Interstate Water Compacts and Their Relation to Basin Development

by

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Volumes have been written on interstate compacts. The best reference that I know of concerning the subject is "Interstate Compacts - A Compilation of Articles and Documents including a Bibliography - 1946" prepared by the Colorado Water Conservation Board. So far as I am aware, all or most of the articles heretofore prepared have had to do with the fundamental principles on which compacts can be negotiated, and legal phases of various compacts. The purpose of my presentation is to indicate how water use problems among states and between countries have been resolved by interstate compacts and international water treaties under the terms of which river basin developments have been able to proceed. I shall cite specific examples of works already constructed to develop the common water supplies of two or more states or two countries, projects authorized for construction, and projects proposed for construction.

In my discussion I shall also indicate the manner in which compacts have relieved tension between states, brought about comity, and resulted in good strong working organizations which not only cooperate with relevant agencies to bring about logical basin development, but administer the terms of compacts in a manner which is beneficial to all parties.

Before embarking upon the substance of the true title of my presentation, I believe it is desirable to point out some of the principles underlying the negotiation of interstate compacts with respect to the use of water.

The United States consists of a number of quasi-sovereign states with independent state governments. The only powers which the federal government has are powers delegated to it by the states. Those who framed the Constitution of the United States were foresighted enough to visualize conflicts between states and to foresee that the logical method of resolving those conflicts was by the making of compacts. The Constitution therefore gave to the states the right to enter into agreements among themselves, providing the consent of the Congress be obtained. This provision is often misunderstood, some considering that when Congress gives its consent to the compact it approves the terms of the compact. This is not true. The consent of the Congress is for the purpose of eliminating the constitutional inhibition for states to enter into agreements unless they do have the consent of the Congress.

The idea of interstate compacts is not new. Many compacts have been consummated concerning state boundaries, fisheries, navigation, easements and other matters. Some of these compacts date from colonial times.

Most of the streams of western United States, all of which are exceedingly important from the standpoint of consumptive use purposes to produce basic wealth in the form of food and fibers, and many of which are being used, and will be used, for the purpose of generating hydroelectric energy, are interstate in character.

By statute and court decrees the waters of all western streams are dedicated to the use of the public. Each state has its own laws concerning the right to use such public water supplies. The laws of the states, however, are not uniform.

Because the streams of the West are largely interstate in character, and because several of the streams are international in character, water use problems developed at an early date in the history of the West, between countries, between states, and among states. Water use problems between countries can be resolved, or partially resolved, by international tribunals, by war, or by treaty. Water use problems between or among states can be resolved by Supreme Court decision or by compact. In such matters between states, the Supreme Court essentially is acting as an international tribunal to compose differences between or among quasi-sovereign entities. An international tribunal acting with respect to differences between countries is the substitution for composing such differences by armed forces.

Experience for more than a half century has demonstrated that the most satisfactory method of composing water use problems between states and between nations is by compact or treaty. This is because representatives of sovereign entities, with competent advisors, are discussing a common problem as equals but not as antagonists. The chances of reaching a logical and equitable agreement by this process are much greater than the chances of arriving at as logical and satisfactory solution by the consideration of the problems by tribunals composed of members far removed from the problem.

Several Supreme Court decisions have been rendered with respect to Western water use problems. Seldom have such decisions been satisfactory. Certain Justices of the Supreme Court have recognized the weakness of supreme court decisions as compared with compacts. Justice Felix Frankfurter and James M. Landis in a paper on interstate adjustments, speaking of the problems on the Colorado River, stated:

> "Conflicts followed, with the conventional resort to courts. But litigation added confusion, not settlement. The judicial instrument is too static and too sporadic for adjusting a social-economic issue continuously alive in an area embracing more than a half a dozen States. The situation compelled accommodation through agreement for continuous control of these continuously competing interests."

Justice Roberts in dissenting from the Court's opinion in the Nebraska versus Wyoming case over the North Platte River stated, in part:

> "The future will demonstrate, in my judgment, how wrong it is for this court to attempt to become a continuing umpire or a standing Master to whom the parties must go at intervals for leave to do what, in their sovereign right, they should be able to do without let or hindrance, provided only that they work no substantial damage to their neighbors. In such controversies the judicial power should be firmly exercised upon proper occasion, but as firmly withheld unless the circumstances plainly demand the intervention of the court. Such mutual accommodations for the future as Nebraska and Wyoming desire should be arranged by interstate compact, not by litigation."

