Strip Mining (II): TVA in Middle in Reclamation Controversy

Many a middle-aged reformer has been pained by accusations that he has sacrificed his youthful principles, and the Tennessee Valley Authority in recent years has been the target of such reproaches. TVA, in many ways the New Deal's most illustrious experiment, has for more than 30 years played a controversial but measurably effective part in transforming life in the Tennessee River Valley. Now TVA, a major coal consumer, is being charged with at least indirect responsibility for the wounds inflicted on the region by rapidly expanding strip-mining operations.

TVA is a government corporation created in 1933 to administer a unified program for the development of the Tennessee's drainage area through use and conservation of the natural resources of the region. The basic TVA blueprint called for a series of dams on the Tennessee and its tributaries for the purpose of improving navigation, controlling floods, and providing inexpensive hydroelectric power. TVA was to furnish power for the production of fertilizers and, when necessary, munitions and was to foster the development of manufacturing, agriculture, and forestry in the region. The results in higher per capita pay, heavier river traffic, increasing land value, and a flourishing recreation industry testify to TVA's successes.

The TVA revolution has been powered by cheap electricity. A comparison of figures on usage and cost suggests the impact. In fiscal 1963 average home use of electricity in the region served by TVA exceeded 10,000 kilowatt-hours per customer, as compared with 600 kilowatt-hours in 1933. In 1933 the average cost of electricity in the region was 6 cents per killowatt-hour. In 1963 the cost was less than 1 cent per killowatt-hour. (The national average in the same year was 2.4 cents.)

TVA's effort to maintain the flow of low-cost power in the face of increasing demand led inexorably to its recent embarrassments. The public image of TVA is of a river-harnessing agency producing hydroelectric power at such sites as Wilson Dam in Alabama and Norris Dam in Tennessee. The fact is that, by the beginning of World War II, most of the potential dam sites in the region were being or soon would be exploited. To meet heavy new demands for power placed upon it and to fulfill its own conception of its role as a regional development agency, TVA turned purposefully to the construction of steam plants.

One major source of demand which is sometimes underemphasized by critics of TVA expansionary policies is the federal government, and particularly government facilities for the production of nuclear materials during and after World War II.

(TVA sells power to some 105 municipal systems, 50 cooperatives, and two private distributors and provides direct service to 30 industries and nine federal installations.)

The availability of large quantities of cheap electric power and the adequate supply of good-quality Clinch River water from nearby Norris Dam were important considerations in the Manhattan District decision to locate facilities for uranium isotope separation and a nuclear reactor pilot plant at Oak Ridge.

In 1944, before Oak Ridge had geared up to its peak wartime pace, federal installations used some 717 million kilowatt-hours out of a TVA total annual output of 9110 billion.

The postwar period brought a very rapid growth in demand for power from TVA's industrial and distributor customers, but the Korean War and the advent of hydrogen weapons sent federal power requirements up proportionally faster. In 1954 federal use of TVA power had climbed to 11.8 billion out of a total output of 30.1 billion kilowatt-hours. By 1964 the federal share was 25.4 billion kilowatt-hours out of a total output of 68.5 billion.

To meet the bounding increase in demand, TVA in the early 1950's began building large steam plants and in a decade doubled the generating capacity of the system. The importance of natural security considerations in building the new steam plants is indicated by congressional willingness to provide appropriations for the expensive projects despite a fairly strong feeling in Congress that TVA had matured to the point where it should be self-financing.

The 1950's was a decade of rapid advance in steam-plant design and particularly in furnace technology, and TVA, which has its own design and engineering sections for its steam plants, contributed to this advance.

New "cyclone" furnaces made it feasible to burn coal of lower quality than had been acceptable before. (Coal for power plants is not bought by the ton alone; calorific value and maximum permissible ash residue are specified in contracts.) Deposits of this newly marketable lower-quality coal happened to be present in large quantity in seams near the surface in Illinois and western Kentucky, for example, and in coal outcrops on hills in eastern Kentucky and Tennessee. The result was a surge in strip mining and the development of new machine mining techniques described in this space last week.

