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DEVELOPMENT OF INTERNATIONAL RIVER BASINS: REGULATION OF RIPARIAN COMPETITION ††

NITZA SHAPIRO-LIBAI†

Approximately 150 river basins straddle international boundaries, and together they cover almost one-half of the world's land surface, excluding Australia and Antarctica.¹ "International river basin . . . development will undoubtedly be one of the major means of accomplishing economic growth and social change in the next few decades, especially in the developing countries"² where most of these rivers flow.

International rivers traditionally have been considered in light of the theory of territorial sovereignty. The segment of the international river flowing within the borders of a state was regarded as part of the state's territory as much as its national rivers, mountains or valleys. With the exception of navigation and to a certain extent fishing and flotage³ the distinguishing characteristics of the international river were not treated outside the territorial context. Specific treatment of the effects ensuing from the distinguishing features of international rivers is of recent origin.

Modern technology makes possible improved distribution of water resources and expansion of their exploitation. More water resources may be harnessed for the generation of hydroelectric energy and the supply of irrigation to extended areas, thus benefiting the agricultural and industrial sectors of the economies. Further contribution to the general well-being is made through the control of floods and the provision of water and electricity for domestic consumption. Making optimum use of water resources generally involves coordination of all the water development projects undertaken within the various parts of a river basin.

Despite the benefits derived from river development and the growing concern about water resources, only a few of the world's international rivers have been developed. This phenomenon is attributed to both an unawareness of the rivers' opportunities and a lack of technical expertise and financial resources in developing countries.

Competition between riparians over the exploitation of river resources also may inhibit development. Riparians who wish to secure for them-

†† First of two parts. The second installment will appear in the next issue.
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2. Id.
3. F. BERBER, RIVERS IN INTERNATIONAL LAW 5, 6 (1959).
selves the maximum possible opportunities may fear that joining in the development of the river will aid the economic growth of other riparians at their expense. Such economic competition may be further aggravated by political rivalry. The disappearance of colonial systems increased the number of independent riparian states, thereby adding to the economic and political rivalry surrounding international river development.

The function of international law in this area should be to transfer to the legal plane the level of achievement attained on the technical plane. The inherent difficulty in doing so is the gap between the rapid advancement in technology and the ability of customary international law to parallel this advancement with the formulation of binding legal principles. The gap can be bridged by treaty-made international law. If international law is expected to serve as an instrument for promoting general welfare in the world, and customary international law cannot keep pace with technological advancement, effort should be directed towards bridging the gap by initiating international legislative action.

The term "international river" usually designates a river which flows through or between the territories of two or more states. Occasionally, different terms are used, such as "multinational rivers," or "not national and boundary rivers." The differences in terminology do not reflect different factual situations but differences of opinion as to the legal principles applicable to these rivers.

An innovation in terminology was introduced by the New York Conference of the International Law Association in September 1958. The conference chose the term "drainage basin" to define

an area within the territories of two or more states in which all the streams of flowing surface water, both natural and artificial, drain a common watershed terminating in a common outlet or common outlets either to the sea or to a lake or to some inland place from which there is no apparent outlet to a sea.

This terminology was adopted in response to doubts raised in the Association's 1956 Dubrovnik conference and represents a broader approach to the complexity of the factors affecting rivers. The doubts raised by the First Committee Report at the Dubrovnik Conference "whether tributary streams should be included in, or whether artificial waterways should be excluded from, the definition of an international

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were resolved by the New York conference through the inclusion of both.  

The Helsinki conference of the International Law Association in August 1966 expanded the definition previously adopted to include underground waters. The term chosen by the Helsinki conference was "international drainage basin," and its scope of application was defined as "a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus." This definition of an international drainage basin was not claimed to represent a traditional concept of international law. In fact, the New York conference explicitly stated that although there were some precedents concerning underground waters, international law for the most part had been concerned only with surface waters. The new definition was based on the argument that a drainage basin was an indivisible unit, requiring comprehensive consideration for the attainment of two goals: the effectuation of maximum utilization and development of any portion of the drainage basin's waters, and the accommodation of potential or existing conflicts in instances of multi-use development.

This study will adopt the proposition that waters which find their way to a basin's outlet form an interdependent system. Accordingly, the term "international river basin" is used to define an area extending over two or more states determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

The state of fluidity marking the definition of the concept of international rivers also applies to the principles governing the exploitation of these rivers. The various theories of riparian rights in international rivers can be classified into three categories: territorial supremacy, territorial integrity, and the unity of a river basin.

The principle of territorial supremacy empowers a state to exercise supreme authority over all components of its territory by virtue of which

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8. INTERNATIONAL LAW ASSOCIATION, PRINCIPLES OF LAW GOVERNING THE USE OF INTERNATIONAL RIVERS: RESOLUTION ADOPTED BY THE INTERNATIONAL LAW ASSOCIATION AT ITS CONFERENCE HELD IN AUGUST 1956 AT DUBROVNIK, YUGOSLAVIA, TOGETHER WITH REPORTS AND COMMENTARIES SUBMITTED TO THE ASSOCIATION 3 (1956).

9. In fact, the New York Conference rejected the following definition adopted by the Dubrovnik Conference: "An international river is one which flows through or between the territories of two or more states." Id. at 2.


11. INTERNATIONAL LAW ASSOCIATION, supra note 7, at IX.

12. INTERNATIONAL LAW ASSOCIATION, supra note 10, at 485.


14. I. OPPENHEIM, supra note 6, at 286.
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it can dispose freely of all the water actually flowing through its territory without concern for the damaging effects on a lower riparian. The principle of territorial integrity gives a state the right to demand that other states abstain from committing any act which constitutes a violation of its territorial integrity.\(^5\) Under this principle, a lower riparian has the right to demand the continuation of the natural flow of water coming from the upper riparian without concern for the needs of the upper riparian. The concept of the unity of a river basin is based on the principle that every river basin is naturally an indivisible physical unit\(^8\) which should be treated as an integrated whole;\(^7\) it establishes an interdependence between the co-riparians founded on the interdependence between the segments of a river basin. Accordingly, this concept stresses the idea of mutuality of rights and duties to the exclusion of any exclusive and superior right of any upper or lower riparian. The inconsistency among the three principles precludes the possibility of their forming a system of international river law.

The absence of agreed principles of international law inhibits the regulation of riparian competition over the exploitation of international river basin resources and impedes the development of these basins. In view of the growing importance of international river development as a means of accomplishing economic growth, the need for finding ways to overcome that impediment is apparent. Discussion of the principles currently claimed to represent customary international law will be oriented toward examining the adequacy of these principles to regulate international river development.\(^8\)

**TERRITORIAL SUPREMACY**

The principle of territorial supremacy is summarized by Schwarzenberger in *A Manual of International Law*:

> If a river is a multinational river, that is to say, passes through more than one state, each of its national segments is under the exclusive jurisdiction of the state through the territory of which it happens to flow. In the absence of treaty arrangements to the

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15. *Id.*
17. INTERNATIONAL LAW ASSOCIATION, supra, note 7.
18. For discussion of the extent to which certain principles are accepted as customary international law, see F. BERBER, supra note 3, at 52-253; see also COMMITTEE ON THE USES OF WATERS OF INTERNATIONAL RIVERS, AMERICAN BRANCH OF THE INTERNATIONAL LAW ASSOCIATION, PRINCIPLES OF LAW AND RECOMMENDATIONS IN THE USE OF INTERNATIONAL RIVERS: STATEMENT OF PRINCIPLES OF LAW AND RECOMMENDATIONS WITH A COMMENTARY AND SUPPORTING AUTHORITIES SUBMITTED TO THE INTERNATIONAL LAW ASSOCIATION (1958).
contrary, rivers are as much as any other land territory subject to territorial jurisdiction.\textsuperscript{19}

Schwarzenberger contends that the segment of an international river which passes through a state is under the exclusive jurisdiction of that state and that limitations on state jurisdiction imposed by customary law or general principles of law recognized by civilized nations are inappropriate. The arguments relying on analogies drawn from the rights of riparian owners in the municipal law of private property or limitations of such rights under municipal public law are discarded on the ground of being "question-begging analogies."\textsuperscript{20} The analogies imported from the quasi-international law on the federal level are considered illegitimate, since application of these analogies would infer "that unorganized or partly organized international society has reached a degree of integration that may be expected only on a federal level."\textsuperscript{21} The proposition that a doctrine which prohibits the abuse of national rights is established on the level of international customary law is dismissed as no more than "mere wishful thinking."\textsuperscript{22}

The territorial supremacy principle operates strongly in favor of upper riparian states and has been invoked most often by them. The effect of the upper riparians' reluctance to acknowledge limitations on their sovereignty imposed by international law is indicated in Fenwick's statement of rules governing international rivers:

It is doubtful whether international law can be said to have recognized any servitude corresponding to that existing in civil and in common law in the form of a right to uninterrupted flow of streams and rivers. Conscious of the possession of the traditional rights of sovereignty, states in possession of the upper waters of a river have not recognized any general obligation to refrain from diverting its waters and thereby denying to the states in possession of the lower waters the benefits of its full

\textsuperscript{19} G. Schwarzenberger, supra note 5. See also H. Briggs, The Law of Nations 274 (1952):
In the absence of such a regime of internationalization accepted by a riparian State, national rivers and those portions of international rivers which are within the national territory are subject to the exclusive control of the territorial sovereign. No general principle of international law prevents a riparian State from excluding foreign ships from the navigation of such river or from diverting or polluting its waters.


