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Universal trends are being recognized internationally in water legislation. Professor Teclaff sees some of these trends as steps toward the goal of the river basin as the legal, as well as natural, unit of water administration, with coordinating functions entrusted to a water agency national in scope. The view of water rights is changing from absolute private ownership to increasing regulation by permit systems.

THE INFLUENCE OF RECENT TRENDS IN WATER LEGISLATION ON THE STRUCTURE AND FUNCTIONS OF WATER ADMINISTRATION†

*Ludwik A. Teclaff**

THE idea that recent legislation in different parts of the world could have any widespread and uniform influence on water administration generally presupposes some elements common to a large number of water law systems, in developing as well as developed countries. Uniformities in water law are nothing new, but in the past they tended to be confined to the sphere of influence of an individual piece of legislation, such as Justinian's Code¹ or the Code Napoleon,² whereas to-

†This article is based on a paper prepared for the United Nations Inter-Regional Seminar on Current Issues of Water Resources Administration, held in New Delhi, India, Jan. 22-Feb. 2, 1973.

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1. CORPUS JURIS CIVILIS. DIGESTA (THE DIGEST OF JUSTINIAN), 2 vols. (C.H. Monro transl., 1904-09). Text translated also in SCOTT, ED., THE CIVIL LAW (1932). The influence of Roman water law, of course, was not confined to its own period and to the Mediterranean world, but permeated European law and, by derivation, that of other continents.
2. CODE NAPOLEON (off. ed. 1810). The influence of the Napoleonic Code upon the water-use regulation systems of other countries was profound and far-reaching. It affected all of the French territories in Africa, the Middle East, and Southeast Asia, and served as a model for the Mejlé Code of

day they are more universal in character and are due rather to cross-fertilization from many sources than to the effect of a single one.

There are good reasons for this. One is that differences in climatic conditions have less influence on law than formerly. Under the constantly increasing, almost universal pressure of demand for water, regions of relative surplus are now experiencing many of the same difficulties as beset regions of water deficiency.³ Another reason is the tremendous growth in means of communication and of information retrieval, which facilitate the adaptation and transfer of institutions from one system of law to another. Such interchange of ideas and knowledge has been accelerating at a great pace through the work of the United Nations and its specialized agencies, through regional organizations such as the Council of Europe, and through conferences such as the International Conference on Water for Peace held in 1967. There now exists in readily available form a considerable body of data on water law and administration at various levels of government, including detailed guidelines for the drafting of legislation.⁴

On the international plane, these common trends are most clearly manifest in the legalizing of the river basin as the basis for cooperation between states. In other words, the river

the Ottoman Empire, as well as for the codes of several South American countries and for early nineteenth-century Spanish water law. See L. Teclaff, *Abstraction and Use of Water: A Comparison of Legal Regimes* (United Nations, Department of Economic and Social Affairs) (ST/ECA/154) (1972), at 27-31 *passim*, 36-39.

3. The following comment on Finland, a country with less than 5 million population and well endowed with rainfall and innumerable lakes, illustrates this point:

The supply and conservation of water for populated centers is one of Finland's most difficult problems, partly due to steep increases in industrial and per capita consumption. The carrying capacity of the environment probably has been exceeded. Water management will be the largest item in funding for environmental protection in the 1970's.

Woodrow Wilson International Center for Scholars, *THE HUMAN ENVIRONMENT, VOLUME II: SUMMARIES OF NATIONAL REPORTS ON ENVIRONMENTAL PROBLEMS 1972*, at 24 (1972).

And on New Zealand:

Despite abundant rainfall, growing demand for water, especially by industries, tends to outstrip supply.

Id. at 67.

4. *E.g.*, the ECAFE document, *Essential Considerations for Drafting Water Codes and Legislation* (WRD/WGWC/3). See also F. Maloney, et al., *A MODEL WATER CODE* (1972).

basin becomes not only the natural unit for water resources development, but the legal unit as well.⁵ This can be seen in the growing number of agreements concluded by co-basin states for joint development of common water resources.⁶ These may present a detailed plan, with a description of particular projects, as did the Columbia River treaty of 1961,⁷ or they may give only a general framework for future development, as in the Niger treaty, which simply obligates the basin states to establish close cooperation as regards the construction of projects that may exercise an appreciable influence on the regime of the river and its usefulness for various purposes.⁸

The emergence of the river basin as the physical framework of international cooperation in utilizing transboundary waters extended the operative area of international water administration without, however, changing its functions. Thus, the jurisdiction of the Nile, Indus, and La Plata commissions, for example, embraces an entire basin or the major part of one, but, like areally more limited commissions, they have authority only to advise and supervise the execution of waterworks already approved. The Nile agreement of 1959 stipulates the creation of a technical committee which is

