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No. 46/47, MAY - AUGUST 1977

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ARGENTINE NEED FOR DEEP WATER PORT CITED

Buenos Aires ESTRATEGIA in Spanish No 46/47 May-Aug 77 pp 15-18

[Article by Capt Roberto M. Orstein]

[Text] The movement of large volumes of cargo in a world with growing needs is a present-day imperative.

This movement must be accomplished quickly, efficiently and safely during both arrival and shipping.

The use of increasingly costly equipment means that their profitability has to be maximized as part of a plan in which technology and competitiveness play very important roles.

In keeping with these guidelines, ocean transportation has over time adapted its contribution to the successful rapid movement of large cargo volumes by cutting freight charges and arriving at destinations on time.

With the above in mind, an analysis of worldwide cargo trends (with a breakdown by type) seems to indicate strongly that at the present time Argentina must, without delay, provide proper answers to this competitive world.

These answers mean that the country will have to consider when to handle each type of cargo (solid and liquid bulk cargoes, fuels or otherwise, and general cargo) with the various modes and means of transportation and, in addition, generate the entire infrastructure of a system in which the means of transportation, cargo handling and distribution from point of dispatch to final destination form an entire unit that must be carefully analyzed.

Due to natural circumstances our country is a large-scale producer of grains and farm by-products, the surpluses of which are sold overseas and provide 50 percent of the country's export trade revenue.

Current policy aims at boosting production to pay for the importation of industrial inputs that we are unable as yet to obtain on the domestic market.

This production increase must also, however, aim at making the process as a whole more efficient by minimizing the loss of profits that is caused by delays, which are mainly the result of inadequate installations and facilities.

Our large-scale export cargo operations involve shortcomings in storage capacity for timely sales, delays caused by overstocking which increase costs and obsolete facilities which make shipping inefficient and costly. Because of this, when we analyze Argentina's need for a deep water port complex, we must consider the problem on a comprehensive basis.

The port alone will not resolve all of the variables; it is the complex around it that will optimize results.

As soon as possible Argentina must market mainly its dry bulk export cargo through such a port, but it must also open the port to large-scale cargo for its iron and steel industry (iron ore, coal, etc).

It must also channel through it the goods that, in similar fashion, originate from the privileged Plata Basin, while allowing bulk cargo to move to and from the countries on it.

This will be possible if the costs of cargo operations are acceptable in terms of profit, which can be achieved by utilizing the most appropriate facilities that will enable the country to be competitive in the marketplace.

The currently excessive scale of ocean transportation for liquid or dry bulk cargo (as well as other modes that continue the movement along rivers) is a substantial part of the problem.

In comparison to intermediate tonnage vessels, deep-draft and high tonnage ships cut freight charges in tons per mile considerably.

Because of our country's geographic location far from the large present-day centers of consumption and from its clients and suppliers, the problem could be alleviated by the use of large freighters that would enable us, through lower freight charges, to compete with other countries that are closer to those centers.

Projected to the year 2000, the import and export volumes to and from Argentina that we are talking about could reach and even surpass 40 million tons, and there is not much of an error in this estimate.

These cargoes must, of course, arrive at destinations that are suited to handle them, which means sufficient drafts in ports and approaches, maneuverability within them, orderly and rapid loading and unloading, and proper storage capacity.

In addition, the port must be properly linked to and complemented by all of the factors that will effect its efficiency.

What we have stated so far indicates that there is a close relationship among large volumes of bulk cargo, large capacity ships, ports with sufficiently deep water and a proper infrastructure for cargo handling and access to the port.

Nature has given our country an extended continental shelf on which there is more than one area that is naturally suited to be a deep water port. Golfo Nuevo is an example, but unfortunately it is too far from major centers, which are north of Bahia Blanca.

The present-day national ports system extends along the river area from the port of Santa Fe to the port of La Plata, all with a maximum depth of 30 to 32 feet, and continues along the Atlantic coast with the ocean ports of Mar del Plata, Quequen and Bahia Blanca. They handle about 90 percent of Argentina's foreign trade, using loading and unloading systems and equipment that are not in keeping with modern technological demands.

The port that comes closest to having the features of a deep water port is Bahia Blanca, which has been deepened to 40 feet and has acceptable facilities.

To deepen the port further, to 50 feet, would involve a significant increase in upkeep and operational costs.

This port, the logical and required outlet of an expanding hinterland, must be maintained and even improved to the extent that it yields a better profit-cost ratio.

Its distance from Entre Rios, Santa Fe, Cordoba, Santiago del Estero, San Luis, Chaco and northwest Buenos Aires, which are also areas with high growth potential, makes it unadvisable to divert their manufactures there.

Per kilometer costs, using non-river or ocean modes, become a drawback after certain distances, which is what we had in mind in making the above assertion.

At present, exports from these areas are handled at the river ports and at the ports of Mar del Plata and Quequen by ships of up to 30/32 foot draft, since there is no chance to reap the benefits offered by the superfreighters.

Naturally, the above analysis does not ignore the utilization of the existing cross-communications, which we must prudently avail ourselves of with an objective attitude and a sense of regional integration.

In any case, the availability of our own cargo in sizable volumes and the need for incoming cargo in substantial amounts as well,point unequivocally to the urgency of having our own deep water port.

Obviously, this port must be located as close as possible to the mouth of the River Plate. In addition to meeting our own needs, this will also satisfy the requirements of the countries on the basin.