\textsuperscript{20} G. Schwarzenberger, supra note 5.

\textsuperscript{21} Id.

\textsuperscript{22} Id. at 106.
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flow. Such restrictions as have been recognized, have been in every case the result of treaty stipulations.\(^\text{23}\)

The upper riparians' position is based on the grounds that endowment with water resources should be treated no differently than endowment with other natural resources.\(^\text{24}\) However, the analogy between water resources and other natural resources, such as coal or diamond mines, is vulnerable on two grounds. Unlike other resources, water resources, if uninterrupted by artificial activity, move from one riparian to another. The location of the international river endows the upper riparian with a geographic advantage over the other riparians in respect to the exploitation of the waters; but the geographic advantage in exploitation is not identical with natural possession of water resources. The significance of the fluid nature of water resources can be compared with the conclusions of the United States Supreme Court with regard to the mobility of migratory birds:

To put the claim of the state upon title is to lean upon a slender reed. Wild birds are not in the possession of anyone; and possession is the beginning of ownership. The whole foundation of the state's right is the presence within its jurisdiction of birds that yesterday had not arrived; tomorrow, may be in another state; and in week a thousand miles away. . . . The subject matter is only transitorily within the state and has no permanent habitat therein.\(^\text{25}\)

Further, the analogy is vulnerable because of the injurious effects which may result from exploiting a geographic advantage. Unlike the

\[^{23}\text{C. Fenwick, International Law 381 (1948).}\]

\[^{24}\text{This rationalization was used against a draft provision of the Geneva Conference of 1923 which called for prior agreement of all riparians where hydraulic power works were likely to change the natural flow of water. The Belgian representative pointed out that the proposed provision would interfere with state sovereignty. He argued that the states were under no obligation to part with their natural resources in favor of neighboring states which did not possess them and that if a state which possessed electric power could be compelled to share a certain quantity of its power with another state, the same principle should be applied to states which possess coal mines, diamond mines or any kind of natural resources. League of Nations Doc. C. 30.M. 16 at 8, 9 (1924) (Convention Relating to the Development of Hydraulic Power Affecting More than One State: Records and Texts). As a result, the draft provision was replaced by a provision placing an obligation on the parties to enter into negotiations. 36 L.N.T.S. 77, Arts. 1, 3, 4, (1923). This obligation was emasculated by Article 1:}\]

\[^{25}\text{The present Convention in no way affects the right belonging to each state, within the limits of international law, to carry out on its own territory any operations for the development of hydraulic power which it may consider desirable. No clarification of the "limits of international law" was made.}\]

\[^{25}\text{Missouri v. Holland, 252 U.S. 416, 434, 435 (1920).}\]
exploitation of coal or diamond mines, the utilization of water resources within the boundaries of one riparian can inflict serious damages on the other riparians. Both lower and upper riparians are vulnerable to injuries. Following an upper diversion of a river, a lower riparian might be exposed to reduction in its water supplies; conversely, following a lower damming of the river, an upper riparian might be exposed to inundation of its territory.26

The above arguments go beyond weakening the analogy between international rivers and other natural resources. They manifest the unreasonableness and the injustice which stem from application of the territorial supremacy doctrine to international rivers. In fact, acknowledgment of such principle would be tantamount to legitimation of a riparian's right to take away the rivers of other riparians, to inflict damage by depriving agricultural communities of their source of livelihood and to obstruct the operation of power plants to the frustration of industrial activities.

The injustice involved in the doctrine becomes all the more glaring when the deprivation of a riparian's water resources results in overabundance in the depriving riparian. If riparians' rights in the river are unlimited, there is no legal impediment to prevent riparians from exploiting the river resources solely at their own convenience. Such results clearly indicate that the application of the territorial supremacy doctrine is not conducive to the prevention of international friction, a goal which is the raison d'être of international law.

"Territorial supremacy" is also objectionable as a principle since it detrimentally affects efficient utilization of resources. Experts in the field of river basin development recognize that:

Individual water projects—whether single or multipurpose—cannot as a rule be undertaken with optimum benefit for the people affected before there is at least the broad outlines of a plan for the entire drainage area. Integrated river basin development with the aim stated [making optimum use of the water re-

26. The extent of the potential injuries can be illustrated by the conclusions drawn by David E. Lilienthal from a fact-finding tour through an area in Pakistan from which India had temporarily withheld water supplies:

Pakistan includes some of the most productive food growing lands in the world in Western Punjab (the Kipling country) and the Sind. But without water for irrigation this would be desert, 20,000,000 acres would dry up in a week, tens of millions would starve. No army, with bombs and shellfires, could devastate a land as thoroughly as Pakistan could be devastated by the simple expediency of India permanently shutting off the source of water that keeps the fields and the people of Pakistan alive. India has never threatened such a drastic step, and indeed, denies any such intention—but the power is there nonetheless. Collier's, Aug. 4, 1951, at 58.
Riparian competition [source] involves the coordinated and harmonious development of the various works in relation to all the reasonable possibilities of the basin. Under the territorial supremacy doctrine, each riparian legitimately could embark on a unilateral uncoordinated, development project which might result not only in harm to other riparians but also in a mutually detrimental conflict of projects.

The detrimental effect of territorial supremacy was demonstrated in the recent Indo-Pakistan dispute. The partition of Punjab in 1947 into India and Pakistan according to religious divisions cut through the middle of the areas of highly developed irrigation systems. This division gave rise to a prolonged dispute between the two countries over the supplies of water for the canals leading from India to Pakistan and to a more general controversy over the use of the waters of the Indus and its tributaries. When protracted negotiations between the two governments proved futile, the International Bank for Reconstruction and Development offered its good offices and submitted to the two governments the plan for "Development and Use of the Indus Basin Waters of February 5, 1954." This plan was embodied, with some modifications, in the Indus Water Treaty of 1960, between India, Pakistan and the International Bank for Reconstruction and Development. The treaty provided for separation of the water supply system of the two countries. All the waters of the eastern rivers (Sutlej, Beas and Ravi) would be available for the unrestricted use of India. Pakistan would be allowed unrestricted use of all the waters of the western rivers (Indus, Jhelum and Chenab).

The essential features of the plan were the allocation of each of the rivers to one of the parties for its almost exclusive use and the construction of replacement canal systems made necessary by such allocation. These features reflect the parties' mistrust of each other in regard to cooperative exploitation of their common rivers and their wish to control

28. For discussion of the dispute, the role played by the International Bank and the agreement reached by the disputants, see generally, A. Michel, The Indus Rivers: A Study of the Effects of Partition 195-268 (1967).
30. Once the transition period was over, the two countries could go their separate ways; no further agreements and no continual consensus was essential. A. Michel, supra note 28, at 239.
31. 419 U.N.T.S. 126, Arts. II, III. Some exceptions were made to the above divisions of the water supply, and a transition period of ten years was provided for adaptation. The parties agreed that "[n]othing in this Treaty shall be construed by the parties as in any way establishing any general principle of law or any precedent." Id. at Art. XI (2).
independently their water supplies. In a sense, rejection of unified development in the Indus Basin in favor of independent planning and operation of the water supplies reflects the notion of recourse to sovereign right. This approach was found by the International Bank to be reasonable in view of prolonged Indo-Pakistani tensions.2 From the economic point of view, however, the plan was found to be exceedingly expensive and inefficient in the utilization of water resources.3 The plan was also deficient from the point of view of an overall settlement of competing claims. Possible future upstream withdrawals by China or Afghanistan were not considered in the plan despite the fact that Afghan projects on the Kabul River (a tributary of the Indus River which contributes about 16 per cent of the waters of the basin) were known already to be under construction.4

The Indus basin plan differs from the normal recourse to territorial sovereignty, since it was established by agreement. However, both the need for the agreement and its content arose out of the parties' mutual suspicions of unrestricted withdrawals. If the parties' suspicions could have been removed by binding principles of international law restraining utilization of international rivers, they might have been able to agree on a plan of efficient integrated river basin development.

Thus, the territorial supremacy principle is objectionable because of the possible injustice which can be involved in its application and its impediment to progressive regulation of international rivers.

