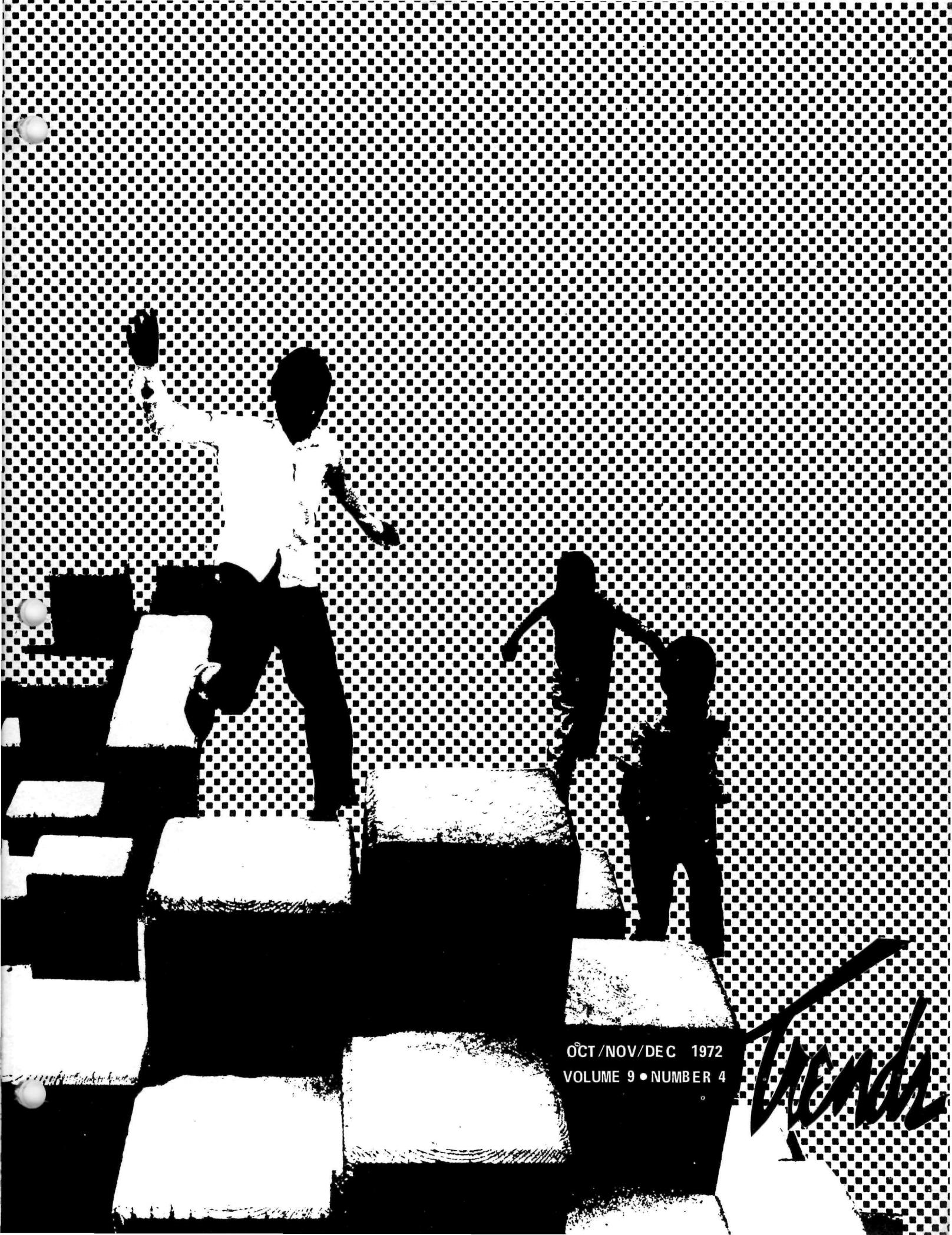

trends

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Tower Hamlets Cemetery, London

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Photo by Harold King, Ltd.