Its actual size will also be determined by a necessary standardization of the ports on the basin that gives due consideration to the economic importance of each of them and that does not overlook the great benefits derived from navigable rivers and the cross- and lengthwise communications that have and are soon to be established.

A comprehensive analysis of these large ports of origin and destination, their standardization and a true sense of regional integration and solidarity can naturally bring about an economic complex that will serve the community of interests that are undoubtedly part of this privileged framework.

The "Prefeasibility,Preinvestment and Preliminary Design for the Construction of a Deep Water Overseas Port" study that was completed in 1971 pointed to the area of Punta Medanos in the province of Buenos Aires as the most suitable port site for technical, economic and financial reasons.

At present, the Naval Hydrography Service is performing the on-site field studies with advice from a ports engineering group from the General Directorate of Research and Development. The latter will be in charge of the port design, which will be tested in the Applied Hydraulics Laboratory to obtain an optimum final design that will enable the authorities to reach a decision on a project of such far-reaching importance for the entire nation.

This decision will be consistent with the overall program that we have outlined and will create a major development pole; it will also no doubt mean that we must keep in mind the imperatives of exporting with the highest possible value added to our raw materials, of improving the quality of the goods we have developed and of utilizing all the technological gains that we can rationally acquire in an increasingly

interdependent world. Our belief is that this port will be a real and objective contribution to the essential integration of our region, to which end we must combine all of our common interests and minimize the logical differences that, as proper perfectionists, we will seek to create along the way.

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BRAZIL'S PRODUCTION OF ARMAMENTS ANALYZED

Buenos Aires ESTRATEGIA in Spanish No 46/47 May-Aug 77 pp 36-43

[Article by Hugo Scarone]

[Text] The suspension of U.S. military aid to Brazil as part of Washington's new approach to its relations with the countries of Latin America, the subsequent termination by Brazil of the 15 March 1952 Rio de Janeiro Agreement--which guaranteed and formalized the aid--and the tension between the two countries stemming from Brasilia's nuclear program, prompted this obvious question among local and foreign circles: Is Brazil in a position to develop a war technology and industry to replace arms imports, especially from the U.S.market? What is the country's degree of military-industrial development? Will Brazil in the short, medium or long term have available rockets and transport vehicles that can deliver or direct nuclear weapons to potential targets?

The Rio Agreement terminated by Brazil last 11 March provided for the supply of arms, military equipment, servicing, the training of officers and even special U.S. credit for the purchase of war materiel; the agreement was drawn up in the U.S.-Brazilian Joint Military Commission.

The Brazilian Armed Forces also announced they they had decided to pay the United States the symbolic figure of $300,000 for the war materiel they had received as a loan under the agreement. In addition, already at the end of February the staff of the Armed Forces asked the air, land and sea branches for a study evaluating the consequences of a potential U.S. cut-off of military supplies as well as the alternatives that could be resorted to in such a case.

Shortly thereafter, the chief of staff, Gen Moacyr Potyguara, stated that Brazil was in a position to purchase arms in world markets other than the United States, while the commander of the Superior War College, Gen Airton Pereira Tourinho, pointed out that the country was on the road to self-sufficiency in weapons.

In statements to the press General Potyguara stressed later on that what Brazil wants is to sell, rather than to buy, arms, and at the same time Finance Minister Mario Simonsen stated that U.S. military aid is minimal even though it involves new arms and equipment. According to reports from Washington, in 1978 Brazil was to receive some $50 million in war materiel and some $100,000 for troop training.

Because of all this, a veritable flood of information was unleashed in official and semi-official Brazilian circles, as well as newspapers, concerning the country's apparent military might and its chances for self-sufficiency; for the first time an enormous volume of data and figures were released on materials, equipment, budgets and other aspects of military affairs that were considered secret until now.

The publication VERDE OLIVA, put out by the Office of Public Relations of the Army Ministry, asserted that the Brazilian Army is one of most inexpensive in the world, taking into account Brazil's size, location on the continent and position among other nations.

The army has 182,809 men, which is 0.166 percent of the country's 110 million inhabitants, and according to data from the magazine AEROSPACE INTERNATIONAL, and cited by VERDE OLIVA, Brazil's military expenditures represent only 1.3 percent of the country's GNP and about $12 per capita, which makes them among the lowest in the world.

Consistent Development

In recent years Brazil has undertaken an intensive program for and an accelerated development of its aerospace industry, with considerable emphasis on rockets and missiles. With regard to conventional airplanes, the Brazilian Aeronautics Company (EMBRAER) is considered the sixth largest firm in the world in the production of small and medium-sized planes.

The rocket and missile manufacturing program, the development of new planes and the production of armored vehicles and light- and medium-weight ships are completely consistent with Brazil's geopolitical, strategic and tactical objectives of attaining and securing its hegemony in the Latin American region as well as domination and surveillance of the South Atlantic.

The development of the Brazilian aeronautical industry, the manufacture of frigates under British license in domestic shipyards and the production of tanks and combat vehicles are accompanied by projects and specific accomplishments in civilian works. The enormous network of roads, which includes the Transamazon Highway and a lengthy route that skirts all of Brazil's borders with countries to the north and on the

Pacific, could well be planned to link up with the national roads of bordering countries with the apparent objective of rapid movement to and from nerve centers in Brazil and neighboring countries; one of the goals here would be the utilization of raw materials that Brazil lacks or which are costly to extract in comparison to purchasing them from other nations, for example Bolivian iron and gas.

