

# A H·I·S·T·O·R·Y O·F T·H·E TENNESSEE VALLEY AUTHORITY





The beauty of the Obed River, in Morgan County, is typical of east Tennessee's mountainous sections.

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Soil testing

To waste, to destroy, our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining in the days of our children the very prosperity which we ought by right to hand down to them amplified and developed.

Theodore Roosevelt, December 3, 1907

## Historical Roots

In the past half-century Americans have lived through some jarring times—the demoralizing economic crisis of the 1930's, World War II and the development of nuclear weapons, and some uncomfortable changes in accepted values that had been the basis for a national sense of pride and progress.

One of the traces of America's passage along that rocky path has been the history of the Tennessee Valley Authority. Around the world, TVA has been held up as an example of the best that enlightened government can do to improve the lives of people. At home it has been condemned at times as liberalism gone wild, and in other times as bureaucracy gone stale. But over this half-century the Tennessee Valley has mirrored America's problems and its striving to overcome them, its successes and its frustrations.

The Tennessee Valley Authority was the product of a long period of growing concern in America about the management of once-abundant resources, squandered in three centuries of settlement.

Gifford Pinchot, chief U.S. forester under President Theodore Roosevelt, was the first prominent conservationist to recognize the inherent balance in nature—the delicate relationships between natural resources and man. After considerable pondering about individual resources such as streams, minerals, soil, forests, and wildlife, Pinchot realized that "here were not isolated and separate problems."

While on horseback one day, "suddenly the idea flashed through my head that there was a unity in this complication—that the relation of one resource to another was not the end of the story. Here were no longer a lot of different, independent, and often antagonistic questions, each on its own separate little island, as we had been in the habit of thinking. In place of them, here was one single question with many parts. Seen in this new light, all these separate questions fitted into and made up the one great central problem of the use of the earth for the good of man."

This concept of unified resource development, articulated by Pinchot in 1907, provided the foundation for TVA 26 years later.

### MUSCLE SHOALS DRAWS ATTENTION

river "is a unit from its source to the sea," and should be developed for full use of water for all purposes, in Pinchot's philosophy. One river that offered opportunity for applying Pinchot's ideas was the Tennessee, with its unique potential to generate electricity and to provide a low-cost transportation artery to the Mississippi River from Knoxville, Tennessee, 650 miles away.

But the treacherous 37-mile stretch of rapids caused by irregular rock formations at Muscle Shoals, Alabama, made navigation difficult. Along one 15-mile stretch, the water fell 85 feet.

The coming of the river steamboat in the nineteenth century accentuated the navigation hindrances caused by Muscle Shoals and sparked repeated efforts to correct the problems. By 1890 three canals had been attempted around Muscle Shoals. Two failed and were abandoned, and one only partially solved the navigation problems.

In 1916 as America prepared for World War I, the nation needed synthetic nitrates for the manufacture of munitions because its natural supply from Chile was threatened by German U-boats. President Woodrow Wilson selected Muscle Shoals as the site for two nitrate plants and a hydroelectric dam to power them. Wilson Dam also would "bury" the shoals under the new lake and help solve the problem that had plagued navigators for so many years.

No sooner had production at the nitrate plants begun than World War I ended, temporarily eliminating the need for munitions. In 1921 Congress put the



The flow of the Tennessee varied so much at Muscle Shoals that periodically a man could cross the river on foot.

facilities up for sale. Henry Ford, the leading industrialist, bid \$5 million for the properties that had cost \$130 million to build. Because Congress had intended that Muscle Shoals would produce fertilizers during peacetime, the purchase bids came before the Senate Committee on Agriculture and Forestry, headed by Senator George Norris of Nebraska. Norris said that if Ford's low bid were accepted, it would amount to "the greatest gift ever bestowed upon mortal man since salvation was made free to the human race."

Norris was not alone in his opposition to Ford's proposal. A photograph of Gifford Pinchot standing in the middle of the Tennessee River at Muscle Shoals with his fist clenched above his head in protest to "the rape of this great national heritage by Henry Ford" illustrated the opposition of the leading conservationists to the sale.

But local residents of this northwest Alabama farm country had a much different opinion of the Ford proposal. For them it meant industry, developmentbadly needed jobs. When Ford talked, somewhat vaguely, of a city near Muscle Shoals where industrial employment would reach one million, developers began paving streets through corn fields, pouring sidewalks, and erecting lamp posts. Congress debated the sale, and debated. Three years later Ford withdrew his bid because "a single affair of business that should have been decided in a week has become a complicated political affair." "Ford City" was never built, and for years useless sidewalks, complete with fire hydrants, remained in the undeveloped countryside near Muscle Shoals. Still, the controversy continued over how to dispose of the property.



Gifford Pinchot's conservation principles gave rise to TVA.



Wilson Dam, completed in 1924 by the Corps of Engineers, provided reliable navigation at Muscle Shoals for the first time.



Henry Ford (1) and Thomas Edison visit Muscle Shoals.

## GREAT DEPRESSION GIVES RISE TO SOCIAL REFORMS

ongress took up first one Muscle Shoals plan and then another during the 1920's. As deliberations continued, focus broadened to regional development. A Corps of Engineers study in the mid-1920's showed Congress the power and transportation potential of the Tennessee River. However, the Corps proposed many low dams and locks, which would not have been practical for navigation, and offered no flood control. Pinchot's concept contributed to the vision of combining better use and control of water on the land for agriculture and forestry, and in the river for hydroelectric generation and navigation.

In 1929 the boom became a bust with the stock market crash, bringing a decade of demoralization and despair foreign in this country. By 1933 some 13 million people were out of work, a third more than the year before. The sum of all goods and services produced in the country fell by almost half. Farm prices plummeted. So did marriage and birth rates. "The American Dream" was far from reality. "The good life" seemed unattainable.

This was the dismal state of the nation when Franklin Delano Roosevelt was sworn in as President of the United States in 1933. At his inauguration Roosevelt told an expectant citizenry: "This great Nation will endure as it has endured, will revive and will prosper." The people, all too eager for relief, supported the new President as a savior. Roosevelt's mission was clear: put the withering economy back on its feet.



Tenant farmer with family

To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for the national defense by the creation of a corporation for the operation of Government properties at and near Muscle Shoals in the State of Alabama, and for other purposes . . .

TVA Act, May 18, 1933

# The Thirties

y 1933 Senator Norris had proposed seven bills for the creation of a regional federal agency in the Tennessee Valley. Disposition of the Muscle Shoals properties was only one objective. The Pinchot idea of a river as "a unit from its source to the sea" offered a broader goal. Here was an opportunity to put into practice—to test on a practical basis—the largely unproven theories about the basic harmony that exists between man and nature. Could the river be controlled to reduce flooding while furnishing dependable transportation and low-cost electricity? Could the soils and forests be restored, the people encouraged, and the economy stimulated?

## VALLEY NEEDS RECEIVE RECOGNITION IN THE FORM OF TVA

s bad as conditions were elsewhere in the nation, in most cases they were worse in the Tennessee Valley. In 1933 the annual per capita income in the Valley region was \$168, and the birthrate was one-third above the national average. Levels of literacy were low, and the labor force was largely unskilled. Valley residents suffered from malnutrition; malaria affected up to 30 percent of the population in some areas. More than half the region's three million people lived on farms, and of these, half lived on farms they did not own. Soil-depleting row crops such as corn, cotton, and tobacco provided most of the farm income. Because these crops left the topsoil exposed to winter rains, about half the Valley's open land was severely eroded or abandoned.

