

## **TENNESSEE VALLEY AUTHORITY: INTERNATIONAL EXPERIMENT**

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AMONG the changes of a very fundamental character in the economic life of the United States of America which were ushered in by the administration of the late President Franklin D. Roosevelt, perhaps none have been so controversial and few more far reaching in influence than has the Tennessee Valley Authority which was originally established by Act of the U. S. Congress, in 1933 for the development of the power and navigation potentials of the Tennessee River as well as to further certain other economic phases of the great fertile valley which constitutes the watershed of that stream.

By virtue of certain basic U. S. National laws, the central government has jurisdiction over all navigable streams in the United States and this power is administered, in the main, by the Corps of Engineers of the United States Army. It was that agency which constructed the Wilson Dam near Florence, Alabama at the foot of a rapids in the Tennessee River known as "Muscle Shoals" within a few years after the signing of the Armistice in 1918—that structure having previously been authorized as a World War One measure, but it soon became apparent that such a structure could not be completed in time for it to make any contribution to victory in that struggle, so the work was held in abeyance until hostilities had ended. Even before the Wilson Dam was completed, a long and heated controversy ensued in the U. S. Congress and elsewhere in the political and industrial life of the United States over the question of whether the power plant and the war-time-constructed nitrate plants would be operated for fertilizer production by the U. S. Government (as actually required by the original National Defense Act of 1916 which had authorized the construction of the great dam) or by some private organization. This debate continued over a period of approximately 12 years until the F. D. Roosevelt Administration came into power in Washington in March, 1933. Mr. Roosevelt took almost immediate steps to bring about some adjustment which would embrace not only the war industries and Wilson Dam at Muscle Shoals, but would encompass a

comprehensive development of the natural resources of the region, including harnessing the river for navigation, flood control, generation of electric power, and other purposes; use of the chemical facilities for research and development to improve fertilizers and make them available as economically as possible, widespread tests and demonstrations of fertilizers, encouraging reforestation and other activities to improve forest and agricultural land use, and further the agricultural and industrial development of the region.

One of Mr. Roosevelt's chief motives in proposing the establishment of the Tennessee Valley Authority was to set up what he termed a "Yard Stick" which would, so he suggested, serve as a guide in determining if the rates charged by electric power companies in the United States were in fact, too high as some had charged. Among the critics of the electric power industry in the United States (and, incidentally, a great exponent of the Hydro-electric Power Commission of Ontario who had previously sought to bring about the establishment of a "Muscle Shoals Commission"), was the late U. S. Senator George W. Norris of Nebraska. He fought what was for several years known in the United States as the "Ford Offer for Muscle Shoals" which resulted when the late Secretary of War John W. Weeks advertised the World War One Muscle Shoals Industries, including the then incomplete Wilson Dam, for sale in 1921. Mr. Henry Ford came forward with an offer which precipitated one of the longest and most heated controversies in the history of governmental operations in the United States and ended only in 1933 with the establishment of the Tennessee Valley Authority. Senator Norris, prior to 1933, had introduced several bills for the public operation of the Muscle Shoals properties and two of them, one in 1928 and one in 1930, were passed by the Congress, but were vetoed by Presidents Coolidge and Hoover, respectively. The depression and the election of President Roosevelt created a climate in which the TVA Act could be passed with the President's support. Therefore, after Mr. Norris had supported Governor Roosevelt in the election of 1932 and when the latter proposed the Tennessee Valley Authority, he had the very enthusiastic and able support of Mr. Norris and many of the latter's colleagues so that the measure became law in the early part of the Roosevelt Administration.

However, almost from the very beginning of its existence, the TVA, as it has become widely known, has been dogged by the opposition of those who champion the private financing and operation of

electric power enterprises. Some of these controversies have been decided only in the courts—in two instances, these cases having gone to the United States Supreme Court. In one such case, the late Mr. Wendell Wilkie, Presidential candidate in 1940, was seriously involved on the side of the electric power companies concerned. During the Eisenhower Administration, there have been grave differences of opinions with regard to over-all policies as may be illustrated by the so-called "Dixon-Yates" contract (now abandoned) which would have authorized the construction of a large power plant near the west bank of the Mississippi River at West Memphis, Arkansas. Under the plan, the Atomic Energy Commission would have purchased the power from the plant and delivered it to TVA as an off-set to some of the power delivered by TVA to the Atomic Energy Commission plant at Paducah, Kentucky.

