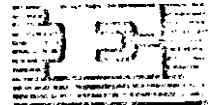


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Eighth Session  
Panama City, Panama, May 1959

PRELIMINARY REVIEW OF QUESTIONS RELATING  
TO THE DEVELOPMENT OF INTERNATIONAL  
RIVER BASINS IN LATIN AMERICA

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Note by the secretariat

At its seventh session (La Paz, Bolivia, 15-29 May 1957), the Economic Commission for Latin America adopted resolution 131(VII) recommending to the secretariat that "it approach the Governments of the Latin American countries to the end that the utilization of rivers and lakes situated in international hydrographic basins, for hydro-electric energy, irrigation, navigation and any other useful purposes to which they may lend themselves, be effected on the basis of adequate planning undertaken by international technical commissions".<sup>1/</sup>

Previously, pursuant to resolution 99(VI), the secretariat, together with the Technical Assistance Administration and the World Meteorological Organization, had established a joint Working Group on water resources.

As a preliminary step towards compliance with resolution 131(VII), the secretariat requested Mr. Guillermo J. Cano, the expert on juridical and administrative matters serving on the above-mentioned Working Group, to prepare the present documents. The author assumes responsibility for the accuracy of the data cited and for the opinions expressed therein.

The aim of this review is to give an objective account of the main aspects of the topic - on the basis of such data as were available - and thus to offer a broad preliminary picture of the whole problem, and especially of those of its facets which may affect the future economic utilization of international river basins in Latin America. As the present text is not a final version, comments will be duly appreciated and used as a basis for more thorough study of the question.

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<sup>1/</sup> Annual report (E/2998), p. 35.



## I. WHAT IS MEANT BY "INTERNATIONAL RIVER BASINS"

1. The subject of this study is non-maritime international waters.

The term "international" is not meant to signify that the waters concerned are under joint sovereignty or joint international administration. Thus, for example, the Argentine-Chilean treaty on frontiers<sup>1/</sup> states that each country has "exclusive" jurisdiction over that part of boundary rivers and lakes, or of those that flow through or lie in both territories in succession, which falls on the hither side of its frontier. This would seem to exclude the concept that such waters are international in favour of the idea that each distinct part is "national", pertaining solely to the country concerned. On the other hand, the agreement between Bolivia and Peru on Lake Titicaca<sup>2/</sup> expressly establishes their joint sovereignty. Thus, when reference is made in the present study to international waters or river basins, allusion is intended only to the physical fact that the river or lake in question is on the boundary between two or more countries, or rises in one and flows across the frontier into the other, leaving aside the juridical implications.

2. The waters under consideration here are those of a "non-maritime" nature. The term "fresh water" might have been used were it not for the existence of cases like that of Lake Assuei, between the Dominican Republic and Haiti, whose waters are saline but not maritime.

3. Considerable significance attaches to the use of the term "river basins", since it covers both the territory or watershed feeding a lake or river, and the waters themselves. In fact, both elements - earth and water - constitute the physical or geographical unit which must be jointly administered if economically optimum results are to be obtained, since these two elements are interdependent, and neither can be properly managed without due regard to the other. They may also be affected by

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<sup>1/</sup> Treaty between Argentina and Chile of 23 July 1881 and supplementary protocol dated 1 May 1893.

<sup>2/</sup> Agreement between Bolivia and Peru of 19 February 1957.

and interdependent with other features of the same area, such as forests. The global concept of "river basin" includes not only surface water, whether running or stagnant (lakes), but also the contiguous ground water, and even the meteoric waters (clouds, etc.) which may influence the physical and economic characteristics of the river basin. All the waters pertaining to a basin, whatever their physical status, are interdependent and form a complete cycle.

The International Law Association, at its 48th Conference (New York, September 1958), adopted the same definition,<sup>3/</sup> with all the implications that are discussed here. This is important because it shows that jurists too have recognized the desirability of the integrated and co-ordinated management of river basins, even when they are international,<sup>4/</sup> a concept which has already been fully developed by economists.

4. Maritime waters are not dealt with in this or in other similar studies carried out by the Economic Commission for Latin America (ECLA) on water resources, not because their nature precludes it, but rather for reasons relating to method, availability of means and differences in utilization techniques. Foremost among the factors warranting their exclusion is the circumstance that certain physical bounds are set to the material jurisdiction of Governments over maritime waters, whereas over inland waters it is complete, to such a point that individuals may even be granted exclusive usufruct of certain parts of the waters concerned. Secondly, the uses to which inland waters can be put meet more urgent needs - the first of which is to slake human thirst - and the technology involved is relatively easier. But the day is not far distant when maritime waters too must command more definite attention from economists and technical experts; according to an estimate of the use of water in the United States in 1950,<sup>5/</sup> out of a total daily consumption of 635.9

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<sup>3/</sup> Declaration dated 7 November 1958: "Heads of unanimous agreement", 4; "Agreed principles of International Law", 1. The term "drainage basin" is used therein and defined.

<sup>4/</sup> Integrated river basin development (E/3066), United Nations publication, Sales N°: 1958.II.B.3.

<sup>5/</sup> Jack R. Barnes, Water for United States Industry.

million cubic metres, 56.8 million (or 8.9 per cent) were salt water, used especially for chilling purposes. Again, the growing food requirements of the world population are arousing steadily increasing interest in industrial deep-sea fishing, as well as in maritime transport in general. Lastly, more and more attention is being devoted by Governments - including those of the countries members of ECLA<sup>6/</sup> - to the production of tidal energy.

5. There are waters which, although under the jurisdiction of one or several countries, are important to others not forming part of the river basin. Utilization of these has been described as "of international importance", and passing references are made to them in this study, although the waters concerned are not, strictly speaking, international, in the sense defined above (paragraph 1). The Rivers Acaray and Monday may be cited, among others, as cases in point in Latin America. Although they are tributaries of the River Plate system, their course lies entirely within Paraguayan territory, and they do not coincide with the frontier of Brazil. On 20 January 1956, however, at Rio de Janeiro, Brazil and Paraguay signed a co-operation agreement under which Brazil undertake to finance the studies and ultimately the construction of the works required for hydroelectric utilization of the rivers in question, receiving in return, over a period of 20 years, up to 20 per cent of the energy produced, for which it was to pay at cost price.

6. International hydroelectric grids, while they have no bearing on international water resources, do create problems, at the international level, as regards the programming of development of a particular country's water resources, and international agreements may have to be concluded before they can be made. Such a possibility is illustrated by the studies showing that hydroelectric development projects based on Lake Yojoa and the River Lindo in Honduras may prove more useful if they are linked with

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<sup>6/</sup> In 1957, the Argentine Government contracted for a study of this type relating to the Valdéz peninsula, on the Atlantic seaboard. The topic was also discussed in the course of the symposium on water resources organized by the Universidad de Cuyo (9-14 December 1957) and sponsored by ECLA.

others which El Salvador has under way in its territory, on the River Lempa.<sup>7/</sup>

## II. IMPORTANCE OF THE TOPIC

7. In quantitative terms, the waters of international river basins far exceed those entirely under the jurisdiction of individual countries. In the case of a single country - Argentina - one author<sup>8/</sup> has calculated that they account for 76.5 per cent of its total water resources, while other estimates raise the figure to 87.1 per cent.

According to another writer,<sup>9/</sup> the annual run-off of water throughout the world amounts to 13 000 million acre/feet, with the Soviet Union, China and Central Europe accounting for 3 330 million. The remaining 8 660 million may be broken down as follows:

|                            | <u>Thousands of millions of acre/feet of water</u> |
|----------------------------|--|
| Amazon and Congo           | 4.00   |
| Other international rivers | 2.30   |
| National rivers            | 1.61   |

These figures show the quantitative importance of the waters of international river basins in relation to the total run-off, even within Latin America, since among the Latin American rivers, besides the Amazon, must be reckoned the basins of the River Plate and the Orinoco.