In 1959 TVA began construction on a plant in the midst of the western Kentucky coal fields. The first of the "mine-mouth" steam plants represented further economies. A single large operator with a long-term contract to supply low-cost coal could transport coal on its own roads almost directly from the coal seam to the plant's coal pile.

The $183-million facility was named the Paradise plant after a village nearby, a choice which, in view of the plant's surroundings, is not without its ironies. The Paradise plant's two generating units, each rated at 650,000 kilowatts, together use 12,000 tons of coal a day. The Peabody Coal Company, which operates the surrounding coal fields, has a contract to provide up to 80,000 tons of coal a week for the two units and 65 million tons over 17 years. The plant, in full operation, produces the cheapest power in the system. It was financed by bonds.

A third generating unit with a capacity of 900,000 kilowatts is to be installed at Paradise, and in June TVA announced award of a contract to the Republic Coal and Coke Company for 31.3 million tons of coal to supply the new unit over a 12-year period. The contract price is $2.95 a ton for coal with heat content of 10,760 BTU per pound delivered at the plant. (The metric equivalent of this heat content is about 6000 kcal/kg.) The coal will be taken from strip mines near the plant.

Another TVA steam plant scheduled

for completion next year is expected to be even more efficient. This is the Bull Run plant on TVA's Melton Hill Lake, a few miles from the town of Oak Ridge. The plant's single unit has a rated capacity of 900,000 kilowatts. Though the plant is located in strip-mine country in eastern Tennessee, its coal will come from eastern Kentucky under a contract with the Kentucky Oaks Coal Company which calls for delivery of 50,000 tons a week for 15 years at a cost of $3 a ton for 12,500-BTU/lb coal f.o.b. rail cars at Hazard, Kentucky. While not a mine-mouth plant, Bull Run will be served by "unit" trains, made up exclusively of coal cars, which will run a continuous round trip from Hazard to Bull Run.

The Paradise plant with its desolated approaches and lofty smoking stacks has become a symbol for anti-strip-mine partisans, from the most disinterested conservationists to deep-mine competitors. A gritty ash from the tall stacks becomes a nuisance from time to time in the area, and conservationists say that the outflow of clean but warm water, which is the by-product of the steam-plant process, is responsible for "thermal pollution" of the Green River, especially in periods of low water. Electrostatic precipitators will probably be installed in the stacks. And TVA technicians watch carefully to insure that river temperatures don't rise above 95°F which TVA biologists have set as the ecological danger point. On the few occasions when the temperature has reached that point, the discharge of water from the plant has been cut off.

Despite efforts to accommodate its critics, TVA in recent years has had a less friendly press, especially in liberal quarters, than it used to have. Since the beginning of the Eisenhower administration there has been criticism to the effect that, in concentrating on meeting the region's power needs and collaborating with private power companies, TVA has acted more like a utilities company than a public service corporation.

The increase in strip-mine operations and the consequent spread of unreclaimed spoil deposits sharpened, whether justly or not, the censure of

Mohole: Last-Minute Opposition Turned Aside

The National Science Foundation last week announced plans to commence construction of the Mohole platform, but it did so only after an extraordinary closed-door meeting that was hurriedly called to quell a sudden outburst of opposition among some of the country's leading earth scientists.

With cost estimates for construction and 3 years of operation of the deep-ocean drilling platform now totaling $110 million—more than double the figure cited a few years ago—some researchers expressed fears that Mohole would restrict the availability of funds for other research in earth sciences. The response from the National Science Foundation and the White House science office was that Mohole is now so far along that it would be economically and politically infeasible to delay or cancel it; and it was also suggested that the earth sciences would be able to ride the coattails of Mohole and attract expanded support.

The outburst of opposition occurred in August during a summer study on federal support of science, convened at Woods Hole, Massachusetts, under the auspices of the President's Science Advisory Committee. In the course of a meeting of a panel on solid earth geophysics, two votes were taken on the subject of Mohole. In the first, the panelists were asked to predict what they thought would happen (as distinguished from what they thought desirable): "Mohole, Slow-Hole, or No-Hole." The outcome, according to persons present, was a 7-to-2 prediction of "Slow-Hole," meaning, apparently, that NSF would proceed with the project, but at a slower pace than had been announced. The second vote was to determine preference, and on this ballot several participants associated with the project did not vote. The outcome in this case was a unanimous vote for "No-Hole."