The Supreme Court in its decision in the case of Colorado versus Kansas over the Arkansas River, recognized the value of the compact method and recommended to the states of Colorado and Kansas that a compact be consummated between the two states resolving their differences.

The Supreme Court of the United States has upheld the compact method for settling interstate water controversies and has decreed that the terms of a compact transcend the application of internal laws of the states so long as the compact is fair and equitable.

The negotiation of water compacts and international treaties over water in Western United States has passed through a process of evolution. At the commencement of the use of such treaties and compacts, negotiation was carried on generally by individuals not too conversant with the physical facts concerning the problem involved. That method has gradually changed to one which, in connection with a number of the more recent compacts in the West, utilizes competent engineering talent in the form of engineering advisory committees to ascertain facts with respect to stream flows and water uses, and generally to suggest solutions of the problem.

I shall now go to some of the water use problems which have developed during the last 60-year period, giving a brief description of the method by which they were resolved, and a description of the basin development which has been made as a result of the settlement.

Exhibit No. 1 is an outline map of the western portion of the United States showing the various states and principal river systems. The states that are parties to important river compacts are outlined on the map, and the river systems that are subject to the provisions of compacts and international treaties and Supreme Court decisions are indicated by symbols.

The problem which developed between the United States and Mexico concerning the uses of the waters of the upper Rio Grande was one of the earliest water use problems which developed in the West. This problem had been brewing for sometime before the 1890's, but it finally came to a head in 1895 when Mexico alleged that the Juarez Valley, which had been irrigated since the sixteenth century, had been damaged to the extent of some $30,000,000 by increased depletions of water at the international dam between El Paso and Juarez, because of increased use of water by New Mexico and Colorado. The problem was accentuated by the occurrence of an extreme drouth period which extended from the early 1890's to 1904. Finally a Convention between the United States and Mexico was consummated in 1906, which ceded to Mexico 60,000 acre-feet of water per year in perpetuity, to be delivered at the international dam in accordance with a certain schedule.

Elephant Butte reservoir with an original capacity of 2,650,000 acre-feet was constructed and went into operation in 1916, one of its purposes being to enable the United States to fulfill its treaty obligation to Mexico. An embargo was placed upon the river by the Secretary of State, which prevented the granting of rights-of-way for the construction of reservoirs above El Paso.

Much development had taken place in New Mexico and Colorado, most of the Colorado development having occurred during the two decades 1870 to 1890. All of the basic water supplies were appropriated, and a great need for reservoirs to provide supplemental water supplies had developed. Those reservoirs could not be built because of the embargo. Finally, the embargo was lifted in 1925, the then Secretary of Interior declaring that it had originally been illegally imposed.

However, the interstate situation was such that the upstream development could not proceed until the water use problems among the three interested states were composed.

The development of water supplies in the remainder of the West also was progressing at a rapid rate. One of the principal rivers in that region, the Colorado River, was almost untouched except for the Gila river development in Arizona, and the developments which served the Imperial Valley and the Mexicali area in California and Mexico, respectively, and some small upstream areas in other states. A great potential existed in connection with the Colorado River. For some time private power concerns had been interested in constructing dams on the Colorado River to generate hydroelectric energy, Southern California being the principal market for such energy. The lower Colorado River basin states, particularly the State of California, became interested in power development; the United States became interested; and, finally, after a series of investigations, the site of Hoover Dam was chosen for the initial major development on the river.

Because of the experience of New Mexico and Colorado with respect to the Elephant Butte development, some farsighted persons, among whom the most important was the Honorable Delph E. Carpenter, an outstanding water attorney of Colorado, conceived the idea of a compact to apportion the waters of the Colorado River in order that the upper basin would have a water supply reserved for future development. It appeared certain that lower basin development would proceed faster than that in the upper basin and, in the absence of reserving such a water supply, the upper basin might be without water for its inevitable and desirable future development. Finally the Colorado River Compact was negotiated and signed in 1922. This was precedent to the authorization of the construction of Hoover Dam. The authorizing act for Hoover Dam, which included also the authorization of Imperial Dam and the All-American Canal, also gave the consent of the Congress to the Colorado River Compact.

Exhibit No. 2 is an outline map of the western portion of the United States, upon which has been indicated all water projects which have been constructed, or authorized for construction, or are being proposed for river basin development as the result of the terms of international treaties or interstate compacts.