**Territorial Integrity**

The argument of "injurious effects" employed to reject the territorial supremacy doctrine embodies the essence of the territorial integrity doctrine. This doctrine was used in the Charter of the United Nations, which instructs the members of the organization to "refrain . . . from the threat or use of force against the territorial integrity . . . of any state, or in any other manner inconsistent with the Purposes of the United Nations."5 The application of this principle to international rivers is summarized in Oppenheim's *International Law*:

But the flow of not-national, boundary and international rivers is not within the arbitrary power of one of the riparian states, for it is a rule of International Law that no state is allowed to

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32. A. Michel, supra note 28, at 232-36.
33. This appraisal is based on a conversation with Gilbert F. White, Department of Geography, University of Chicago.
alter the natural conditions of its own territory to the dis-
advantage of the natural conditions of the territory of a neigh-
boring state. For this reason a state is not only forbidden to stop
or divert the flow of a river which runs from its own to a neigh-
boring state, but likewise to make such use of the water of the
river as either causes danger to the neighboring state or pre-
vents it from making proper use of the flow of the river on its
part.\textsuperscript{36}

Oppenheim considered the duty of a state not to interfere with the
flow of a river to the detriment of other riparians to stem also from the
document of the abuse of rights, according to which a state is under an
obligation not to "[avail] itself of its right in an arbitrary manner
in such a way as to inflict upon another state an injury which cannot be
justified by a legitimate consideration of its own advantage."\textsuperscript{37}

The first step in the efforts of international lawyers to outline the
tenets of international river law was taken by the Institut de Droit
International at its Madrid Congress of 1911. The Congress, noting the
need to remedy the lack of rules of international law with respect to the
use of international rivers, arrived at conclusions similar to those of
Oppenheim.\textsuperscript{38} The rules laid down at the conference distinguished
between boundary streams and streams which traverse successively the
territories of two or more states. With regard to boundary streams, it was
provided that no state may, in its own territory, utilize the river in such
a way as to "seriously interfere with its utilization by the other state."\textsuperscript{39}
With regard to successive streams, it was provided that the point where
these streams cross the frontier of two states may not be changed "with-
out the consent" of the riparians. Furthermore, "no establishment (especi-
ally factories using hydraulic power) may take so much water that the
constitution, otherwise called utilizable or essential character, of the
stream shall, when it reaches the territory downstream, be seriously
modified."\textsuperscript{40}

A recent comparative study of domestic legal systems by F. J.
Berber concluded that no general principle according to which a riparian
cannot exercise its rights when it would damage another riparian existed

\textsuperscript{36} I. OPPENHEIM, supra note 6, at 474, 475.
\textsuperscript{37} Id. at 345.
\textsuperscript{38} Id. at 345.
\textsuperscript{39} The text of the resolution is reported in 24 ANNUAIRE DE L'INSTITUT DE
DROIT INTERNATIONAL 365-67 (1911). The resolution is cited in English in LEGAL
PROBLEMS RELATING TO THE UTILIZATION AND USE OF INTERNATIONAL RIVERS: REPORT
OF THE SECRETARY-GENERAL [hereinafter cited as: REPORT OF THE SECRETARY-
\textsuperscript{40} Id. Art. II (3).
in the national law of the individual states. The only rule drawn from the comparison as being common to all civilized states was that "no one may exercise his rights in such a manner as to damage another when the causing of this damage is the purpose, the motive, perhaps the only motive, for the exercise of such rights." Similarly, the comparison between the systems of municipal water law did not lead to the abstraction of any general and definite rule. However, an indefinite rule was found to underlie most of these systems according to which "the user must in some way take into consideration the use of waters by other users."

The positive element which unifies all the rules is an affirmative recognition of existing international duties on the part of riparians to international rivers. The arbitrary utilization of a river is limited by consideration of its effects on other riparians. But in comparison with the definite and self-executing qualities of the territorial supremacy doctrine, the territorial integrity theory does not present a clear criterion as to the extent of the effects which are disallowed or as to the way to establish the occurrence of such effects. Limitations upon the use of rivers on such grounds as it "causes danger," "prevents from making proper use," "is detrimental," or "seriously modifies the essential character of the stream" are susceptible to controversial interpretations. A question arises as to who is the authority to decide these controversies: the effecting riparian, the affected riparian or another third body? Moreover, the principle is oriented toward safeguarding the interests of lower riparians without giving due consideration to the interests of the upper riparians. The weakness of this approach is illustrated by the use by riparians of an inundation system of irrigation. Such irrigation systems often result in large supplies of water being wasted. Under a different and more efficient irrigation system, much less water would be needed to irrigate the equivalent areas. However, if the wasted supplies were to be consumed by the development projects of an upper riparian, such use might be considered detrimental to the less efficient lower riparian and therefore

41. F. BERBER, supra note 3, at 209.
42. Id. at 210.
43. Id. at 253-54.
44. Id. at 254. A survey of water treaties led Berber to conclude that no general principle of law could be extracted from this source. However, with regard to regional customary law, he found that:

[the] continental European treaties agree with each other in requiring the consent of the other riparian state for works likely to affect materially the flow of water in that state. But apart from this there does not appear to be any general rule. Sometimes the provisions relate only to a short stretch of common waters in the strict sense, sometimes only boundary waters (and sometimes this expression includes tributary streams, sometimes it excludes tributary streams), sometimes all common waters without any restriction.

Id. at 155, 156.
illegitimate. In this respect, the doctrine may be viewed as inconsiderate of upper riparian interests and inhibitive of efficient utilization of water resources.

The problems inherent in the territorial integrity doctrine were apparent in the Franco-Spanish dispute known as L'affaire du lac Lanox. Lake Lanox lies wholly within France and is fed by streams arising in and crossing only French territory. It is drained by the River Font-vive, which is a source of the Carol River. The Carol River flows from France into Spain where it empties into the River Segre.

From 1917 to 1957, France and Spain were unable to come to terms on the question of France's right to proceed with the utilization of the waters of Lake Lanox. France contemplated using Lake Lanox as a reservoir and then diverting its waters to the basin of the River Ariege (a wholly French river), where it could profit by a precipitous drop for the production of electric energy. This project would have enabled France to produce enough electricity to serve a city of 326,000 inhabitants throughout the year. The planned diversion amounted to twenty-five per cent of the entire flow of the Carol, the water of which was used in Spain by 18,000 farmers. French proposals to compensate Spain took several forms. The first proposal provided for monetary indemnity for the losses to be suffered. France then provided for the return to the Carol River of a flow adequate to meet "Spain's real needs." A later proposal suggested the return of an amount of water equivalent to the full inflow at Lake Lanox with supervision opportunities to a Spanish representative, enabling him to verify that equivalent returns were actually being made. Spain rejected the French proposals, claiming that France could not lawfully change in its territory the natural course of a river flowing into Spain without the prior consent of Spain, even though the flow at the border was to remain unchanged, and that the contemplated change in the river course would subject to French control the flow of the water into Spain. The dispute was resolved in favor of France by an arbitral award given in 1957—forty years after its inception.

The Spanish contention adopted the territorial integrity principle to disallow any change in the river course without its consent. However, its physical integrity was not actually threatened, since France guaranteed the return of at least the same amount diverted and provided for oppor-

45. For discussion of this case see generally Laylin and Bianchi, The Role of Adjudication in International River Disputes: The Lake Lanox Case 53 Am. J. Int'l L. 30 (1959); Griffin, The Use of Waters of International Drainage Basins under Customary International Law, id. at 50; Machensey, Judicial Decisions, id. at 156.
tunities to verify its compliance with this obligation. Spain did not even claim that the quality of the water would be changed by the contemplated project. The only detrimental effect Spain could point to was the subjection of the river flow to French control and will. The French project would have had an effect on the control of the flow, but the change would be in degree only, since France already possessed control as an upper riparian. Thus, a claim based on an insubstantial effect paralyzed French development projects for forty years.

Water control usually takes the form of changing its distribution in time and place. The change in distribution can be worked out to the benefit of all riparians on the basis of an efficient, coordinated development project. But a beneficial change in the distribution of the waters of an international river can be challenged by any riparian which refuses to coordinate its projects on the ground that its territorial integrity is being violated.

The orientation of the territorial integrity principle toward safeguarding riparian interests from detrimental changes can operate to negate beneficial development of international river basins. In this respect, the application of the principle is an impediment to progressive regulation of international rivers.

UNITY OF THE RIVER BASIN

While territorial supremacy is concerned with the benefits accruing to riparians from their sovereign faculties, and territorial integrity is concerned with the detrimental effects which might be inflicted upon other riparians, there is a third doctrine which is concerned with the impact of both the benefits and detriments on all the riparians in an international river basin. In contrast to the two former doctrines which treated separately the segments of the river passing through the territories of each riparian, the new doctrine starts with the premise of the unity of the river basin.

The first principle of international law adopted by the New York Conference of the International Law Association in September 1958 stated:

A system of rivers and lakes in a drainage basin should be treated as an integrated whole (and not piece-meal).