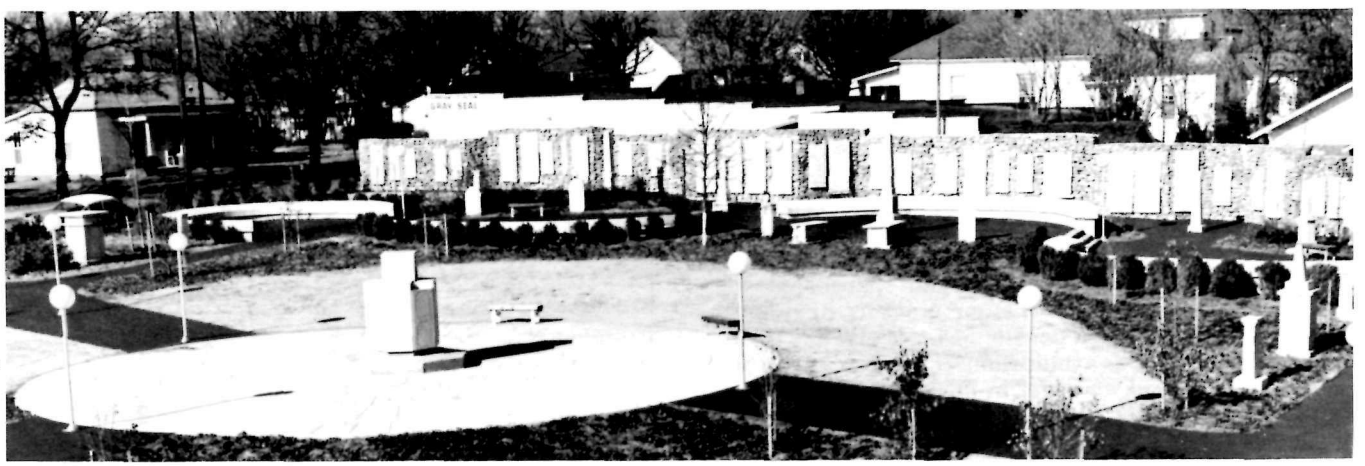
Pulaski, Tenn before and after (below) park improvement.

Urban role of cemeteries

By the years 2000 and 2015, the projected population of the United States will be 300 and 400 million respectively. Though normal mortality rates may decline and birth control improve, the simple geometric progression of population growth clearly indicates that burial requirements will pose distinct land problems in the future. No longer can urban planners minimize the significance of the open space nature of cemeteries, nor can cemetery developers randomly consign land to normal burial methods within the urban environment.

New York City is already facing a fiscal crisis resulting from land depletion. Nearly one-third of its property is tax exempt, thus hampering efforts at a coordinated expansion of the city. Even though huge blocks of land are assigned to cemetery use, the available land reserve for future burial is fast disappearing. New York is also plagued by vanishing open spaces for park reserves. One logical conclusion is to integrate the parks and cemeteries. Even though cremation is fairly common, the cemeterians and urban planners must collaborate in development of techniques to decrease land consumption for conventional burials.

Many of the principals inherent in successful old cemeteries, memorial parks, and modification concepts pre-



Photos by John E. Roe, Pulaski, Tenn.

sented thus far will be appropriate in cemetery design for the future. But emphasis will have to be concentrated on means of interring an ever increasing number of dead in minimal land area. Changes in social attitudes can foster a new emphasis on non-burial methods of interments. Cremation may become not only accepted but required by law as prime land availability diminishes. The main deterrent to the extensive use of cremation will likely be religious doctrine. American cities will, if current burial practices prevail, face the same circumstances presently being experienced by Japan, Italy, and some other European countries. Bodies are stored for weeks at a time as burial space is sought. In fact, some countries are constructing mausoleum "skyscrapers" to accommodate ten to fifteen thousand interments.

