excess quantity goes for export (in 1987 about 44.000 tons of semis were exported beside the same quantity if ingots). The built-in capacities of semifinishing factories are considerably higher than their outputs, the utilization of theirs may be estimated as high as 50 %. The alumina needed by ALUAR comes from Australia. On the domestic market time by time fixed prices exist but for longer periods their average corresponds to the international ones. On the export the firms realize the actual LME prices. It happens sometimes that the domestic price of aluminium is higher than the LME one. Export incentives existed formerly, now it does not work.

In connection with copper industry Argentina imports the raw material from Chile (90 %) and Peru (10%). The total imported quantity was 53.000 tons in 1987. 50 % of the quantity was manufactured for the electric industry, the other 50 % served for producing plain and alloyed copper semis to satisfy the need of other industrial sectors. The producing capacities are considerably higher than the actual domestic demand. In case of rolling capacity it is over 30.000 tons/year, for tubes 12.000 tons and for wires

about 40.000 tons can be considered. The machines and equipments in semis sector are on up-to-date level and are able to produce exportable products, but as a consequence of exchange and taxation problems the export is a very hard task.

Subsecretario de Mineria
Partners: Mr.Alberto Diego Salmuni - Subsecretario de Mineria
Mr.Jose Antonio Lopez - Asesor de Cabinet
Mr.Delfor A. Cadario -Director Nac.de Program.Minera
The economic structure of the country is under change with the main feature of reprivatization though the trade unions oppose the plan. The debt reached as high as 10 % of the GDP. The location of the producing firms is unfavourable for the long transportation inside the country. The aim is to settle factories along the Colorado river where neither the energy nor the trasportation cause problems.

Minera Tea S.A.
Partner: Mr.Elviro A. Vernaz - Director Technico
This firm is not engaged in the aluminium and copper industries. The only connection would be in the future in the field of aluminiumsulphate production.

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