Only three farms in 100 had electricity. Unchecked fires burned 10 percent of the region's woodlands every year, and poor logging practices had nearly ruined forests that once offered endless miles of virgin timber. When Norris tried a seventh time to create a regional federal agency to tackle all these problems as part of a whole, President Roosevelt backed him. The Tennessee Valley Authority fit neatly into his "New Deal" plan for revitalizing the economy. In a message sent to Congress on April 10, 1933, Roosevelt said, "It is clear that the Muscle Shoals development is but a small part of the potential public usefulness of the entire Tennessee River. Such use, if envisioned in its entirety, transcends mere power development: it enters the wide fields of flood control, soil erosion, afforestation, elimination from agricultural use of marginal lands, and distribution and diversification of industry . . .

"I, therefore, suggest to the Congress legislation to create a Tennessee Valley Authority—a corporation clothed with the power of government but possessed of the flexibility and initiative of private enterprise. It should be charged with the broadest duty of planning for the proper use, conservation, and development of the natural resources of the Tennessee River drainage basin and its adjoining territory for the general social and economic welfare of the Nation . . . ." The bill was signed on May 18, 1933, creating TVA and embracing the principles presented by Gifford Pinchot at the turn of the century.

The Tennessee Valley Authority may have seemed an unlikely source of salvation to the people of the Valley, but the dry legalisms of the TVA Act authorized help for families whose homes were endangered by flood waters, farmers whose topsoil had been washed away, husbands out of work, and families suffering from malaria.

Soon after the Act was passed, TVA's threemember Board of Directors divided agency operations into three major areas. Chairman Arthur E. Morgan became responsible for engineering and construction, David E. Lilienthal took charge of organizing the power system, and Harcourt A. Morgan headed the fertilizer and agriculture program.



(Clockwise from top left): Eroded farmland was a severe problem in many parts of the valley; Malnourished cow on poor Valley farm; Farmer plows field in Knox County, Tennessee; 1937 flood in Paducah, Kentucky.

## CONSTRUCTION OF A MULTIPURPOSE DAM SYSTEM BEGINS

ess than three months after the TVA Act was signed, construction began on the agency's first hydroelectric dam, originally planned as a Corps of Engineers project, on the Clinch River in northeast Tennessee. The dam was named for Senator Norris, who had campaigned so indefatigably for TVA's creation. Only weeks later, work began on Wheeler Dam on the main river in north Alabama. By the end of 1934, construction had begun on two other dams: Pickwick Landing and Guntersville. In 1936 Norris and Wheeler started generating electricity, and work began on Chickamauga Dam, near Chattanooga, Tennessee. By 1939 these five hydroelectric facilities were in operation, and five others were under construction.

Although this system was harnessing the Tennessee River for flood control, navigation, and power generation, there were dissenters. One river hermit, displaced from his home by Wheeler Reservoir, expressed his feelings by saying, "In the beginning God created the heavens and the earth, but then along came that \_\_\_\_\_\_ TVA."

### **OPPOSITION TO POWER POLICIES GROWS**

his was not the only dissent. TVA had been instructed to produce electricity "primarily for the benefit of the people of the section as a whole . . . at the lowest possible rates." In October 1933, TVA announced its electric rate schedules—far below prevailing rates of the time. Wendell Willkie, president of Commonwealth and Southern Corporation, the utility holding company with major interests in the Tennessee Valley, spearheaded the opposition to TVA. Willkie and other critics claimed the rates were too low to succeed, and that there was no market for TVA power because the region was amply supplied.

But city after city that already had municipal electric systems voted to buy TVA power. TVA tried to buy the facilities of some private companies so it



By FRANCIS M. LEMAY d being given con-governor of a Rocky Rocewelt as it recently at the

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Art courtesy of The Florence Times

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Wilson Dam mural illustrates President Franklin Roosevelt signing the TVA Act, which created the agency on May 18, 1933.

could serve more people, but was impeded by lawsuits and injunctions. Power companies, afraid of losing customers and being undercut by low government rates, charged that TVA sales of electricity from Wilson Dam were unconstitutional. In 1936 the U.S. Supreme Court repudiated these contentions in the Ashwander case, stating that TVA had the constitutional and statutory authority to generate electricity at Wilson Dam, to sell the electricity, and to acquire transmission lines to allow it to do so. Still, opposition persisted.

Finally in 1939 the power fights ended when a special three-judge federal court upheld the constitutionality of the TVA Act in the "18 Company Case." The companies lost in the Supreme Court. That same year TVA bought the power plants and transmission lines of the Tennessee Electric Power Company, a subsidiary of Commonwealth and Southern. As part of the same package, municipal distribution systems and rural cooperatives bought the local lines and substations to deliver TVA power to consumers. With that obstacle out of the way, local communities and farmer cooperatives were free to tap into the TVA power supply, and within a few years this power system was supplying an 80,000-square-mile service area.

### ELECTRICITY IMPROVES FARM CONDITIONS

eanwhile, TVA had undertaken an aggressive effort to bring electricity to farms that had never been served. For years power companies shunned the farmers as potential customers on the grounds that it was too expensive to serve these scattered farmsteads. But when TVA began supplying power through a system of local cooperatives, power companies changed their minds. Suddenly private utility crews appeared on country roads erecting poles by day and night. Many farmers did not warm to this instant attentiveness. Toting shotguns, they ran the workmen off, uprooted the poles, and waited for TVA power. TVA and electricity were almost synonymous, as reflected by a roadside sign in rural Tennessee: "Farm for sale. Have TVA."

During the early years of rural electrification, TVA set up an agency to help farm families in the purchase of basic appliances. It demonstrated how electricity

could help both the farmer and his wife, and it established "electro development farms." These farms demonstrated how the use of electrical equipment could save money and labor, while increasing productivity and improving living conditions.

In 1936, W. A. Phillips of Tishomingo County, Mississippi, was approached to participate in the program because his farm was considered typical. He had no running water, no paint on his house, and he raised barely enough food for his own family. Within three years a transformation came over the farm. During the first year he bought a pump and a washing machine, which released time and energy for other activities. He also bought a refrigerator that enabled him to sell butter, cream, and milk—providing an extra \$30 a month income. Over the next two years he





(Top): Installation of rotor in the Norris Dam powerhouse, 1936. (Bottom): Construction crew in cafeteria at Cherokee Dam.



Bringing Electricity to the Farm

One day in the early 1940's a TVA land buyer was driving on a country road at dusk when he saw the farmer of a newly electrified farm, sitting on a little knoll overlooking his farm. Below him the house, barn, and smokehouse were ablaze with light. And on the hill sat this farmer enthralled by a special wonder.

About a week later the TVA man attended a church to which this farmer belonged. During the service, the farmer got up to express his spiritual condition: "Brothers and sisters, I want to tell you this. The greatest thing on earth is to have the love of God in your heart, and the next greatest thing is to have electricity in your house."

(Clockwise from top left): TVA electric substation in Etowah, TN, 1946; Workman on transmission line, 1941; Farmer uses electric corn grinder.





High quality TVA fertilizers increased crop yields.

bought an incubator, brooder, churn, lights in the laying house, yard, and laundry.

When he joined the program in 1936 he had 50 hens, one cow, and two pigs. Six years later his inventory included 300 hens, four cows, five pigs, and two head of beef cattle. Annual net income for the farm increased during that period from \$700 to \$1,700. Weeds around the house were replaced with a lawn, the kitchen was remodeled, the house was painted, and hot and cold running water were added. Mr. Phillips planted cover crops to conserve and improve his soil, and he used TVA fertilizers on his land. In 1940 he was asked to what he attributed his exceptional achievement. He replied, "Well, electricity got me started."