Daily consumption of water in the United States in 1950, as stated above, was calculated to be 635.6 million cubic metres,<sup>10/</sup> and estimates suggest that 25 years later, in 1975, it will amount to almost double that quantity (1 230.3 million). Although this figure was computed for a country whose economic structure is different from that of the Latin

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<sup>7/</sup> Renato Salazar, El desarrollo eléctrico de Centroamérica (Electricity development in Central America) (TAA/LAT/9) (Spanish only), p. 60.  
A. Pfaff, A. Desneiges and F. Bordrionnet, Informe preliminar sobre la electrificación en América Central (Preliminary report on electrification in Central America), (ST/TAA/J/CENTRAL AMERICA/R.1) (Spanish only), pp. 124 and 129.

<sup>8/</sup> Carlos A. Volpi, Aprovechamientos hidroeléctricos internacionales (International utilization of hydroelectric resources), Buenos Aires, undated, pp. 11 and 13.

<sup>9/</sup> W.A. Dexheimer, International water problems and progress made through treaties, compacts and agreements, World Power Conference, Rio de Janeiro, 1954.

<sup>10/</sup> Jack R. Barnes, op. cit., p. 27.



American republics, it serves to call attention to the fact (to which more thorough attention has been devoted in other ECLA studies) that world demand for water is steadily increasing. Since less use is made of the waters of international river basins than of others, for a variety of reasons, it is particularly important to eliminate those factors which hinder or delay their utilization.

### III. INTERNATIONAL RIVER BASINS IN LATIN AMERICA

8. Table 1 presents some information concerning the international river basins of Latin America. The six most important have been placed in the first group, and from then onwards the order followed is from north to south and from west to east. Totals on the right show the number of countries concerned with each river basin, and those at the foot the number of international river basins in which each country has a share. It should be noted that river basins are mentioned only the the name of the main river, and that the tributaries are not listed. The symbol "cc" (curso contiguo) has been used to denominate boundary waters of those whose course is contiguous to two countries, and the symbol "cs" (curso sucesivo) to indicated successive rivers, or those which do not border a country but cross the territory of two or more. The double symbol "cc/cs" denotes waterways that fall into both categories. Names underlined indicate river basins whose systems include lakes.

### IV. PRESENT OR FUTURE USES OF CERTAIN INTERNATIONAL RIVER BASINS IN LATIN AMERICA

#### 1. River Amazon

9. Although the greater part of the Amazon river basin lies in Brazilian territory, Brazil is not the only country concerned with its development. In fact, the territories of Colombia, Ecuador and Peru are split from north to south by the Cordillera of the Andes, and the most natural and easiest outlet for the areas to the east of the mountain ranges is by the navigable rivers that flow into the Atlantic. This might also be true of the north-east of Bolivia. The possibility of economic integration of these similar areas in different countries also derives from the fact that the crest of the Andes marks a physical dividing-line which

/Table 1

Table 1

LATIN AMERICA: INTERNATIONAL RIVER BASINS AND COUNTRIES CONCERNED <sup>a/</sup>

| River basin <sup>b/</sup>             | Argentina | Bolivia | Brazil | Chile | Colombia | Costa Rica | Dominican Republic | Ecuador | El Salvador | Guatemala | British Guiana | French Guiana | Haiti | British Honduras | Honduras | Mexico | Nicaragua | Paraguay | Peru | Surinam | United States | Uruguay | Venezuela | Total |
|---------------------------------------|-----------|---------|--------|-------|----------|------------|--------------------|---------|-------------|-----------|----------------|---------------|-------|------------------|----------|--------|-----------|----------|------|---------|---------------|---------|-----------|-------|
| Amazon (cs)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           |       |
| River Plate (co/os)                   | x         | x       | x      |       | x        |            |                    | x       |             |           | x              |               |       |                  |          |        |           | x        | x    |         |               | x       | x         | 7     |
| Orinoco (cs)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           |       |
| Lake Titicaca (co)                    |           | x       |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lampa (co/os)                         |           |         |        |       |          |            |                    |         | x           | x         |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Guaja (co)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  | x        |        |           |          |      |         |               |         |           | 2     |
| R. Grande (co/os)                     |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Tiguana (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Colorado (co)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Hondo (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Suohiate (co/os)                      |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Usunacinta (co/os)                    |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Chiapas (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Belize (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Sarstoen (co/os)                      |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Notagua (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| La Paz (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Goasocardin (co)                      |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Sinipul (co/os)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Negro (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Coco (co)                             |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Nicaragua                        |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| y San Juan (co)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Chiriquí Viejo (co)                   |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Sizola (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Canal de Panamá (cs)                  |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| La Miel (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Artibonite (co)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Assuel (co)                      |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Massara (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Federmates (co)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Zulia (co/os)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Catatumbo (co)                        |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Táshira (co/os)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Mataje (co/os)                        |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Mira (co/os)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Patía (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Zarumilla (co)                        |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Túmbez (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Chira (co/os)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Blanca (co)                      |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Uchusuma and Mauri canals (co)        |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lauca (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Cansosa (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Todes Santos (co)                     |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Caquena (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Sabalari (co)                         | x         |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Hua Hum (Calle Calle) (co)            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| La. Gris (co)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Puelo (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Yelcho (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Palena (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Aysén (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Baker (co)                            |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Pasqua (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| "Continental shelf" and icebergs (co) |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Serrano (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Gallagos (co)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Gullen (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| San Martín Grande (co)                |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Fagnano (co)                     |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Cuyuni Cerentino (co)                 |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Marent (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Oyapoc (co)                           |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Lake Merim (co)                       |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Cuaraim (co)                          |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Yaguarón (co)                         |           |         |        |       |          |            |                    |         |             |           |                |               |       |                  |          |        |           |          |      |         |               |         |           | 2     |
| Total                                 | 17        | 7       | 6      | 22    | 9        | 3          | 4                  | 7       | 5           | 10        | 3              | 2             | 4     | 3                | 6        | 7      | 3         | 4        | 1    | 7       | 2             | 4       | 4         | 6     |

a/ Excluding Cuba, which has no river basins of this kind.

b/ In each case the only name mentioned is that by which the river is known at its mouth, although it may be the tributaries alone that coincide with national boundaries or that flow from one country into another. Hydrographic basins of which the names are underlined include lakes.

co: Boundary waters.

os: Successive rivers.

/accounts for

accounts for the great differences in flora, fauna and natural conditions between the east of the Andes and the western side which slopes towards the Pacific.

The biggest falls, capable of producing abundant electric energy are more common near the sources of the Amazon in the Andes than in its lengthy course across the plains, and although for the time being the population around the upper reaches is too sparse for electricity development to be a matter of immediate interest, it is equally true that the pressure of population in the areas referred to may be one of the results of the development of the river basin from other points of view, such as that of inland navigation. Moreover, the Andean portion of the Amazon basin may be assumed to abound in mineral raw materials, a circumstance which directly affects electricity development.

Although the Amazon basin seems to offer little interest from the standpoint of irrigation works, flood control and adequate drainage, on the other hand, may bring under cultivation vast tracts of land which today are infertile.

10. In 1948 the United Nations Educational, Scientific and Cultural Organization (UNESCO) promoted<sup>11/</sup> the initiation of scientific and social studies on the Amazon basin which might supply background information on which to base the programming of its economic development. The international convention signed on that occasion, which provided for co-operative action on the part of all the countries with territory in the river basin and some outside it, has not been ratified by a sufficient number of the signatories.

11. Brazil and Peru signed at Lima, on 29 November 1957, a convention setting up a joint commission, the aims of which included the study of "existing navigation conditions on rivers common to both countries in the Amazon basin, and of the measures required to promote fuller utilization of these means of communication", including the prospect of establishing free ports.

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<sup>11/</sup> Convention dated 10 May 1958, signed at Iquitos (Peru) by UNESCO, Bolivia, Brazil, Colombia, Ecuador, France, Italy, the Netherlands, Peru and Venezuela, to create the International Institute of the Hylean Amazon. It has been ratified only by Ecuador and France. See UNESCO/NS/ILHA/10 and annex 1 and UNESCO/NS/ILHA/16 (1948).

12. Brazil has made provision for the financial and institutional resources needed for the development of its share in the Amazon basin,<sup>12/</sup> since this is an express obligation of the Government under the Constitution.