Reference is first made to the lower Colorado River basin and the projects which have been constructed and are being proposed, which probably could not have been constructed or proposed except for the Colorado River Compact. Hoover Dam and Lake Meade which it creates have been in successful operation since 1935. Parker Dam which creates Lake Havasau, which is essentially the diversion works for the Los Angeles Aqueduct, has been in operation since 1938. Hydroelectric energy is also generated at that dam.

Davis Dam, which creates Bullshead reservoir, has just gone into operation. Energy will be generated at that dam, and it ultimately will be used essentially as afterbay storage to reconcile the use of water from Lake Meade for the generation of hydroelectric energy with the subsequent use of that water downstream for consumptive use purposes. One of the stated purposes also for Davis Dam and Bullshead reservoir in its authorization act is to "meter out water to Mexico."

The line of the Los Angeles Aqueduct which transports Colorado River water to Southern California is shown upon the map. This aqueduct could not be operated on a firm basis without the regulation supplied by Hoover Dam and Lake Meade.

Imperial Dam, the All-American Canal, and the Gila Canal are also indicated on the map. The All-American Canal supplies water to the Imperial Valley and for that purpose replaced the old Alamo Canal which, because of topography extended

into Mexico irrigating some lands there and then back into the United States. The Gila Canal, which diverts from the left side of Imperial Dam, will irrigate the Gila Project in Arizona. These works would not have been feasible without the regulated water supplies provided by the reservoirs heretofore cited, which could not have been built without the Colorado River Compact. Bullshead reservoir will enable the above consumptive uses to take place in the lower basin without interference with the generation of hydroelectric energy at Hoover Dam.

The Colorado River Compact allotted to the lower basin 8,500,000 acre-feet of beneficial consumptive use, and to the upper basin 7,500,000 acre-feet of beneficial consumptive use per year, the division point between the two basins being Lee Ferry, Arizona. The compact also provided that the upper basin states would not deplete the flow of the river at Lee Ferry below 75,000,000 acre-feet in successive 10-year periods.

In 1948 a compact was consummated among the states of the upper basin, Arizona, Colorado, New Mexico, Utah, and Wyoming. The compact apportioned to each state what was considered its equitable share of the 7,500,000 acre-feet of beneficial consumptive use per annum apportioned to the upper basin by the Colorado River Compact. In order for this obligation to be met and for the upper basin to beneficially consume 7,500,000 acre-feet per annum, major storage must be provided on the main stem of the Colorado River in the upper basin and on the main tributaries thereof. This storage will largely equate the remaining flow of water after the upper basin utilizes its full apportionment.

A report on the so-called Colorado River Storage Project has been submitted to the Secretary of the Interior by the U. S. Bureau of Reclamation. The units of that proposed project are indicated on the map. When and if those units and the Bridge Canyon reservoir in the lower basin are constructed, the flow of the Colorado River below the major developments in the upper basin will be largely equated and large amounts of hydroelectric energy will be generated, for which there is a rapidly growing market.

Indicated on the map is the additional depletion of the water supply at Lee Ferry which can be permitted to take place by man's activities in the upper basin, the amount being 5,100,000 acre-feet per year. Such depletion will be the result of the construction of a multitude of projects, principally in the four upper basin states, Colorado, New Mexico, Utah, and Wyoming.

Little of the proposed development in the upper basin which has been described above would have been possible without the Colorado River Compact and the Upper Colorado River Compact. Major development in the upper basin had reached a stand-still because of the lack of apportionment of the use of the waters of the Colorado River among the states. Actually, the Commissioner of Reclamation had indicated that he could not find a dependable water supply for any major project, which it is his function to do under the 1939 Reclamation Act, unless the upper basin states apportioned the upper basin's share of the beneficial consumptive use of the Colorado River among themselves. The members of the Upper Colorado River Commission, which was created by the Upper Colorado River Compact, are working harmoniously together. The Commission is also working harmoniously with relevant governmental agencies to bring about a rational development of the upper basin of the Colorado River, which could not have been done without the two compacts.

The Colorado River Compact of 1922 started a chain reaction with respect to the negotiation and consummation of compacts, which is still in process.

That same year the La Plata River Compact between Colorado and New Mexico was negotiated. At present no works have been constructed under the terms of this compact, but the most efficient uses of the water supplies for the benefit of the two states results because those uses are being administered in accordance with the provisions of the compact.