Electricity was a new and unknown commodity to many farm families. One appliance salesman who returned to an east Tennessee farm, a month after selling a new refrigerator, reported the farmer's enthusiasm over his new purchase: "That there electric ice box is just the grandest thing that's ever been in this house," he said. "You know, the day you plugged 'er in I put a 25-pound cake of ice in that thing and that ice ain't melted yet."

### FERTILIZER INFLUENCES AGRICULTURE

n 1933 most Tennessee Valley farmers were using outdated agricultural practices. Much of the land required phosphate and lime to produce successful cover crops that would control erosion. TVA introduced fertilizers and new farming systems that would save the soil and increase farm income. Soon after TVA's creation, agency personnel met with Valley agricultural experiment stations to evaluate regional fertilizer needs. TVA decided to concentrate on producing phosphate fertilizers.

Seven of 12 million cleared acres needed erosion control measures, and one million acres were eroded



Farmers discuss TVA grassroots programs with county agent.



Untreated corn (l), and corn grown with TVA fertilizer.



Fields reflect productive use of fertilizers and good cropping practices (foreground), and neglect (background).



The Civilian Conservation Corps planted trees and conducted other erosion control efforts. (Top): Four CCC boys at induction. (Middle): The same group after being fed and put to work. (Bottom): Planting seedlings in Tennessee.



Food locker programs allowed people to rent freezer space at low cost, and taught them to freeze vegetables and meat.

to the point of abandonment. Among TVA's new agriculture systems were terracing, contour farming, strip cropping, soil surveys, and education to get row crops off hillsides—to be replaced by grass or close-growing crops or trees.

Farmers were suspicious of the new technology at first, but a few of the more adventuresome agreed to try it on a demonstration basis. In return for free TVA fertilizers, the farmers agreed to pay transportation and handling costs if any, to keep records, invite their neighbors in for organized tours, and adopt intensive five-year farm management programs. TVA also emphasized the land's need for lime to produce legumes for winter cover crops and to supply nitrogen to the soil. As the results came in, skeptics were convinced, and whole communities volunteered as demonstration sites. Some counties contained 20 such demonstrations, with up to 80 families participating in each one.

During TVA's first decade, as the wounds of erosion began to heal, agricultural production levels on more than 15,000 demonstration farms grew to three times greater than before. The grazing season for cattle was lengthened, and the land yielded a more nutritious grass and better grades of corn. In 1937 TVA began introducing its experimental fertilizers outside the Tennessee Valley. As schools of agriculture, fertilizer distributors, and thousands of farmers joined the program, TVA's test-demonstration approach became a byword in farm country from coast to coast.

Forestry problems offered another way to turn around the region's use of resources. Demanding immediate attention were fire control, reforestation, management practices that would increase timber yield, and reducing waste in cutting and using wood. TVA set up nurseries at Norris and Muscle Shoals to provide tree seedlings by the millions. The Civilian Conservation Corps, another New Deal creation, showed landowners how to plant these tree seedlings to turn idle and eroded acres into productive land.

### CLASH OCCURS IN TOP RANKS

ifferences among TVA's first three Board members flared into the open in the late thirties. The controversy appeared to stem from a basic disagreement about offering low-cost TVA hydro power to the public. Chairman Morgan proposed entering into an agreement with the private utilities to distribute TVA power. Directors David Lilienthal and Harcourt Morgan strenuously opposed this type of arrangement. As this disagreement grew deeper and more sensitive, the Chairman published several articles in national magazines attacking his colleagues' motives and integrity. Lilienthal and Harcourt Morgan responded by passing a resolution condemning "such methods in the discussion of problems as injurious to the project and to the public interest."

The effort that had begun with such high hopes was almost blown apart by this internal wrangling. Staff members who had been caught up in a common sense of purpose found themselves divided by loyalties to individual Board members.

After months of public disputes among the Board members, President Roosevelt finally asked A. E. Morgan to offer evidence to back up his claims regarding Lilienthal and Harcourt Morgan. When he failed to do so, he was removed from office.

TVA's opponents in Washington and in the press enjoyed this spectacle, and urged Congress to appoint a joint committee to investigate every aspect of agency operations. After a long investigation in 1938 and 1939, the committee dismissed Morgan's charges, and reported favorably on TVA activities, policies, and rates.



Douglas Dam Construction Site

In the desperation of a fight to survive, miracles have been wrought in laboratories and with machines. Seeing the reality of things they had never dreamed could happen, men have been deeply stirred; now almost nothing seems impossible. Whether on the fighting fronts or tending the home sector, men are thinking of tomorrow, thinking of it with longing tinged with fear and uncertainty, livened with hopes for the future.

David E. Lilienthal, 1944

# The Forties

y 1940 substantial progress had been made in agriculture, power production, and flood control. TVA had presented a mission—a goal and the means of attaining it. People responded, and began to believe their hard work would finally pay off. Although real prosperity still did not exist in the Tennessee Valley, developments in the world were to bring the agency a new mission.

#### WAR EFFORT AIDED

he public's preoccupation with social reform was replaced by a growing concern about America's role in World War II. Unemployment was almost eradicated as the nation mobilized its total resources and manpower to fight the war.

By the early forties, TVA had proven its expertise in resource development, enabling it to shift quickly to support the war effort. The agency's principal contribution was the massive amount of electricity it was able to supply by rushing to completion a series of hydroelectric dams. This power was used by the Aluminum Company of America to manufacture aluminum for warplanes and by the secret "Manhattan Project" in Oak Ridge, Tennessee, where the atomic bomb was being developed.

In 1941 President Roosevelt asked the Congress to approve funding for Douglas Dam in east Tennessee. TVA engineers had pinpointed this project as the best choice to meet an urgent need for power for national defense, but there was local opposition to the loss of farmland for this reservoir project.

Senator Kenneth McKellar from Tennessee, who had supported previous TVA dams, tried to block the Douglas project and proposed others instead. Then the Japanese bombed Pearl Harbor, and the President's defense program, including Douglas, got quick approval in Congress. TVA construction forces completed the dam in an unbelievably short time for a project of this size—barely 13 months. For several years after that defeat, Senator McKellar attempted to reduce TVA's independence by introducing numerous amendments to the TVA Act, but they were not enacted. Despite his view that TVA should be run "like the Post Office," the agency survived as a government corporation with, in President Roosevelt's words, "the flexibility and initiative of private enterprise."

But even with Douglas, and nine other dams under construction, hydroelectric power was unable to meet the increased demand for electricity, so TVA began building its first coal-fired steam plant. Taking advantage of the TVA electricity supply, six basic materials plants located in the Valley. These defense industries processed metals, food, fibers, timber products, and chemicals. Others produced airplanes, boilers for ships, gas masks, and explosives.

In a joint effort with the U.S. Geological Survey, TVA developed advanced mapping techniques. During the war TVA made maps from aerial photographs of a half-million square miles of foreign territory. Today TVA still is respected for its mapping technology.

### POST-WAR GROWTH IMPROVES CONDITIONS

he industries that located in the Valley during the war began producing other goods, and new industries were attracted to the region because of the abundance of low-cost power, flood-free sites, and navigation. Valley residents, taking advantage of these opportunities, began taking increasing responsibility and initiative in developing the region. New state and local planning boards, aided by TVA in planning reservoir readjustments, developed independent programs. States took over demonstration parks originally operated by TVA, and established others.

During the post-war period between 1945 and 1950, the number of TVA electricity customers came close to doubling, as power distributors pushed for-











### Winning the War

American entry into World War II created an immediate and vital need for electricity to power the factories that made wartime goods, such as aluminum necessary for making warplanes.