When word of this vote reached Washington, several of the panelists, as well as a larger number of persons prominent in the earth sciences, were asked to meet in Washington during the following week with Leland J. Haworth, director of the National Science Foundation. Also present at this meeting was Donald F. Hornig, director of the Office of Science and Technology, and several NSF staff members. According to several persons who were present, Haworth indicated that the commitment to Mohole has proceeded to a point where it would be politically embarrassing and financially wasteful to turn back. When it was suggested that perhaps the pace of the project could be reduced to stretch the costs over a longer period, the response was that it would be most economical to get the platform built and out of the shipyard as quickly as possible. This conclusion was accompanied by the prediction that while Mohole would take a large portion of funds going into research in the earth sciences, it could also serve as a device for bringing greater attention and support to the entire field. No votes were taken at this Washington meeting, and it concluded with what was described as a consensus that, under the circumstances, the only choice was to proceed.

NSF, which is providing all the funds for the venture, has now gone ahead. Last week it announced that it was authorizing the award of a contract for construction of the platform to the National Steel and Shipbuilding Company of San Diego, California, on a bid of $29.9 million. This was the lowest of four bids, which ranged up to $45.09 million. NSF had originally estimated that construction would cost approximately $18 million. The prime contractor for Mohole remains Brown & Root, of Houston, which, in addition to compensation for its design efforts, is receiving a $1.8 million management fee for supervising the project. It is expected that the shipyard will complete drawings within 90 days, and that construction, now estimated to take 2 years, will begin in January.

—D. S. GREENBERG

TVA. Some coal operators were not loath to blame the hard-bargaining TVA for the lag in reclamation efforts. One Kentuckian was quoted as saying, "There isn't an operator in this business who can sell coal at TVA prices without tearing up the state. There is no reason why we should have to mine coal under emergency conditions."

Criticism of TVA took on a new dimension early in the summer when Kentucky governor Edward Breathitt referred to the $53 million TVA paid into the federal treasury last year as a "dividend" and a "profit." The sum represents repayment of a portion of federal funds invested in TVA plus a dividend amounting to interest on the balance outstanding at the average interest rate paid by the Treasury on all its marketable public obligations.

The nub of Breathitt's criticism is to be found in his remark that "certainly the TVA, which is basically a conservation agency, should insist that good conservation practices be observed whenever it does business. The conscience of the authority should not allow the destruction it is today helping to promote."

The reference to conscience pinpoints TVA's dilemma. A responsibility to provide power at the lowest possible cost in order to assist in the continued development of the region is deeply felt by TVA policy makers. At the same time, TVA is judged by criteria different from those applied to private power companies and other industries which are also big users of coal.

TVA officials have been stung by the criticism, and in June a rejoinder could be found in a speech by TVA chairman of the board Aubrey J. Wagner. Wagner is a TVA career man who joined the authority as an engineering aide in 1934, rose through the ranks to become general manager in the 1950's, and was made a director in 1961.

Commenting on the charge that TVA is the dominant force in the market for strip-mined coal, Wagner has this to say. "To put the picture in perspective in 1963, out of a total production of 178 million tons of coal in Kentucky, Tennessee, Illinois, Virginia and Alabama, TVA bought some 22 million tons or about 12 percent. During this same year, slightly more than one-third of the total production came from surface mines—strip and auger—and slightly over half of the total coal TVA bought came from these mines."

A case in point is Muhlenberg County, Kentucky, where the Paradise plant is located. According to recently released U.S. Bureau of Mines figures, Muhlenberg County, for the first time, is the leading coal-producing county in the United States. Last year the output in the county was 17.6 million tons. According to Wagner, nine large strip mines adjacent to the Paradise plant produced all but about a million tons of the total. But the Paradise plant received only 3.6 million tons, and total TVA purchases amounted to about 4.9 million tons.

In suggesting that TVA has sold its birthright for a mess of wattage, critics are obviously demanding a kind of behavior different from that of private industry, and this has equally obvious economic implications for the government corporation.