13. With similar ends in view, Peru also organized the Peruvian Amazon Corporation (Corporación Peruana del Amazonas) which operates a river fleet and concerns itself with the development of rubber, pulp and vegetable oil production.<sup>13/</sup> There are some descriptive studies of navigation on the Peruvian tributaries.<sup>14/</sup>

## 2. River Plate system

14. The River Plate system includes the two major tributaries of the River Plate itself, the Uruguay and the Paraná, as well as the minor tributaries flowing into the latter, i.e. the Paraguay, the Pilcomayo and the Bermejo.

The Organization of American States (OAS) prepared a preliminary study laying particular stress on the use of this river system as a means of transport,<sup>15/</sup> but also considering other possibilities, such as energy production and flood control. Other United Nations studies approach the problem of navigation with special reference to the Paraguay,<sup>16/</sup> and to certain international questions relating to that river.

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<sup>12/</sup> Brazil, Act N° 1806 (6 January 1953), setting up the Programming Authority for the Economic Development of the Amazon Basin (Superintendencia del Plan de Valorización Económica de la Amazonía).

<sup>13/</sup> Peruvian Amazon Corporation Memoria 1950 Report 1950 Lima, 1950.

<sup>14/</sup> Frank Rosten, "The Marañón River Region", Peruvian Times Lima, 20 June 1958, p. 7.

<sup>15/</sup> Organization of American States, Transporte y crecimiento económico: El sistema del Plata (Transport and economic growth; The River Plate system), Document N° 11, presented at the OAS Economic Conference (Buenos Aires, 1957), pp. 138 and 143.

<sup>16/</sup> Jean Aubert, La navigation intérieure du Paraguay (Inland navigation on the River Paraguay) (ST/TAA/J/PARAGUAY/R.1), p. 19.

15. Government attention has been devoted to certain partial projects for the development of sub-basins. As regards the river Uruguay, the prospects held out by the Salto Grande project are twofold. The first is the installation of a potential capacity of 1 500 000 kW and the provision of 6 000 million kWh annually to serve both banks of the River Plate, which are densely populated (about 10 million inhabitants) and industrialized. The second is the extension of the stretch of river navigable for 9-foot boats to 1 000 kilometres, in the interests of Argentina, Brazil and Uruguay.<sup>17/</sup>

16. The Rincón del Bonete hydroelectric dam in Uruguay, with an installed potential of 120 000 kW operates on the River Negro, a tributary of the Uruguay and thus part of the River Plate system.

17. In connexion with the Argentine stretch of the Paraná, certain preliminary studies relate to works which might enable a substantial hydroelectric potential to be installed and facilities provided for the irrigation of arid zones some distance away.

18. Argentina and Paraguay have begun a study of the Apipé Rapids on the Upper Paraná, with a view to the installation of a potential of 1 500 000 kW and a considerable increase in navigation facilities, as far as the Guayra falls in Brazilian territory, which constitute an insuperable barrier.<sup>18/</sup>

19. Argentina and Brazil have also studied the prospects for energy production at the Iguazú falls, but consideration has been given only to a maximum of 700 000 installed kW, so as not to mar the beauty of the famous view, since the economic importance of the latter from the standpoint of the tourist industry may be greater than that of utilization of the same waters for energy purposes.<sup>19/</sup>

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<sup>17/</sup> Energy in Latin America (E/CN.12/384/Rev.1), United Nations publication, Sales N°: 1957.II.G.2, p. 68.

<sup>18/</sup> Ibidem.

<sup>19/</sup> Ibidem, and Miguel S. Marienhoff, Régimen y legislación de las aguas públicas y privadas Control and legislation of public and private waters, V. Abeledo, Buenos Aires, 1939, p. 382.

20. The Government of Argentina is making an intensive study of the development of the basin of the River Bermejo, which rises in Bolivia and runs into the Paraná.<sup>20/</sup> The project includes dams to regulate the flow, and the construction of two canals, navigable for 7.5-foot vessels, of which one would be 728 and the other 1 050 kilometres long, and which would provide the whole of the north of Argentina, as well as the south of Bolivia, with inland waterway approaches to the Paraná, and thus to the sea. In addition, the projected works would permit the irrigation of a further 500 000 hectares and the production of 1 000 million kWh yearly.

21. Regulation of the channel of the Pilcomayo (Argentina-Bolivia-Paraguay), a tributary of the Paraná, which has also been the subject of preliminary studies, would serve two purposes, namely, flood control, which would enable large tracts of land to be farmed that at present cannot be utilized, and the opening-up of the river for navigation to serve the adjacent parts of the three countries concerned. Hydroelectric works at Puerto Margarita, on the Bolivian stretch of the river,<sup>21/</sup> by virtue of which the flow could be regulated, are also under study. Lastly, studies exist on projects for irrigation by pumping at Villa Montes (Bolivia), but countries farther downstream have raised objections, because the works concerned would reduce the summer flow.<sup>22/</sup>

22. Allusion has already been made (see paragraph 5) to possible hydroelectric works on the Rivers Acaray and Monday, tributaries of the Paraná.

23. The River Plate is not only used by the shipping of Argentina, Uruguay and the other countries whose territories form the river basin, but also supplies the household, municipal and industrial water requirements of the large towns on its banks.<sup>23/</sup>

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<sup>20/</sup> Argentine, Comisión Nacional del Río Bermejo, Canales proyectados para lograr el aprovechamiento integral del Río Bermejo (Buenos Aires, 1957).

<sup>21/</sup> Alfred Bennet, La energía hidroeléctrica en Bolivia (TAA/BOL/4), pp. 10 and 30; and Energy in Latin America (E/CN.12/384/Rev.1), United Nations publication, Sales N°: 1957.II.G.2, p. 68.

<sup>22/</sup> Ibidem.

<sup>23/</sup> Marienhoff, op. cit., p. 380. A summary account of the river's juridical status is given.

### 3. River Lempa-Lake Güija system

24. Lake Güija lies on the boundary between El Salvador and Guatemala and a recent treaty<sup>24/</sup> makes provision for its utilization to produce hydroelectricity, as well as for the indemnification necessitated by the flooding of part of Guatemala's territory which will result from regulation of the lake. El Salvador has pledged itself to supply Guatemala with up to 5 000 kW.<sup>25/</sup>

25. El Salvador has constructed and is already operating the 5 de Noviembre hydroelectric works at Guarajambala, on the River Lempa, of which the installed potential will reach 120 000 kW. Part of the course of the Lempa is contiguous with Honduras. Allusion was made above (see paragraph 5) to the possible future inter-connexion of this plant with those projected by Honduras on Lake Yojoa-River Lindo.<sup>26/</sup>

### 4. Lake Titicaca

26. Eight different schemes have been sketched out for the utilization of this Bolivian-Peruvian lake.<sup>27/</sup> Two of these suggest that its waters should be diverted towards the Pacific, for hydroelectric purposes and for the irrigation of land in Chile and Peru; five propose works whereby they could be carried down to the Atlantic, by way of the Amazon, also for hydroelectric purposes; and one is a project to be carried out within the hydrographic basin itself, on the outlet river (the Desaguadero). Three international agreements have been signed in relation to the utilization of these waters by the countries on their shores.<sup>28/</sup>

<sup>24/</sup> Treaty of 15 April between El Salvador and Guatemala.

<sup>25/</sup> See TAA/LAT/9, pp. 60 and 158; and ST/TAA/J/CENTRAL AMERICA/R.1, p.127.

<sup>26/</sup> See ST/TAA/J/CENTRAL AMERICA/R.1, pp. 86, 123, 126 and 131; TAA/LAT/9, p. 60; Central American economic integration: Development and prospects (E/CN.12/422), p. 52; André Pfaff, "Les ressources hydroélectriques de l'Amérique Centrale", La Houille Blanche, N° 5, Grenoble, November 1956, p. 679.

<sup>27/</sup> TAA/BOL/4, pp. 10 and 32. Energy in Latin America (E/CN.12/384/Rev.1), op. cit., p. 68. S. Baldomar, "Puntos de vista adversos al convenio con el Perú sobre aguas del Titicaca" El Diario, La Paz, Bolivia, 18 December 1958. See also paragraph 5 above.

<sup>28/</sup> Agreements between Bolivia and Peru of 17 July 1935, 30 July 1955 and 19 February 1957.