5. L. TECLAFF, *THE RIVER BASIN IN HISTORY AND LAW* 160-79 (1967).

6. Among them are: Statute of the Committee for Coordination of Investigations of the Lower Mekong Basin established by the governments of Cambodia, Laos, Thailand, and the Republic of Viet-Nam in response to the decision taken by the United Nations Economic Commission for Asia and the Far East, Oct. 31, 1957, U.N. Legislative Series (ST/LEG/SER.B/12), treaty no. 81; Agreement for the Full Utilization of the Nile Waters, Nov. 8, 1959, 453 U.N.T.S. 51; Indus Waters Treaty between the Government of India, the Government of Pakistan, and the International Bank for Reconstruction and Development, Sept. 19, 1960, 419 U.N.T.S. 126; Joint Declaration of Argentina, Brazil, and Uruguay of Sept. 23, 1960, U.N. Legislative Series (ST/LEG/SER.B/12), at 163, n.1; Treaty between United States and Canada relating to the Columbia River Basin, Jan. 17, 1961, T.I.A.S. No. 5638, 542 U.N.T.S. 244; Convention Concerning General Development of the Basin of the Senegal River, July 26, 1963, text in 19 *Rev. Jurid et Politique (Indépendance et Coopération)* 299 (1965); Act Concerning Navigation and Economic Cooperation Between the States of the River Niger Basin, Oct. 26, 1963, text in 9 *Ann. Francais de Droit Int'l* 883 (1963); Convention for the Development of the Chad Basin, May 22, 1964, text in 19 *Rev. Jurid et Politique (Indépendance et Coopération)* 306 (1965); Treaty Concerning the Plata Basin, Concluded Among the Governments of Argentina, Bolivia, Brazil, Paraguay, and Uruguay, Apr. 23, 1969, text in 8 *INT'L LEGAL MATERIALS* 905 (1969).

7. Treaty between United States and Canada Relating to the Columbia River Basin, Jan. 17, 1961, T.I.A.S. No. 5638, 542 U.N.T.S. 244. See also TECLAFF, *supra* note 5, at 165-70.

8. Act Concerning Navigation and Economic Cooperation Between the States of the River Niger Basin, Oct. 26, 1963, Art. 4, text in 9 *ANN. FRANCAIS DE DROIT INT'L* 883, 885 (1963).

functionally confined to supervising and directing research work and drawing up arrangements for the party states in case of abnormally low supply.⁹ The commission provided for in the Indus treaty of 1961 also has limited powers, serving chiefly as a channel of communication between the two basin states.¹⁰ Similarly, the intergovernmental Coordinating Committee for the Plata Basin is circumscribed in its role of promoting, coordinating and implementing multi-national activities for basin development by the proviso that collective action be taken without prejudice to projects which the basin states initiate within their own territories.¹¹ Only a very few commissions are empowered to approve projects. The International Joint Commission, United States-Canada, can do this to a certain extent, and so can the Senegal Commission, which, in addition, may be entrusted with construction of works.¹²

Clearly, the influence of the river basin on international water administration as a unit of international cooperation in water utilization has been less dramatic than its influence as a unit of national water development on domestic water administration. In the latter case it spurred the emergence of a new administrative form, the valley authority. But, though it is still utopian to expect the emergence of supra-national drainage basin authorities, it can perhaps be expected, according to one of the most recent studies on the subject,¹³ that an international entity will evolve to act as a catalyst by acquiring information, formulating policy recommendations, and disseminating both to the co-basin states which would actually execute policy and regulate the resource. Such a commis-

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9. Agreement for the Full Utilization of the Nile Waters, Nov. 8, 1959, 453 U.N.T.S. 51.
 10. Indus Waters Treaty Between the Government of India, the Government of Pakistan, and the International Bank for Reconstruction and Development, Sept. 19, 1960, 419 U.N.T.S. 126.
 11. All that is required of the basin states is a "due respect for international law" and the carrying out of projects "in accordance with acceptable practice among friendly and neighboring nations." Art. V of the Treaty Concerning the Plata Basin, 8 INT'L LEGAL MATERIALS 905 (1969).
 12. Treaty Relating to Boundary Waters and Questions Arising Along the Boundary Between the United States and Canada, signed at Washington, January 11, 1909, 36 STAT. 2448, T.S. 548 (Articles III, IV, and VII refer to the Commission's approval of projects); Convention Concerning General Development of the Basin of the Senegal River, July 26, 1963, Art. 3, 19 Rev. Jurid et Politique (Indépendance et Coopération) 299 (1965). See generally TECLAFF, *supra* note 5, at 160-79, 183-84.
 13. Utton, *International Law and the Pollution of International Drainage Basins*, 13 NATURAL RESOURCES J. 282, 303 (1973):

sion would have both the authority and the personnel to initiate scientific and planning studies on its own, without having to await a reference from the basin governments.

Descending from the international to the national plane, the most recent, if not the most striking, trend appears to be the pre-eminence given in new water legislation to pollution. As could be expected, this is more evident in the codes of the developed countries, which have more severe problems, but it is becoming widespread. Concern over pollution is of relatively recent origin. Some anti-pollution laws began to appear in Europe and the United States early in the 19th century, but they usually pertained to protection of a particular interest, such as fisheries.¹⁴ The end of the 19th century and the beginning of the 20th produced more comprehensive laws, such as the English statute of 1876,¹⁵ the United States Refuse Act of 1899,¹⁶ and the French law of 1917.¹⁷ The approach in those laws was to prohibit pollution altogether. That was the simplest policy concomitant with the development of science and with the technical means at the disposal of the authorities. However, its simplicity was matched by its ineffectiveness. Both the English law of 1876 and the Refuse Act of 1899 are examples of inadequate solutions. The problem needed a more sophisticated approach; outright prohibition merely resulted in more pollution than ever and in disregard of the law.

As a rule, these rather primitive, early laws persisted with few changes until the middle of the century, when a slow modernization began, introducing classification of streams and standards for pollution.¹⁸ Until then, the administrative control of pollution had been generally entrusted to health departments.¹⁹ More and more now, it is either en-

14. E. Manner, II WATER POLLUTION IN INTERNATIONAL LAW, THE RIGHTS AND OBLIGATIONS OF STATES CONCERNING POLLUTION OF INLAND WATERS AND ENCLOSED SEAS, IN UNITED NATIONS, CONFERENCE ON WATER POLLUTION PROBLEMS IN EUROPE, DOCUMENTS SUBMITTED TO THE CONFERENCE, 446, 450-53 (1961) (61.II.E/Mim.24).