Because TVA already had proven its dam-building expertise, in the early 1940's the agency moved swiftly to help meet the power needs of the nation.

TVA's massive construction program attracted men, women, and often whole families by the tens of thousands, and put to work a region's people after the long and demoralizing Great Depression.

Fontana, one of 10 dams built during the war, required a particularly impressive organizational effort. Because the site was located in the remote mountains of North Carolina, a railroad had to be built to transport supplies. Dormitories, houses, trailers, and tents for the workers and their families were erected in the wilderness almost overnight. A hospital, bank, library, post office, and schools were established where none had been before.

On many days thousands of cubic yards of concrete were placed by crews working around the clock, seven days a week. Because of the accelerated schedule, construction time was slashed almost to half of what it would have been in peacetime. In the camp, military marches and big band music were piped over a PA system, and everywhere signs reminded workers of their patriotic duty to remain on the job.

(Clockwise from top left): Worker in ammonia plant at the National Fertilizer Center in 1943; Rally at Douglas Dam, 1943; Douglas Dam, 1947; Carbide furnace operator; Fontana Dam under construction in 1944; Drillers working at Ft. Loudoun Dam.



A Hamilton County, Tennessee, housewife oversees unloading of her new electric stove and washing machine, 1947.



Regional libraries supplied books to people in rural communities, who were thankful to have a source of reading material.



TVA checked blood samples for malaria parasites as part of its malaria-control program, which also included spraying insecticides and fluctuating lake levels to destroy mosquito habitats.

ward in electrifying the Tennessee Valley.

Libraries, set up to serve TVA construction workers at the various project sites, were turned into regional library systems when construction ended. They were enthusiastically supported by residents and were administered with state and local funds.

State forest, fish, and wildlife agencies greatly expanded their activities. Several TVA dam construc-

tion camps became recreation and resort centers operated by state, cooperative, and private agencies.

The filling of Kentucky Dam in 1945 opened the Tennessee River to year-round commercial navigation from Knoxville to Paducah, Kentucky, and on to the Mississippi River. The dam also was designed to protect 10 million acres of land from flooding along the lower Ohio and Mississippi Rivers.



Electric appliance show

TVA is controversial because it is consequential; let it become insignificant to the public interest, an agency of no particular account, and people will stop arguing about it.

Gordon R. Clapp, 1955

## The Fifties

he Tennessee Valley Authority had been steeped in controversy since the first suggestion of its creation. Still, the agency remained intact through the thirties and forties despite efforts of private utilities to curb its growth. But the 1950's brought the most serious threat yet to TVA's existence. A conservative ideology was prevalent in the nation, creating distrust of Roosevelt's democratic institutions. TVA was the principal New Deal federal agency left over from the thirties, and it came under attack.

Part of the basis for this attack was provided by a major change in the power program. The rapid growth in the region's use of electricity, plus large new requirements from Atomic Energy Commission facilities, were outstripping the supply TVA could provide by building dams. In 1949, TVA began building a series of very large coal-fired plants that would eventually account for much more of its generating capacity than the hydroelectric plants. In the 1950's this would prompt questions from Congress about whether it was sound policy to continue appropriating taxpayer funds to build these more conventional power plants, which did not offer the multipurpose benefits of the reservoir system.

### TVA STRUGGLES AGAINST OPPOSITION

n 1955 former President Herbert Hoover headed a commission that evaluated national water and power resources. The commission's task force made several recommendations to limit TVA operations by encouraging private companies to assume responsibility for power plant construction and by transferring many of TVA's non-power activities to other agencies. The task force went on to suggest that if these and other recommendations were followed, TVA could then dispose of its power facilities entirely. In effect, the commission task force was urging that TVA be dissolved.

When a more liberal-minded Congress did not approve the plan, the conservative administration tried to limit TVA in another way. In 1954, Congress shelved a TVA proposal to build a coal-fired power plant near Memphis at Fulton, Tennessee. Instead, the government announced the signing of what became known as the "Dixon-Yates" contract, authorizing construction of a private generating station in West Memphis, Arkansas.

Under the complicated plan, TVA was to reduce the amount of power it was delivering to Atomic Energy Commission production facilities, and use this power to serve the growing needs in the Memphis area. The West Memphis plant, in turn, was to serve the AEC by delivering power to the TVA system at Memphis.

TVA fought the proposal because it would bring private power into the TVA service area and threaten TVA's ability to continue to serve all its customers. Memphis openly defied the plan, too, announcing its withdrawal from TVA upon termination of the thencurrent contract. The city announced construction of its own steam plant, with which it would become electrically self-sufficient. With Memphis supplying its own load, the power from the West Memphis plant was no longer needed, and the government cancelled the Dixon-Yates contract.

### BOND BILL SETTLES FUNDING PROBLEMS

ixon-Yates was TVA's most famous controversy during the fifties, but actually was only one of several problems. Congress, influenced in part by heavy expenditures for the Korean War, cut domestic spending to the bone. TVA's budget dropped drastically, and many of the agency's resource development programs were severely curtailed.

At the same time, electric power needs were rising rapidly. Additional coal-fired generating plants were



Original stacks at Paradise Steam Plant in Kentucky. Nine of TVA's 12 coal-burning plants were built during the 1950's.

needed, but Congress refused to continue appropriating funds to build them.

Self-financing was the only satisfactory way to meet TVA's power needs without reliance on congressional appropriations. In 1959, after exhaustive debate extending over several years, the President signed a law, amending the TVA Act, authorizing TVA to sell bonds on the private market to finance its own operations. These bonds were backed, not by the credit of the U.S. Government, but only by the revenues of the TVA power system.

The amendment placed the TVA power system on an independent course, freeing it from the annual appropriations process and making it responsible for its

own financial operations. Under the amendment, TVA also is required to pay back in annual installments to the U.S. Treasury the funds previously invested by Congress in the TVA power system, along with an annual return on the outstanding investment.

The 1959 self-financing amendment also defined the area that may be supplied with TVA power. This helped lay to rest the old controversy of private versus public power.

### CORPORATIONS VIOLATE ANTI-TRUST LAWS

he turbulence of the fifties was not over, however. In 1959 a scandal broke, later dubbed "The Gentlemen's Conspiracy," involving the executives of the nation's leading electrical equipment manufacturers. TVA had pointed out to the Justice Department what it considered questionable pricing policies of these companies on large equipment items. The resulting investigation revealed a price-fixing conspiracy. TVA and the Justice Department sued the manufacturers to stop the price-fixing and collect damages. TVA also began inviting bids from foreign manufacturers to encourage more competitive bids from domestic sources.

### PROBLEMS FOLLOW STEAM PLANT EXPANSION

VA's power system expanded enormously in the fifties, with the construction of seven coal-fired steam plants. In many cases the largest turbine-generator units of the times were used. As unit size increased, so did efficiency.

In 1955 coal-burning capacity surpassed hydro. The next year TVA's annual report announced "the completion of the largest of all the world's steam plants—Kingston, whose great condensers use as much water as the city of New York and whose boilers consume a 50-ton carload of coal in six minutes." By the end of 1960 coal capacity was more than double that of hydro, and coal was supplying the base load for the system, with the more flexible hydro plants being used for peaking.



TVA began purchasing huge quantities of coal in the 1950's as the agency shifted from hydro as its main energy source.



TVA's dams on the Tennessee River have created a stairstep progression of lakes from Knoxville to the lower Ohio River.

In the 1950's TVA's new large-scale use of coal was a popular development in the Tennessee Valley. The coal industry had lost its longtime main customer, the railroads, to locomotives burning diesel oil. Miners welcomed the new market for coal at these big power plants. Meanwhile, mechanization at the mines was keeping coal prices low.