### 5. Lake Nicaragua-River San Juan

27. The whole of Lake Nicaragua lies within the country of which it bears the name, but its outlet river, the San Juan, partly coincides with the boundary between Nicaragua and Costa Rica. The project for hydroelectric utilization of the lake, with an installed potential in the neighbourhood of 170 000 kW, will have to make provision for the navigability of the River San Juan and even take into account Costa Rica's prospects of using it for irrigation purposes.<sup>29/</sup> In 1952, transport services on Lake Nicaragua carried 279 000 passengers and 8 400 tons of cargo.<sup>30/</sup>

### 6. River Cocos (or Segovia)

28. It has been recommended that a study be made of the feasibility of future exploitation of the water resources of this international river basin common to Honduras and Nicaragua, which is also used for navigation.<sup>31/</sup>

### 7. Rivers flowing through Mexico and the United States

29. Reference must be made to these river basins because their Mexican waters fall within ECLA's sphere of operation. The rivers concerned are the Colorado and the Tijuana, which flow into the Pacific Ocean, and the Rio Grande, which finds its outlet in the Atlantic. These three river basins have been the subject of various treaties, and are now intensively utilized.

The Rio Grande is the site of the Falcon Dam, built jointly by the two countries. This dam has a hydroelectric potential of 300 000 kW, and is also used for irrigation and flood control. Downstream it is supplemented, for this last purpose, by the Anzaldúas diversion dam.

The Morelos diversion dam operates on the River Colorado.<sup>32/</sup>

<sup>29/</sup> ST/TAA/J/CENTRAL AMERICA/R.1, pp. 196, 121, 125, 127 and 131. Central American Economic Integration: Development and prospects (E/CN.12/422), p. 52. André Pfaff, op. cit., p. 688.

<sup>30/</sup> Transportation in Central America (E/CN.12/356), pp. 277 and 712.

<sup>31/</sup> ST/TAA/J/CENTRAL AMERICA/R.1, pp. 107 and 108. Transportation in Central America (E/CN.12/356), p. 279.

<sup>32/</sup> Energy in Latin America (E/CN.12/384/Rev.1), p. 68. See also International Boundary and Water Commission (United States and Mexico), Minutes 192 (7 November 1949), 195 (6 May 1950), 197 (30 June 1951) and 196 (18 December 1950).



## 8. River Orinoco

30. For the time being, Venezuela alone is developing the Orinoco river basin. In addition to the Caroni hydroelectric project, where 300 000 kW are being installed,<sup>33/</sup> all obstacles to navigation have been eliminated on the lower reaches of the river, so as to provide an outlet for the production of Venezuela's big iron deposits.

### V. INTERNATIONAL DOCUMENTS INVOLVING THE DEVELOPMENT OF INTERNATIONAL RIVER BASINS IN LATIN AMERICA

#### 1. Treaties and conventions

31. A list (complete up to November 1957) of the treaties and conventions on international river basins signed by all the countries of North, Central and South America can be found in a publication issued by the Inter-American Bar Association.<sup>34/</sup>

Table 2 comprises solely treaties and conventions relating to river basins in Latin America (including those pertaining to both Mexico and the United States), and only such as contains clauses aimed at promoting the development of the hydrographic basins in question. In a large number of treaties, international waters and rivers are mentioned merely as marking political boundaries between the signatories, or in order that these latter may recognize one another's navigation rights. Instruments of which the scope extends no farther than this are irrelevant to the present study, and do not appear in table 2, which comprises only the treaties and conventions that may result in economic utilization of the waters of the basins involved, and those setting up international bodies whose terms of reference have some bearing on such waters.

What is most impressive about this list is its brevity. It includes no more than 22 instruments, of which only 12 countries are signatories and in which only 8 different hydrographic basins are involved. This contrasts with the fact that in table 1, as many as 68 international river basins in

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<sup>33/</sup> José F. Olalquiaga, Algunos antecedentes para la programación del sector energía (Background data for the programming of the energy sector), Caracas, Venezuelan Development Corporation (Corporación Venezolana de Fomento), 1958, p. 14.

<sup>34/</sup> See Guillermo J. Cano, "The Juridical Status of International (Non-maritime) Waters in the Western Hemisphere", Inter-American Bar Association, Principles of Law Governing the Uses of International Rivers and Lakes (Library of Congress, Catalogue Card N° 58-12112), Washington, 1958, pp. 108 et seq.

Latin America are listed, and shows that the action of the various countries in this field is not proportionate to the amount of international water resources available, or to the possible present or future economic importance of their development for the countries concerned.

## 2. Other international documents

32. The VII Pan American Conference passed a Declaration (Montevideo, 24 December 1933) recommending principles for the agricultural and industrial use of international rivers. This Declaration followed upon a report by the Pan American Union's Permanent Committee on Codification of Public International Law (Rio de Janeiro, 23 July 1932), drawn up by Clovis Bevilacqua.<sup>35/</sup> The delegations of Mexico and Venezuela endorsed it with reservations, that of the United States abstaining. As a declaration, it imposed no obligation upon any of the countries voting in its favour although it undoubtedly constitutes an important element in the creation of international river law, and, in default of legally binding agreements, might be accessorially taken into account by the International Court of Justice.

The Declaration in question alludes in the first place to studies on development projects or activities, recommending that if the country in whose territory they should be carried out is not willing to undertake them directly, it should allow the other interested States to do so on their own account.

As regards works and projects in connexion with the exploitation of contiguous or successive rivers, the Declaration establishes the exclusive right of each State to use the water in that part of the river which is under its jurisdiction, but makes the exercise of the right conditional upon the consent of the other riparian countries if such works might cause alterations prejudicial to the latter's interest. The term "alteration" must be understood to imply both physical changes (diminution of volume, modification of cycle or intensity or location of flow) and those of a chemical nature (pollution).

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<sup>35/</sup> Boletín da Sociedade Brasileira de Direito Internacional, Year I, N° 1, Rio de Janeiro, 1945, p. 161.

Table 2

LATIN AMERICA: TREATIES AND OTHER AGREEMENTS PROVIDING FOR STUDIES, ETC., ON THE  
DEVELOPMENT OF THEIR INTERNATIONAL RIVER BASINS

| Signatories                | Date          | General objective  | Topics covered by the provisions |  |                |                                   |        | Contem-<br>plated<br>works<br>or<br>projects |
|----------------------------|---------------|--|----------------------------------|--|----------------|-----------------------------------|--------|--|
|                            |               |  | Irriga-<br>tion                  | Elec-<br>tricity<br>and<br>indus-<br>trial<br>uses | Fish-<br>eries | Inter-<br>na-<br>tional<br>bodies | Floods |  |
| Argentina-Bolivia-Paraguay | 10.II.1941 a/ | River Pilcomayo  | x                                | x  | x              | x                                 |        |  |
| Argentina-Paraguay         | 1.II.1926     | Apipe Rapids   |                                  | x  |                |                                   |        |  |
| Argentina-Paraguay         | 10.II.1941    | Dredging of<br>River Paraguay  |                                  |  |                |                                   |        | x  |
| Argentina-Paraguay         | 1.VI.1946     | Boundaries   |                                  |  |                |                                   |        | x  |
| Argentina-Uruguay          | 30.XII.1946   | River Uruguay<br>(Salto Grande<br>project)   | x                                | x  | x              | x                                 |        | x  |
| Bolivia-Peru               | 17.VII.1935   | Lake Titicaca  |                                  |  | x              |                                   |        |  |
| Bolivia-Peru               | 30.VII.1955   | Lake Titicaca  |                                  |  |                | x                                 |        |  |
| Bolivia-Peru               | 19.II.1957    | Lake Titicaca  | x                                |  | x              |                                   |        |  |
| Brazil-Paraguay            | 14.VI.1941    | Navigation of<br>River Paraguay  |                                  |  |                | x                                 |        | x  |
| Brazil-Paraguay            | 20.I.1956     | Rivers Acaray<br>and Monday  |                                  |  |                |                                   |        | x  |
| Brazil-Peru                | 29.XI.1957    | Amazon basin   |                                  |  |                |                                   |        | x  |
| Brazil-Uruguay             | 20.XII.1933   | General boundary<br>rivers regime  |                                  |  |                |                                   |        | x  |
| Brazil-United Kingdom      | 27.III.1932   | Rivers Mahú and<br>Tacutu: Bound-<br>aries and regime                              | x                                | x  | x              |                                   |        |  |
| Chile-Peru                 | 3.VI.1929     | Distribution in<br>Tacna and Arica   | x                                |  |                |                                   |        |  |
| El Salvador-Guatemala      | 15.IV.1957    | Lake Güija   | x                                | x  |                | x                                 |        |  |
| Mexico-United States       | 2.II.1848     | Guadalupe-<br>Hidalgo Treaty   |                                  |  |                |                                   |        |  |
| Mexico-United States       | 12.XI.1884    | Río Grande and<br>River Colorado:<br>boundary                                      |                                  |  |                |                                   |        |  |
| Mexico-United States       | 1.III.1889    | Boundaries and<br>creation of<br>international<br>boundary and<br>Water Commission |                                  |  |                |                                   | x      |  |
| Mexico-United States       | 20.III.1905   | Río Grande:<br>elimination of<br>shoals  |                                  |  |                |                                   |        |  |
| Mexico-United States       | 21.V.1906     | Río Grande:<br>irrigation  | x                                |  |                |                                   |        |  |
| Mexico-United States       | 1.II.1933     | Río Grande:  |                                  |  |                |                                   |        |  |