15. Rivers (Pollution Prevention) Act of 1876, 39 & 40 Vict., c. 75.

16. 33 U.S.C. § 407 (1970).

17. France, Loi relative aux établissements dangereux, insalubres ou incommodes, 19 dec. 1917, *text in* 8 Législation de la Guerre de 1914-1918, Recueil Sirey (1917).

18. See, e.g., England and Wales, Rivers (Prevention of Pollution) Act, 1961, 9 & 10 Eliz. 2, c. 50; United States, Water Quality Act of 1965, as amended, 33 U.S.C. § 1151 et seq. (1970).

19. See generally LITWIN, CONTROL OF RIVER POLLUTION BY INDUSTRY (1965).

trusted to a separate agency or incorporated in the agency which deals with water generally, contributing to administrative consolidation and adding a whole new dimension to water administration.²⁰

Closely connected with concern over pollution is the attention given to the detrimental effects that water development may have on other elements of the environment. This is evident in some, as yet rare, international treaties, one example being the Niger treaty²¹ and another the 1972 Ramsar convention for the preservation of wetlands.²² It is also apparent in the growing volume of domestic legislation, such as the United States National Environmental Protection Act of 1969²³ or the Japanese act of 1967, as amended.²⁴ Here we have a unitary approach, with water as just one component in the environment. In the United States, this has resulted in a rectification of the federal agencies' previous lack of interest in environmental deterioration. Agencies engaged in water development now have to take into account the influence of such development on ecology in general, and must file a report showing the impact on environment and all possible alternatives to the project in question.²⁵

If this trend continues, it may be expected that in some countries water law will become a branch of general environ-

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20. *E.g.*, in Poland pollution control is the responsibility of the Central Water Economy Office; in England and Wales, of the river authorities at the area level and of the Secretary of State for the Environment at the national level; in Sweden, of the National Water Protection Service. *Id.* at 32-40.
 21. The basin states, according to Article 4, are obligated to establish close cooperation as regards construction of projects which may exercise an appreciable influence on the regime of the river itself, its tributaries, and sub-tributaries, on navigability and industrial and agricultural exploitation of the basin, on the quality of the waters, and on the biological characteristics of the fauna and flora. Act Concerning Navigation and Economic Cooperation Between the States of the River Niger Basin, Oct. 26, 1963, Art. 4, text in 9 ANN. FRANCAIS DE DROIT INT'L 883, 885 (1963).
 22. International Conference on the Conservation of Wetlands and Waterfowl, Final Act and Summary Record, Ramsar, Iran, 30 Jan.-3 Feb., 1971. Text of Convention at 17.
 23. 42 U.S.C. § 4321 et seq. (1970).
 24. Japan, Basic Act for Environmental Pollution Control, Act. No. 132 of 1967, as amended to December 1970. English translation of the original text in Tsuru, S., Environmental Pollution Control in Japan, Proceedings of International Symposium on Environmental Disruption, Appendix pp. 342-48 (1970); translation of revised act in Problems of the Human Environment in Japan, National Report Submitted by the Government of Japan to the United Nations Conference on the Human Environment, Annex I (1971), and in Sand, P.H., Legal Systems for Environment Protection, Japan, Sweden, United States 47 (1972) (FAO Legislative Studies No. 4).
 25. National Environmental Policy Act, 42 U.S.C. § 4332 (2) (C) (1970).

mental law. Under that influence, new restraints on the management of water resources will develop, in order to minimize an adverse impact on ecosystems. In the United States, for example, this unitary approach to problems of the environment has already produced a consolidation of water pollution control with other elements of environmental protection under a single agency.²⁶ It may eventually lead to the inclusion of all water administration in such a body. In Europe, Sweden, France, and the United Kingdom have similarly confided environmental protection to a single agency, though the French example is really one of coordination rather than the consolidation of administrative power achieved in the United Kingdom, Sweden, and the United States.²⁷

(In this matter of consolidation, there is perhaps one important difference between Sweden and the United States on the one hand, and the United Kingdom on the other. While the United States and Sweden seem to consolidate only protective functions in the super-agencies, leaving developmental functions elsewhere, the English system appears to consolidate both functions.²⁸)

On a world-wide scale, consolidation of water administration *per se*, preferably independent of existing ministries, is taking place very slowly. The reasons are inherent in political structure and historical background. Nevertheless, consolidated agencies or ministries do exist in every part of the world—from Poland to Ethiopia, from Iran to Alaska.²⁹

26. In 1970 President Nixon transferred responsibility for administering the Federal Water Pollution Control Act from the Secretary of the Interior to the newly created Environmental Protection Agency. Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15,623 (1970).

27. In Sweden, the Nature Conservancy Agency was set up by decree of May 25, 1967. Instruktion for Statens Naturvardsverk, Svensk Forfattningssamling (1967) No. 444, as amended. Its powers and functions were expanded by the Environment Protection Act of May 29, 1969, for which it was designated executive agency. Svensk Forfattningssamling (1969) No. 387 (translated in Sand, *supra* note 24, at 37-46). In the United Kingdom, the Secretary of State for the Environment has taken over a wide range of functions previously dispersed among several ministries. See United Kingdom, Secretary of State for the Environment Order, Statutory Instruments 1970 No. 1681. In France the corresponding consolidation was achieved by Decree No. 71-94 of Feb. 2, 1971, [1971] J.O. 1182, [1971] B.L.D. 113.