In addition to the production of war materiel and civilian works, which are of clearly military use, Brazil has made considerable gains in the field of electronic surveillance and control. Security mechanisms and the strategic control of flights and air cover alternate with rocket and missile tracking systems and computer and data storage centers for the automatic monitoring of air defense. To this must be added a wideranging program in space research and the production of "nonmilitary" rockets to explore the atmosphere.

Arms Production

Brazil's arms production plants are mostly concentrated in the outskirts of Sao Paulo, mainly in Sao Jose dos Campos, which is some 85 kilometers from the large industrial metropolis. Others are located at Santo Amaro and Interlagos, which are also near Sao Paulo, and at Juiz de Fora, Minas Gerais. Guanabara, the headquarters of the Brazilian fleet, is the site of the Navy Missile Center (CMISM), which was created by the presidential decree of 13 September 1974, and nearby the Marambaia Missile Tracking System was recently set up as well.

In San Jose dos Campos the firms EMBRAER, AEROTEC [expansion unknown] and NEIVA [expansion unknown] manufacture combat and transport planes, and AVIBRAS [expansion unknown] handles the production of rockets and missiles for the Armed Forces. Moreover, these firms are exporting their products to countries in Latin America (such as Chile, Bolivia and Paraguay), Africa (Angola) and the Middle East.

The joint aeronautical enterprises manufacture equipment that is designed entirely domestically or under foreign license; the following is a partial inventory:

1) EMBRAER. This firm has developed twin engine transport and armed surveillance planes, with piston and turbine engines, that are of completely domestic design. The EMB-110 is a Canadian-made twin piston engine light transport and was the first model in a series that includes the turbine-powered EMB-111, which is designed for naval surveillance and is armed with rockets. The EMB-120, an offshoot of the Bandeirante, is an 11-seater version with a pressurized cabin and is designed for transport over distances no greater than 2,000 kilometers at a top cruising speed of 485 kilometers per hour. The EMB-120 is the beginning

of another series (EMB-12X), which initially includes three versions: EMB-121 Xingu with a cruising range of 2,300 kilometers at a cruising speed of 470 km/hour and seating for 6 passengers; EMB-123 Tapajos, with a cruising range of 3,200 kms at 550 km/hour and a 10 passenger capacity, and the new EMB-120 Araguaia, which can carry 20 passengers over a cruising range of 2,800 kms at 530 km/hour.

All of these planes have a pressurization system that enables them to fly at 3,600 meters with a cabin pressure that equals that of sea level and at 8,200 meters with an altitude-pressure of 2,400 meters. The engines are still the PT6A variety in the models 27 for the Bandeirante, 28 for the Xingu and 45 for the Tapajos and the Araguaia.

EMBRAER also manufactures the twin engine EMB-CX, which is an intermediate transport, and the EMB Maraba, which is similar, for the navy.

But EMBRAER's star attraction is perhaps the EMB MB326K, a light fighter and ground support plane that is specially designed for counter-insurgency use, and the AT26, its armed training version known as Xavante. This military jet is the Brazilian version of the Italian Aeromacchi MB 326 and has British-made engines and weaponry from Italy, France, Britain and Switzerland. It entered production in 1971 under a license granted in 1970. Several Brazilian Air Force bases utilize more than 100 units in training and tactical support, and it has been exported to Bolivia and African countries. The Xavante can transport up to 3,500 kilograms of bombs and rockets in addition to cannons and machine guns.

Another EMBRAER plane, the EMB AX, is presently under production and will be used for reconnaissance and combat work.

Under an Italian license the firm also manufactures Audi SH-4 Silvercraft helicopters, a version of the SH-4 SIAI Marchetti.

2) AEROTEC. This minor, but totally domestic aeronautical enterprise produces training and reconnaissance planes that have even been exported to Bolivia and Paraguay and the license for which was sold to Portugal in 1974. The Aerotec T-23 Uirapuru is a primary training vehicle whose Uirapuru 144 version is used for reconnaissance. Production on it began in 1968, and the rate of output is four a month. The engines are a U.S. made piston variety.

3) NEIVA. So far this firm has produced the Neiva T-23 Universal, a training vehicle armed with machine guns, bombs and Brazilian-made rockets, and the Neiva N-621A Universal II T-25 version, which is also for training purposes and has an American-made power plant. A new turboprop version, the Neiva N-721 Caraja T-25, designed in 1973, is armed with two stationary 7.62 millimeter machine guns that are manufactured domestically.

4) AVIBRAS. This firm manufactures domestically designed rockets and missiles, as well as those under license, and has produced the SBAT-127 surface to air series designed by the Technical Aerospace Center (CTA). The SBAT-127, which is supposed to replace the now obsolete HVAR-5, will be used as a tactical system by the army and navy and also as the first stage of the SONDA [expansion unknown] scientific rockets system. The army and the air force are utilizing the SBAT-37 for training purposes with an eye towards the use of the SBAT-70. This rocket, whose U.S. counterpart was used during the Vietnam War, has a high destructive power and can put a tank out of action. It is smaller than a 105 millimeter cannon and larger than a 60 millimeter mortar. Like all AVIBRAS systems, it uses domestic solid fuels, basically the composite variety.