The origin of the above principle can be traced to the 1911 Madrid Con-

47. Integrated River Development, supra note 27, at 3.
ference of the Institute du Droit International which provided in its statement of reasons that:

Riparian states with a common stream are in a position of permanent physical dependence on each other which precludes the idea of the complete autonomy of each state in the section of the natural watercourse under its sovereignty.49

Although this Congress appreciated the interdependence between the river sections to the exclusion of complete autonomy of various sections, the deduction of commensurate conclusions did not occur until fifty years later in the Salzburg session of the Institute in September 1961. The resolution adopted at this session stated in its preamble:

Considering that the economic importance of the use of waters is transformed by modern technology and that application of modern technology to the waters of a hydrographic basin which includes the territory of several states affects in general all these states. . . .

Considering that in the utilization of waters of interest to several states, each of them can obtain, by consultation, by plans established in common and by reciprocal concessions, the advantages of a more rational exploitation of a natural resource. . . .50

On the basis of these and other considerations, the session resolved to recognize the right of each riparian to utilize the waters of international rivers on an equitable basis.51

To view the river as a physical unity is to reject territorial sovereignty or integrity. The unity principle does not allow territorial claims to shape the right to utilize the waters of international rivers. Instead, it provides that the river as a whole should be utilized to benefit the communities served without the hindrance of priorities claimed by upper or lower riparians.

A firm advocate for the use of the river unity theory is H. A. Smith:

The first principle is that every river system is naturally an indivisible physical unit, and that as such it should be developed so as to render the greatest possible service to the whole human community which it serves, whether or not that community is

51. Id. Art. 3 at 382.
divided into two or more political jurisdictions. It is the positive
duty of every government concerned to cooperate to the extent
of its power in promoting this development. . . . 52

Three elements in the above statement should be emphasized. Plans for
the development of water resources should be calculated to optimize the
benefits of the river. There is a duty of governments to cooperate in
promoting such development. This development should not be subjected
to political boundaries. There is no doubt that the combination of these
three elements is designed to bring the maximum benefit to the com-
munity surrounding the river as a whole; hence, any progressive regula-
tion of international rivers should include these elements. Adoption of
such an approach raises the intricate dilemma of mediation between the
above elements and the interests of the political entities comprising the
community of the river. Specifically, it raises the question of allocating
benefits and concessions between the riparians of an international river
basin.

Smith continues by delineating the relation between the beneficial
development approach and the interests of the political entities. He admits
that the government concerned:

. . . cannot be called upon to imperil any vital interest or to
sacrifice without full compensation and provision for security
[of] any other particular interest of its own, whether political,
strategic, or economic, which the law of nations recognizes as
legitimate. 53

Since friction between riparians ordinarily occurs when they have
important interests at stake, the concession admitted by Smith detracts
considerably from the efficacy of the beneficial development approach. A
few observations should be made about the interests involved and their
satisfaction.

To begin with, there is growing concern over the availability of
water resources in the world. A report prepared by a panel of experts
for the Economic and Social Council of the United Nations concluded
that:

The steady growth in world population and a growing water
consciousness have increased the demand for water, conse-
sequently, its value with every indication that the value will
continue to increase. 54

53. Id. at 151.
54. INTEGRATED RIVER DEVELOPMENT, supra note 27, at 32.
Possibilities for water use are in many cases irreconcilable. Distinction should be made between consumptive uses and non-consumptive ones. Consumptive uses are those in which the water is wholly or largely used up, such as irrigation, industrial processing and to a certain extent domestic use. Non-consumptive uses are those in which the physical quantity of the water is undiminished, such as generation of hydraulic power and navigation. Consumptive uses are mutually exclusive, and in a sense the same is true of non-consumptive uses in competition with consumptive uses. Water used for generation of power in the downstream level is no longer available for withdrawal at the upstream level, and waters used for navigation cannot, beyond a certain minimum, be used for other purposes. Yet, multiple use of a watercourse is sometimes possible. In these cases, greater opportunities lie in a unit-basin approach.

In cases of irreconcilable uses, the common remedy of monetary compensation is rarely adequate, at least until artificial production of usable water (whether by desalination process, cloud seeding or otherwise) becomes economically feasible. Illustrative of this point is the dispute between the United States and Canada over the Columbia River. Monetary compensation proved to be inadequate to resolve this dispute, although the Boundary Water Treaty of 1909 (in force between the two parties) provided for a right of action for damages when injuries were caused by "any interference with or diversion from their natural channels of such waters on either side of the boundary." In 1951 the United States applied to the International Joint Commission (created by the above mentioned treaty) for approval of a contemplated Libby Dam to be built on the central point of Kootenay River, where the river dips briefly into the United States. The proposed dam would have raised the water level at the border some 150 feet, thereby creating a large storage reservoir extending forty-two miles into Canada, rendering communication between certain Canadian communities more difficult. The United States offered to compensate the Canadians for the lands flooded, for highway and railway relocations and for resettlement of displaced persons. Canada rejected the offer and insistently claimed that it was entitled to share the Libby power in return for the physical contribution of her natural resources. Protests by the United States that the demand for a share of Libby power and other downstream benefits was con-

55. Id. at 4.
57. Id. Art. 2 at 2608.
trary to the 1909 Treaty, which provided only monetary compensation, were to no avail. The dispute was resolved by the 1961 Columbia River Treaty which provided *inter alia* for equal sharing of increased dependable capacity and average energy at United States head plants on the Columbia downstream reaches.

The possibilities of irreconcilable water uses, the inadequacy of monetary indemnity to compensate for losses of water benefits and the increased demand for water resources create a growing number of situations in which the common sharing of water resources involves a conflict between riparian interests. Any theory that restrains the beneficial development approach by requiring non-interference with particular interests of riparians is likely to impede rational exploitation of water resources. Therefore, a different theory based on the unity of the river basin concept should be employed for allocating water resources. The concept of equitable apportionment provides the basis for such a theory.

**Equitable Apportionment**

The equitable apportionment concept can best be understood by analysis on three levels: technical, international and federal.

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59. *Id.* at 714.
61. The Columbia Treaty provides that:
   - Canada is obligated to provide 15.5 million acre-feet of storage in the High Arrow Lakes, Duncan Lake, and Mica Creek reservoirs to be operated predominantly to meet flood management and power objectives in the United States. The flowage rights in Canada required for the headwaters of the Libby reservoir, with damsite located in the United States, are to be provided by Canada as well, should the United States elect to build the Libby project.
   - In exchange for the Stream regulation provided by the Canadian storages, the United States agreed to share equally the increase in dependable capacity and average energy at United States head plants on the U.S. reaches of the Columbia downstream, and to advance payment in amounts equal to one-half the estimated damage reduction in the flood plain of the lower Columbia. This sum discounted to the year 1964 was estimated to be approximately $54 million.
   - Although Canada initially elected to have its downstream power share returned for use in British Columbia, it ultimately opted to sell such power entitlement, parts of which commence in 1968, 1969, and 1973, for $254 million (U.S. 1964 worth). In addition, according to the terms of the Treaty, the United States will provide stream regulation having a net present value of approximately $60 million from its Libby project for Canadian head plants downstream on the lower Kootenay in Canada.

Krutilla, *The International Columbia River Treaty: An Economic Evaluation* in *Water Research* 69, 70 (A. Kneese and S. Smith ed. 1966). Krutilla suggests that "[I]t might be expected that the benefits from the Columbia Treaty would not be divided equally, but only that some net advantage could accrue to the United States." *Id.* at 84.
The Technical Approach

On the technical level, the starting point for treating international river basins is the concept of integrated river basin development, which is defined as the “orderly marshalling of water resources of river basins for multiple purposes to promote human welfare.”32 Applying this concept to international river basins would mean that “[t]he waters therein should be developed to provide the optimum benefit to the community within the basin, whether or not it comes under a single jurisdiction.”38

A panel of experts was established by the Secretary-General, acceding to the request of the Economic and Social Council, to deal with the economic and social implications of integrated river basin development and to advise proper action. The panel, after elaborating the features of an integrated river basin development, suggested a way to mediate between this concept and the difficulties encountered in cooperation between political entities. Viewing the extent of riparian cooperation as influencing considerably the degree of success in carrying out any development project, the panel delineated a sequence of steps to bring about an atmosphere of cooperation between the concerned riparians, beginning with the less explosive subjects, such as exchange of data and exploration of the physical possibilities, and ultimately reaching the issue of allocation. Characteristic of the panel’s approach is the following statement: “It is emphasized that the representatives would come together to cooperate in planning, not to settle international disputes.”36 Imperative to the success of this approach is the formulation of a clear statement of the benefits to be derived from the project, thereby providing the riparians an incentive for cooperation.35

The preparation of the comprehensive plan will naturally raise a great variety of issues, all of which have to be analyzed and settled in a spirit of give and take. What must emerge is a plan that exhibits two main features, first, a fair deal for all rather than a good bargain for one, and second, obvious benefits, direct and indirect, to all although the benefits can hardly be equal.35

The suggested basis for allocation is thus a “fair deal” and “obvious benefits” to all. The panel did not elaborate further, presumably because it approached the question of benefit allocation by delineating a friction-reducing process designed to promote a cooperative atmosphere in bar-

63. Id. at 32.
64. Id. at 36.
65. Id. at 32.
66. Id. at 37.
gaining sessions, the outcome of which should provide a fair deal and obvious benefits to all parties. The determination of a fair deal was left, however, to be decided by the riparians' negotiations.