28. United Kingdom, Secretary of State for the Environment Order 1970, Statutory Instruments 1970 No. 1681. Art. 2(1) transfers to the Secretary of State for the Environment any functions of the Ministry of Housing and Local Government under the Water Acts of 1945, 1948, and 1963.

29. Poland, Water Law of May 30, 1962, Dziennik Ustaw (1962), p. 289; Ethiopia, Order No. 75 of 1971, to Provide for the Establishment of a

While the new water laws appear to foster consolidation at the top, they tend at the same time toward decentralization lower down the scale, corresponding as closely as possible to the confines of the river basin. This has been very largely achieved, for example, in Hungary; local agencies there, while remaining an integral part of the water administration, have varying degrees of autonomy which, in some instances, include not only permit-giving but also construction.³⁰ The Hungarian experiment can be termed bureaucratic decentralization, whereas the river authorities of the British Water Act of 1963 represent autonomous decentralization.³¹ This trend was picked up about the same time in France, in the 1964 legislation establishing river basin committees.³²

In other countries, autonomous decentralization is best exemplified in those valley authorities which have been entrusted with planning, execution of works, and general development of basins or sub-basins. Such a mandate—for the achievement of goals beyond water administration alone—can be found in virtually all of the legislation creating valley authorities of the TVA type.³³ By the late 'fifties, it was generally recognized that, in economically less developed areas, water projects might have a disproportionately large influence and that, as a U.N. panel of experts put it, when water works were extended to the physical boundaries of a river basin, there would be a concomitant tendency for the

National Water Resources Commission, *Negarit Gazeta*, No. 3, p. 12 (Oct. 27, 1971); Iran, Water Law of 18 July 1968, and the Manner of Water Nationalization (for English translation, see United Nations, Economic Commission for Asia and the Far East, Water Legislation in Asia and the Far East, Part II, Water Resources Series No. 35, at 217-26 (1968)); ALASKA STAT. ANN. § 46.15.010 et seq. (1971). See also Caponera, *Towards a New Methodological Approach in Environmental Law*, 12 NATURAL RESOURCES J. 133, 140-41 (1972).

30. Ballo and Szesztay, Water Resources Administration in Hungary 102-09 (1970) (United Nations Panel of Experts on Water Resources Development Policies, Buenos Aires, 8-13 June, 1970) (ESA/RT/AC.1/12).
31. England, Water Resources Act, 1963, c. 38.
32. France, Law No. 64-1245 of Dec. 16, 1964, on the Regime and Distribution of Waters and Protection Against Pollution, Art. 13, [1964] *Bull. Legislatif Dalloz* 674, 676.
33. India, Damodar Valley Corporation, Act No. 14, Mar. 27, 1948, 6 India Code 13-33 (1956); Sri Lanka (Ceylon), Gal Oya Development Board, Act No. 51, Nov. 24, 1949, Legislative Enactments of Ceylon, vol. IX (1958), chap. 260, p. 561, as amended and substituted by the River Valley Development Board (Amendment) Act, Act No. 6 of 1965, Legislative Enactments of Ceylon, 1966 Supplement, vol. I, p. 572; Brazil, Law No. 541, Dec. 15, 1948 (creating the Comissao do Vale do Sao Francisco), (1948) *Colecao da Leis*, v. 7, p. 141.

economic unit to coincide with the basin area.³⁴ Though valley authorities are scattered throughout the world, they have not become the dominant form of water administration, even in the countries where they have been introduced. On a lesser scale, however, the valley authority may be a forerunner of the environmental super-agency. In both instances the mandate is very broad, but, while water management is the primary task of the valley authority, it may be quite secondary in the activities of an environmental super-agency.

The decentralization of water administration along river basin lines, though still a qualified success, is the direct result of general acceptance of the basin region as a unit for water resources management, on both a national and an international plane.³⁵ However, this role of the river basin has been challenged in some areas of fairly acute shortage, where planners have been turning more and more to inter-basin transfers of water over long distances and on a very big scale. There are many examples, some already in existence, some still on the drawing-board. They include: the Lower Rhone-Languedoc project in southern France; the Texas Water Plan; the Snowy Mountains Project in Australia; the Israeli National Water Carrier; the California State Water Project; the half-dozen plans for combining waters of the Columbia, and even of Alaskan rivers, with those of the Colorado and other western United States rivers; the Soviet project to divert water from the great north-flowing rivers of Siberia to the arid interior of Central Asia; and, most recently, the Indian proposal to link the Ganga and Cauvery rivers by a 2,000-mile canal.³⁶

34. U.N. Dep't of Economic and Social Affairs, *Integrated River Basin Development* (U.N. Doc. No. E/3066) (1958) at 1.

35. See L. TECLAFF, *THE RIVER BASIN*, *supra* note 5, at 120, 145, for developments in Japan, France, and Spain; also, the U.S. River Basin Planning Act of 1965, 42 U.S.C. § 1962 (b) (1970), which envisaged the establishment of the river basin unit on a nationwide scale for planning purposes.

36. See generally, TECLAFF, *THE RIVER BASIN*, *supra* note 5, at 185-92, 202-03; Quinn, *Water Transfers—Must the American West be Won Again?*, 58 GEOGRAPHICAL REV. 108 (1968); D. MANN, *INTERBASIN WATER TRANSFERS: A POLITICAL AND INSTITUTIONAL ANALYSIS* (prepared for the National Water Commission) (1972); R. Johnson, *MAJOR INTERBASIN TRANSFERS: LEGAL ASPECTS* (National Water Commission Legal Study No. 7) (1971); Vendrov, *Water Management Problems of Western Siberia*, SOVIET GEOGRAPHY 13-23 (May 1964) (translated from *Izvestiya Akademii Nauk SSSR, 1 SERIYA GEOGRAFICHESKAYA* 36-44 (1963)); India, Central Water and Power Commission, *Water Wing, Note on National Water Grid of India* (1973).