5) The CTA and the Army Research and Development Institute have developed the SS-X-20 and SS-X-40 rocket engines. The former is designed to carry a 40 kilogram nose cone for 60 kilometers, and the latter, which was designed by the Military Engineering Institute (IME), is supposed to deliver a 150 kilogram payload at a distance of 60 kilometers as well.

6) The National Space Research Institute, the Technical Aeronautics Institute and the CTA are developing the SONDA I, II, and III series of rockets "to create the conditions for Brazil's active and effective participation in the field of launching rockets with instrument systems, to do in flight tests of telemetry systems, to monitor payload equipment and to recover them at sea."

SONDA II and III rockets, which have ranges of 100 and 500 kilometers respectively, were launched recently at the test site and launching pad at Barreira do Inferno in Natal, the state of Rio Grande do Norte, as part of a wideranging program of cooperation with domestic factories and as part of the Second Basic Scientific and Technological Development Plan.

Along with this, the Directorate of Research and Technical Schooling has intensified research and development of special fuels. The Research and Development Institute's inert fuels laboratory has begun full-scale operations, and a pilot power plant using solid fuels has been installed at the Presidente Vargas factory, which is a branch of the institute. The Technical Aeronautics Institute and the CTA are developing a series of medium and high energy solid fuels.

AVIBRAS developed the Avibras MAS-1, a surface to air missile with a high explosive power warhead; it has been in production since 1973. The CCM, a guided anti-tank missile with a 3 kilometer range that was designed in 1967, is another example of the emphasis that Brazil has placed on this type of weapon.

In the Juiz de Fora, Minas Gerais factory, the Army Department of War Materiel is producing, under French-German license, the MMB Cobra anti-tank missile, the know-how for which was acquired in 1973.

The Cobra is a guided missile with a 2 kilometer range and can be mounted on land vehicles of the Unimog Mercedes Benz variety. It is 95 centimeters long and has a launch weight of 10,200 kilos. The warhead, which carries a hollow charge, weighs 2.5 kilos and has an optical detonator.

At the end of 1974 the Brazilian Army received a shipment of French-German Roland surface to surface and surface to air missiles, along with the know-how needed to manufacture them domestically. The Aerospatiale/MBB Roland, with its MK-1 and MK-II versions, is produced by the French SNI [expansion unknown] Aerospatiale together with the West German company Messerschmidt Bolkow-Blohm. It is a surface to air missile for mainly ground use (the MK-2 is also for naval use) and has a range of 8,000 meters. It is 2.4 meters long and weighs 63 kilos at launch. Guided by remote control, it reaches a minimum altitude of 500 meters and a maximum of 6,500. The nose cone has a proximity fuse, and the missile can be mounted on vehicles for ground use. In fact, the initial shipment of Rolands arrived on Marder combat cars from France.

7) ENGESA [Specialized Engineers Corporation]. This enterprise, which initially produced tractors and civilian vehicles, became one of the main suppliers of combat cars and armored vehicles on wheels for the Brazilian Army. Last year the firm made a net profit of 66 million cruzeiros and hopes to take in 240 million in 1979, according to its director, Luis Aratanguy.

ENGESA manufactures the Cascavel, Urutu and Sucuri military vehicles and has plants at Sao Jose dos Campos, Interlagos y Santo Amaro, Sao Paulo and Bahia. The ENGESA group also includes ENGEPEQ [Trade, Industry, Enterprises and Technology Research Ltd] and ENGEX [Specialized Equipment] and has exported sizable amounts to countries in Latin America and the Middle East.

The Urutu EE-11 is an amphibious vehicle for personnel transport that can hold up to 14 soldiers. It can cope with difficult terrain, rivers, lakes and even waves. It carries troops and arms and has been earmarked already for use by the army and navy. The armored car is equipped with the Boomerang System--an ENGESA development--and does not require a specially trained driver. It can take part in landing operations when there are high waves since it has a special ventilation system in the roof which employs tubes. Its high firepower is provided by a 116 millimeter and a 20 millimeter gun,in addition to a battery of rockets and two 30 millimeter and 50 millimeter machine guns.

The Boomerang Special Transmission System is a rear suspension that was specially designed by ENGESA for 6x6 traction tire vehicles. All of the company's vehicles can operate at a speed of more than 100 kilometers/hour along difficult terrain.

The EE-9 Cascavel, a light and efficient combat car, is armed with a 90 mm gun and a 7.62 NATO coaxial auxiliary machine gun. It is faster than any other caterpillar-driven vehicle (like the X-1, which was also developed by the Brazilian Army) and has been in great demand locally and overseas. Its features are not as outstanding as the Urutu's and it is not amphibious. However, it can be used as a transport, an ambulance, a reconnaissance car and a command vehicle.

The Sucuri, another non-amphibious armored vehicle, is more powerful and has more modern firepower, although it is not used as a transport. The rockets, guns and machine guns that make up its weaponry are among Brazil's latest developments in this area.

ENGESA also manufactures the EE-15 and EE-25 trucks with 6x6 traction for the transport of men and materials.

8) Ships. The Brazilian Navy has undertaken the production and development of ships, both domestically designed and under license, that range from river patrol boats to missile-carrying frigates.

Under a 1970 British license it has manufactured frigates of the Niteroi variety with anti-submarine weaponry. Each unit displaces 3,500 tons and has a speed of 30 knots. The engines, both diesel and gas turbine, are from France, Germany and Great Britain, respectively. Its complete weaponry includes: Australian Ikara rockets, British Lynx helicopters, a British Vickers cannon, a Swedish Bofors/RL cannon and British Seacat surface missiles.