For TVA and the region's power consumers, the efficiency of these massive new generators offered a way to supply more power for economic growth without losing the key benefits the region had gained with its low-cost power supply from TVA dams. Electric rates continued to be among the lowest in the United States.

But as TVA became one of the country's largest users of coal, it would come to experience economic and environmental problems associated with coal. Coal-fired power plants poured out polluting gases and flyash to the air, and the growing practices of strip-mining for coal tore up the land. In the 1950's most people didn't worry about these problems. They still had searing memories of poverty during the Great Depression. The most popular photographs of the new TVA steam plants were those showing smoke pouring from the plant stacks. To most people, the smoke symbolized power flowing out to new industries that were creating the jobs the region had needed so desperately.

But that would change.

### INDUSTRY GROWS ALONG WATERWAYS

y November 1952 TVA fulfilled one of its obligations stated in the TVA Act by completing the navigation channel. Although Kentucky Reservoir allowed commercial navigation in 1945, final width and depth along the full length of the river were not achieved until 1952.

In 1940 TVA estimated that in 20 years river traffic

on the Tennessee could reach seven million tons annually with shipper savings of \$9 million. That estimate, questioned by skeptics, turned out to be low. In 1959 river traffic totalled 12 million tons of freight with savings to shippers of about \$25 million—more than five times the total expense for the waterway that year, including depreciation.

The growing use of the river was reflected in the expansion of industry along its shores. Where industrial projects in the previous two decades amounted to only about \$60 million, private industry invested \$669 million during the 1950's in more than a hundred waterfront plants and expansions, taking advantage of the navigation, power, and flood-free sites.

Before the close of the decade, 28 major dams straddled the Tennessee and its tributaries.

In 1957 the flood control system was subjected to the longest rainstorm in its history. A record floodcrest reduction of almost 22 feet prevented damages of \$112 million, overshadowing the \$33 million of damages averted during three floods in the forties.



Reliable river transportation resulted in a mushrooming of industry on the Tennessee. (Above): Guntersville, Alabama.



South Holston Dam, completed in 1950 in east Tennessee, is one of 26 TVA tributary dams in the Tennessee River basin.



Job training

... the work of TVA will never be over. There will always be new frontiers for it to conquer. For in the minds of men the world over, the initials TVA stand for progress, and the people of this area are not afraid of progress.

John F. Kennedy, May 18, 1963

## The Sixties

s the economy continued to grow, the sixties saw an end to the long era of massive outmigration of Tennessee Valley young people who had been forced to look for work outside the region. This was a gratifying landmark in the years of effort to rebuild Valley job opportunities and living standards from the Depression levels of 1933. But in this more prosperous era, some people also would begin to ask whether all the results of industrialization were good—to question the automatic assumption that "more is better."

### ENVIRONMENTAL PROTECTION MOVEMENT GAINS MOMENTUM

he growing size of TVA power facilities required more vigorous efforts to combat the detrimental effects of power operations. Increasing demands for coal and the development of giant earth-moving machinery resulted in expanded strip mining. The visible results of surface mining brought criticism that TVA was neglecting its responsibility for integrated resource development.

TVA responded by establishing demonstrations of strip mine reclamation methods and urging passage of effective state reclamation laws. But the agency refused to stop buying strip-mined coal on the grounds that if it didn't buy this coal, others would, and the problem would not be solved. The states were slow to act, and in 1965 TVA began including in its contracts a requirement that mine operators supplying stripmined coal to TVA reclaim and revegetate the stripped area.

### TRIBUTARY AREA DEVELOPMENT FOCUSES ON GRASSROOTS

VA's commitment to total regional growth was enhanced largely by the Office of Tributary Area Development, created in 1961. TAD (now the Office of Economic and Community Development) acted on the premise that for progress to be made on the local level, attention would have to be given to the tributary regions. TVA worked closely with community leaders and volunteers to stimulate economic development and improve the quality of life through specific programs tailored to meet local needs. Resource work groups, comprised of citizens and TVA specialists, focused on agriculture, forestry, water, business and industrial development recreation, minerals, human resources, governmental services, and finance.

TAD assistance centered on technical studies used to improve community understanding of local resources and how to use them most effectively. Because available funds for this program were limited, results were often spread thin. Still, sites for industrial parks were selected, and industries whose needs most closely matched local resources were targeted. Adult education and job training programs were started; water and sewer systems were planned; health education programs were begun; in some cases, water control structures were constructed; intensive farm management and agricultural development programs were undertaken, and garbage collection and disposal systems were established.

Local towns and communities received help from TVA during the 1960's in analyzing their local flooding problems and in drawing up plans and local ordinances to restrict development in the flood plains and reduce local flood damage. By 1968, TVA had prepared detailed reports on local flooding problems for more than 120 communities throughout the Tennessee Valley.

The flood-plain management program, which focused more on using the flood plains for such floodcompatible purposes as recreation than upon building structures to control flooding, proved so successful that it served as a model for a nationwide program administered by the Corps of Engineers.

Community and regionwide industrial development of the sixties helped provide jobs close to home. Moving north was no longer a necessity. At last there was a choice.



### Partnership With The People

TVA's mission to improve the quality of life in the Valley was manifested in the 1960's through a diversity of localized programs.

(Clockwise from top left): Boy is examined during a health fair in Clairfield, Tennessee, as part of a drive called "Project Community Outreach" to bring medical services to rural areas where none were previously available; TVA enlarged and straightened the channel running through Coeburn, Virginia, to reduce flooding there; Bowling Green, Kentucky, is one of the many cities that have taken advantage of "Operation Townlift"—a program to help revitalize Valley communities through urban planning and beautification.







TVA established Land Between The Lakes in 1963 as a national demonstration in outdoor education and recreation.

### LAND BETWEEN THE LAKES COMBINES RECREATION WITH EDUCATION

rosperity during the decade created more leisure time, and TVA responded with increased recreation development. A site in western Kentucky and Tennessee was particularly well-suited for this purpose. The Corps of Engineers was building Barkley Dam which, when finished, would define a 40-mile-long strip of woodland between TVA's Kentucky Lake and the new Barkley Lake. In June 1961 the TVA Board recommended to President Kennedy the creation of a national outdoor education and recreation demonstration area to be called "Land Between The Lakes." In 1963 the President approved the proposal and charged TVA with responsibility for developing the project. Foresters, engineers, and landscape architects worked together to prepare the "living laboratory."

A youth station was built to house overnight school groups that came to use the outdoors as a classroom for study of many different subjects biology, chemistry, math, English, and many of the social sciences. In the process they also learned about nature, the environment, and man's place in it.

### TVA ENTERS THE NUCLEAR POWER AGE

uring the sixties the number of electricity customers in the Valley passed the two million mark. About 30 percent of all homes in the region were heated electrically. Average residential use was twice the national average. By 1970 the homes and farms of the region used nearly 200 times as much electricity as they had in 1933. This growth in the region's use of power required substantial increases in generating capacity.

In 1967 TVA entered the "Atomic Age" by starting construction of the world's largest nuclear plant— Browns Ferry in north Alabama. The decision to build Browns Ferry was based on an analysis of the costs of coal and nuclear plants, finding nuclear power the more economical. The first generating unit of the plant went into operation seven years later.