It also stipulates that where successive rivers are concerned, works should not affect navigation, and that the other riparian states should be notified of any project which might do so. (In this case, however, nothing is said of obtaining their prior consent.)

With respect to both contiguous and successive rivers, it is recommended that top priority be given to their use for navigation, which should not be affected by other forms of water utilization. Nowadays this principle seems too stringent, as economic circumstances are conceivable in which navigation could not be considered more important than other uses.

A procedure is also suggested whereby conflicts could be avoided or settled. Notice of every project connected with international waters must be sent to the other countries, and the latter will be entitled to formulate their comments within a given time-limit, at the expiry of which their consent will be taken for granted. If they raise objections, a joint technical commission must be set up, and if agreement is not reached either through this body or through diplomatic channels, it is suggested that recourse be had to conciliation, or, failing this, to arbitration, in accordance with the principles laid down by the Hague Convention.

33. The First Regional Conference of the River Plate, in which Argentina, Bolivia, Brazil, Paraguay and Uruguay participated at Montevideo in 1941, made recommendations on technical questions relating to the navigation of the rivers forming the River Plate system. It proposed the creation of joint technical commissions, the union of the Orinoco, Amazon and Plate basins by canals and the conclusion of agreements based on the Montevideo Declaration of 1933.<sup>36/</sup>

34. At its seventh session (La Paz, Bolivia, 1957), ECLA adopted a resolution recommending to the secretariat that "it approach the Governments of the Latin American countries to the end that the utilization of rivers and lakes situated in international hydrographic basins, for hydroelectric energy, irrigation, navigation and any other useful purposes to which they may lend themselves, be effected on the basis of adequate planning undertaken by international technical commissions." Reference to this topic is

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<sup>36/</sup> OAS, Economic Conference of the Organization of American States (Buenos Aires, 2 August 1957), document 73. Carlos A. Volpi, *op. cit.*, p. 4.

also implicit in resolution 122 (VII), adopted on the same date, since it recommends "the desirability of granting the greatest possible facilities for the expansion of the international trade of landlocked countries".<sup>37/</sup>

35. Three months later, the Economic Conference of the Organization of American States (Buenos Aires, August 1957), also recommended to its member States, on the basis of a report by its Secretariat<sup>38/</sup> and a proposal by Paraguay,<sup>39/</sup> that agreement should be concluded for the study of international rivers within their respective jurisdictions, with regard to the technical aspects of navigation, industrial and agricultural utilization and improvement of the transport systems.

36. The Inter-American Bar Association, a non-governmental body recognized by the United Nations, at its tenth Conference in Buenos Aires, adopted on 19 November 1957 a resolution laying down the principles which, according to that document, "form part of existing international law" and are applicable to the use of waters in international river basins. These principles are in essence the same as those formulated in the Montevideo Declaration, with the addition of the following: (a) recognition of the right of each riparian State to the maintenance of the status of the existing beneficial uses of the part of the system under its jurisdiction; (b) establishment of the right of each State to enjoy the benefits of future developments, according to the relative needs of the respective States; and (c) the stipulation that each riparian State is under a duty to refrain from making changes in the existing régime that might adversely affect the advantageous use of the waters by one or more other States having a part of the system under their jurisdiction, except by agreement or in accordance with a decision by an international court or arbitral commission.

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<sup>37/</sup> See ECLA, Annual report (15 May 1956 - 29 May 1957) United Nations publication (E/2998 and E/CN.12/451), resolution 131 (VII), p. 35, and resolution 122 (VII), p. 31

<sup>38/</sup> OAS, document 11, op. cit.

<sup>39/</sup> OAS, document 73, op. cit.

VI. TOPICS WITH ECONOMIC REPERCUSSIONS ON THE DEVELOPMENT OF  
INTERNATIONAL RIVER BASINS, DEALT WITH  
IN LATIN AMERICAN TREATIES

1. Juridical aspects of the subject

37. Since purely juridical studies do not fall within ECLA's terms of reference, they are omitted from the present document. Nevertheless, it may usefully be noted that intensive and praiseworthy work is being carried out in this field,<sup>40/</sup> and that whatever is done to clarify the juridico-political problems which in some cases are holding up the development of particular river basins will make it easier to overcome the difficulties of another sort (technical and economic) which are also partly responsible for such delays.

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<sup>40/</sup> Allusion has already been made (paragraph 32 above) to the following: (1) Report of the Permanent Committee on Codification of Public International Law of the Pan American Union (Rio de Janeiro, 1932); (2) Declaration of the Seventh International Conference of American States (Montevideo, 1933); (3) Resolution of the Tenth Conference of the Inter-American Bar Association (Buenos Aires, 1957). It should also be noted that the Inter-American Bar Association has a permanent committee on international rivers which will again discuss this topic at the Association's Eleventh Conference (Miami 1959). See Guillermo J. Cano, op. cit. (footnote 34 above) and, in the same volume, Eduardo Theiler, "Los ríos, lagos y canales internacionales" and John G. Laylin, "Principles of law governing the use of international rivers". Of the bibliography on Latin American river basins or by Latin American authors, the following may be cited: Angel M. Paredes, "La condición jurídica de los ríos internacionales", Revista del Instituto Ecuatoriano de Derecho Internacional, N° 3, Quito, April 1957; Higinio Arbó, "Libre navegación de los ríos", Buenos Aires, 1939; Salvador Cardona, "El régimen jurídico de los ríos internacionales", Revista de Derecho Internacional, Vol. 56, N° 111, Havana, 1949; James Simsarian, "The diversion of waters affecting the USA and Mexico", Texas Law Review, Vol. 17 1938; Carlos Sosa Rodríguez, "Le droit fluvial international et les fleuves de l'Amérique Latine", Paris, 1935, and "Les fleuves de l'Amérique Latine et le droit des gens", Paris, 1955; Charles Timm, "The International Boundary Commission: United States and Mexico", Austin, 1941, and "Water treaty between the US and Mexico", Department of State Bulletin, Vol. 10, Washington, 1944; F. E. Wilson, "Proposed treaty with Mexico concerning international waters", New Mexico State Bar Bulletin, 1944; José F. López, "La soberanía de la República Argentina sobre las aguas del Río de La Plata", Buenos Aires, 1909; Amenodoro Urdaneta (ed.), "Colección de los documentos relativos a la navegación fluvial del Río de La Plata, el Amazonas y sus afluentes", Caracas, 1857; Ismael López, "Régimen internacional de los ríos navegables", Bogotá, 1905; José Aguiar, "Dos problemas internacionales de interés nacional: el río de La Plata y el mar territorial", Montevideo, 1934; Cesar Díaz Cisneros, "El tratado sobre delimitación del río Uruguay", Buenos Aires, 1927.