A compact was negotiated in 1925 between Colorado and Nebraska with respect to the uses of the waters of the South Platte River. This is largely a self administrating compact. No works have been necessary to effectuate its terms.

Directly after the negotiation of the Colorado River Compact, studies were commenced to gather information to enable the states of New Mexico, Colorado, and Texas to negotiate a compact on the upper Rio Grande. A temporary five year compact, which in effect provided for maintaining the status quo on the river until certain things could be done, became effective in 1929. Before its expiration, the states extended it for another five years. In the meantime, Texas had started a suit against New Mexico in the United States Supreme Court alleging, among other things, non-compliance with the provisions of the compact because of the construction and operation of El Vado reservoir as a part of the Middle Rio Grande Project. Finally, in 1937 and 1938, a permanent compact was negotiated which became effective in 1939. During the period when the compact was being negotiated hearings in the Texas versus New Mexico suit were held in abeyance. When the compact became effective, the suit was dismissed. The terms of the compact are such that dams for storage reservoirs can be constructed above Elephant Butte reservoir. Immediately after the compact became effective, the San Luis Valley Project was authorized which provides for the construction of one or more reservoirs on the Conejos River, the principal tributary of the Rio Grande in Colorado, and the construction of the 1,000,000 acre-foot Wagon Wheel Gap reservoir on the main stem of the Rio Grande above Del Norte, Colorado. The Platoro reservoir on the Conejos River, which is shown on Exhibit No. 2, is now under construction and will go into operation probably next season. The authorized Wagon Wheel Gap reservoir is also indicated on Exhibit No. 2.

Because of the agradation of the bed of the Rio Grande in New Mexico above Elephant Butte, the irrigated middle Rio Grande area has been seriously and adversely affected. In recent years excessive non-beneficial consumption of water resulting from the deterioration of the river channel and the growth of native water-loving vegetation has placed New Mexico in a position of not being able to comply with the terms of the Upper Rio Grande Compact. The spirit of comity among compacting states evidences itself in this situation. On a number of occasions the Compact Commission permitted New Mexico to release debit water from the El Vado reservoir, the principal storage reservoir of the Middle Rio Grande Project. This water under the terms of the compact was water which belonged to the Elephant Butte project. On the last occasion, which occurred during the past season, the storage in Elephant Butte reservoir was so depleted that the interests below the reservoir could not afford to permit the release of debit water from El Vado reservoir for use by New Mexico. However, Colorado had in storage in Elephant Butte reservoir so-called credit water which she had delivered at the state line in excess of her compact obligation and, in the spirit of comity, Colorado released part of her credit water to Elephant Butte reservoir for use below that reservoir, and the Commission permitted New Mexico to release an equivalent amount of debit water from El Vado reservoir in order to save perennial crops in New Mexico.

The three states, New Mexico, Colorado, and Texas, have supported authorizing legislation for a project, the object of which will be to rehabilitate the middle Rio Grande area. This project consists of the Chamita and Jemez flood control and silt detention reservoirs, channel improvements, and drainage. The

project has been authorized and work on it is proceeding. The various features of the project are indicated on Exhibit No. 2.

None of this important river basin work in the upper Rio Grande could have been accomplished without the Rio Grande Compact. The commissioners of that Compact Commission have worked harmoniously together in the administration of the compact since it went into effect, and are also working harmoniously with governmental agencies in devising logical plans for the solution of the water use problems within the basin.

Water use problems concerning the Pecos River developed between Texas and New Mexico in the early 1920's. A compact was negotiated in 1925. It was ratified by the legislatures of the two states but the New Mexico ratification was vetoed by the Governor of that State. Texas then repealed its ratification and the compact never became effective. Tension between the two states became greater as the water use problems became more critical. McMillan reservoir, the main reservoir for the Carlsbad Project in New Mexico, was gradually losing its capacity because of sedimentation. Salt cedars had taken root over a large area of the delta created by the sedimentation at the head of Lake McMillan, and were beginning to take a large toll of the already short water supply. The quality of water was not good, becoming progressively worse downstream. The City of Roswell in New Mexico needed flood control protective works; the old Fort Sumner project in New Mexico required rehabilitation because of damage to its system by flood flows; the Carlsbad Project required replacement storage; and the irrigated area in Texas required supplemental storage.