In 1967 the long-time downward trend in the Valley's average residential electric rate turned upward, when rapidly-rising costs for fuel, interest, labor, and materials forced TVA and the local power distributors to begin increasing their rates. The end of the sixties also marked a fundamental change for TVA and other electric power suppliers—the end of the long period when increasing use of electricity had meant savings to consumers in the cost per kilowatt-hour of electricity. A new era was beginning when every additional kilowatt of supply planned for the power system would increase (rather than decrease) the cost of electricity.

The promise of low fuel costs for nuclear plants



Children who visit LBL's Youth Station study geology, archaeology, and other subjects in the "living laboratory."



Every year millions of people enjoy boating, fishing, swimming, and skiing at TVA lakes in all seven Valley states.

when Browns Ferry was planned was borne out. Compared to power from coal, Browns Ferry saved consumers some \$200 million a year. But as construction costs increased, power from new plants began to cost more than existing supplies from plants built when construction costs were much lower.

### NEW PROGRAMS ENCOURAGE MODERN FARM MANAGEMENT

n the early sixties the heaviest reliance on agriculture in the Valley occurred where physical resources were poor, where farms were small, and where incomes were low. Farmers were forced to choose between mechanizing their operations and adopting efficient management practices, or being squeezed out of the national market.

Several programs were introduced by TVA and Valley land-grant universities to provide the direction and training the farmers needed to compete with progressive farmers elsewhere in the nation.

TVA's fertilizer center at Muscle Shoals continued to lead the world in broad-scale fertilizer research.

One of TVA's most successful efforts was the Rapid Adjustment Farm program, which was designed to test the most current farm management practices on a few farms, using about a third of the conventional time. The program helped scientists learn which practices work in certain areas and on specific types of farms.

The farm plans typically included the use of laborsaving equipment, high-analysis fertilizers, chemical weed and pest control, high-yielding crop varieties, improved storage facilities, and better marketing techniques.

One of the first farmers selected to participate in the program was W. E. Taff of Franklin County, Alabama. When he joined in 1962, his principal goals were to increase his dairy herd from 30 cows to 40 during the four-year period, and to increase milk production from 7,000 pounds per cow to 10,000. Taff reported that three years into the program, "We really went up faster than I thought we could. Our milk production was above the 10,000-pound goal, and we were milking 60 cows instead of the 40 we had planned for." In 1965 Taff's net farm income was 25 times more than in 1961, the year before the program began. An analysis of 65 Tennessee Rapid Adjustment Farms operated between 1965 and 1980 shows that on the average, net income increased by 300 percent.

In 1977 an extension farm agent commented, "A lot of farmers have used practices Mr. Taff has put into effect. We still use his farm to show other farmers in Franklin County what can be achieved."



Corn stalks illustrate the difference between properly and improperly fertilized crops.



Knoxville student

TVA has a long history of carrying out difficult assignments. We in this country are now facing problems of energy production and conservation that we have never faced before and the proper use of natural resources which TVA is uniquely suited to help solve.

Jimmy Carter, May 1978

# The Seventies

he 1970's were years of economic turmoil for America, and TVA was not exempt from the severe problems that arose for electric power producers. In many respects the Tennessee Valley was a microcosm for these national developments. In 1970 the impact of inflation forced the first large increase in electric rates in the TVA area—a shock for consumers who had long taken low-cost electricity for granted.

Fuel costs soared in the early 1970's. With TVA depending on coal to supply its baseload power requirements, huge cost increases and repeated uncertainties about coal supplies continued. The cost per ton of coal rose from \$5 to \$33 in 10 years. Interest costs and prices for materials and labor spiraled upward, and utility bills became a serious hardship for low-income consumers and energy intensive industries.

New standards of environmental protection, particularly for air quality at coal-burning plants, added to the difficult decisions involved in maintaining power supplies and limiting cost increases. Nuclear power offered lower expected fuel costs, but building these plants to safe standards proved to be much more complicated and time-consuming than expected. As construction schedules stretched out, the combination of inflation, rising interest rates, and construction delays multiplied the cost estimates. TVA also encountered serious difficulties in procuring a reasonably priced, assured supply of uranium.

While nationwide electric rates showed steep increases, the impact was particularly harsh in this region of historically low rates and high electricity use —even though rates were still below the rising national levels.

These dramatically changing circumstances required changes in direction and priorities. In the late 1970's, TVA responded with a series of major initiatives. The agency became a national leader in energy conservation, with a variety of aggressive programs to encourage conservation, alternate energy sources such as solar, and load management to cut peaks in power demand. The combination of conservation and a changing relationship between economic growth and energy use led eventually to major cutbacks in the extensive nuclear construction program TVA had begun in the late 1960's.

Some major conflicts over environmental protection were resolved, including agreement with the Environmental Protection Agency and others in the long dispute over what methods would be used to meet clean air standards at TVA coal-fired power plants.

TVA put new emphasis on public participation, by holding open meetings on various topics across the Valley, by establishing toll-free telephone lines for citizen questions and comments, and by opening new field offices to make TVA more accessible.

TVA also went back to its roots in reemphasizing nonpower programs, which had been obscured in the public eye by the massive attention given to powerrelated problems here and elsewhere in the early 1970's. The agency again focused public attention on its role as more than "just another utility company."

David Lilienthal, who had been a member of the original TVA Board and later its chairman, revisited TVA in 1979 for the last time before his death. In an address to employees, he urged the agency to look forward, and have the public "look to TVA as a national example of people looking ahead—not behind, not preoccupied with studies of why it can't be done —but looking forward with the old spirit of 'can do.'"

#### TVA ADDRESSES ENVIRONMENTAL PROBLEMS

uring the early seventies TVA—and the nation—faced up to the reality that difficult and costly measures were necessary to protect the quality of the environment from further deterioration. TVA installed electrostatic precipitators to control ash and soot particles emitted



Scrubbers remove sulfur dioxide from steam plant emissions.



A TVA-state program reclaims Tennessee strip mine.

from its coal-fired steam plants. To control sulfur dioxide fumes, it first proposed a system of very tall stacks for better dispersal and decreased generation during poor weather conditions to limit the effects at ground level. That approach did meet "ambient standards" for protecting public health and welfare in the area around each power plant, but it did not protect against more distant effects from total sulfur dioxide emissions.

In 1978, TVA and EPA agreed on a plan that used the least costly control measures to meet strict air quality standards at each plant. Even so, TVA's air quality program, which will control millions of tons of pollutants each year, is one of the most expensive ever undertaken.

In addition to addressing air quality problems, TVA also supported passage of the Surface Mine Control and Reclamation Act of 1977. With its passage the agency began or expanded several projects to underpin its effectiveness. A Small Coal Operators Assistance Program was launched, while ongoing



Close check is kept on radiation exposure at Browns Ferry.

reclamation efforts were redirected to provide vital information needed to implement the law. In 1976 TVA initiated a regionwide reclamation demonstration on abandoned coal mine sites in cooperation with four Valley states. Fifteen thousand acres of mined land were stabilized and revegetated. But "orphan lands" remain as an ugly reminder of the past failure to safeguard the land adequately.

### NUCLEAR PLANTS ARE PLANNED

uring the late sixties and early seventies, TVA planned six nuclear power plants, in addition to Browns Ferry, already operating in Alabama, to meet projected power demands determined by well-established patterns. In 1979 the Three Mile Island accident in Pennsylvania reminded the nation of the constant vigilance nuclear power demands. Soon after that incident, TVA established a Nuclear Safety Review Staff to reevaluate the agency's nuclear safety program. As a result, TVA took many steps in the design and operation of its nuclear plants to make them safer.

### NUCLEAR PLANT CONSTRUCTION SLOWED

VA's plan to meet future power demands by building seven nuclear plants changed in 1979, while construction was still under way at six of the sites. Since then, construction of eight of the 17 units has been cancelled.