**The Modern International Legal Approach**

Efforts have been made recently toward the formulation and systematization of legal principles applicable to users of international rivers. These legal efforts were directed at replacing the traditional one-sided concepts with new principles based on mutuality. The principles enunciated by three international law institutes are worth considering in this respect.

The Institut de Droit International at its Salzburg Session in September 1961 recognized the existence in international law of a restricted right of every state to utilize the waters which traverse or border its territory. It was further stated that:

> If the states are in disagreement over the scope of their rights of utilization, settlement will take place on the basis of equity, taking particular account of their respective needs as well as of other pertinent circumstances.\(^67\)

The International Law Association at its forty-eighth conference held in New York in 1958 stated some principles of international law governing the uses of the waters of drainage basins within the territories of two or more states, including:

> Except as otherwise provided by treaty or other instruments or customs binding upon the parties, each co-riparian state is entitled to a reasonable and equitable share in the beneficial uses of the waters of the drainage basins. What amounts to a reasonable and equitable share is a question to be determined in the light of all the relevant factors in each particular case.\(^68\)

The Helsinki conference of the Association in 1966 added to the above principle a list of relevant factors, not considered to be exhaustive, including: the physical conditions of the basin, the past and existing utilization of the basin, the riparians' economic and social needs, the satisfaction of these needs by alternative means, and the compensation of riparians as a means of adjusting conflicts among uses.\(^69\)

The Tenth Conference of the Inter-American Bar Association at

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\(^{67}\) [49 Annuaire de l'Institut de Droit International, pt. 2, Art. 2, at 382 (1961).]

\(^{68}\) [International Law Association, supra note 7, Art. 2, at IX.]

\(^{69}\) [International Law Association, supra note 10, at 488.]
Buenos Aires in November 1957 enunciated the existence in international law of the equal rights of riparians to make use of the “system of international waters.”\(^7\) It was further stated that:

States having under their jurisdiction a part of a system of international waters are under a duty, in the application of the principle of equality of rights, to recognize the right of the other states having jurisdiction over a part of the system to share the benefits of the system, taking as the basis the right of each state to the maintenance of the \textit{status} of its existing beneficial uses and to enjoy, according to the relative needs of the respective states, the benefits of future developments.\(^1\)

All the above principles were concerned with defining the basis for allocation of the water resources but, despite the awareness of the advantages offered by a regional approach to development of international river basins, the above mentioned institutions formulated no principle of international law to that effect. However, the issue was touched upon in the context of recommendations reflecting the desirability of establishing common organs to deal with the problems arising out of common use and with facilitating the economic utilization of the river.\(^2\)

Under the above principles, allocation of water resources is not subject to claims based on territorial assertions but rests instead upon the recognition of riparians’ equal rights to equitable allocations. Although the three definitions are not identical, when read together they convey the modern approach of equitable apportionment based on consideration of all “relevant” or “pertinent” circumstances with particular attention given to the riparians’ respective needs and their prior appropriations. The criterion of equitable apportionment is a point of departure in the sense that it negates claims based on the sovereignty and the integrity concepts, but it is incapable of being cast in the language of a definite formula. The three institutions made specific reference to respective needs and prior apportionment as being factors to be weighed in the balance. A few observations should be made with regard to these factors.

The need for water is a relative concept vulnerable to controversial interpretations. The indefinite character of the concept of need for water has been recognized on the state level:

\(^7\) Inter-American Bar Association, I Proceedings of the Tenth Conference held at Buenos Aires from 14 to 21 November 1957, Art. 1 (1958), cited in Report of the Secretary-General, supra note 38, at 544.
\(^1\) Report of the Secretary-General, supra note 38, Art. 2 at 544.
\(^2\) See Annuaire de l’Institut de Droit International, supra note 38, Art. 9 at 389; International Law Association, supra note 7, Art. 4 of the Agreed Recommendations at ix; Report of the Secretary General, supra note 38, Art. III(a), at 545.
The idea of "needs" or "requirements" for water has an appealing ring of calculable definiteness about it as compared with the connotation of words like "demands," "claims," or "desires." But in fact, the former mean nothing more than the latter. A man has a certain physiological need for water to survive. Beyond this more water will improve his health and well-being, still more permits him to wash and cook, and so on down the line through the use of waters for irrigation and industry, gardening and air conditioning, etc.

Finally, even if any sense could be made of the idea that men "need" water in certain calculable amounts, it could not be inferred that regions "need" water since men will choose what regions they desire to live in on the basis of water availability combined with all other considerations. Thus, the water available per square mile in the Sahara Desert is much less than in the urban area of New York, but we do not hear much of the "needs" of the former region. The reason is that man has adapted to the fact that water is an extremely scarce commodity in the Sahara, and consequently only those limited human activities capable of coping with this fact can be carried on there. Since "needs" for water are indefinitely expandable, there will always be competition for the use of existing supplies.\footnote{J. Hirshleifer, J. DeHaven, \& J. Milliman, \textit{Water Supply: Economics, Technology, and Policy} 34, 35 (1966).}

An analogy drawn from water supply on the state level is not wholly applicable to water supply on the international level. The premise of men choosing the regions in which they desire to live on the basis of water availability is not valid for dwellers in desert states. It is certainly untrue that the political entity of a state can choose the regions it desires to live in. However, the premise that "water needs" is an indefinite concept is certainly valid.

The expansive character of the need for water gives rise to controversial interpretations of the concept. Are agricultural and industrial uses to be included among the components of water needs or only domestic and sanitary uses; is the saturation point of water needs to be measured according to the standards of countries fairly abundant with water resources and doing well economically; should all riparians' water needs be equally measured by the same standards? Presumably, resolution of the above issues upon an equitable basis must consider all the relevant circumstances. Consequently, standards adopted on such a basis would be
specific to the circumstances existent in a certain international river basin, and therefore no generalization of standards can be laid down for the "respective needs" of riparians.

Prior appropriations, the second specified factor to be weighed in determining equitable apportionment, embodies the principle "that priority of appropriation gives superiority of right."74 The resolution of the Inter-American Bar Association provided that the basis of each riparian's right to share in the benefits of the river is the "maintenance of the status of its existing beneficial uses." The relative needs of the riparian would be taken into account only with respect to the benefits of future developments. In contrast with the above resolution, the principles enunciated by the Institut de Droit International and by the New York Conference of the International Law Association did not specify prior appropriations as a factor to be considered in the apportionment but referred generally to all other relevant and pertinent circumstances. The Helsinki Conference of the International Law Association did refer specifically to prior appropriations but only as one of the factors bearing on the equitable apportionment of the benefits. Thus the statements of the latter two institutions imply a denial of the ascendancy of prior appropriations but not a disavowal of its relevancy to the balance of the overall equities of a given case.

The priority of appropriation rule has both positive and negative aspects. If, for example, a riparian has built a multi-purpose dam and is operating a hydroelectric plant, it would hardly be equitable to suggest a study of potential uses of the river which ignores the existence of the dam. The objection raised by the United States to a contemplated Canadian project diverting water from the Columbia River relied on the potential injuries to the various uses of the existing dams in the United States.75 On the other hand, acknowledgment of wasteful senior uses, like the inundation system of irrigation which has been practiced in the Nile and the Indus basins, hardly justifies a rule of priority of appropriation. The disadvantage inherent in this rule was pointed out by the United Nations Panel of Experts:

75. Under the Fraser Diversion Scheme, contemplated by Canada in 1950, water from the Columbia was to be diverted into the Fraser River. Under this plan, the Kootenay was also to be diverted. The United States claimed that Grand Coulee Dam needed all the natural flow of the Columbia to keep its storage reservoirs full and its generators in full operation. It was argued that during a low-flow year there would be a direct conflict between Grand Coulee operation and the proposed diversion. The critical winter months, when the Grand Coulee reservoir should be filling, would be the same period when the Columbia waters would be drained off into the Fraser diversion. See Johnson, supra note 58, at 716-17.
‘Historic uses’ and ‘priority of appropriations’ have, in many cases, come to have an almost sacred significance, irrespective of the actual benefits derived, or whether the water is being put to the best use.\textsuperscript{16}

The Indus Commission which recommended in 1942 the gradual replacement of the inundation system by weir controlled irrigation in order to save the wasted supplies took the position that until such changes take place the existing irrigation uses must be protected.\textsuperscript{17} Thereafter, the existing uses were to be measured by the benefits previously accrued rather than the previous amounts of water used in order to adjust the priority of appropriations rule to an equitable approach.