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In this context an enlightening example is afforded by the history of the pertinent relations between Mexico and the United States, which can be divided into the following phases:

- (1) Treaties aimed solely at establishing the river boundaries between the two countries (1848-1905);<sup>41/</sup>
- (2) Agreements providing for distribution of the waters between riparian States, but not for the joint construction of utilization works (1906-32);<sup>42/</sup>
- (3) Treaties providing for study, construction and joint management of works for the integrated utilization of international river basins (from 1933 up to the present time).<sup>43/</sup>

It can clearly be seen that in the case under consideration the solution of political problems immediately cleared the way for the development of water resources with economic ends in view. The first step was confined to the establishment of rights, but this was succeeded by a phase definitely concerned with construction. Such an example might well be followed.

The stipulations contained in Latin American treaties will now be examined, but only in cases where they affect the economic aspects of the development of international water resources.

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<sup>41/</sup> Treaties of 2 February 1848 (Guadalupe-Hidalgo), 30 December 1853, 12 November 1884, 1 March 1889 (setting up the International Boundary Commission) and 20 March 1905. They relate only to the river boundary, its determination and the juridical effects of changes in the channel.

<sup>42/</sup> Treaty of 21 May 1906. This is the first which partly apportions the waters of the Río Grande between Mexico and the United States, but without providing for the joint construction of works.

<sup>43/</sup> The treaty of 1 February 1933 is the first providing for the joint construction of works, i.e., the rectification of part of the channel of the Río Grande (Bravo), of which the immediate economic aim was flood control. That of 14 November 1944 apportions the waters of the Río Grande and the Colorado River and provides for the construction and joint management of works on those two rivers and on the Tijuana to ensure their maximum utilization. Under the terms of this treaty the name of the International Boundary Commission was changed to the International Boundary and Water Commission.

## 2. Preferences among uses

38. The following are the orders of preference laid down in the treaties which deal with priorities:

Mexico - United States (14 November 1944): domestic and municipal uses, agriculture and stock-raising, electric power, industrial uses, navigation, fishing and hunting, other beneficial uses.

Argentina: Uruguay (30 December 1946, Salto Grande): domestic and municipal uses, navigation, electric power, agriculture and livestock.

Bolivia - Peru (19 February 1957, Titicaca): navigation, fishing, agriculture and livestock, electric power. <sup>44/</sup>

It is noteworthy that after human consumption, which always takes first place, the traditional preference given to navigation has been superseded in countries (such as Mexico and the United States) where the use of water for agriculture and power has greater economic importance. In general priorities are determined according to local economic circumstances.

## 3. Distribution of benefits

### a) Criterion for water distribution

39. At earlier stages in the development of water resources, certain treaties were confined to guaranteeing that the country containing the headwaters of a river would allow a certain volume of water to pass annually. This is so in the treaty of 1906 (Mexico - United States) which guarantees the delivery to Mexico of 2,613,000 cubic feet distribute according to a schedule which specifies quantities per month, these being variable (for December and January none is provided; from April to June, 522 million cubic feet a month). This treaty covers only a part of the river basin in question (the Rio Grande) and provides that, in the event of extraordinary drought or emergency the guaranteed minimum shall be diminished in the same proportion as the supply to United States users.

40. Under the 1944 treaty these two countries adopted a similar arrangement for the waters of the Colorado River. Almost the whole of its basin is in the United States. It then follows the boundary for 20 miles

<sup>44/</sup> The order of priorities is not expressly laid down in this treaty and can only be deduced.



and afterwards flows for a short stretch entirely through Mexican territory to the sea. The United States undertook to deliver to Mexico a guaranteed annual minimum of 1,850 million  $m^3$  except in the event of extraordinary drought or emergency, in which case, as in the treaty on the Rio Grande, the quantity may be cut in the same proportion as supplies to United States users are reduced. In the event of a water surplus on the other hand, the United States is required to raise its maximum to 2,096 million  $m^3$ , while Mexico is not entitled to the surplus. One portion of the supply (1,233 million cubic metres) must be delivered in the bed of the limitrophe section of the river; a further quantity (30 million  $m^3$ ) at another point, away from the river, for the purpose of supplying Mexican lands which, owing to their levels, could not be irrigated if Mexico had to take the entire volume from the river itself; and the remainder (616 million  $m^3$ ) to an old Mexican canal from an exclusively United States storage dam and reservoir.

41., This treaty provides for the allotment of all the water of the Rio Grande between Fort Quitman and the sea. The situation is different from that of the Colorado for the drainage basin is partly in one country and partly in the other, although the larger share goes to the United States. In this case the principles of distribution were as follows:

(i) It was agreed to make an accounting of the waters which each country recognized as belonging to the other, as regards inflows into storage reservoirs, existing supplies and outflows (the latter at the request of the country owning the waters).

(ii) Each country's ownership was recognized over the quantities flowing into the international limitrophe section from the main tributaries the sub-basins of which are situated in the country in question and are expressly specified and measured. These volumes are not the same therefore for both countries but are proportionate to the contributions of each which in turn, depend on the area of their catchment basins and their rainfall patterns.

(iii) As it is planned to construct a system of storage dams, the run-off below the loest dam is divided equally. The same principle is adopted for other smaller tributaries not specified or measured, and for all the water entering the international limitrophe channel not specifically allotted to an owner. (In these sections the contributions of both countries are negligible.

/((iv) For

(iv) For a certain number of tributaries, specified and measured, whose basins are in Mexico, it was agreed that two-thirds of the flow belongs to Mexico and one third to the United States. But the latter is guaranteed an annual minimum delivery from those tributaries, to be calculated over five-year periods (431 million cubic metres annually). If exceptional flows entirely fill the useful capacity assigned to the United States in the highest international storage reservoir and in one other, the five-year cycle is considered as terminated and all debits fully paid, and thereupon a new five-year cycle begins.

(b) Distribution of energy potential

42. For the international lake of Güija, Guatemala and El Salvador agreed, in the treaty of 1957, that the latter would undertake the necessary construction to enable it to use the lake as a regulator for its River Lempa hydro-electric scheme. Since this work will cause the flooding of a part of Guatemalan territory, El Salvador must pay compensation for all the damage done and undertake the drainage work necessary in Guatemala to deal with these floods. Of the electricity produced it has to supply Guatemala with an amount equivalent to an installed capacity of up to 5,000 kW at the same price as it supplies it to distributors on its domestic market. But it is required to put this potential at the disposal of Guatemala during the first ten years only. After that time it need guarantee only the consumer supply it has actually required during the first ten years.

43. The Mexico-United States treaty of 1944 provides that the energy potential is to be divided equally between the two countries, despite the unequal distribution agreed on with regard to other benefits and loads.

The release of stored water for the purpose of producing energy is to be debited to each country in proportion to the volume accredited to it in the reservoir in question. Thus, although each country has half the power produced the water used to generate it is not debited to them in equal parts but in relation to the quantities stored. Each country is permitted to divert water from the course of the river, including the water belonging to the other country for the purpose of generating hydro-electric power, and such water is not debited to the account of the country using

it provided that it is returned to the river that the diversion does not interfere with the generation of power it has been agreed to undertake jointly and does not cause injury to the other country and that, if any quantity is consumed, it will be charged against the user country.

44. The Argentine-Uruguayan treaty of 1946 concerning the Salto Grande project authorizes each country to use half the power produced. But Argentina - whose power needs are greater - undertakes to absorb more than 50 per cent if Uruguay does not need its half. This obligation includes that of assuming most of the cost of constructing and administering the necessary works. Uruguay is entitled, upon four years' notice and payment of the relevant costs, subsequently to recover the use of the power it did not utilize, up to the half agreed on in the treaty.

#### 4. Distribution of costs

##### (a) Costs of hydrometry, studies and work projects

45. As regards Lake Güija, Guatemala and El Salvador have agreed that each of them is to measure the inflowing waters in its territory and to pay the costs involved.

46. The 1944 treaty between Mexico and the United States stipulates that the costs of the International Boundary Commission it sets up is to be divided equally between them, but not the costs of constructing works, as will be seen below (paragraph 51).