The cutbacks became necessary because a decadeslong trend of rapid growth in electricity consumption has slowed substantially. When TVA began planning nuclear power plants in the 1960's, electricity was much cheaper than it is today, and demand was growing rapidly. Experience indicated that demand would continue to grow at about seven percent per year, and thus would double about every eight years. When power sales slowed in the early 1970's, the change was viewed as only a temporary interruption in the longterm trend. But as the decade progressed, the trend changed dramatically. The explosion in energy costs and conservation began to play important roles in reducing demand. Economic growth for the first time no longer depended so heavily on growth in electricity demand.

The controversial cancellations of nuclear plant construction emphasize the difficulty of precisely tailoring electrical capacity to power demand in an era of rapidly changing economic conditions.

## TELLICO DAM COMPLETION DRAWS OPPOSITION

nother environmental controversy focused on the construction of Tellico Dam in east Tennessee. The reservoir to be created by the new dam would flood productive farmland and valuable archaeological sites. It also would flood the spawning ground of a newly-discovered fish—the snail darter, which was classified an



Biologists plant rainbow trout eggs to establish a resident population in east Tennessee's Norris Reservoir.



Controversy involving the Ocoee River centers on the relative benefits derived from water sports and power generation, and how the natural resources should be used.

endangered species. In 1979, after years of debate, the supporters of Tellico made their voices heard in Washington, and the Congress passed legislation directing TVA to close the gates of the dam. In the meantime, TVA biologists had successfully transplanted the little fish to other rivers. More recently, the snail darter has been discovered living naturally in still other rivers.

### FORESTS CONTRIBUTE TO AREA ECONOMY

onsiderable attention was paid to forestry, one of TVA's traditional areas of activity. The Woodland Resource Analysis Program, a computer-backed forestry management program, was developed to help private landowners manage their woodlands for a variety of goals. Meanwhile, the forest products industry grew, with pulp and paper production in the lead. By the end of the 1970's, forest industries in the Valley approached \$2 billion in gross production.

At the same time, attention turned to the Valley's abundant forests as a source of fuel that could help tip the energy balance away from crisis. The Valley's 20.8 million acres of forest were increasing in wood volume at an annual rate of about 3 percent and constituted a major renewable resource. TVA's wood energy program provided no-interest loans for the purchase of efficient wood-burning stoves, demonstrated advanced wood-energy technologies, and studied ways to extract fuel alcohol from wood.

## EDUCATION AND RECREATION PROGRAMS EMPHASIZED

R esponding to a need for environmental education, the agency established six Environmental and Energy Education centers involving nine institutions of higher learning. The cooperative network provides teacher training, regional service to public schools and the nonschool population, assistance in program development for colleges and universities, and research.

The energy crunch and rising inflation began to change recreation habits in the region in the seventies, with the public looking for recreation opportunities closer to home. TVA developed its reservoir-related recreation facilities, resulting in the construction of 87 recreation sites that now receive about 4.5 million visits a year.

In 1978, Homeplace-1850, a living history farm, was opened at Land Between The Lakes, bringing



TVA environmental education specialist observes National Arbor Day with elementary school students in Tennessee.

back to life a family environment that was typical of the area more than a century before. The following year the Golden Pond Visitors Center, TVA's first major building to utilize solar energy on a large scale, was completed. It features a multimedia theater and planetarium, and provides orientation for visitors.

Special programs and accommodations were developed at Land Between The Lakes for the handicapped, such as specially designed campsites, picnic tables, campfire theaters, fishing piers, and interpretive trails.

As a boom occurred in stream-related recreation such as canoeing and rafting, conflicts began to arise between stream users and private landowners who control most of the streams. To solve the problem, TVA began a stream access program on selected watercourses, and started acquiring and developing sites in cooperation with other federal, state, and local agencies. FARMERS ADOPT COMPETITIVE PRACTICES

rogress also was made in agriculture, another of TVA's original programs. The seventies forced farmers into intense competition with other segments of the American economy for land, energy, and labor. By 1974 the Valley's farmland had shrunk by a third, and farm jobs had dropped by more than half since 1949. Capital for new equipment had also become scarce.

Yet, during that time span, average farm size grew substantially, allowing greater efficiency, which resulted in a dramatic increase in average value of farm products sold per farm. While there were fewer farm workers than before, those remaining were more than eight times more productive than the farmers of 25 years earlier.

In some parts of the region, increasing demands on farm land brought back problems that precipitated

TVA's first agricultural programs. Serious soil erosion occurred in the western part of the region, partly because many farmers plowed up cover crops to plant soybeans, a lucrative cash crop. This rapid expansion of soybean production, coupled with the erosive nature of the region's soil, caused some fields to lose as much as 100 tons of topsoil per acre a year.

In 1979 TVA, in cooperation with others, put renewed efforts behind a program to reverse this trend. The program consists principally of educational efforts and demonstrations, which help farmers curb erosion without sacrificing income.

The Rapid Adjustment Farm program continued during the decade, as did the Resource Management Farm program which demonstrated proven agricultural practices to farmers.

In 1976 Valley farmers sold about \$485 worth of farm products per acre compared to the U.S. average of \$285.

Despite these improvements, many of the region's small farmers still live at the poverty level. In fact, 72 percent of the Valley's small farmers sold less than \$5,000 worth of produce in 1977. Through more than 4,000 demonstrations in 1977 alone, TVA encouraged



LBL's Homeplace-1850 creates a historical atmosphere.



Etowah County, Alabama, family at home on their farm.

many of these farmers to shift to labor-intensive, high-value crops such as Christmas trees, shrubs, and vegetables.

### AID GIVEN TO COMMUNITIES

uch of the industrialization in the Tennessee Valley region in recent years has occurred outside the major cities, in small communities and semi-rural areas. This is one reason urban sprawl has been kept to a minimum. But this pattern of development also has forced many small communities to deal with bigcity problems.

In 1969 TVA began assisting local governments to locate and design sanitary landfills and garbage collection systems. This service has been provided to more than 150 communities since the early 1970's. In 1972 TVA began exploring the possibility of burning garbage to generate electricity and steam for industrial use as an alternative to sanitary landfilling.

TVA also initiated a cooperative junk car collection demonstration program. Not only were more than 32,000 abandoned vehicles collected, but the TVA project stimulated similar efforts throughout the country.

Because many areas in the Valley have no quality health care available within a reasonable traveling distance, TVA began the Health Manpower Recruitment Service, which helped recruit more than 40 health professionals to serve in rural areas in 1979.

### ALTERNATE ENERGY SOURCES DEVELOPED

everal current programs will help allow coal, an abundant resource, to meet more of the nation's energy needs during the next 10 years.

Solar and other renewable energy sources can play an increasing part in years ahead in helping meet energy needs from a source that is clean, plentiful, and beyond the reach of any cartel. Practical use of solar energy is already a reality in the Tennessee Valley.

TVA has begun a large-scale demonstration project



Residents of Triana, Alabama, were contaminated with DDT after years of eating fish from a polluted creek. TVA is helping them to develop alternate food sources.

involving the installation of solar hot water heaters in Valley region homes, and is encouraging the use of passive solar energy in the design and construction of new homes and commercial buildings. TVA also has cooperated in the design and development of energyefficient modular solar homes that are estimated to reduce conventional heating and cooling by half.

TVA will demonstrate to private businesses the possible energy savings afforded by solar technology by constructing a TVA solar office complex in Chattanooga. Active and passive solar concepts are being applied at Lakeland Wesley Village, a 96-unit housing development for the elderly. TVA architects estimate the project will cut energy consumption by more than 50 percent.