Changes other than the technological ones, such as a natural change in the water resources, changes in the population surrounding it and its economy, might also render a strict application of the priority of appropriations rule inequitable.

Application of the rule might cause further injustice in cases where there is an economic and technonological gap between the concerned riparians. Owing to technological advancement and financial abilities a riparian might acquire vested rights in expansive water uses, leaving very little for the time when other riparians will be technically and economically capable of expanding their own water uses. In such cases, backward riparians substantially might lose their right to share the benefits of the river. The Arab opposition to the Israeli diversion relied also on the reason that Israel would thus be prevented from acquiring vested rights in the waters.\textsuperscript{18}

Since the equitable quality of the priority of appropriations rule is conditioned upon the context in which it is applied, prior appropriations should be considered as one among other factors comprising the equitable balance rather than as a preponderant factor.

Another issue dependent for its solution on the specific conditions of each river basin is the order of priorities among the different kinds of uses. Since no two river systems are the same,\textsuperscript{19} the physical capabilities of the river systems vary along with the various uses established and required by the population surrounding them. Thus, no generalization can be made for an order of precedence to be applicable to all situations.

\textsuperscript{76} INTEGRATED RIVER DEVELOPMENT, supra note 27, at 38.
\textsuperscript{77} AMERICAN BRANCH, INTERNATIONAL LAW ASSOCIATION, supra note 8, Appendix D (Report of the Indus Commission [1942]) at 97-99.
\textsuperscript{78} E. RIZK, THE RIVER JORDAN 37, 38 (The Arab Information Center, Information Paper No. 23, 1964).
\textsuperscript{79} White, A Perspective of River Basin Development, 22 LAW AND CONTEMPORARY PROBLEMS 157, 160 (1957).
This point was noted by the Helsinki conference of the International Law Association in stating the following principle:

A use or category of uses is not entitled to any inherent preference over any other use or category of uses.  

The above observations indicate that, although the concepts of respective needs and prior appropriations are relevant factors in the allocation of water resources, their impact depends upon other pertinent factors, and therefore they are of only limited aid in assessing the implications of the equitable apportionment doctrine. Under the equitable apportionment doctrine the question of what amounts to a reasonable and equitable share must be determined in the light of the relevant factors in each particular case.

The Federal Approach

The principles enunciated by the three international law institutes mentioned above, reflect to a considerable extent the impact of decisions reached on the so-called quasi-international level, the federal or inter-provincial level. The Supreme Court of the United States has had ample opportunity to decide water disputes between the states. Controversies between states are governed by federal, state and international law considered and applied "as the exigencies of the particular case may require." The leading principle under which such disputes are settled is equality of right which may be summarized as follows:

... the principles of right and equity shall be applied having regard to the 'equal level or plane on which all the states stand, in point of power and right, under our constitutional system' and that, upon a consideration of the pertinent laws of the contending States and all other relevant facts, this Court [the Supreme Court] will determine what is an equitable apportionment of the use of such waters.

The doctrine of territorial supremacy was rejected by the Supreme Court:

The contention ... that ... a state rightfully may divert and use, as she may choose, the waters flowing within her boundaries in this interstate stream, regardless of any prejudice that this may work to others having rights in the stream below her

80. INTERNATIONAL LAW ASSOCIATION, supra note 10, Art. 6, at 491.
82. Id. at 670.
83. Id. at 670, 671. See also Wyoming v. Colorado, 259 U.S. 419, 465, 470 (1921).
boundary, cannot be maintained. The river throughout its course in both states is but a single stream wherein each state has an interest which should be respected by the other.\footnote{259 U.S. at 466.}

Likewise, the territorial integrity doctrine in its strict sense was also rejected:

The lower state is not entitled to have the stream flow as it would in nature regardless of need or use. If, then, the upper state is devoting the water to a beneficial use, the question to be decided, in the light of existing conditions in both states, is whether, and to what extent, her action injures the lower state and her citizens by depriving them of a like, or an equally valuable, beneficial use.\footnote{Colorado v. Kansas, 320 U.S. 383, 393 (1943).}

The Supreme Court has stated that the equitable apportionment doctrine is the basis for water allocation between riparian states. Yet, in applying this doctrine, the Court has occasionally resorted to the priority of appropriation rule as representing the equitable allocation in a particular case. The interrelation between these two principles can be witnessed in the decisions rendered in the controversies of Wyoming v. Colorado\footnote{259 U.S. 419.} and Nebraska v. Wyoming.\footnote{325 U.S. 589 (1945).}

In the first case, Wyoming instituted proceedings against Colorado to prevent a proposed diversion in Colorado of part of the water of the Laramie River which threatened to deprive Wyoming of water it had been using for some time. The Court enjoined Colorado from diverting or taking more than the residual supply of the river after deducting Wyoming's senior appropriations, which were proved to be reasonably required for the irrigation of land dependent on this water supply. The amount sought to be diverted and taken under Colorado's diversion project was much larger.\footnote{259 U.S. at 496.}

The Court stated that the rule was “priority of appropriations gives superiority of right.”\footnote{Id. at 470.} Moreover, it was held that this rule “furnishes the only basis which is consonant with the principles of right and equity applicable to such a controversy as this is.”\footnote{Id. at 470.} Application of the “priority rule” in this controversy did not violate principles of right and equity since,
Both States pronounced the rule [priority] just and reasonable as applied to the natural conditions in that region; and to prevent any departure from it the people of both incorporated it into their constitutions. It originated in the customs and usages of the people before either State came into existence, and the courts of both hold that their constitutional provisions are to be taken as recognizing the prior usage rather than as creating a new rule.91

Wyoming v. Colorado might be regarded as an endorsement of "priority of appropriation" as a rule of law, but closer study reveals that the decision rests on the "principles of right and equity" which in the light of the specific circumstances of this controversy were expressed in the terms of the priority rule. Nor does the opinion suggest that the priority rule is the sole basis for deciding the rights of states following such a rule in their municipal systems, since adoption of this rule hinged on the specific circumstances of the controversy and not on the fact that the parties belonged to the category of "appropriation states."92

The foregoing analysis is in accord with Nebraska v. Wyoming, involving the use of the North Platte River for irrigation. Nebraska alleged that diversions in Wyoming and Colorado violated the priority rule, which was in force in all three states, and deprived her of water to which she was equitably entitled.

It was emphasized by the Court that the mere fact that the parties were appropriation states did not necessitate a literal application of the priority rule. The Court juxtaposed Wyoming v. Colorado and Colorado v. Kansas,93 which did not involve a controversy between two appropriation states. The decision in the latter case provided that "all factors which create equities in favor of one state or the other must be weighed"94 in determining whether one state was using or threatening to use more than its "equitable share." This observation led the Court to conclude that:

[If an allocation between appropriation States is to be just and equitable, strict adherence to the priority rule may not be possible. For example, the economy of a region may have been established on the basis of junior appropriations. So far as possible those established uses should be protected though strict application of the priority rule might jeopardize them. Appor-

91. Id.
92. The Term "appropriation states" refers to these states which follow the priority rule.
93. 320 U.S. 383 (1943).
94. Id. at 393-94.
tionment calls for the exercise of an informed judgment on a consideration of many factors. Priority of appropriation is the guiding principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former—these are all relevant factors. They are merely illustrative, not an exhaustive catalogue. They indicate the nature of the problem of apportionment and the delicate adjustment of interests which must be made.95

The actual apportionment made by the Court did, under "counter-vailing equities" in the factual context, deviate from the priority rule.

In summary, apportionment of interstate streams is based on the principle of equity which takes into consideration prior appropriation, efficiency of uses, benefits derived as compared with damages inflicted and any other relevant factor. With regard to controversies between appropriation states, the priority rule is only a guide the application of which may be limited by the factual context.

The decisions of the United States Supreme Court were echoed in the report of the Indus Commission. The Indus river system irrigates more land than is irrigated in all the United States, yet there is still more fertile land in the Indus basin than water to irrigate it. Agricultural dependency upon this water resource gave rise to disputes between the pre-partition princely states and the provinces inhabiting the basin. Until 1921 these disputes were resolved by the British Secretary of State for India acting as an arbiter. Thereafter his authority passed to the Government of India which acted on the advice of a central board of irrigation. Under the Government of India Act, differences between the provinces, or between the provinces and the princely states were to be resolved by a central authority acting upon the advice of independent commissions. Regulation of the water supply within the states was under the direct authority of the rulers of those states. The Act of 1935 assigned to the provinces authority to regulate their own water supplies.96

Under the Act of 1935 a lower riparian, Sind Province, brought a

96. See generally Laylin, Principles of Law Governing the Uses of International Rivers, 1959 American Society of International Law: Proceedings 20, 21-3; Bains. supra note 19, at 45.
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complaint against an upper riparian, Punjab Province, in 1939, charging
that the river withdrawals for new Punjab projects would lower the water
level of the Indus River in Sind and would affect seriously the efficient
working of the Sind's inundation canals. 97

A commission was established to hear the dispute; other states and
provinces became parties and submitted their views. The chairman of the
Indus Commission was Sir Bengal N. Rau, then a judge of the Calcutta
High Court of Justice and later a member of the International Court of
Justice. The other two members were chief engineers from the provinces.
At the outset the commission issued a statement of principles of law
governing the rights of the states and provinces which were accepted
unanimously by the primary disputants and the five other states and
provinces which joined the proceedings. This statement, after pointing
out that the conclusion of agreements based on a community approach is
the most satisfactory settlement of disputes of this kind, provided that:

(3) If there is no such agreement, the rights of the several
Provinces and States must be determined by applying the
rule of 'equitable apportionment,' each unit getting a fair
share of the waters of the common river.