##### (b) Flood control works

47. The 1933 treaty between the same two countries requires the United States to defray 88 per cent and Mexico 12 per cent of the cost of rectification works on the Rio Grande and the construction of a flood control dam. This distribution was based on an assessment of the value and the productivity of the land in both countries to be protected by the defence works. In paragraph 8 of its Minute 129 (of 31 July 1930) on which the treaty was based, the International Boundary Commission took into consideration the fact that the United States has 28,000 hectares under cultivation in the region with good systems of irrigation and drainage and for the marketing of agricultural products. Mexico, on the other hand, has only 14,000 hectares without drainage, with a defective marketing

system and inadequate irrigation works. The lands in the two countries, with their improvements (buildings, crops, roads, etc.) were assessed at 17 million and 2.7 million dollars respectively. An estimate was also made of the value of the towns of both countries situated in the flood region. It may be observed that the total apportioned cost includes that of a storage dam situated entirely in United States territory but serving to regulate rises in the river.

(c) Multi-purpose works

48. Bolivia and Peru agreed, in 1957, on a basis for studies on the utilization of the waters of Titicaca, with the idea of using them both for irrigation and for the production of electricity. The country using the energy is to be charged 0.001 of a dollar per kWh and the amount credited to the two joint owners in equal proportions. Similarly, 0.001 of a dollar is to be charged for each cubic metre of water used for irrigation, and this sum too is to be credited to the two countries equally. These payments represent payment of the intrinsic value of the water or water power used and have nothing to do, therefore, with the amount each country must pay towards the cost of the works and their administration. Thus, if a country uses more than half the electric potential or consumes more than half the water, it must compensate the other proportionately.

49. In connexion with the Salto Grande energy and navigation project, Argentina and Uruguay agreed, in 1946, that the share of the cost of power would be established on the basis of the estimated value of a thermic plant with the same power as the hydro-electric plant. The difference, up to the cost of the latter is to be charged to its use for navigation. Each country is to contribute to hydro-electric power costs in proportion to the amount it uses, as explained above (paragraph 44). As regards the use of the project for navigation - it is estimated that an extra 1,000 kilometres will be made navigable - it has also been stipulated that payment is to be in proportion to use, and in that connexion the two countries have agreed to allow Brazil to participate since it is interested in such use although it is not a signatory of the treaty.

50. Mexico and the United States (1944) agreed that the benefits derived from the hydro-electric plants constructed on the river Colorado on the

/dams built

dams built for other purposes (irrigation, flood control) would be applied, in the first instance, to the amortization of the costs of the hydro-electric plant and, after that is paid off, to the costs of the other facilities.

51. For multi-purpose storage reservoirs, the same treaty provides that the total capacity of each is to be divided into three parts: the first dead and for the retention of sediment (silt); the second for the storage of water for useful purposes, such as irrigation and power production; and the third for storing water for flood control. As regards the second of these, each country is to be assigned a volume in each reservoir proportionate to the water owned by it which it may discharge into the reservoir and which, as was already seen (paragraph 41), is not necessarily the same for both countries; as regards the first, the apportionment is to be in the same proportion as for the second, and in the third the two countries are to have equal shares. The construction and operating costs are to be distributed on the basis of the volumes allotted, according to the above criteria. The contribution to the cost of the diversion dams and works is to be proportionate to the use or benefit received by each country.

52. As a general rule, the damage caused in the territory of one country by work solely of benefit to the other are borne exclusively by the beneficiary country. This is the case with El Salvador and Guatemala (Lake Güija) and Mexico and the United States, e.g. the river Colorado (treaty of 1944) and the Morales diversion dam.

##### 5. The use of waters from other non-international river basins

53. The Chilean-Peruvian treaty of 1929 provides for the diversion, for the benefit of Peru, of water which will remain in Chilean territory pending the constitution of an international servitude (the Uchusuma and Mauri canals).

54. A canal has been constructed to divert water from the Peruvian-Ecuadorian river Zarumilla to serve Ecuadorian towns.

55. The Mexico-United States treaty of 1944 envisages the possibility of a country contributing to the (international) Rio Grande waters from other basins and receiving a corresponding right to tap equal quantities of water lower down.

6. Bodies concerned with international river basins

56. Table 2 lists the treaties which set up international bodies for the purpose of implementing them. The majority of these bodies are commissions intended merely for carrying out studies and work projects, and when such projects are completed the signatory countries must arrange for their administration.

The only treaty which provides for joint ownership of an international river basin is that of Peru and Bolivia referring to Lake Titicaca. One consequence of this might be that the administration would also be joint. In the other treaties each country has retained its sovereignty and thus the responsibility for administering those parts of the works situated on its side of the frontier.

57. The El Salvador-Guatemala treaty concerning Lake Güija sets up a commission of experts to assess the value of the land to be flooded, which must be paid by El Salvador to Guatemalan landowners through the Government of Guatemala. Of the three members of this commission one must be nominated by the Government of El Salvador or by the company engaged to undertake the construction of the works, the second by the injured landowners or, failing agreement between them, by the Guatemalan Government; and a third, who must be Central American but not a national of either of the signatory countries, by the other two experts.

58. In general each country acquires and retains for itself the ownership of the lands, rights of way and servitudes required for the international water works, and it alone is responsible to its nationals before the civil courts for any damage resulting from such works. <sup>45/</sup>

59. The Mexican-United States International Boundary and Water Commission is the only one which has gone beyond the stage of studies to the construction and administration phases. It was originally set up (1889) as a boundary commission but its competence was extended in 1944 to cover water development, although it had already previously acted in this matter so far as it concerned boundaries.

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<sup>45/</sup> Mexico-United States treaties of 1933 and 1944.

The attached plan shows the structure of the Commission and its relationship to member Governments together with its actual operation in connexion with the construction of the Falcon Dam. The latter example is mentioned because of the tremendous success of the project.

It may be noted that the Commission consists of two Sections, one for each country, and that each has jurisdiction over the works situated in its territory. The two Sections act jointly, however, as regards the works or parts of them situated on their common boundary. In such cases, and also when they agree on regulatory recommendations or on projects within their competence, the relevant recommendations are transmitted to their respective Governments. If neither of them raises any objections within a period of one month, they become binding, as if they had been expressly ratified.

The Commissioners in charge of the two Sections enjoy diplomatic status and live in towns in the river basin.

The joint Commission may not send reports at the request of one Government without the consent of the other. It may suspend any work which is being carried out in the international basin if, in its view, such work contravenes the treaty which established it. If it has to resort to force it must appeal to the judicial or police authorities of the country in question.

Its specific functions include "the application of the present Treaty, the regulation and exercise of the rights and obligations which the two Governments assume thereunder, and the settlement of all disputes to which its observance and execution may give rise". It has the juridical status of an international body.