Replying to the charge that TVA has been callous on the subject of strip-mine reclamation, Wagner expressed the TVA view as follows. "Coal produced by strip mining must carry in its selling price the cost of reclaiming the land. We in TVA expect to pay our share of the cost in the price of the coal we buy."

No Effective Mechanism

In a highly competitive market, and where state laws on reclamation have been notably weak, there has been no effective mechanism requiring reclamation, and the TVA policy has been an empty one. TVA's stance is in part explained by its long tradition based on the charter of working cooperatively with the states—assisting, persuading, and providing services and information but not imposing its will. The effectiveness of this policy in agriculture, forestry, and wildlife management has been considerable. But in the case of strip-mine reclamation it has been less effective. The TVA, for example, greeted Kentucky's new, stiff amendments to its strip-mine laws with praise and, one surmises, a sense of relief. But Tennessee, which more than any other is a TVA state, has no strip-mine law, and TVA as an advocate of such a law has been a lone voice crying in a wilderness.

While the official TVA view continues to be that states should legislate controls on strip mining, it is known that some members of the board have swung to the attitude that federal legislation may be necessary.

The reappraisal of the TVA position this summer produced a precedent-breaking move when, in late July, the authority invited bids on coal to supply seven of its major steam plants and included requirements for reclamation of strip-mined land in the specifications.

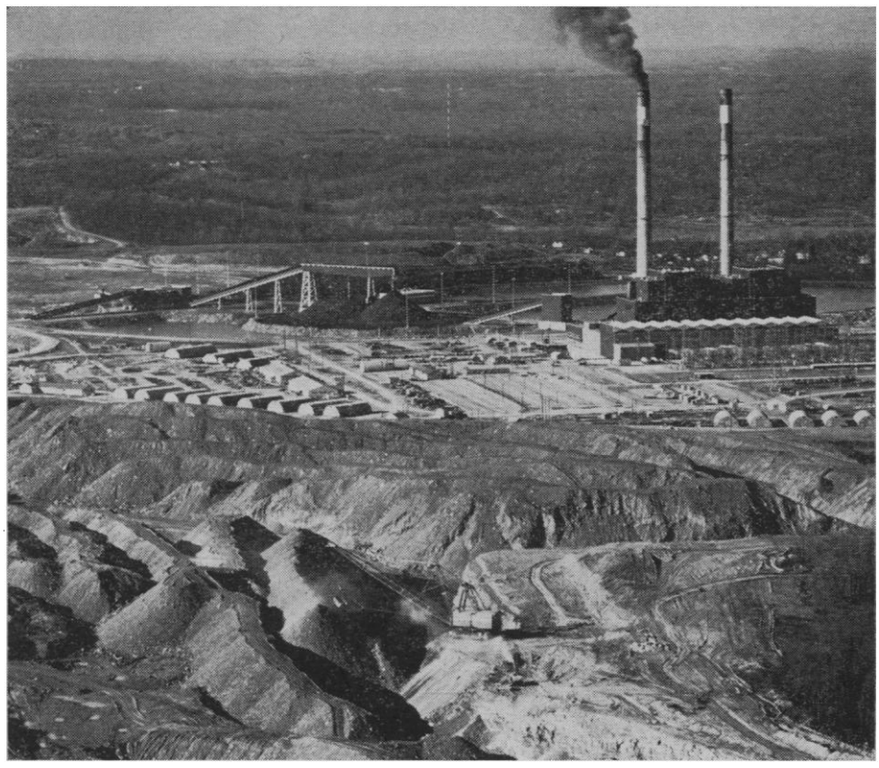
Wagner was quoted as saying, "TVA's action reflects no change in our belief that strong, well-enforced legislation is the only means by which effective solutions to the problems of strip mining will be assured." Only Kentucky and Illinois, among the states in which TVA buys coal, now have laws setting standards comparable to those in the TVA contracts.