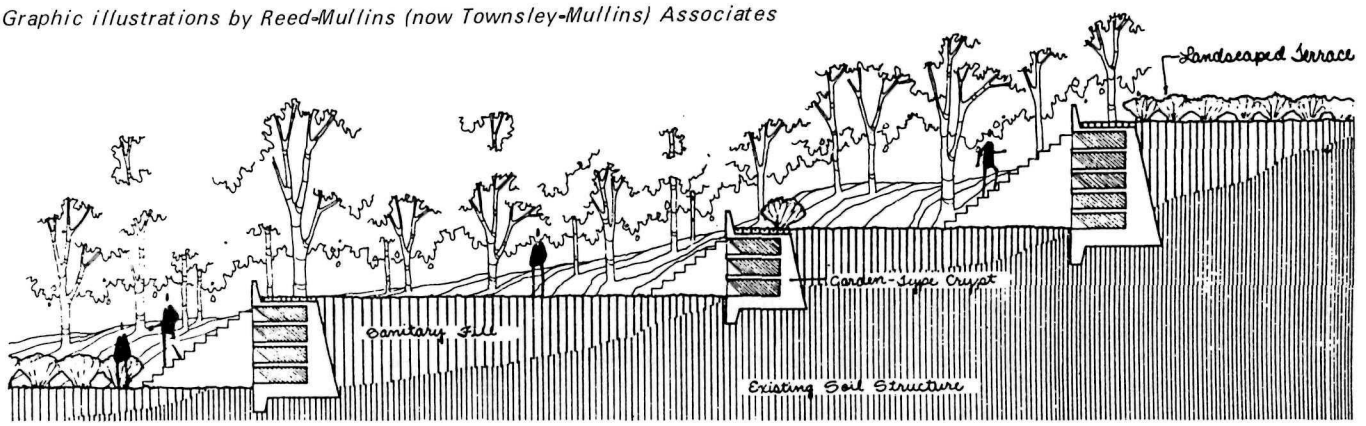
Prime land will eventually be consigned to the active needs of cities. The planners will be forced to innovate different methods and sites for cemeteries. Land currently not commendable as burial use, such as hilly terrain, may eventually become the only choice available. Human need for contact with nature will persist as the impact of urban density is felt, thereby making open green spaces for active and passive relaxation more relevant. At present, green space dispersion commensurate with population patterns does not exist. This one factor is a strong motivation for the increasing exodus to the suburban sprawl outside the city's infrangibility. Unification and integration of the open space character of cemeteries and park amenities is a solution to the social need for both functions. The advantages of singular composition are best realized if sufficient land reservation is made prior to actual development. This will effect an efficiency in land use concurrent with optimum relation between the active and passive natures of park and cemetery.

The urban consequences for future city planners will be dependent upon the status of the city. In an attempt to create a rational pattern or urban environment, the "New Town" has been postulated and executed to varying degrees in many regions of the country. The "New Town" concept permits a fresh start on undeveloped land. Reston, Virginia, is an instance of such a new city plan. Reston, envisioned ultimately at 75,000 population, has been carved and molded from 10 square miles of Fairfax County, southwest of Washington, D.C. Land use pattern proposals balance the permanent open space against and between diverse zones. Larger portions of green space are included in high density residential areas than in other ones. This is one indication of the awareness of planners of the need for relief in apartment and townhouse districts. Significantly, a cemetery is included in the open space classification of the Reston plan. As indicated on the plan, the nearly thirty acres of cemetery adjoins a low density residential area providing a block of buffer space against future land development outside the established limits of the city.

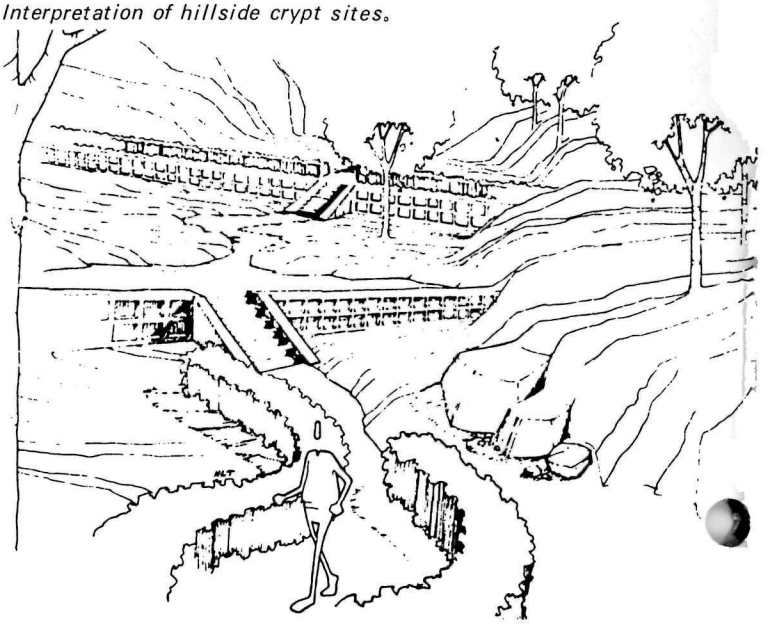
The permanent land preserve motivations discussed earlier with regard to abandoned cemeteries as open spaces also apply to future cemeteries. As population growth stimulates ever larger concentrations of construction, the requisite need for open space will likewise increase. Cemeteries alone or combined with other green space functions are a logical response to the need for these open spaces. Comparable problems of mass construction exist in the area of commerce and industry. Urban growth will obviously continue to place these disparate functions at juxtaposition with residential areas. The buffering character of cemetery green space cannot be minimized. Not only does physical separation result, but there is also relief within the heavy construction sphere.