It is too early, however, to predict the eventual decline of the river basin as a planning and development unit. First of all, the growing concern over pollution in many countries gives renewed emphasis to the basin as a unit for pollution control, and, thus, for efficiency in water management. Secondly, after initial enthusiasm, doubts have arisen about long-distance transfer as a solution to water supply problems. The high cost of transfers, as well as their potentially detrimental effect on the environment, contribute to such doubts. Less expensive ways can be found to augment supplies. One is through shifting from uses (usually highly consumptive) which must be subsidized if they are to survive to uses which can afford to bear the cost.³⁷ Another is through multipurpose recycling of water and wastes, and here some really complex new approaches are being tried. A sophisticated project for simultaneous sewage disposal, wastewater irrigation, reclamation of water for domestic and industrial use, drainage, and soil fertilization—the Muskegon County Wastewater Management System—is being put into practice in the state of Michigan within a small and compact administrative unit.³⁸

So promising is this approach that it is being studied for nearly two score metropolitan areas in the United States. Being essentially localized, it requires the cooperation and involvement of the public, but—and this is another highly important trend—modern legislators do realize and increasingly make provision for the role which the public can and should play in water administration and management. It is true that, through the institution of users' associations, the public has long played such a role in management and even construction of works in some countries, especially in irrigation.³⁹ But the associations' responsibilities were historically confined to small areas, commanded by at most a few canals. Now, however, local units have planning and consultative

37. Wollmann and Bonem have shown that water brought by interbasin transfer is the most expensive of all—more costly than reclaimed and recycled water or, even, than desalted water. N. WOLLMAN AND G. BONEM, *THE OUTLOOK FOR WATER* at 210 (1971).

38. Sheaffer, *Pollution Control: Wastewater Irrigation*, 21 DE PAUL L. REV. 987 (1972).

39. See, e.g., Lopez, J., *Organización de las comunidades de usuarios en la República Argentina*, in *Actas y Documentos, Ia Conferencia Internacional de Derecho de Aguas* (Argentina, 28 Aug.-2 Sept. 1968).

functions in the French river basin committees,⁴⁰ for example; and in England and Wales, the appointed representatives of local interests, such as agriculture, industry, and commerce, are part of administrative bodies which have executive responsibilities in addition to the other functions.⁴¹

The association of the public with administration is not confined to the regional sphere, but permeates entire administrative systems, though at higher levels the function of the lay element is predominantly consultative, as, for example, in New York State's Council of Environmental Advisors, appointed by the Governor, which is authorized to associate in planning and policy-making for water management, among other concerns.⁴² The universities and scientific societies which play an advisory role in Hungary and Spain are another example.⁴³ It can safely be forecast that this trend is here to stay and will grow, because modern water administration requires a counterbalance to over-centralization and adequate recognition of local needs and interests, and public participation provides both of these.

While remodelling the structure, modern water legislation also affects the powers and functions of administration. Perhaps this is most evident in the expansion of regulatory powers to embrace almost all uses of almost all waters. Some of the most far-reaching changes have taken place in countries with a riparian rights system. Thus, in England and Wales, riparianism was replaced (with certain exceptions) by a permit system in 1963,⁴⁴ and in Latin America, agrarian reforms in several countries have put an end to the riparianism which had been inherited under the influence of the Code Napoleon.⁴⁵

40. France, Law No. 64-1245 of Dec. 16, 1964, on the Regime and Distribution of Waters and Protection Against Pollution, Arts. 13-16, [1964] Bull. Législatif Dalloz 674 at 676-77.

41. England and Wales, Water Resources Act, 1963, c. 38, secs. 6, 7 & 8. See also L. CRAINE, WATER MANAGEMENT INNOVATIONS IN ENGLAND 96-103 (1969).

42. NEW YORK ENVIRONMENTAL CONSERVATION LAW §§ 7-0101 to 7-0109 (McKinney 1972).

43. See Ballo and Szesztay, *supra* note 30, at 214-218; S. MARTIN-RETORTILLO, WATER RESOURCES ADMINISTRATION IN SPAIN 89-90 (United Nations, Department of Economic and Social Affairs, Water Resources Section) (1969) (ESA/RT/AC.1/18).

44. England and Wales, Water Resources Act, 1963, c. 38.

45. This was brought about in Chile, for example, by the Water Code of 1951, Law No. 9909 of 1951, Diario oficial No. 21,960 (1951), Recopilación de

Expansion of regulatory powers appears also in the treatment of groundwater. Previously, groundwater was outside administrative control in many countries. Now an authorization has been required in England and Wales since 1963, in parts of France (termed special zones) since 1964, and in the Canary Islands of Spain since 1962.⁴⁶ A few years ago, Argentina amended its Civil Code to make all underground waters public, although it did preserve for the landowner a privileged position as user of such waters.⁴⁷ Inroads are being made even in the eastern United States, one of the last strongholds of private ownership of groundwater. Recent legislation in New York State, for example, requires authorization in one area threatened by serious depletion.⁴⁸ In some modern legislation—such as the Israeli law of 1959, the Turkish water nationalization law of 1960, the water code of Alaska of 1966, or the Iranian law of 1968—all waters are declared to be public and their use subject to authorization.⁴⁹

With the modernization of water laws in progress in many parts of the world (involving, in some instances, a switch from one system of water disposition to another), the question of rights acquired under previous legislation becomes of

leyes, vol. XXXVIII (1950/1951), p. 234, and by Act No. 16,640 of July 16, 1967 on Land Reform, No. 26,804, *Diario oficial* (28 July 1967), p. 2713 (for English translation, see *Food and Agricultural Legislation*, vol. XVI, No. 4 (1967/1968), p. V/lb.). In Venezuela it was brought about by the Agrarian Reform Act of Mar. 5, 1960, *Gaceta oficial* No. Ext. 611 (19 March 1960) (for English translation, see *Food and Agricultural Legislation*, Vol. IX, No. 2, (1960), p. V/1).