Alamogordo reservoir was constructed to provide replacement storage for the Carlsbad Project, the authorization act having been permitted to pass in Congress under what was known as a gentleman's agreement between certain members of the Texas and New Mexico delegations and the Secretary of the Interior. Red Bluff reservoir was constructed in Texas at about the same time to provide supplemental water supplies and to generate hydroelectric energy. These projects, however, did not solve the interstate problems and the tension between the two states continued to increase.

Claims were made practically every year by Texas interests that the Secretary of the Interior was not adhering to the gentleman's agreement in the operation of Alamogordo reservoir. Bills were introduced in Congress to provide needed flood control for Roswell and the rehabilitation of the Fort Sumner project, but it was impossible to secure passage of these authorization bills because of opposition by Texas.

Compact negotiations were resumed and a compact was finally consummated which became effective in 1949. Tension between the states was relieved immediately. Since the compact became effective the states have been working closely together to make the best use possible of the extremely limited and poor water supply.

At present the Pecos River Commission, working in cooperation with relevant governmental agencies, is making studies to determine how the non-beneficial use of water on the stream can be reduced, and how the salinity problem can be alleviated. Studies are also being made of a reservoir which would provide flood control and replace Alamogordo reservoir as a conservation reservoir. The liaison between the Commission and the governmental agencies at the technical level is through the Engineering Advisory Committee to the Commission.

Congress has authorized the rehabilitation of the Fort Sumner Project in New Mexico and the work is practically complete. The authorizing legislation had the support of the Texas congressional delegation.

The Conchos reservoir was constructed on the Canadian River by the Corps of Engineers in the middle 1930's as a part of the pump-priming program. Its function is for flood control and the regulation of the erratic flows of the Canadian River.

The Tucumcari (Hurley) Project was authorized and is nearing completion in New Mexico to utilize a portion of the regulated water for irrigation. Several growing cities and towns along the Canadian River below the New Mexico state line have begun to develop a need for additional municipal and industrial water supplies A project was investigated and reported upon by the Bureau of Reclamation to supply additional domestic and industrial water needs of eleven cities in Texas. The project also would have other functions, namely, the provision of flood control, some irrigation, and improvement of the propagation of fish and wild life.

In the closing days of the 81st Congress, the President signed the Canadian River bill authorizing the construction of the project. Actual construction, however, was made dependent upon the ratification of a compact among the states of New Mexico, Texas, and Oklahoma. A compact has been agreed upon by commissioners appointed by the three states, and has been signed. Bills have been introduced in the legislatures of the three states calling for its ratification. As soon as the compact becomes effective, work can proceed upon the construction of the project if funds are made available by Congress.

A compact between Colorado and New Mexico over the uses of the waters of Costilla Creek became effective in 1946. This compact had the effect of resolving serious controversies between the two states and between interests of the two states. Under the terms of the compact much more beneficial use is being made of the waters of the stream with present facilities than resulted prior to the consummation of the compact.

Water use problems with respect to the Arkansas River developed between Kansas and Colorado at an early date. In 1902 Kansas took action against Colorado in the United States Supreme Court. This suit was dismissed in 1906 without prejudice to Kansas. The Court, however, did lay down a principle which theretofore had not been clear, namely, that a state did not have the exclusive right to the use of the waters which originate within its boundaries, and also laid down the principle that there should be an equitable apportionment of the uses of the waters of an interstate stream. Litigation between private parties on both sides of the state line was detrimental to both states for a number of years, and had the effect of casting a cloud over the water rights initiated on the stream under the laws of the respective states. Colorado, for the first time in its history, became the plaintiff in an interstate water suit before the Supreme Court. It filed what in essence was a bill of peace, asking that the problems between Kansas and Colorado over the uses of the waters of the Arkansas River be resolved for all time. This suit was costly and extended over a period of 16 years. The Court again found that Colorado had not exceeded her equitable share of the uses of the waters of the Arkansas River and had not injured the interested Kansans. The Court recommended strongly that the two states negotiate a compact apportioning the uses of the waters of the river.

In the meantime, in the 1930's the Corps of Engineers had constructed a project known as the John Martin dam which created the Caddoa reservoir. This project, similar to the Conchos reservoir on the Canadian River, was for the purpose of providing flood control and of regulating and making useable infrequent flood flows. In order for the construction of the reservoir to have the support of Colorado and Kansas, a stipulation was entered into by representatives of those states concerning

its use. After the Supreme Court decision, a compact commission was created by the two states and a compact was negotiated which became effective in 1945. The Caddoa reservoir is being operated under the direction of the Commission and there is no tension between the two states, or any of the interests in the states regarding the Arkansas River. This would not have been possible without the Arkansas River Compact.