Under specific authorization by the U. S. Congress, the Corps of Engineers conducted what was, up to that time, perhaps the most thorough and exhaustive scientific study of the Tennessee River basin that had ever been made of any river system. This study was started in 1922 and was completed in 1929 at a cost of approximately \$1,000,000 and dealt with navigation, flood control and electric power development. A complete coordinated scheme of navigation and water-power development comprising 149 separate hydro-electric projects within the basin was worked out and presented in the detailed report with corresponding suggested designs, and approximate cost estimates.

This report proved to be a valued contribution to the rapid advances made by the TVA in the early stages of its development. An outstanding example of the helpfulness of this report may be cited in the case of what was suggested as the "Cove Creek Dam," but which, in reality, has been named "Norris Dam" in honor of the late U. S. Senator George W. Norris. Almost immediately upon the establishment of the main TVA offices at Knoxville, Tennessee, in the early part of 1933, work was started on the then proposed "Cove Creek Dam" and this was pushed to completion by 1936 to become one of the most spectacular engineering projects of the TVA and to form one of the greatest artificial lakes in the U. S. A. up to that time. The project was inaugurated with much "fanfare" and with numerous people of National prominence in the United States participating in the ceremonies.

The Tennessee River is the largest tributary of the Ohio, which in turn empties into the Mississippi. It is formed by the confluence

of the Holston and the French Broad rivers at Knoxville, has a length of 652 miles, and a drainage area of 40,900 square miles. At times its discharge exceeds that of the Ohio, into which it flows. After flowing southwest through east Tennessee into Alabama, it flows westerly across north Alabama, touches a corner of Mississippi, and flows almost due north through Tennessee and Kentucky to its junction with the Ohio. Its source is 800 feet above sea level and it discharges into the Ohio at 302 feet above sea level. The main river is subject to wide fluctuations in flow with a minimum recorded discharge at Florence, Alabama (Wilson Dam) of 4,300 cfs and a maximum at the same point of 481,000 cfs. The average recorded flow at Florence is given as 53,300 cfs.

Statistically speaking, it would require much more space than can be devoted to this subject to really do the TVA justice, but perhaps a brief summary of its outstanding accomplishments and activities over the last 24 years may be justified. Thus, to this end the following is quoted from a recently-published report by the TVA: "TVA has harnessed the Tennessee River and its tributaries with a system of multiple-purpose dams to extract the maximum control and usefulness from flowing water. Floods have been regulated, a new waterway opened to commerce, water supplies for cities and industries improved, recreation opportunities afforded, fish and wildlife conservation advanced, and health conditions improved by the virtual elimination of malaria. Electric power has been generated economically in both hydro and fuel plants. It has been distributed widely and at low cost and used for the fuller and better balanced development of the resources of the region. It has also contributed greatly to the national defense. Chemical research and experimental production of fertilizers for use in widespread agricultural programs have provided a basis for improved farm management and land use, in the nation as well as the Valley region. Planting of seedlings, protection of timberlands against fire and other hazards, and better management have been encouraged to reestablish the beauty and economic value of the region's forests. Improved farm and forest management has brought better control of water on the land, curbing erosion, conserving moisture for plant growth, and slowing the runoff into the streams.

"Progress in these accomplishments in the Tennessee Valley region has been the work of many people, institutions, and agencies. The work of TVA in controlling the river, producing power and new chemical fertilizers, and in other activities has opened new opportuni-

ties for people of the region to make better use of their natural resources. Widespread cooperation with other agencies, as authorized and directed in the TVA Act, has helped build up and reinforce state and local units, private enterprise, and individuals in exercising increasing responsibility and initiative in resource development.

"The TVA flood control program was proven to be justified by virtue of its effects on major Tennessee River floods in 1946, 1947 and 1950 when it reduced by 10 to 12½ feet the crests of the fifth, sixth, and seventh largest floods of record on that stream; thus saving property owners along its course millions of dollars in damage. In 1950 TVA's 2-foot reduction of the Mississippi crest at Cairo, Illinois, spelled the difference that saved 200 square miles of farm land in the Birds Point-New Madrid floodway from evacuation and flooding.