The Pedro Teixeira river patrol units, which were completed in 1974, are of domestic design and displace 700 tons, with a speed of 16 knots. They are powered by diesel motors and carry anti-aircraft weapons, machine guns and helicopter platforms.

Another patrol boat, the Roraima variety, is also diesel-powered and carries similar weapons, except helicopters; it displaces 340 tons, and production has now reached 5 units.

a) Electronic surveillance

Two years ago the Brazilian Air Force implemented the SISDACTA-I air defense and air traffic system to coordinate protection for civilian flights and surveillance in the Rio-Sao Paulo-Belo Horizonte-Brasilia quadrilateral. This region, which looks on a map like a birectangular

trapezoid, is one the country's most important strategic areas. The vertices of the quadrilateral are four of Brazil's most important cities, including the federal capital and populous Rio de Janeiro.

Within the quadrilateral, near Sao Paulo, there is Sao Jose dos Campos, the nerve center of the Brazilian aerospace industry with the EMBRAER, NEIVA and AEROTEC factories, in addition to military equipment plants. Midway between Sao Jose dos Campos and Rio, where the CMISM and the Marambaia center are located, there is Angra dos Reis, the site of the Brazilian nuclear powerplants.

On National Route 3, Rio-Belo Horizonte, the city of Juiz de Fora contains major production centers of the Armed Forces, and on the side of the trapezoid that links Sao Paulo with Brasilia, there is Pocos de Caldas, one of the country's main uranium deposits. Near Brasilia, on the route that links the federal capital with Goiania, the capital of the state of Goias, there is Anapolis, the headquarters of the First Air Defense Wing, which is equipped with Mirage fighter planes from France.

SISDACTA-I was undertaken in 1974 with the support of the French Government, which provided a $70 million loan as well as a large part of the equipment furnished by a French company. The system can automatically control air defense and traffic, process up to 2,000 flight plans a day and track up to 150 movements. SISDACTA-I can also direct several simultaneous interceptions of "unknown" aircraft by Mirage interceptors and surface to air missiles. The system's Automatic Computer Center, which is controlled by two computers, is able to receive, store and send 27,000 messages a day, identify errors and establish priorities.

Modern meteorological equipment set up at various strategic points around the nation transmit data to aid navigation and are also used to identify aircraft that enter Brazilian airspace.

9) The nuclear problem

Brazil's ambitious and accelerated nuclear program and its refusal to sign the Nuclear Non-Proliferation Treaty reflect a fear of losing hegemony and bargaining power in South America, as O ESTADO DE SAO PAULO pointed out on 27 January.

The paper stressed that there is solid opposition, both in the Armed Forces and among Brazilian politicians and diplomats, to the signing of the treaty, which "would leave the nation potentially inferior, in military terms, to Argentina." Argentina has not signed the treaty either and is in a position to manufacture an atomic bomb.

For their part, diplomats, again according to O ESTADO, "contend that if Argentina were to have the bomb, it would have an obvious political and psychological advantage in international talks."

Obviously, the idea of losing the "race" with its neighbor to the south (which is a pretext because Argentina has reiterated that it would not manufacture nuclear weapons) has led Brazilian circles to maximize the development of the country's military potential in weaponry and equipment and explains the emphasis that has been placed on the production of planes and rockets, which, after all, are vehicles that could deliver future nuclear weapons.

Conclusion

The suspension of U.S. military aid has accelerated Brazil's domestic development of arms, with an eye towards self-sufficiency. In addition, the confrontation with the United States over the socio-political problem of human rights and, above all, the technological and political problem of nuclear development, could prompt Brazil to speed up and take a tougher stand regarding its atomic programs and its supremacy in this field in the Southern Cone.

Nevertheless, common problems with Argentina are drawing the two countries of the Plata Basin together, and we are seeing signs of a new relationship between them.

To paraphrase a Latin American diplomat who used to say: "If Brazil sneezes, the OAS catches a cold, and if Argentina sneezes, the OAS catches a cold. But if they both sneeze at the same time, the OAS catches pneumonia," we could express the wish that a joint sneeze in the Plata Basin will attract attention and lead, in the future, to the good health of the continent.

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ARGENTINA'S INTERNATIONAL BORDERS

Buenos Aires ESTRATEGIA in Spanish No 46/47 May-Aug 77 pp 93-102

[Article by Col Aurelio Aristobulo Luchetti (retired)]

[Text] 1. Argentine International Border Demarcation Commissions

The Argentine International Border Demarcation Commissions began their activities as a direct branch of the Foreign Affairs Ministry as a result of the provisions of Decree No 7713 of 24 March 1947. Previously, in order to observe Argentina's various border treaties, the commissions had operated on an independent basis.

The commissions in charge of the borders with Bolivia, Chile, Paraguay (in the Pilcomayo River area from the Bolivian border until it empties into the Paraguay River) and Uruguay (on the Uruguay River) and the Boundary Marker Inspection Commission along the Brazil border are under the chairman of the Argentine International Border Demarcation Commissions.

Each one of these commissions teams with its namesake in the neighboring country to form the corresponding Joint Commission, whose mission is specified in the respective protocols.

In general, they do a topographical survey of a strip of land on both sides of the border, place boundary markers, determine their geographical coordinates and replace the ones that are in bad condition or that have disappeared for various reasons. In addition, they increase the amount of markers along the borders when it becomes essential to mark them more clearly, whether because of population growth in the area or due to other circumstances. In this sense the work of the joint commissions is practically a continuous one, as progress moves into the distant regions of the country, which are generally border zones.