(4) In the general interests of the entire community inhabiting
dry, arid territories, priority may usually have to be given
to an earlier irrigation project over a later one: 'priority of
appropriation gives superiority of right.'

(5) For purposes of priority the date of a project is not the
date when a survey is first commenced, but the date when
the project reaches finality and there is a fixed and de-
finite purpose to take it up and carry it through.

(6) As between projects of different kinds for the use of water,
a suitable order of precedence might be: (a) use for
domestic and sanitary purposes; (b) use for navigation and
(c) use for power and irrigation. 98

With regard to the last mentioned principle, the Commission itself
made the observation that the order of precedence depends upon the
particular circumstances of the river concerned and that different author-
ities may take different views even with reference to the same river.

97. Laylin, supra note 96, at 23; see generally, A. MICHAEL, supra note 28, at
128-32.
98. I REPORT OF THE INDUS (RAU) COMMISSION 10-11 (1942), cited in AMERICAN
BRANCH, INTERNATIONAL LAW ASSOCIATION, supra note 18, at 97-8.
The imperative principle in this statement is the sharing of the water on the basis of equitable apportionment. Yet, prior irrigation projects are usually to be considered as the predominant factor. Determination of priority according to the date on which the project is completed and not when the surveying of the project was commenced avoids the possibility of acquiring rights on the basis of uncertain or faked projects. But such a principle may force riparians to speed up irrigation projects without thorough consideration or due regard for economic priorities. Moreover, the principle might operate to deprive riparians who are oppressed with economic or political problems of their "fair share of the water." At the appropriate time these riparians might be unable to appropriate money for surveying or carrying out irrigation projects. In contrast, such results could be avoided if an appropriate body prepared at least a broad outline of a development plan for the entire basin which considered the projects to be carried out by each riparian.

With regard to the dispute itself, the Commission pointed out the inequitable situation of Sind wasting the water supply by practicing an inundation system while opposing Punjab's plan to utilize a fraction of the wasted supplies for irrigation of land which laid barren for lack of water. In view of this situation, the Commission recommended converting Sind's inundation canals to weir-controlled canals to be fed from diversion barrages. These would allow both the operation of the contemplated Bhakra Dam in Punjab and the preservation of irrigation formerly dependent upon Sind's inundation canals. It was further recommended that Punjab contribute to the cost of the diversion barrages in order to avoid having to pay compensation for which it would be liable in the event the inundation canals had remained unconverted to weir control. The recommendation of the Commission was subsequently incorporated into a draft agreement between Sind and Punjab. This agreement never came into effect, however, because the partition of India took place before resolution of differences over Punjab's financial contribution to Sind's diversion barrages. Since the partition, India has gone forward with the construction of the Bhakra Dam, and West Pakistan has been working on two Sind barrages. 99

The equitable approach to the allocation of water supply between riparians was also adopted by the German Staatsgerichtshof in Wurttemberg and Prussia v. Baden. 100 The court said:

100. German Staatsgerichtshof, June 18, 1927, cited in A. McNair and H. Lauterpacht, 4 Annual Digest of Public International Law Cases 128 (1927, 1928). In Wurtenberg and Prussia v. Baden, a dispute arose between Wurtenberg and Baden over the effect of proposed projects on the flow of the Danube. These two parties
The exercise of sovereign rights by every state in regard to international rivers traversing its territory is limited by the duty not to injure the interests of other members of the international community. Due consideration must be given to one another by states through whose territories there flows an international river. No state may substantially impair the natural use of the flow of such a river by its neighbor. . . . The application of this principle is governed by the circumstances of each particular case. The interests of the states in question must be weighed in an equitable manner against one another. One must consider not only the absolute injury caused by the neighboring state, but also the relation of the advantage gained by one to the injury caused to the other. (Emphasis added.)

While the German court saw an analogy in relations between members of the German Federation and relations between states in the international arena, the same approach was pursued neither by India, nor, to a certain extent, by the United States.

On April 1, 1948, one day after the tribunal set up to resolve questions arising out of Partition ceased to exist, East Punjab cut off irrigation supplies to canals which crossed into Pakistan. The flow of most of the water was eventually restored by East Punjab. The Inter-Dominion Agreement between the Government of India and the Government of Pakistan on the Canal Water Dispute between East and West Punjab, signed in May, 1948, incorporated the East Punjab assertions of territorial supremacy. This contention was stated in Article 1, which provided that:

. . . proprietary rights in the waters of the rivers in East Punjab vest wholly in the East Punjab Government and that the West Punjab Government cannot claim any share of these waters as a right.

The Government of West Punjab disputed this contention asserting that it had "a right to the waters of the East Punjab rivers." However, since both governments were anxious to settle the dispute in a spirit of goodwill and friendship, the East Punjab Government assured the West Punjab Government that "without prejudice to its legal rights in the

sought restraining orders against each other and Prussia intervened as a Danubian riparian.

101. Id. at 130-31.
102. See A. Michal, supra note 28, at 196-97.
103. 54 U.N.T.S. 46.
104. Id.
matter . . . it has no intention suddenly to withhold water from West Punjab without giving it time to tap alternative sources."

The West Punjab Government agreed, on its part, to deposit with the Reserve Bank of India such ad hoc sum as might be specified by the Prime Minister of India, out of which an undisputed sum would be transferred immediately to the East Punjab Government. On the whole, the Indian position has been that it has "exclusive jurisdiction and control" of water in its own parts of the river and that in the above mentioned agreement India merely "agreed to delay the exercise of its legal rights" so as to enable Pakistan to make alternative arrangements.

In 1945, the position of the United States was described:

The United States appears to be reluctant to admit that the territorial sovereign is legally subject to restraint which it has not itself undertaken by treaty to observe.

This position was enunciated in 1895 by U.S. Attorney General Harmon with regard to the Mexican complaint that acts committed within the United States reduced the flow of the Rio Grande River at the Mexican border to the damage and hardship of numerous Mexican inhabitants.

The Attorney General, in concluding his opinion, said:

The case presented is a novel one. Whether the circumstances made it possible or proper to take any action from consideration of committee is a question which does not pertain to this department; but that question should be decided as one of policy only, because, in my opinion, the rules, principles, and precedents of international law impose no liability or obligation upon the United States.

This conclusion was based on the principle that every nation has absolute sovereignty within its own territory and on the premise that the doctrine of natural servitudes does not apply to cases in which it "would interfere with the enjoyment, by a nation within its own territory, of whatever was necessary to the development of its resources or the comfort of its people."

The record of the United States' practice, however, reveals some

105. Id. Art. 3.
106. Id. Art. 5.
107. Bains, supra note 19, at 44.
109. J. Moore, A Digest of International Law 653, 654 (1906).
111. Id.
reluctance to press for the privileges of its sovereignty.\textsuperscript{112} Even the Mexican complaint, which provoked the Harmon doctrine, was settled by the agreement of 1906 which provided for the delivery to Mexico of a specified volume of water annually.\textsuperscript{113} Yet, this agreement incorporated stipulations that negated any interpretation of the instrument as a repudiation by the United States of the territorial supremacy principles.\textsuperscript{114} Subsequent treaties between the United States and Mexico or Canada maintain to a certain extent this duality between practicalities and legal theory.\textsuperscript{115}

A change in the United States' position is evident in a 1958 State Department memorandum.\textsuperscript{116} This memorandum concluded that:

1. A riparian has the sovereign right to make maximum use of the part of a system of international waters within its jurisdiction consistent with the corresponding right of each riparian.