46. England, Water Resources Act, 1963, c. 38, sec. 24(3); France, Law No. 64-1245 of Dec. 16, 1964, on the Regime and Distribution of Waters and Protection Against Pollution, Art. 47, [1964] *Bull. Législatif Dalloz* 674, at 682; Spain, Decree No. 43/65 of Jan. 14, 1965 (in execution of Law No. 59 of Dec. 24, 1962, Regulating the Development of Waters and Waterworks in the Canary Islands), [1965] *Enc. Jurid Esp.*, Appendix 118 (1966).
47. Argentina, Law No. 17,711 of Apr. 22, 1968, art. 1 (91), *amending* art. 2340 of the Civil Code, 28-B *Anales de Legislación Argentina* 1779 at 1820 (1968).
48. On Long Island. See NEW YORK ENVIRONMENTAL CONSERVATION LAW § 15-1527 (McKinney 1972).
49. Israel, Law No. 5719-1959 of Aug. 3, 1959, [1959] *Sefer Ha Chukkim* (Israel Statutes) No. 288 (English text in State of Israel Water Commission, *The Water Laws of Israel* (Virshubski, ed., 1964)); Turkey, Act No. 167 of Dec. 16, 1960 (summarized in Food and Agriculture Organization, *Groundwater Legislation in Europe* (FAO Legislative Series No. 5) at 139 (1964)); Alaska Water Use Act, ALASKA STAT. ANN. §§ 46.15.010 et seq. (1971); Iran, Water Law of July 18, 1968, and the Manner of Water Nationalization (English translation of text in U.N. Economic Comm'n for Asia and the Far East, WATER LEGISLATION IN ASIA AND THE FAR EAST, Part 2 (Water Resources Series No. 35) at 217 (1968)). The Israeli, Turkish and Iranian statutes are water nationalization laws; the Alaska statute is a new water code.

great importance, for the efficient working of the new system may depend on a correct solution of this question. In the past, the old rights were left more or less undisturbed and the previous system applied to them.⁵⁰ Even the English law of 1963, admirable as it is in establishing the framework for true regionalization of water administration, gave users the statutory right to continue their former uses, thereby making it more difficult to adapt water management to changing needs.⁵¹ That may be of no great consequence in water-rich England and Wales. It may have been an easier solution than facing the constitutional problem of abrogating vested property rights. Generally, however, in the newer legislation there is a distinct trend toward subjecting the old rights to the new regime. For example, in the Israeli law of 1959 or the Alaska code of 1966, existing users were given only the right to apply within a specific period of time for a water use right governed by the rules of the new system.⁵² Similarly, in Iran, under the 1968 water nationalization law, old rights have been converted into new permit rights, with the possibility of an adjustment in the water quantity granted.⁵³

Along with this trend toward extending administrative control over all uses, the more recent water laws show a tendency to set flexible limits to such control. This can be seen in the assignment of priorities of use, in revocation and suspension of rights, and in the duration of authorizations. In these instances, a general framework is provided within which the administration is left a great deal of latitude to fit individual interests into the larger scheme and to coordinate individual needs with the public or general interest. Traditionally, for example, water legislation in some jurisdictions incorporated a fixed list of priorities of use to be employed

50. L. TECLAFF, ABSTRACTION AND USE OF WATER, *supra* note 2, at 206-11.

51. England and Wales (United Kingdom), Water Resources Act, 1963, c. 38, secs. 33 and 34.

One who had abstracted water at any time within 5 years prior to the act or who was entitled to do so by virtue of any statutory provision in force other than an order under the Water Act 1958, is, on application to the river authority, entitled to a license of right. If applicant was entitled to abstract water under two or more separate statutory provisions relating to different sources of supply or different points or different means of abstraction, he may be entitled to two or more licenses. . . . *Id.*

52. Israel, Law No. 5719-1959 of 1959, sec. 26; ALASKA STAT. ANN. § 46-15-060 (1971).

53. Iran, WATER NATIONALIZATION LAW, 18 July 1968, arts. 6 and 7.

in granting licenses and permits. These lists can be quite long and elaborate; the State of Texas has a hierarchy of no fewer than eight categories of use in descending order of priority.⁵⁴ However, the Italian law of 1933 dispensed with a list of priorities and made public interest the sole criterion.⁵⁵ This solution has been picked up by the Israeli law of 1959 and the Iranian code of 1968, while, in Peru's agrarian reform act of 1964, essential utility is only another term for public interest.⁵⁶

At the same time, the requirement in many laws that water be permanently attached to land and purpose is being eased.⁵⁷ Generally, attachment of a water right to a particular piece of land is justified on the ground that it discourages speculation; this is especially characteristic of regions where water is more valuable than land. But attachment of a right to place and purpose may hinder development of the land. Increasingly, therefore, the administration is given the power to authorize transfer of water rights in accordance with the public interest. In Kenya, for example, if water cannot be used beneficially on land to which it was originally made appurtenant, the permit holder may apply to have it transferred to another piece of his land, provided that this is in the public interest and the rights of others are not adversely affected.⁵⁸ The Japanese River Law of 1964 also makes transfer of water rights dependent on administrative authorization, and, according to the Iranian law of 1968, rights cannot be transferred without the permission of the Ministry of Water and Power, under penalty of fine or imprisonment.⁵⁹

54. VERNON'S TEXAS CODES ANN. § 5.024 (1972).

55. Italy, Royal Decree of Dec. 11, 1933 (Teso Unico), art. 9, [1933] Racolta Ufficiale delle Leggi a dei Decreti del Regno d'Italia, v. 5 (complimentare) 30.