The megalopolis of today is gradually spreading over many geographic features which are the sole remnants of natural assets to the city scope. Los Angeles, with an area of over 300,000 acres, encompasses, among other landmarks, the Santa Monica Mountains. Extensive residential expansion into these mountains has pervaded the slopes and contributed to the divesting of natural plant cover and produced barren vistas. An exception to this

Graphic illustrations by Reed-Mullins (now Townsley-Mullins) Associates



Interpretation of hillside crypt sites.



trend is the vicinity of Griffith Park near Burbank and Glendale. Two cemeteries lying west of the park act as green space preservers of over 700 acres. Well landscaped and possessing perpetual care trust programs, these two memorial parks and mausolea illustrate a concept worthy of investigation by other cemeteries.

Sanitary waste disposal also plagues city planners and administrators, with effective solution thus far evading the analysts. Where geographic and social conditions permit, sanitary fills can be placed in hill country near or within cities. By proper mixing of soil with waste, safe and stable fill material can be compacted into terraces between slopes. The forms produced could be shaped in sympathy with the natural configuration of the site. To retain the fill, structural elements would allow great variation in levels of terraces. Retainage could well be accomplished by sustaining walls being combined with terrace or garden crypt chambers. The plateaus and terraces created could then be landscaped to provide either seclusion or passive public park space.

Obviously attempts at such a concept would require extensive planning in terms of engineering and scheduling. Scheduling is critical due to the social impact of such disparity in joint land use. Planners will be well advised to not program burials until landscaping is complete and potential public objection is past.

The arboretum and the active playground are park functions which can be effectively coordinated with the cemetery. The unification of such dissimilar functions is possible because of the green space character of all three. A further deployment would be the incorporation of a conservatory into the cemetery or arboretum. With such an arrangement, an impressive, extensive green strip could be possible, rather than a series of unrelated and isolated small open spaces. Such a concept would provide means of secluding the burial area with a perimeter of active use park space. The arboretum or botanical garden is not only a means of displaying horticultural material, but also could be a home in the city for small wildlife. Superficially, this may not appear significant. But by use of nature, bike, or bridle trails, the city-bound populace would have the capability to relate to nature, as well as to relax in the quiet of a small piece of nature.

Interpretation of beneath-the-freeway concept of cemeteries.