"Traffic on the new waterway doubled in five years. Grain traffic from the Midwest increased. Specially designed barges began regular transportation of automobiles. Navigation became a strong inducement to industrial development. During World War II, even before the new navigation channel was completed, it was plied by tows stacked with military jeeps, trucks, and ambulances. Ocean-going ships were constructed on its banks at Decatur, Alabama, and dispatched down-river to the Gulf.

"In the electric power field, by the year 1956, TVA engineers and builders had brought to near completion the extraordinary 6-year program which added 6 million kilowatts of generating capacity to the TVA power system. During the year they placed in operation 1,469,500 kilowatts of generating capacity, only a little less than the record of 1,734,300 kilowatts completed the year before. The total installed capacity had been increased from 2,993,610 kilowatts at the end of fiscal year 1950 to 9,279,485 kilowatts at the end of fiscal 1956.

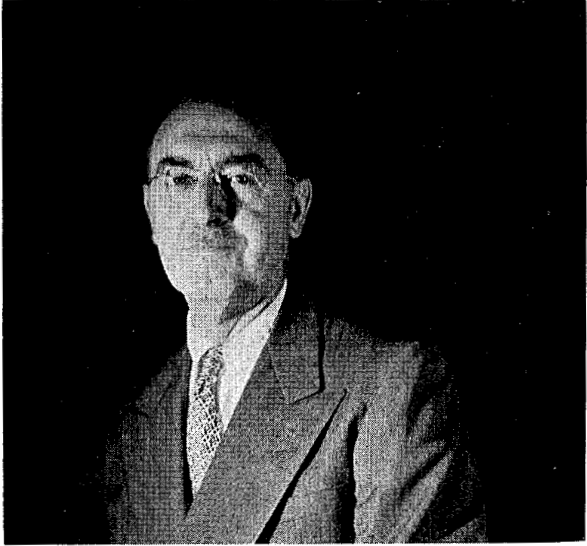
"The year included the completion and placement in operation of what is believed to be the 'world's largest' steam-electric power plant (in point of installed capacity of 1,600,000 kilowatts in nine units) at Kingston, Tennessee. This plant is a major source of power for the U. S. Atomic energy defense plants at nearby Oak Ridge, Tennessee and its great condensers use as much water in reducing the exhaust steam from the huge turbine to water as the city of New York consumes for various purposes. Its mammoth boilers consume a 50 ton carload of coal every six minutes when the plant is in full operation.

"The year 1956 also brought a new record in power generation of

57.5 billion kilowatt-hours, and a new record of sales to the U. S. Atomic Energy Commission. The Oak Ridge and Paducah plants, which together use from TVA more than twice as much power as is consumed in the city of New York, took 30.2 billion kilowatt-hours—56% of TVA's total sales."

Shortly after the late Dr. Albert Einstein wrote a letter to President F. D. Roosevelt in which he drew attention to energetic efforts by Germany to bring into being atomic weapons and urged him to undertake serious investigation in this field, a mysterious project of enormous proportions was under construction at Oak Ridge, Tennessee. This plant, which produced essential materials for the experimental bombs tested at Almagordo, New Mexico and used against enemy territory for the first time at Hiroshima and Nagasaki, Japan demanded about 300,000 kilowatts of installed power capacity in 1950. However, by 1956, this figure had climbed to 3½ million kilowatts. When World War II ended and the original mystery of the Oak Ridge operations was unveiled, it was revealed that one of the major reasons for locating the atomic plant in the Tennessee River Valley was because of the availability of large blocks of electric power in that area. Between 1950 and 1956, the atomic energy plants multiplied their demands for TVA electric power elevenfold so that they used 31 billion kilowatt hours in 1956, which was well over half of TVA's total output and was almost twice the amount of electric energy used in New York City that year.

More and more frequently, TVA is being requested to supply consultants on foreign TVA-like projects around the globe. TVA engineers and other experts familiar with its development programs are being sought for responsible positions on foreign river valley developments. Visitors from all over the world come to TVA in increasing numbers to study its operation and its development programs and to inspect its various projects. Since World War II, TVA has had over 12,000 visitors from 90 countries; in 1954 alone there were some 1800 from 70 countries. Noted world travelers are pointing out that TVA is coming to be recognized around the world as a symbol of resource development, pointing the way to a higher living standard and more satisfying way of life. As an outstandingly successful test-demonstration of multipurpose river valley resource development, TVA has become an example for the world and is being emulated on increasing numbers of the earth's river valleys.



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