56. Israel, Water Law No. 5719-1959 (*see supra*, note 49); Iran, Water Law of July 18, 1968 (*see supra*, note 49); Peru, Act No. 15037 of May 21, 1964, Art. 110 (English text in 13 Food and Agricultural Legislation, No. 4, v/1b (1964-1965)).

57. Water is tied to riparian land in the riparian rights system, and in some Latin American states water for irrigation is attached permanently to land by so-called *intuitu rei* concessions. *See* CANO, G., LAS LEYES DE AGUAS EN SUDAMERICA 76, 79 (1956).

58. Kenya, Water Ordinance of May 7, 1952, sec. 48 (Laws of Kenya, c. 372, rev. ed. 1962).

59. Japan River Law, Law No. 167 of 1964, art. 34 (summarized in U.N. Economic Comm'n for Asia and the Far East, Water Legislation in Asia and the Far East, Part I (Water Resources Series No. 31), at 83 (1967); Iran, Water Law of July 18, 1968, sec. 14. *See supra*, note 49.

The increasing flexibility of legal systems is further shown by the fact that areas where rights are granted in perpetuity and retained when they are not used are shrinking. This is due to the decline of the riparian system, under which the right is given in perpetuity and cannot be lost by non-use,⁶⁰ and the expansion of the permit system, under which, with certain exceptions,⁶¹ a time limit is put on water rights.⁶² Though it is generally agreed that modern conditions do require a limit to the duration of water rights, there is less agreement on how long they should be granted in order to provide sufficient stability. The drafters of Iowa's 1950 law, for instance, evidently considered ten years sufficiently long,⁶³ but Iowa is a water-rich state and so far there has been enough for everybody. Countries with a long-established permit system, such as Spain and Italy,⁶⁴ make a distinction between short-term and long-term utilization of water; they grant easily revocable permits in the first case, and licenses or concessions for 60 to 75 years, or even longer, in the second.

With the extension of management to almost all waters and with the tightening of administrative control over the exercise of water rights in the name of public interest, the

60. See R. POWELL, 5 THE LAW OF REAL PROPERTY 356, 480-83 (1971).

61. See L. TECLAFF, ABSTRACTION AND USE OF WATER, *supra* note 2, at 187-88, which states:

Permanent concessions are especially a feature of Spain and South America; and, for the most part, they can be revoked only for reasons stated in the law, such as failure to use them and failure to fulfil the conditions under which they were granted. . . . Concessions are granted in perpetuity by the Spanish Law of 1866,⁷ by the constitutions of La Rioja, San Luis and Mendoza Provinces of Argentina,⁸ by the Bolivian Water Law,⁹ and by the Mexican Law of Waters.¹⁰

7. Spain, Law of Waters of 3 August 1866, art. 236 (for irrigation only), *Gaceta* (7 August 1866), *Boletín de la revista general de legislación y jurisprudencia*, vol. XXV (1866), p. 165.

8. La Rioja (Argentina), Constitución (7 October 1949), art. 60, *Anales de legislación argentina*, vol. IX-B (1949), p. 2435; San Luis (Argentina) Constitución, 21 June 1949 (revised), art. 32, *Anales de legislación argentina*, vol. IX-B (1949), p. 2815; Mendoza (Argentina), Constitución (1949), art. 248.

9. Bolivia, Law of Waters of 28 November 1906, art. 233, *Anuario de leyes* (1906), p. 414 and appendix.

10. Mexico, Law of Waters of National Ownership of 30 August 1934, art. 46, *Legislación mexicana* (1934), p. 1660. Summarized in Spota, *Derecho de aguas*, vol. I, pp. 1026-1032.

62. POWELL, *supra* note 60, at 471-73.

63. IOWA CODE ANN. § 455A.20 (1971).

64. Spain, Law of Waters of 1879, art. 188, *Gaceta* (19 June 1879), *Boletín de la revista general de legislación y jurisprudencia*, vol. LIX (1879), p. 21; Italy, Royal Decree No. 1775 of Dec. 11, 1933, art. 21 (see *supra* note 58.)

role of the administration itself is changing. Almost everywhere it is less a grantor of *rights* and more a grantor of water *per se*.⁶⁵ As the economic structure develops and becomes increasingly complex, instances in which individual users tap water directly from the source are fewer, and the supplier of water is interposed between the source of supply and the ultimate consumer.⁶⁶ This supplier is either the government itself or an organization which it closely controls, and in some water codes, therefore, it has been found necessary or expedient to give the administration explicit power to build water works and supply water.⁶⁷ This, of course, leads to changes in the traditional concept of water rights. The ultimate user becomes less the holder of a right in his own name than a consumer who has a more or less precarious claim on the supplier to deliver the needed or agreed amount of water.⁶⁸ The growing involvement of water administration in the building of water works and supply of water also extends to economic planning (for example, the question of who is going to pay for works and how) and to social engineering, as when it decides what category of consumers is to get the water it has produced.⁶⁹

CONCLUSIONS

The idea of consolidated water administration was fostered by multi-purpose development of water resources, ultimately within the river basin unit, which was advocated in theory from the beginning of this century and given expression in law with increasing frequency from the 'thirties onward.⁷⁰ It seemed logical that water administration should correspond to the natural interdependence of waters. The ideal that emerged has been approached here and there, but generally remains a goal still.⁷¹ It was, and is, the centralization of water activities within a series of river basin agencies, with the coordinating functions entrusted to and centralized within one water agency of national scope.