The demarcation work is, in general, slow and costly, and one can appreciate the enormous sacrifices involved in it if one takes into account the vast length of our borders; our border with Chile alone extends about 3,600 kilometers, one of the longest in the world.

In many regions work can go on for only a few months during the year, since very adverse weather conditions make technical tasks impossible, as well as lengthy stays by the commission in the field. Moreover, the topographical features of many border regions include high, steep mountains and glaciers, impenetrable jungles or rambling rivers that change shape from year to year and flood adjacent lands, and this makes the transfer of personnel and the accomplishment of tasks very difficult, especially since many of these areas are desolate.

The topographical survey of a strip of land on both sides of the border is generally the basic preparatory operation for the future demarcation. It is usually done by aerial photogrammetry in the scale of 1:50,000 or more; when the terrain requires it, a map is then drawn up of the area on which the boundary line is plotted as it is established in the respective treaty and in all other official documents connected with the demarcation of the corresponding border.

Once the plotting of the boudary line has been approved by the joint commission, it becomes a legal document, and then work begins on marking the line in the field by setting up boundary markers in the most transitable spots and where population growth so requires. These operations involve a large number of personnel, tools and provisions, and enormous resources are needed to carry them out.

The demarcation delegates of the border commissions are technical officials who are in charge of directing and supervising the work that the field commissions do, but their basic mission is to demarcate the border. This means that together with their colleagues from the neighboring countries they set up or replace the international boundary markers in their proper sites and in accordance with the background information they have available. In this regard, their work involves great responsibility; before deciding on the boundary line in the field, they must be absolutely certain that they are accurately interpreting the border treaty and other legal documents on which they base their opinion. The placement of a boundary marker in the field is final and permanent and from that moment on determines the country's sovereignty in the demarcated area.

The work of the demarcation delegates is not limited to just the aforementioned technical task, that is to say, the demarcation of geographical borders. Along with this, they must to a certain extent bring together nations that are related by blood and tradition. The relations between the two countries depend greatly on the success or failure of their efforts.

The Military Geographical Institute works with the Argentine International Border Demarcation Commissions in their tasks by furnishing **technical**

personnel for field and office work. The Military Geographical Institutes of Chile and Argentina are helping in particular along the Chilean border in drawing up the border map in specific areas.

The work done by the Military Geographical Institutes is supervised by the Joint Border Commission and is independent of the work done by the latter with its own resources in the field of demarcation.

An inspector from the other country takes part in all of this work, which is why the commissions are joint ones.

Each border is determined by the respective border treaty, and we should make it clear that the task of the commissions is to interpret the treaties in the field and demarcate the border on the basis of them.

This does not rule out the possibility that on some occasions there might be differences of opinion among the inhabitants of a zone and even among the local authorities of the two countries concerning the true boundary line, especially when dealing with locations in which the joint commission has not yet worked and which therefore have not been demarcated.

In order to prevent border incidents in these cases, the joint commission decides to take charge of the problem and sends a joint subcommission made up of demarcation delegates into the field. It surveys the area and tries to determine the true location of the border by mutual agreement. If this is not possible, because it does not have sufficient information for a judgment, it orders a topographical survey on the appropriate scale so that it can later make an authoritative ruling on the boundary line. This is done in the attempt to prevent tense and irritating situations that could lead to complications which would make necessary the intervention of the two governments.

Interestingly enough, the mere presence in the field of the joint commission has prevented potential incidents through a clarification of the boundary line, and on more than one occasion the inhabitants have been put at ease when they realized that serious, capable and responsible technical personnel from both countries were fully acquianted with the situation and were working to resolve the problem.

The demarcation of a country's borders allows it to exercise sovereignty precisely and without doubts, precludes border incidents that disturb good relations between nations and makes possible the truly essential harmony and peace among peoples.

2. Status of Demarcation Work along Our Various Borders

a) Border with Bolivia

From the three-border Zapaleri boundary marker (Argentine-Bolivia-Chile) to the Condado zone, the boundary is determined by watercourses and straight lines.

The ends of the straight lines are indicated by markers placed on distinctive hills in the area as well as confluences of rivers and streams (boundary stones).

From the confluence of the Condado and Bermejo rivers to the Esmeralda boundary marker (Argentina-Bolivia-Paraguay) on the Pilcomayo River, the border is established by rivers, streams and a geographical parallel.

To mark the rivers and streams, boundary stones have been placed close to the border (along its entire length), and markers have been set along the geographical parallel to pinpoint the boundary line.

To provide an idea of the work that has been done, we can mention that because of the rambling characteristics of the Bermejo and Grande de Tarija rivers (the borders), 11 markers have been set up in the Juntas de San Antonio zone and 54 markers along these two rivers. Moreover, a map has been drawn up with a scale of 1:50,000 that comprises the area between La Quica and Quirquinchos and the geographical parallel between Yacuiba and D'Orbigny (on the Pilcomayo River), as well as another complete map in the scale of 1:100,000 that includes the Bermejo, Grande de Tarija and Itau rivers.

b) Border with Brazil

In 1970 the Border Commission was reestablished with the Federated Republic of Brazil. The boundary had been demarcated between 1901 and 1903.

All of the markers on the islands in the Uruguay and Iguazu rivers were inspected, replaced or rebuilt.