Water use problems between certain interests in Kansas and certain interests in Colorado developed on the Republican River at an early date. A United States District Court rendered a decision on some of these problems which had been brought before that Court. Such decisions, however, did not solve interstate problems with respect to the use of the waters of the stream.

Development of the water supplies of the Republican River was desired by the states of Colorado, Kansas, and Nebraska. This development could not take place until the waters were apportioned among the three states. This was done by the Republican River Compact which became effective in 1943. Since that time five dams have been constructed and nine additional dams are authorized for construction.

This compact had one feature which former compacts did not have, but which subsequent compacts do have. I have indicated above that the consent of the Congress does not constitute approval by the United States of the provisions of the compact. However, the Republican River Compact did recognize the interest of the United States and, to a certain extent, its obligations.

The North Platte River is covered by a Supreme Court decree. Before the commencement of the Supreme Court suit, futile efforts were made over a period of years to negotiate a compact on this river. I am confident that, had those efforts been successful, the remaining needed development on the North Platte River would be proceeding under logical planning by the three states of Nebraska, Wyoming, and Colorado, working with relevant federal agencies.

A Supreme Court decision in 1922 fixed the status of the uses of the waters of the Laramie River. Three decisions, including a clarifying one, have been rendered by the Supreme Court since that time. In spite of such decisions, current efforts are being made to resolve some intra-state water use problems in Colorado concerning the Laramie River, which may develop into efforts for a compact resulting in an amicable adjustment of a long-pending controversy.

Water use problems in the Missouri River basin are complicated and are apt to become more so as the various units of the Missouri River basin plan progressively go into operation. Some of the fundamental problems were settled by the authorizing legislation. However, it will be necessary to set up machinery to bring about a coordinated operation of the various units of the project which will perform various functions and serve several states. I understand that the officials of the states of the basin, recognizing this, are having certain studies made to determine the practicability of negotiating a compact among the states to carry out these purposes. A compact between the states of Wyoming and South Dakota exists on the Cheyenne River and its principal tributary, the Belle Fourche River. Some of the units of the Missouri River Basin Project will be constructed and operated under the terms of this compact.

Efforts have been made to negotiate a compact among the states of Wyoming, Montana and North Dakota over the uses of the waters of the Yellowstone River. It is understood that the terms of a compact have been essentially agreed upon by representatives of the states. In the meantime, at least one reservoir of

the Missouri River basin plan, which is located on a tributary of the Yellowstone and on which pre-construction work had started, is being held in abeyance pending the outcome of the effectuation of the compact.

A treaty exists between the United States and Canada with respect to the St. Mary and Milk Rivers. This treaty was necessary in order that certain works might be constructed to provide a supplemental water supply for the Milk River Project which is located in the United States. The principle of equitable apportionment and beneficial use is illustrated by the following portion of Article VI of the treaty:

> ".....the St. Mary and Milk Rivers and their tributaries (in the State of Montana and the Provinces of Alberta and Saskatchewan) are to be treated as one stream for the purpose of irrigation and power, and the waters thereof shall be apportioned equally between the two countries, but in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each."

I should like now to describe the international situation between the United States and Mexico which has developed on the lower Rio Grande on the Colorado River, and on the Tiajuana River. Beginning in the early 1900's irrigation of lower Rio Grande lands in the vicinity of Brownsville, Texas, started and proceeded at a rapid rate. At the present time some 600,000 acres of land are irrigated in that area. This is a very rich agricultural area, the principal crops being citrus fruits and winter vegetables. Mexico began a corresponding development at a considerably later date. Because of the topography of the area, and because there was no treaty between the United States and Mexico to permit the construction of diversion dams, all the water used on the United States side had to be pumped, and now is being pumped, from the river. On the other hand, the land on the Mexican side slopes away from the river in such a way that gravity diversions can be made without diversion structures.

The Retamal Heading was constructed by Mexico in the 1930's. This heading is located above approximately two-thirds of the pump headings in the United States. Clearing of lands in Mexico proceeded at a rapid rate. In the meantime, what is now known as the Marte Gomez dam was constructed near the mouth of the San Juan River, one of the principal Mexican tributaries of the lower Rio Grande. No outlet was provided from the storage dam. The development of lands under the San Juan project proceeded at a rapid rate. There developed a real threat to the water supplies which had been used by United States interests for some years.