2. (a) Riparians are entitled to share in the use and benefits of a system of international waters on a just and reasonable basis.\textsuperscript{117}

These principles were employed by the United States in support of its objection to the Canadian Fraser diversion plan, contemplating a diversion of the Columbia into the Fraser River.\textsuperscript{118} Canada disputed the contention that equitable apportionment was an established principle of international law and claimed that this principle was primarily a product of interstate cases before the United States Supreme Court.\textsuperscript{119} The dispute was settled with the conclusion of a treaty relating to cooperative development of water resources in the Columbia River basin.\textsuperscript{120} In the treaty the parties recognized that

\begin{itemize}
\item \textsuperscript{112} C. Hyde, supra note 108, at 567, 571-77.
\item \textsuperscript{114} Id. Arts. 4, 5.
\item \textsuperscript{115} For the view that U.S. international rivers treaties with Mexico from 1906 and 1944 and with Canada from 1909 do not repudiate the Harmon Doctrine, see Bains supra, note 19, at 42, 43. Members of the Committee of the American Branch of the International Law Association took the position that the United States had in practice never followed the Harmon Doctrine and by 1945, at least, had repudiated it, see Laylin, supra note 96, at 29.
\item \textsuperscript{116} U.S. Department of State, Legal Aspects of the Use of Systems of International Waters: Memorandum of the State Department (1958).
\item \textsuperscript{117} Id. at 89, 90.
\item \textsuperscript{118} Johnson, supra note 58, at 716-22.
\item \textsuperscript{119} Id. at 722-23.
\item \textsuperscript{120} Treaty with Canada Relating to Cooperative Development of the Water Resources of the Columbia River Basin, supra note 60.
\end{itemize}
the greatest benefit to each country can be secured by cooperative measures for hydroelectric power generation and flood control, which will make possible other benefits as well.\textsuperscript{121}

But the application of this conviction was restricted to the specific arrangement provided for in the treaty and for the period of the Treaty only. Article XVII, titled "Restoration of Pre-Treaty Legal Status," provided that:

Nothing in this Treaty and no action taken or foregone pursuant to its provisions shall be deemed, after its termination or expiration, to have abrogated or modified any of the rights or obligations of the United States of America or Canada under then existing international law, with respect to the uses of the water resources of Columbia River basin.\textsuperscript{122}

In conclusion, the principles adopted on the federal level support the modern international legal approach to benefit allocation of international river basins. However, the acceptance of these principles as governing law in controversies between members of a federal state does not necessarily imply recognition by the federal states that the same principles are applicable to controversies over international river basins.

\textbf{ISSUES INVOLVED IN THE PROCESS OF EQUITABLE APPORTIONMENT}

Analysis of these three approaches indicates that equitable apportionment is to be viewed as the consequence of a conciliation process rather than as a point of departure capable of being cast into a concrete formula. It is necessary, therefore, to analyze the issues which may be raised in the conciliation process.

What considerations guide apportionment of benefits? This problem involves selecting those factors which should bear on the apportionment, demarcating their impact in relation to each other and transferring such demarcation to terms of benefits. These elements may be illustrated by simplifying some of the Indus Commission recommendations on the dispute between Sind and Punjab,\textsuperscript{123} where the considerations bearing on apportionment were the irrigational needs of both provinces, Sind's prior apportionment and her wasteful irrigation practice. The effect of Sind's inefficient irrigation method was to reduce the impact of her prior apportionment, without impairing her irrigational uses, while better satisfying Punjab's irrigational needs. Thus the construction of the

\textsuperscript{121} Id. Preamble.
\textsuperscript{122} Id. Art. XVII.
\textsuperscript{123} See text accompanying notes 95-97 supra.
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Bhakra Dam in Punjab for increased withdrawals from the rivers was allowed, and Sind was apportioned the water amounts calculated to satisfy her irrigational uses under a more efficient irrigation method.

The issue often is more complicated as the dispute over the Jordan system illustrates. Irrigational needs in that case invoked such considerations as food production, absorption of unemployed labor force, rise in the standard of living, saving of foreign exchange and political and security interests. Prior appropriation did not constitute a major factor, since most of the river flow was yet unexploited. The scarcity of available water resources necessarily invites consideration of relevant needs in light of feasible alternatives and efficiency of uses. Thus the ultimate relevancy of factors such as savings of foreign exchange, absorption of labor force and political and security interests may be challenged; the feasibility of pursuing alternative economic policies capable of satisfying these needs would have to be explored and likewise the efficiency of existing uses would have to be inspected. Some instances of misuse of water and land resources have been encountered with respect to both Jordan and Israel. The reasons for those misuses included inadequate experimentation and research, the inhibitive social structure and the ascendancy of political over economic interests. The removal of these causes would involve financial expenditures, a long process of social change and the subjecting of political interests to economic reason. Thus the impact of inefficiency upon the apportionment of the benefits would have to be considered in the light of financial, social and political factors; the determination of the relevancy of the various considerations and the extent of their impact on the apportionment is likely to involve reconciliation of economic, social and political policies.

Two other sets of issues relate to the essence of the development project and the supervisory arrangements. Although these issues concern executive or administrative aspects, they are likely to constitute the starting point for discussing allocation of benefits and bear directly on the resulting allocation.

In a regional integrated river basin development project, the issue is how to provide for the needs of the riparians most efficiently. The number of the regional projects advanced for the development of the Jordan system is illustrative. In unilateral development projects the issue would be whether a given project interferes with existing or contemplated projects of the other riparians. The potential effect of the Canadian Fraser Diversion Scheme on downstream United States facilities was one of the two controversial issues in the Columbia River dispute.

The administration issue relates to the provision of supervisory arrangements for the operation of a regional project or withdrawals by
unilateral projects. The magnitude of the issue usually depends on the degree of confidence the riparians have in each other. Thus the United States and Canada were able to come to terms on this issue, while Israel and the Arab countries smothered the Unified Plan by disagreeing on this point. Similarly, the mistrust between India and Pakistan motivated the rejection of a regional integrated development of the rivers shared by them.

To sum up, the consequence of equitable apportionment may involve the process of settling three sets of issues: selection of projects, apportionment of benefits and supervisory arrangements.

CONCLUSION

Many experts agree that the unit area which affords the optimum opportunities for planning the development of an international river is the entire basin, embracing the main stream and all its tributaries. Progressive regulation of international rivers should, therefore, be directed at stimulating development on a unit basin approach. The territorial supremacy and the territorial integrity doctrines, being oriented toward safeguarding the interests of either upper or lower riparians, are repugnant to the comprehensive approach. On the other hand, the doctrine of equitable apportionment is in line with such an approach, since it is oriented toward satisfying equally the interests of all riparians. The doctrine of equitable apportionment alone, however, establishes only the equal right of each riparian to an equitable share in the benefits of the river. It does not specifically call for joint development, although it is capable of encouraging such cooperation. The premise that the total benefits of the river have to be shared equitably by all the riparians is apt to engender the incentive for enlarging the opportunities to be shared through joining in a regional project.

The role played by the equitable apportionment doctrine in the conclusion of the treaty relating to cooperative development of the water resources of the Columbia River basin is evidenced in a study made on the controversy over this river. According to this study, most lawyers and statesmen on both sides of the border agreed that the Harmon Doctrine was incorporated into the Boundary Water Treaty of 1909 in force between the two countries. But the application of this doctrine to the dispute was rejected since it would have made joint planning and development an impossibility. On the other hand, the doctrine of equitable apportionment emerged as the widely favored principle for the solution of the dispute despite the disagreement over the question whether it was

124. Johnson, supra note 58.
125. Id. at 758.
already an accepted principle of international law. The impact of the doctrine on the actual negotiations is described as follows:

The equitable apportionment concept played an important part in the resolution of the Columbia dispute. As applied here it was not thought to set a rigid formula for settlement. Rather, it set a tone and created an atmosphere that made negotiations easier and permitted compromise of even the most knotty problems. Once the disputants had accepted equitable apportionment as their basic premise, they were encouraged, if not required, to move away from extreme positions toward the middle range of alternatives more acceptable to the other side. Given this climate for negotiations, the specific plan of the Treaty had to be thrashed out in the political arena. Each side wanted something the other had; they simply had to negotiate the price of the trade. 126

The doctrine of equitable apportionment, favorable as it is, has limits set by the indefinite terms of its fundamental conceptions. Acceptance of the doctrine by disputing riparians cannot insure its being expressed in concrete terms of respective benefits. Israel and the Arab states accepted the doctrine of equitable apportionment to be the prevailing principle, but they differed on what amounted to equitable shares. That differences are likely to arise not only in connection with political emnity is evidenced by the record of disputes between the more cohesive entities, such as the members of a federal state, which are connected by political, economic, legal, cultural and traditional ties. Yet in the case of disputes between members of federal states, the availability of an immediate supreme authority (whether judicial or administrative) insures that the accepted doctrine will be interpreted into a concrete apportionment of benefits.

Thus, the usefulness of the doctrine of equitable apportionment is limited because it lacks the quality of self-application 127 and depends upon agreements or authoritative decisions for the concrete interpretation of its terms.

126. Id. But cf. Krutilla, supra note 60. Krutilla observes that, in a restricted sense, "the ultimate division of the gains appears to be inequitable." However, he qualifies this statement, saying that "unless one knows all the elements of the broader background, therefore, one cannot properly judge the equity of the Columbia Treaty terms." Id. at 96.

127. The quality of self-application is used here in the sense of a definite rule which can be applied without further definition of its terms. For example, a rule which determines the extent of territorial waters would be self-applicable in this sense. Conversely, the rule of equitable apportionment cannot be applied without defining what equitable shares amount to.