The new contract provisions specify that contractors will cover coal faces and bury all toxic materials, including coal wastes and strongly acid shales; seal off any breakthrough to former underground mines; avoid deposit of spoil into natural drainage courses; control water from mines and haul roads; cover auger holes in the coal face; grade spoil banks as necessary to provide for the reestablishment of vegetation; and revegetate the disturbed area with trees or other cover which meets TVA specifications. Reclamation must be done, insofar as possible, at the time of mining. All work must be completed within 24 months after delivery of all coal supplied, unless TVA agrees to an extension. The penalty for failure to fulfill the terms is cancellation of the contract and removal of the contractor from the list of eligible bidders.

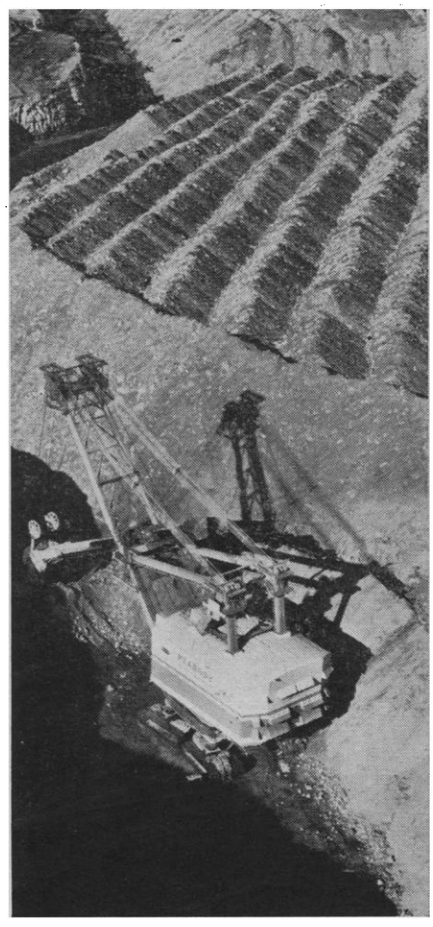
Neither contract stipulations nor stiffer legislation all around, however, can be expected to banish criticism of strip mining while so many unsolved problems affecting reclamation remain.

TVA's interest in reclamation, for example, goes back to its early days. The authority operates phosphate mines and claims with satisfaction that it has returned all disturbed areas to usable condition. TVA participation in research on coal strip mines dates from 1945, when the authority collaborated with the state division of forestry in Virginia and with several coal companies on tree-planting experiments on spoil banks. TVA has increasingly engaged in reclamation experiments, but, despite the experience, officials concede there is still much to be learned as well as much to be done.

The difference between conditions in the laboratory and greenhouse and conditions in the field is part of the difficulty. In some spoil banks the range of acidity is such that uniform planting cannot succeed. Erosion, slips and slides, and settling of the banks often