Efforts to negotiate a treaty over the waters of the Rio Grande and the Colorado were initiated in 1923 and abandoned in 1928. In face of the impending danger, the United States Section of what was then the International Boundary Commission conceived what was known as Federal Project No. 5, which was authorized by the Congress for construction in 1941. It consisted of an extremely long canal to divert water from the Rio Grande on the United States side and carry it to an off-channel reservoir from which water would be released through a power plant into another long channel, thence into a terminal reservoir. From the terminal reservoir, water would be released into a gravity canal to serve all of the United States lands by gravity. The purpose of the project was to convert from an international status to a domestic status those waters which were being used, and had been used for sometime, by Texas irrigators.

At the same time, on the Colorado River, water uses in Mexico were increasing rapidly. This was entirely possible and feasible from Mexico's standpoint. After Hoover Dam went into operation, the flow of the Colorado River was largely equated for the purpose of generating hydroelectric energy. The development below that dam in the United States for consumptive use purposes had not nearly reached the lower basin compact allocation; hence, some 8,000,000 to 10,000,000 acre-feet of equated water per year was, and is now, flowing into the Gulf of Lower California. The Colorado River runs along the western edge of the very fertile Mexicali Valley, and essentially is on the rim of a saucer, making it easy for Mexico to divert water from the river to the Mexicali lands.

Water uses were increasing in Mexico under the Alamo Canal, and some water was being pumped from the river to serve more remote areas.

Treaty negotiations were finally started in El Paso, Texas in the fall of 1943. They were carried on on the basis of facts which had been gathered by engineers. The negotiations themselves were carried on largely by engineers. Finally, the Mexican Water Treaty of 1944 was consummated and became effective in 1945 upon its ratification by both countries. This treaty permitted Mexico to build certain works on the lower Colorado River and provided for the International Boundary and Water Commission, the treaty having changed the name of the Commission, to construct certain works on the lower Rio Grande consisting of regulatory reservoirs and diversion works for the benefit of the two countries. The Falcon dam and reservoir and power plant are now under construction. The location of that dam and reservoir is shown on Exhibit No. 2.

The Anzalduas dam on the lower river is being designed and is in the process of being agreed to by the two countries by a Minute. This will be a diversion dam for the Mexican Anzalduas 9,000 second-foot canal, which is nearing completion and which will divert most of the Rio Grande water allocated to Mexico. It can be used to divert water by gravity to at least 500,000 acres of land in the United States, and will be used to divide flood flows between various flood channels of the lower Rio Grande flood control project.

There is shown on Exhibit No. 2 the location of the proposed Garza dam and reservoir which, if agreed upon, will be utilized to re-regulate power releases from Falcon reservoir in order to reconcile the use of lower Rio Grande water for the generation of hydroelectric energy and the use of the water for irrigation purposes. It will also permit the use of Falcon power plants for peaking purposes.

Additional dams and reservoirs on the lower Rio Grande in what is known as the Big Bend region are currently being investigated. The location of some of the most promising of such dams and reservoirs is shown on Exhibit No. 2.

The above is an outstanding example of two countries under treaty arrangement, through an international body, designing and supervising the construction of major projects which will make more useable a common water resource for the good of the two countries. Probably when this work is finished, the projects will represent the most important water use facilities ever constructed by two or more countries for their mutual benefit.

The water supplies of the lower Rio Grande basin could not have been developed logically without a treaty between the United States and Mexico.

On the Colorado River, Mexico has completed the Moreles diversion structure which will divert a major portion of the water of the Colorado River allotted to her by the Mexican Water Treaty. During that period when surplus water

is available in the river, she can also divert some of that water and produce wealth from it.

Summarizing, there are over 200 water use projects or units of projects in the western United States which are either in operation, under construction, proposed for construction, or considered as desirable potentialities, which could not exist or be considered except for compacts and treaty provisions. The estimated cost of these projects is in excess of $4,000,000,000. The amount of water that these projects will make useable for the benefit of various states and countries is about 45,000,000 acre-feet per year.

It is my firm opinion that, at least so far as the West is concerned, by far the best way to develop interstate water supplies is by means of the provisions of rationally negotiated compacts, administered by compact commissions working in cooperation with federal and other relevant agencies.

Denver, Colorado
February 16, 1951

(The foregoing paper was presented before the American Society of Civil Engineers at Houston, Texas, on February 20, 1951.)