### CONSERVATION IS WEAPON AGAINST HIGH RATES AND INFLATION

onservation has become the byword of the utility industry. At TVA, it means not only electricity cutbacks, but wise use of natural resources—conservation in its full sense. Programs include development of coal and renewable energy sources such as solar, wood, and waste heat. Environmental protection remains a priority.

Improvement of America's transportation system is essential to reduce dependence on foreign oil. Twentyeight percent of the total energy used in the United States is spent on transportation. TVA is trying to reverse this trend by studying uses for electric vehicles, by using gasohol to power agency vehicles, and by operating the nation's largest bus and vanpooling system for its employees.

TVA has established a policy of aggressive conservation. Among projects for the 1980's is the continuation of insulation and weatherization programs that offer free energy surveys and low- or no-interest loans for residential, commercial, and industrial consumers to use in financing measures to lower electric energy consumption. The Heat Pump Financing Program provides qualifying customers with low-interest loans for purchasing and installing the highly efficient heating and cooling units. TVA's Warm-Room Project is designed to reduce energy consumption 25 to 30 percent in houses for which complete insulation is impractical or uneconomical by weatherizing the primary living area.

One large-scale conservation effort involves demonstration projects on practical uses of waste heat—the energy contained in power plant discharge





Rising electric rates reflect the high costs of coal, labor and interest. Often, it is the elderly who suffer most.

water. One successful application is greenhouse heating and cooling. Plans are being made for a multipurpose industrial park adjacent to TVA's Watts Bar Nuclear Plant that would use waste heat to operate greenhouses, fish farms, and food processing plants.

There are at least six large industrial plants in the Tennessee Valley that generate electricity with their own resources. TVA is encouraging other industries to cogenerate electricity by offering an attractive market for the electricity they produce.

Combined, all the agency's conservation programs could save enough energy to equal roughly 15 percent of TVA's total electricity production in 1978.

#### ECONOMIC EQUALITY SOUGHT FOR VALLEY

In addition to developing more efficient methods of using domestic resources, TVA remains committed to stimulating quality economic growth in the Valley. During the eighties, TVA intends to evaluate carefully the region's strengths and weaknesses. By understanding the nature of a rapidly changing population, TVA will be in a position to help guide the region in providing jobs that will be in demand, and in training workers to fill these positions. TVA envisions the creation of new hightechnology industries that place little burden on the natural environment while producing products for export outside the region.

One goal is to raise per capita personal income in the Valley to 100 percent parity with the rest of the United States. In the early 1930's the Valley stood at 45 percent of the national average. By 1980 the income level reached 80 percent. But some counties remain at 50 percent, reflecting little improvement since the Great Depression.

A statement issued by the Board of Directors asserts, "The unique opportunity afforded TVA in the 1980's is the chance to show how energy sufficiency, economic vitality, harmony with the environment, and social opportunity can flourish together, not as competing goals but as essential ingredients to enhance the quality of life in the Tennessee Valley. No other region . . . has a comparable opportunity."

National problems have changed dramatically since the turn of the century, but the TVA Board's 1980 message is remarkably reminiscent of the one made by Gifford Pinchot in 1907—pursuit of thoughtful and efficient "use of the earth for the good of man."



Poverty-level families in Alabama's Colbert and Lauderdale counties are eligible to receive seeds, plants, and fertilizers for growing home gardens. The program, sponsored by TVA, other agencies, and churches, assisted 1251 families in 1980.

## Appendix

#### TVA BOARD OF DIRECTORS: HISTORY

All Board members are appointed by the President, subject to Senate confirmation. Appointments run for nine years except the original unequal periods set up to stagger the terms, or for the remainder of an unexpired 9-year term in case of a vacancy. The Chairman of the Board (\*) is designated by the President.

\*ARTHUR E. MORGAN. Appointed as Chairman 5-26-33. Senate confirmation 5-30-33. Removed by Presidential action 3-23-38.

\*HARCOURT A. MORGAN. Appointed 6-3-33. Senate confirmation 6-10-33. Designated Chairman 3-23-38. Reappointed. Senate confirmation 5-8-39. Relinquished Chairmanship 9-15-41. Term expired 5-18-48.

\*DAVID E. LILIENTHAL. Appointed 6-3-33. Senate confirmation 6-10-33. Reappointed. Senate confirmation 5-18-36. Designated Chairman 9-15-41. Reappointed. Senate confirmation 5-21-45. Resigned 10-28-46 to become Chairman of the Atomic Energy Commission.

JAMES P. POPE. Appointed 1-5-39. Senate confirmation 1-12-39. Reappointed. Senate confirmation 5-12-42. Term expired 5-18-51. (Succeeded A. E. Morgan.)

\*GORDON R. CLAPP. Recess appointment as Chairman 10-28-46. Senate confirmation 4-24-47. Term expired 5-18-54. (Succeeded Lilienthal.)

HARRY A. CURTIS. Appointed 5-4-48. Senate confirmation 2-8-49. Term expired 5-18-57. (Succeeded H. A. Morgan.)

RAYMOND ROSS PATY. Appointed 6-27-52. Senate confirmation 7-4-52. Died 8-7-57. (Succeeded Pope.)

\*HERBERT D. VOGEL. Appointed as Chairman 8-2-54. Senate confirmation 8-11-54. Resigned 6-30-62. (Succeeded Clapp.) Served without Board quorum from 8-7-57 to 9-19-57.

A. R. JONES. Recess appointment 9-19-57. Senate confirmation 7-15-58. Term expired 5-18-66.(Succeeded Curtis.)

FRANK J. WELCH. Recess appointment 11-25-57. Senate confirmation 7-15-58. Resigned 2-20-59. (Succeeded Paty.) BROOKS HAYS. Appointed 4-23-59. Senate confirmation 6-23-59. Reappointed. Senate confirmation 2-8-60. Resigned 2-27-61. (Succeeded Welch.)

\*AUBREY J. WAGNER. Appointed 2-20-61. Senate confirmation 3-3-61. Designated Chairman 6-23-62. Reappointed. Senate confirmation 5-23-69. Term expired 5-18-78. (Succeeded Hays.)

FRANK E. SMITH. Appointed 6-25-62. Senate confirmation 7-23-62. Took office 11-14-62 after completing congressional term. Reappointed. Senate confirmation 4-26-63. Term expired 5-18-72. (Succeeded Vogel.)

DON McBRIDE. Appointed 5-8-66. Senate confirmation 5-19-66. Term expired 5-18-75. (Succeeded Jones.)

WILLIAM L. JENKINS. Appointed 7-25-72. Senate confirmation 9-30-72. Resigned 5-5-78. (Succeeded Smith.)

\*S. DAVID FREEMAN. Appointed 7-19-77. Senate confirmation 8-4-77. Designated Chairman 5-19-78. (Succeeded McBride.) Served without Board quorum from 5-18-78 to 10-13-78. Relinquished Chairmanship 6-20-81. Term expired 5-18-84.

RICHARD M. FREEMAN. Appointed 8-18-78. Senate confirmation 10-13-78. (Succeeded Wagner.) Resigned 2-14-86.

ROBERT N. CLEMENT. Appointed 2-12-79. Senate confirmation 8-2-79. Term expired 5-18-81. (Succeeded Jenkins.)

\*CHARLES H. DEAN. Appointed 4-30-81. Senate confirmation 6-19-81. Designated Chairman 6-20-81. (Succeeded Clement.)

JOHN B. WATERS Appointed 5-10-84. Senate confirmation 8-3-84. (Succeeded S. D. Freeman.)

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