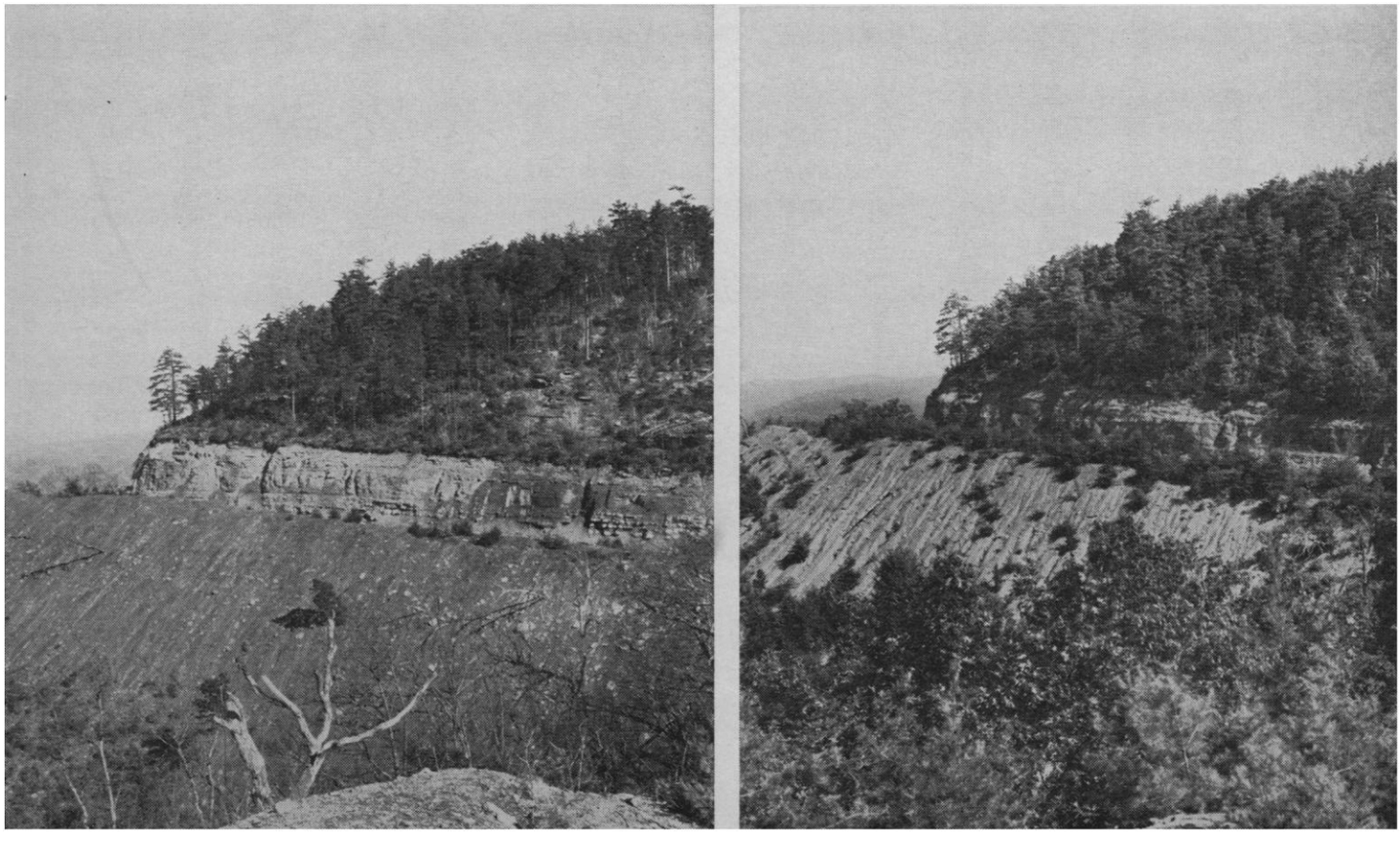


(Above) TVA's Paradise Steam Plant, which is located in the midst of strip-mine country in western Kentucky, is the first of the authority's "mine mouth" power plants.



(Right) This electric-powered shovel with a bucket capable of moving 115 cubic feet of earth operates in the mine which supplies nearby Paradise Steam Plant.

(Below) These before-and-after views illustrate results of a TVA reclamation demonstration on a strip-mine bench in Morgan County, Tenn. Picture at left was taken in February 1963, second picture 2½ years later. Pine mixture was used for project.



undo the work of the reclaimers. Severe winter weather or the long dry spells characteristic of the Appalachian autumn may kill seedlings. And there are more sophisticated problems. Soil chemists find that acidity in the spoil banks may release elements, such as aluminum, which are toxic to grasses, plants, and trees.

On the other hand, a good deal has been done to identify species which can survive inhospitable conditions. Among trees, sycamore, cottonwood, European alder, black locust, yellow poplar, and some kinds of pine have proved viable.

The U.S. Forest Services Central States Experiment Station, based at Columbus, Ohio, has worked since 1937 on problems of reforesting strip-mined areas. In 1961 a special strip-mine reclamation project was established at Berea, Kentucky, on the fringe of the Appalachian coal area. Over 30 studies are in progress on five aspects of the problem: revegetation, hydrology, earth movement and placement, spoil-bank chemistry, and coal-haul roads.

Commenting on work done by reclamation associations sponsored by the coal industry, Robert F. May, who heads the Berea station, had this to say: "While we do not have all the answers concerning tree planting, we have enough information to satisfactorily restore forest cover on banks located in moderately rolling topography. Where we are lacking in knowledge is in the stabilizing of banks on steep, forested watersheds of the Appalachian coal fields."