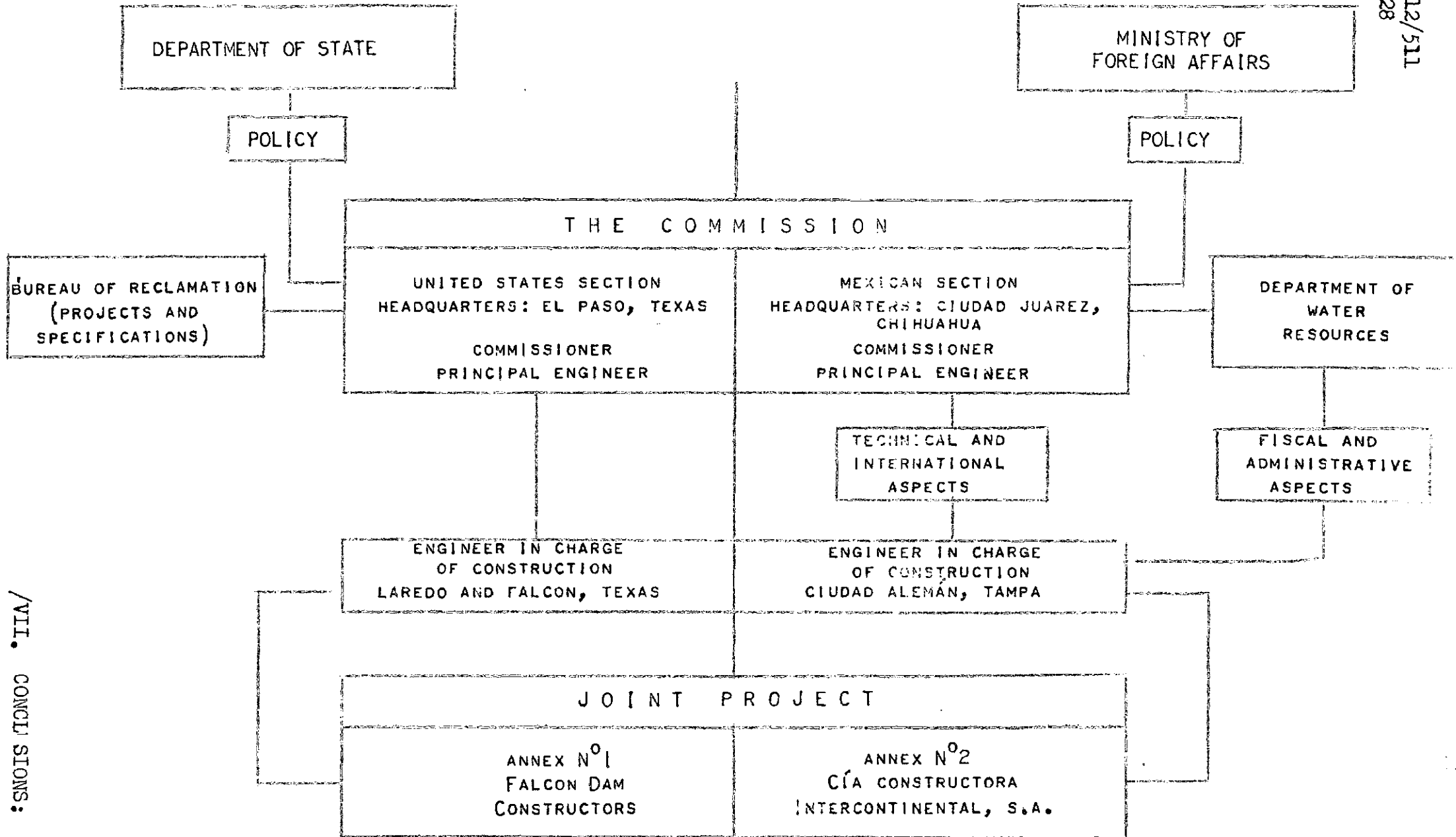
The Commission may prepare plans for projects and works and undertake their construction and administration. For this purpose the two Sections draw up the plans together and decide which part of each undertaking is to be the responsibility of each national Section. There are thus works or parts of them administered jointly by the full Commission and others by the national Sections.

INTERNATIONAL BOUNDARY AND WATER COMMISSION  
 UNITED STATES AND MEXICO  
 ORGANIZATION FOR THE FALCON DAM

UNITED STATES

MEXICO

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VII. CONCLUSIONS:



VII. CONCLUSIONS: PROGRAMME OF INTERNATIONAL ACTIVITIES  
WHICH COULD BE CARRIED OUT IN LATIN AMERICA IN THIS  
CONNEXION IN THE IMMEDIATE FUTURE

60. The panel of experts convened by the Secretary-General of the United Nations in 1958 to study the subject of integrated river basin development dealt specifically with international river basins <sup>46/</sup> and made some very practical recommendations regarding the steps which the United Nations and the countries concerned could take in connexion with them. It is hardly necessary to add anything to these suggestions here, except to urge that they should be put into practice.

61. The meeting of Central American electricity officials (San José, Costa Rica, 20-29 November 1957), arranged by the Central American Economic Co-operation Committee of ECLA, adopted two recommendations connected with one aspect of the development of international water resources. <sup>47/</sup> One of them (recommendation II) is designed to enable international transfers of power to be made. The other (recommendation III) advises the setting up of a Central American sub-committee on electricity one of whose purposes should be to lay down standard general principles for the survey of water resources, to do the same for statistics, to establish a document and information centre and to undertake hydro-electricity planning on a sub-continental basis.

62. It would appear advisable to suggest here the extension of such recommendations to cover the whole subject of water resources.

It is impossible to make any plans for water resource development for all its various purposes without the basic (pluviometric, hydrometric, climatological, nivometric, glaciological, hydro-geological) information on the physical facts. When this information refers to international river basins two conditions must be met:

(a) Age - it is estimated that such information must be at least five years old to be worth considering and that it is highly advisable that it should date back still further.

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<sup>46/</sup> E/3066.

<sup>47/</sup> Informe de la Reunión de Funcionarios Centroamericanos de Electrificación (E/CN.12/CCE/107), pp.23 and 24; for the recommendations in question see pp.28-30. See also TAA/LAT/9, p.66.

(b) Accuracy - such that all the countries interested in a given river basin can rely on it since their rights may be affected by it. It may be observed in this connexion that the unreliability of the information has been one of the main reasons for the persistence in other parts of the world of latent conflicts which prevent the full utilization of international river basins.

The fulfilment of these conditions would be guaranteed by joint commissions set up by the countries concerned, with the assistance, if they think it necessary, of some international organization.

It is not suggested that these commissions and international bodies should collect the information themselves, for this can be done by each Government, and in many cases it would be better so, <sup>48/</sup> but rather that they should:

- (a) establish uniform and comprehensive standards for the collection of information, so as to ensure its consistency and completeness;
- (b) receive texts of all the information collected, tabulate it, analyse it and publish it together with their own critical appraisal of it so that its value may remain fixed for the future and all interested countries may have access to it. There could be some form of control in situ over efficiency in collecting the information.

Although in general there would not at present seem to be any great pressure in Latin America towards the development of its international water resources, it is clear that such pressure will increase in the near future, in view of the greater demand for water which can be predicted. This, combined with what has been said about the length of time necessary to ensure the reliability of information of this kind, makes it essential that the foregoing recommendation should be carried out soon. It would be advisable to make a preliminary study of those river basins the development of which, from the economic point of view, is more urgent or more difficult, in order to facilitate the execution of this plan.

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<sup>48/</sup> The countries which think it necessary could take advantage of the technical assistance of the appropriate international bodies.

Thereafter, as soon as possible, further information might be collected on the other natural resources connected with water and on the industrial and human resources related to them.

63. In a study on Paraguay <sup>49/</sup> another idea is put forward which might well also be taken up and extended to the whole of Latin America: that of arranging international meetings of experts from the countries of the region in order to exchange technical information on specific aspects of water resource development. The idea was suggested in connexion with international river navigation but it is equally applicable to the other uses, and not to international problems only, for it can also help towards the solution of purely national questions.

The experience of different Latin American countries in particular fields of water resource development is valuable, especially in the more underdeveloped countries and in those in which certain practices are very ancient. But there is very little exchange of information and of technicians within Latin America and almost all the countries in the region have more exchanges with countries outside it. In certain matters, especially those requiring contact with the user, the experience of technicians with a similar human and cultural background is more useful than that of persons from outside the continent, since no adaptation is called for. This does not mean to say, of course, that the invaluable contribution of the technical experience obtained from outside the area is not appreciated. It would undoubtedly also be easier, however, for the Latin American countries to arrange for the periodical exchange of information among their own technicians, as the Economic Commission for Asia and the Far East (ECAFE) has done for its region through its periodical regional conferences.

64. The United Nations has recently set up a Special Fund (SUNFED), one of whose guiding principles <sup>50/</sup> it is to give preference to projects of

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<sup>49/</sup> ST/TAA/J/PARAGUAY/R.1, p.20.

<sup>50/</sup> The United Nations Special Fund. An explanatory paper by the Managing Director (SF/1), 1959.

interest to a large number of countries - and these include those of international scope - and to give special attention to those tending to promote the development of natural resources. International river basins fall into both categories. On some of them there are studies well under way and a number of countries hope that the development of these basins will help them meet their urgent needs. It may be concluded from this that some of these projects could be carried out under the Special Fund programme. But since the funds available are very limited, priorities must be established within the programme, and to this end it is essential, first and foremost, to decide which are the most urgent projects from the economic point of view. That decision in turn presupposes not only an individual examination of each project but also its selective grading within the economy of the continent as a whole. To facilitate the selection it would be useful if the countries concerned were to work out a suitable procedure.

65. It would also be useful to study the technical and institutional factors accounting for the success, the failure or the delay in achieving results of the various international commissions and bodies set up, or which may in the future be set up, to foster the development of international river basins in Latin America. The countries concerned could then make the best use of the experience gained in this matter.