In the "dry border" zone between the source of the Pepiri-Guazu and San Antonio rivers, a topographical survey in the scale of 1:2,500 is being carried out to place more markers along the border.

The main polygon has been measured throughout the entire sector in order to furnish support points for drawing up the border map and to determine the precise coordinates for existing markers and those to be built. The geometric leveling and survey of three border zones have been done from the main boundary marker at the source of the Pepiri-Guazu River located near the town of Bernardo de Irigoyen.

Moreover, in addition to the reconstruction of markers that have been destroyed, 10 new ones have been set up, and another 7 were completed during the 1976 campaign.

The survey throughout the "dry border" will be completed in future field campaigns in order to determine the precise path of the boundary line and plan for the erection of new markers that will indicate the border zone more clearly and make possible a definitive topographical map.

c) Border with Chile

The Joint Argentine-Chilean Border Commission bases its activities on the following documents that govern the demarcation of the two countries' common border:

1) The Border Treaty of 23 July 1881
2) The 1 May 1893 Supplementary and Explanatory Protocol to the 1881 Border Treaty
3) The report on the Atacama Territory border from His Excellency the Special Envoy and Plenipotentiary Minister of the United States, Mr Williams I. Buchanan, of 24 March 1899
4) The report and maps of the Arbitration Tribunal, of 19 November 1902
5) The decision of His Majesty Edward VII, of 20 November 1902
6) The demarcation maps and the list of markers set up by the Holdich Commission in 1903
7) The 2 May 1904 agreement on the border north of parallel 23 of the southern latitude
8) The report of the arbitration court of 24 November 1966
9) The decision of Her Majesty Queen Elizabeth of the United Kingdom of Great Britain and Northern Ireland on 9 December 1966
10) The report of June 1967 by the director of military surveys to the Government of the United Kingdom conerning the work of the Demarcation Mission, and its corresponding appendices
11) The protocol on the replacement and location of boundary markers along the Argentine-Chilean border signed in Buenos Aires on 16 April 1941

Pursuant to the provisions of this last document, the joint commission approved a work and general arrangements program and its technical regulations. This regulates all of its administrative activities and sets forth the technical guidelines for the procedures it follows to draw up the border map and to make possible the subsequent task of demarcation. As stated in Article 1 of the 1941 Protocol, the task consists of replacing markers that have disappeared or are in bad condition, placing new interjacent markers wherever it is considered necessary and determining the precise geographic coordinates of all existing and future markers.

Zones Comprised by the Work of the Joint Commission

The joint commission carries out its activities in the entire jurisdiction between the Beagle Channel and the Zapaleri Hill tri-border boundary marker (Argentina-Chile-Bolivia). As of now, demarcation in the Beagle Channel itself is not within the competence of the commission.

In order to more efficiently organize the work programs and general documentation drawn up by the joint commission, the boundary line has been divided into the following 16 sections:

Section I: meridian of Tierra del Fuego, from the Beagle Channel to Espiritu Santo Cape
Section II: parallel -52 and the border to Dungeness Point
Section III: from parallel -52 to -50
Section IV: from parallel -50 to -48
Section V: from parallel -48 to -46
Section VI: from parallel -46 to -44
Section VII: from parallel -44 to -42
Section VIII: from parallel -42 to -40
Section IX: from parallel -40 to -38
Section X: from parallel -38 to -36
Section XI: from parallel -36 to -34
Section XII: from parallel -34 to -32
Section XIII: from parallel -32 to -30
Section XIV: from parallel -30 to -28
Section XV: from parallel -28 to -26
Section XVI: from parallel -26 to the Zapaleri Hill marker

Work Involved in the Mission of the Joint Commission

In accordance with Article 28 of the work program and general arrangements and pursuant to Article 3 of the 1941 Protocol, the joint commission must, prior to demarcation, have at its disposal a map of the pertinent area on which the approved boundary line is plotted.

The map is done on a scale of 1:50,000 and includes an at least 5 kilometer strip of land on both sides of the border. It is not only official and totally legally valid but it is also, and above all other considerations, a true international notarial instrument that demarcates the entire length of the boundary line, especially along the sections of the line between the markers. In this sense it accomplishes a more effective and permanent goal than the markers, which can wear out. This is in fact the case because the maps will reveal the line along the sections in which markers have not been placed or have disappeared.

The land survey that will yield the map is the first task that the joint commission undertakes along the entire border. The boundary line is determined on the map in accordance with existing official documents, and once it is approved, demarcation work begins with the placement of new markers at the sites considered necessary.

The land survey requires a series of complementary tasks that must be carried out in progressive and orderly fashion, in accordance with a work program for each period in the field that is approved by the joint commission at its yearly plenary meetings. The following field work is done in each zone to be surveyed:

1) aerial photogrammetrical surveys
2) precise astronomical measurements
3) measurement by main triangulation or polygonation and the link-up of existing markers
4) determination of support point coordinates for aerial photographs

Subsequent office tasks include:

1) calculations of all measurements taken in the field
2) aerotriangulation
3) drawing up topographical sheets
4) provisional printing of these sheets

After an in-the-field control inspection and once the sheet is approved, the line is plotted, and then work begins on demarcation.

All of these stages are approved one by one by the joint commission at its plenary meetings, and when each section has finished all of its work, the definitive legal and technical report is drawn up.