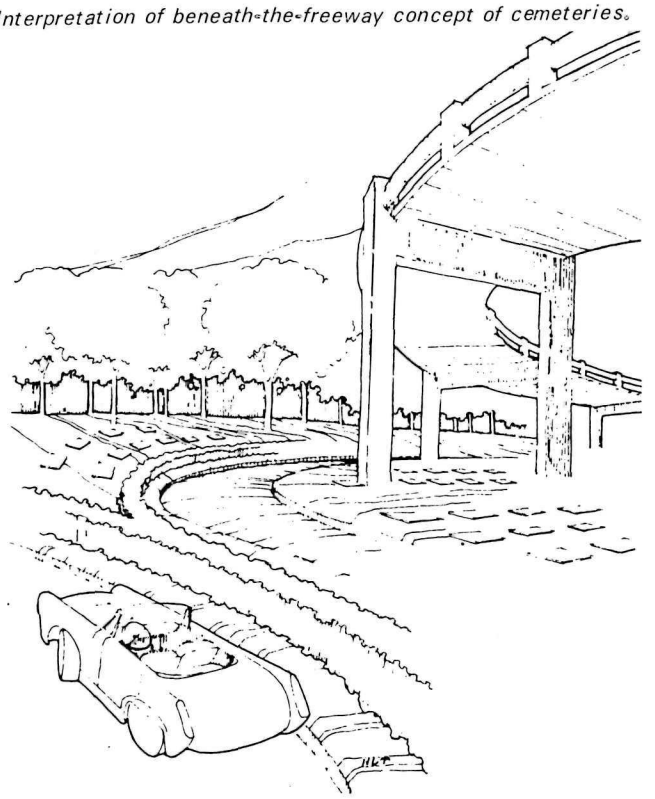


Illustration by Reed-Mullins (now Townsley-Mullins) Associates

Other means of joint land use integration with cemeteries exist. Airports are growing in magnitude and number to such an extent that considerable amounts of land are required for clear approaches and sound isolation. Cemetery land could well be allocated to parcels within the flight paths or runway approaches. Though the problem of noise may be a disadvantage during funeral proceedings, it should be noted that the living would benefit ultimately by more separation from the noise of airports.

Another contemporary feature in the city scape is the freeway with its multitude of access interchanges. Though of apparently great utility in meeting man's need for mobility, the barren austerity of the freeway system can be a depressant to the neighborhoods through which it passes. Urban beauticians now recognize the great need to relate the traffic troughs to the static human realm primarily by landscaping. Because of the large amount of right-of-way necessary for freeway construction and the entry-egress media, the landscaping would well be accomplished by incorporating cemeteries within the right-of-way and between traffic lanes and adjacent development.

In all of the discussions relative to future cemetery development, it is assumed that the memorial park type design will be used. With the primary aim of this report being promotion of cemeteries, both old and new, as open space, the memorial park best satisfies the needs. Maintenance reduction and clearly superior aesthetic character are possible with this cemetery design. Combined with effective landscaping, the memorial park can be a great asset to the city fabric. As burial needs increase with population growth, both architectural interment structures such as mausoleums and garden crypts, and cremation will grow in prominence. Even though land requirements are less for such burial techniques, the need for natural settings will continue to make the memorial park a potential green space asset.

This article is adapted from a report entitled "Cemeteries as Open Space Reservations," published June 1970 and produced by Townsley-Mullins (formerly Reed-Mullins) and Associates, Huntsville, Alabama, for the City of Pulaski, Tennessee, through a Federal Urban Beautification Demonstration Grant from the U.S. Department of Housing and Urban Development. Project coordinator for the City of Pulaski was Robert Abernathy; Townsley-Mullins and Assoc. is an architecture and engineering firm; R.E. Townsley developed the final design for the Pulaski demonstration, represented by the accompanying drawings and photography.

A postscript is necessary here: In correspondence from Mr. Townsley, we are pleased to hear that since the improvements at the cemetery, all the facing buildings have been refurbished.

People- Parks- Plans- Programs- and PEOPLE

By Robert E. Everly

In the acquisition, planning, developing and programming of parks we begin and end with "people". We, like the school superintendent who said that he could run the best of school systems if he could keep kids and their parents out of the schools, could operate some pretty fine parks if all people would stay out of "our parks." But planning authorities know that people are going to use parks — they also know that park problems are in direct ratio to the numbers of people that use those park facilities.

City planners have also come to acknowledge that urbanization without adequate park and recreation space invites destruction of the human spirit. Man needs to walk on grass and feel "mud between his toes." Deny this and urban dwellers drift toward an aggressive and destructive nature.

An example, which can be used in this connection, is the recognized lack of open space in the inner city. At one time when the so-called "bronze belt" existed in the near south side of Chicago, a survey revealed that practically no parks or open space existed in that area.

The hundreds of thousands of blacks who came to the Chicago area from the rural south in the 50's and 60's were denied the opportunity, yea, the necessity of contact with the soil with which they had been identified and as a result Chicago, like many metropolitan districts, developed the so called "asphalt jungle." The dollar cost of these jungles far exceeds the cost of parks and the social indignities resulting from lack of open space leave scars that will long be unhealed.