Opponents of strip mining will continue to find grounds for complaint, but the days of unfettered strip mining seem to be numbered. A pattern of stiffer state laws is spreading. The discussion of federal legislation seems likelier to serve as a warning to industry and an encouragement to state legislatures to legislate than as the prelude to a national strip-mine law, which would be very difficult to write. The Appalachia Act, which has helped focus attention on the strip-mine problem, could lead to the establishment of a federal "reclamation fund," however, providing a combination of financial incentives and reclamation requirements designed to persuade the states to act. TVA's decision to add the reclamation clause to its contracts will also have its effect.

The economics of strip mining—particularly the before-and-after value of land—will continue to be a principal factor. A 1963 TVA report, "An Appraisal of Coal Strip Mining," pained many conservationists, who felt its dispassionate tone indicated that strip-mining practices were being condoned. The report noted that, "in a typical west Kentucky mining county, the average annual gross value of agricultural products is $18 per acre of farmland, and only half of the land is in farms. Gross value of coal averages $18,000 an acre." The report says that typical revegetation costs, as determined from TVA demonstration projects, run to about $50 a acre. The facts which the TVA report faces are that the value of land before and after strip mining varies greatly and that the cost of reclamation does too. Some land, particularly orphan banks, probably will never be properly reclaimed. But the point now gaining acceptance is that both damage to the land and the costs of reclamation can be minimized if adequate precautions are taken during mining operations.

The debate on strip mining in Appalachia has often sounded like a shouting match between Cassandra and Pollyanna. The furor has finally attracted the attention the subject deserves. It is reasonable to expect that in the future—as in the case of air and water pollution—social costs will be taken into account and a more deliberate effort will be made to balance economic advantage against total damage to the environment.

—JOHN WALSH

Water Pollution: Federal Role Is Strengthened by Law Authorizing New Agency and Quality Standards

A bill establishing the federal government as a power to be taken seriously in the field of water-pollution control was passed by Congress in mid-September and signed into law by President Johnson last Saturday. The act, known as the Water Quality Act of 1965, has emerged after several years of legislative maneuvering, 4 months of negotiation between House and Senate on conflicting versions of the program, and industrial and other lobbying that, as one Congressman put it, "made things as hot around here as they've been in quite awhile." At more than one point the intervention of the White House was required to keep matters moving. But despite the tortuous route to passage, conservationists in and out of Congress feel, with few exceptions, that the result was worth the fight: they anticipate that the new law will change the strategy underlying this country's water-pollution programs from one of containment to one of prevention, and will give the federal strategists a firm handle as well as a firm hand.

Underpinning the new water-pollution control program is a massive reorganization of the government apparatus that deals with it. The reorganization collects the various research, grant, and enforcement programs now ensconced in the Public Health Service and places them in a newly created Water Pollution Control Administration (WPCA). The new agency is expected to be securely represented at the top levels of the Department of Health, Education, and Welfare through the appointments of a new assistant HEW secretary, who will have jurisdiction over environmental health, and of a WPCA administrator, who will be a high-level civil servant. (Congressional leaders, aware of other programs stunted by unsatisfactory appointments, took care to write into the legislative history of the bill that the appointees should be "individuals of the highest caliber with the finest possible background in the field of water pollution," and they will be watching the selections closely.)

Although proposals for the new unit drew continued disapproval from the Public Health Service, the state pollution agencies with whom the PHS deals, and many industries during the years in which the legislation has been under consideration, outside these circles the feeling has been general that, for a variety of reasons, the PHS is ill-equipped to run the pollution program. The PHS has frequently been charged with a predisposition to softness in dealing with states which, in turn, have a predisposition to avoid discouraging industries or alienating municipalities by harsh insistence on expensive anti-pollution installations. It has also been felt that the PHS, with its built-in preoccupation with health, has been insensitive to the conservation and economic values of water resources that also deserve attention. And, finally, it has been felt that, simply by virtue of bureaucratic diffusion, the present arrangements have allowed far too much room for evasion and buck-passing in the delicate situations that are endemic to pollution-control proceedings. The new administration, therefore, is not just a reorganization but a deliberate upgrading.