A meeting of the joint commission in Balmaceda (Chile) in 1965, which was attended by the Argentine and Chilean ministers of national defense, made it clear that the cooperation of the two countries' Military Geographical Institutes was needed in an accelerated border survey program under the supervision of the joint commission, in light of the enormity of this task along our entire common border and the urgency of completing it as soon as possible in order to forestall frictions between the two countries stemming from inadequate border markings in certain areas. This program is currently under way, after successive delays due to lack of funds, helped by the agreements between the two governments which have furnished the most modern tools for the task, within the range of their possibiltties.

Current Status of Work

Section I: all field work completed; calculations far advanced.
Section II: all field work completed.
Section III: all field and calculation work completed, except in the continental icecap zone, for which new techniques are required because of the inherent difficulties; charting work under way for maps.
Section IV: field and calculation work completed, except in continental icecap zone; charting work on maps far advanced.
Section V: all field and calculation work completed.
Section VI: maps charted; only remaining activities are field check and study of border plotting on sheets V-1 to V-5, inclusive, V-7, V-8 and V-15.
Section VII: all work completed, with definitive legal and technical report published.
Section VIII: same as VII.

Section IX: all field work completed; map charting work under way.
Section X: 90 percent of field and calculation work completed; map sheets drawn up for half of section, as well as field checks.
Section XI: field work completed.
Section XII: 75 percent of field work completed.
Section XIII: astronomical measurements and aerial mapping completed, as well as 85 percent of main polygonation, link-up of markers and land support.
Section XIV: aerial mapping and astronomical measurements completed.
Section XV: aerial mapping completed and 33 percent of astronomical measurements.
Section XVI: aerial mapping and astronomical measurements completed; 10 percent of main polygonation work and aerial mapping support completed; all field and calculation work completed.

d) Border with Paraguay

The joint commission was set up under the Complementary Treaty on Definitive Borders, which established the boundary line in the Pilcomayo River from the Esmeralda common border point (Argentina-Bolivia-Paraguay) to the mouth of the Paraguay River. Therefore, it is still not authorized to operate along the rest of the border in the Paraguay and Parana rivers.

The Pilcomayo River is a rambling watercourse and can change direction at each swelling, especially at points where its course switches suddenly.

This border is divided into three sectors, which are each broken down into two sections:

I. The Sector between Puerto Pilcomayo and Salto Palmar
II. The sector between Salto Palmar and Point Horqueta
III. The sector between Point Horqueta and Esmeralda

The third sector, which is the zone between the Esmeralda common border marker on the Bolivian border and the point called Horqueta, is about 260 kilometers long. It has been demarcated with boundary stones that have not been placed on the boundary line itself, for various reasons. In this case the river is an obstacle, and they have been placed away from the boundary line where it is felt that their stability is insured. Distances are measured from the marker to the border, and a border map is also being drawn up that will pinpoint the position of the river border, no matter what future changes in its course might occur.

The river is no longer present in the second sector. Because of successive diversions that have taken place, this border sector is

currently a "dry border." Of the two sections in it, the second one has been completely demarcated, in other words, the more westerly section, which is between Horqueta Point and a point near Destacamento Isleta and is about 100 kilometers long.

To complete the second sector, demarcation has to be performed on the zone between Destacamento Isleta and Salto Palmar, which is a straight line about 64 kilometers long. Years ago there had been a plan to build the Estero Patino Canal here for the purpose of extending the Pilcomayo River.

In fact, this river had a large area in which it subsided into swamps, and the continuation of the border follows the southern arm of the Pilcomayo River, which originates practically in Salto Palmar and eventually empties into the Paraguay River near the Argentine town of Clorinda (Formosa).

The demarcation has been done in the first sector from Salto Palmar eastwards over about 110 kilometers.

Boundary stones on both sides of the Pilcomayo River mark the border in the area that has already been delimited.

The boundary markers were placed approximately every 4 kilometers, and the field work is being completed with a topographical survey of the zone.

The tasks involved are made especially difficult because of the swamps and low-lying,easily flooded areas as well as the broad stretches of land near the border that are covered with forest, where long and wide trails have to be opened up not only to do the measurements but also to facilitate the passage of vehicles.

The upcoming field work will continue the demarcation up to where the Pilcomayo River flows into the Paraguay River.

e) Border with Uruguay

The joint commission was the outcome of the Uruguay River Border Treaty between the Argentine Republic and the Eastern Republic of Uruguay that was signed on 7 April 1961 and ratified on 19 January 1966.

The first task that the joint commission undertook was to identify all of the islands and islets specified in the treaty, as well as others in the Uruguay River whose ownership would have to be determined.

After this, all of the necessary topographical work was carried out for the subsequent charting of the border map in the sector that under the treaty

is bounded by the center line in the Uruguay River. This sector, which is about 150 kilometers long, is located between "a line approximately perpendicular to the two banks of the river and that passes near the southwest point of the Brazilian island" (Brazil border) and "the Ayui area (the section where the Salto Grande Dam is being built)."

The preparatory office work is now under way for the charting of the map on which the joint commission must later determine and draw the boundary line.

In addition, boundary markers have been set up on the banks of the Uruguay River to delimit: the northern border; the section of the Salto Grande Dam and the Gorda Point parallel, the extreme southern border in this river.

The border has been determined for the section of the dam being built at Salto Grande, and the international boundary line has been established and designated with markers on the Paysandu-Colon and Fray Bentos-Puerto Unzue bridges.

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