65. See L. TECLAFF, ABSTRACTION AND USE OF WATER, *supra* note 2, at 88-98.

66. *Id.* at 88.

67. Kenya, Water Ordinance of May 7, 1952, secs. 33-34. See *supra* note 58.

68. Israel, Water Law No. 5719-1959. See *supra* note 49.

69. See L. TECLAFF, ABSTRACTION AND USE OF WATER, *supra* note 2, at 85-98, 102-10, 157-71.

70. L. TECLAFF, THE RIVER BASIN, *supra* note 5, 113-84.

71. See *supra*, at 2-5.

More recently, awareness of the interdependence not only of water, but of all elements of the physical environment, has speeded up the trend toward administrative consolidation, enlarged its scope, and added a whole new dimension to it.⁷² The aim now is to consolidate protection of the total environment, including water, in one super-agency. Developmental aspects may be left out of or included in the structure of the super-agency, depending on the theoretical bent of the legislators and decision-makers.⁷³ Whatever the blueprint, it becomes obvious that water management and administration can no longer be pursued in splendid isolation.

Environmental concern has affected not only the structure, but equally the functions of water administration, both at the planning and executory levels. The need to take into account other elements and facts, for example, requires considerable changes in the planning staff. Thus, the law now places on the administration the onus of gathering accurate and sufficient data—social and economic, as well as hydrologic—to permit sophisticated model-making, so as to plan more efficiently and to provide a more through-going rationale for projects and actions taken.⁷⁴ This implies, of course, an inter-disciplinary approach to problems.

72. See *supra*, at 5-6.

73. See *supra*, at 7-9.

74. See, e.g., Environmental Protection Agency, Water Quality Office, Portland, Ore., Environmental Impact Statement Guidelines for Agencies Submitting Statements to E.P.A. for Review (1971):

- (p.1) I. 2. The Environmental Protection Agency has, by law or special expertise, the responsibility to comment on the following types of environmental impacts:
- a. Water quality and pollution control.
 -
 - c. Water supply and water hygiene.
 -
 - j. Land use and management; wetlands, river banks, estuaries, . . . irrigation projects, . . . reservoirs. . . .
 - k. Electrical power generation.
- (p.2) i. 3. . . . It is apparent that the proposing agency is to have done sufficient environmental investigation and to report in sufficient detail to allow reviewing offices to make substantive evaluation and appropriate comment in the relatively short review period.
- (p.3) II.2. . . . For example, a proposal for a reservoir project, power plant or other facility, must include quantities of water stored, amounts and schedules of releases, changes in water quality including temperature, aquatic resources affected, tail water fluctuations, diversion points and amounts, quality of return flows if irrigation uses are involved, any exchange-of-flow arrangements, resource losses in reservoir area, and any other physical change which will have a significant impact

The kind of planning is affected, too. For one thing, the whole process tends to be slower and more deliberate—one might say even more tentative. Emphasis rests on short-term rather than long-term commitment of resources, whenever possible, and on a more diligent search for alternative solutions, influenced by an awareness of rapidly changing demands and expectations on the part of the public.⁷⁵ The public is being associated more fully in all stages of water resources management, to the extent of being the final arbiter of plans and projects.⁷⁶ Counterbalancing this public involvement in the administrative process, however, the administration is given more discretion in controlling water use by indi-

II.3. This section also requires a description of the environmental interrelationship in the direct project area and the total affected area—however extensive it may be. A major action, such as a storage reservoir . . . may not only affect, air, soil, vegetation, and water quality in the immediate project area but may also be the inducement needed for industrial, recreational, or agricultural development with attendant environmental impacts.

75. See, e.g., Corps of Engineers, Permits for Discharges or Deposits into Navigable Waters: Proposed Policy, Practice, and Procedure, 35 Fed. Reg. 20005 at 2008 (1970), which states that:

It is the policy of the Corps of Engineers to conduct the civil works program in an atmosphere of public understanding, trust, and mutual cooperation and in a manner responsive to the public interest . . . In considering whether or not a public hearing is advisable, consideration will be given to the degree of interest by the public in the permit application . . .

See also G. WHITE, STRATEGIES OF AMERICAN WATER MANAGEMENT 79 (1969), who says:

Public tolerance or intolerance of stream conditions may be expected to change in response to new technologies and to new views of the practicable. Just as one of the profound shifts in attitudes toward stream cleanliness came with the Senate Select Committee estimates of dilution possibilities, a further adjustment in view as to what is clean water and which uses of it should be favored may be expected as sectors of the public become convinced of the efficacy of new forms of waste treatment or river management.

76. Executive Order 11514, Protection and Enhancement of Environmental Quality, 35 Fed. Reg. 4247 (Mar. 7, 1970):

Sec. 2. *Responsibilities of Federal agencies.* Consonant with Title I of the National Environmental Policy Act of 1969 . . . the heads of Federal agencies shall:

(b) Develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage State and local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment.

White cites the appraisals of water policy made by local chapters of the League of Women Voters and the work of citizen groups in the Delaware Basin. WHITE, *supra* note 75, at 121.

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viduals and a wider control over all types of waters. The administration is becoming less the moderator and arbiter of private development and more a developer and supplier itself.⁷⁷

77. *See supra*, at 9-14.