Israel offers another excellent example. Israelites seem to derive their strength and spirit from their land. That country's modern pioneers came from Jewish ghettos in Europe's most highly industrialized cities. Reunited with the land, they transformed Israel into a model State.

Why Parks - And Why Program Their Use?

Actually the question of "why parks?" is an absurdity. Only a few years ago we referred to park areas in metropolitan districts as "the lungs of the city." Today with all of the environmental and pollution problems combined with the social implications which involve freedom of action for the people of the community, the question of parks is no longer a question of "why." It is a matter of how many and where and when as well as the programming of the activities within those areas.

At one time we thought of "recreation" as a device to "keep children off the street." Today, enlightened recreation programming is accepted as an integral part of the culture of the community.

Park land also satisfies man's desire for territorial protection. Landscape screening provides a pseudo-impression of security in middle-class neighborhoods. In high-density areas, buffer parks serve this same purpose.

Park Locations

People want outdoor recreation close to home. In a metropolitan area, this need becomes most difficult to fulfill when the demand for land has made the cost per square foot soar and the availability of land suitable for recreation is all but non-existent in areas where most needed.

More efficient use of acres presently available can provide a partial solution. Land now designated as public outdoor recreation

space lies in sparsely settled areas. These include the familiar county or state parks. But intimate parks, the kind most needed by inner-city people, either do not exist or have very limited space. These neighborhood facilities, if properly located, designed, and operated, can help to satisfy the hunger for active as well as passive recreation.

Population density and availability of land and transportation affect park location. To help alleviate some needs, a city should provide economical transportation to outlying recreation areas.

Photo by Public Recreation Commission, Cincinnati, Ohio

Photo courtesy of AIA JOURNAL

This pipe-and cable system was used in a vest-pocket park on East 5th Street in Manhattan.

Public Transportation to Large Parks

Some American cities have planned well in providing major recreational facilities within reasonable travel effort of the citizenry. For instance, Chicago has its principal parks fairly well situated and a family from any section of the city can use public transportation to reach the great lake front recreation areas in a matter of minutes. Or, using the same transportation, they can travel in the opposite direction to one of the Cook County Forest Preserves which maintain about 70,000 acres immediately adjacent to the city.

Milwaukee, with its exceedingly well conceived county park system, is another example of putting parks where the people can reach them. From Boston to the bay region of San Francisco-Oakland and from Minneapolis to Miami, we can find in varying degrees similar examples in metropolitan park systems. While public transportation is not always adequate, these cities are trying to make their major parks readily accessible to the people. So if we cannot bring the parks to the people, we must find economical and fast ways to bring the people to the major parks.

Imaginative Use Of The Land

One of the solutions lies in creative land use. Vest-pocket parks, roof parks, the reclamation of slum clearance properties (land as well as usable structures) and the use of land underneath or adjacent to city expressways are just a few methods of meeting this problem.

continued

The imaginative use of these "acres of God" put a great stress on the planning abilities of those who are responsible for the physical, cultural and spiritual well-being of the people which the land is to serve.

New York City has put outdoor gyms on the flat roofs of schools and factories. This has its drawbacks, but it typifies how something can be created out of nothing. Multiple use of public properties, elimination of over-lapping facilities and services and park-school uses all must become part of modern city planning.

The latter service does not imply that school-building programs should encroach on existing park property. On the contrary, the school-city should acquire property contiguous to parks for educational purposes.

In addition to the so called park-school concept, recreational planners are attempting to find methods of using the wasted land gobbled up for highway cloverleafs (sometimes as much as 40 acres) and for highway acquired property that is not needed for actual highways. There are instances where such properties are extensive due to prevailing land acquisitional-legal requirements.

The Cook County Forest Preserve District in the Chicago area acquired many "borrow pit" areas from road contractors who "borrowed" huge quantities of earth for grade separations. These excavations now serve as small lakes which have been stocked for fishing and are enthusiastically used by large numbers of Cook County residents.

Then consider the vast acreage retained by the Corps of Engineers for reservoirs, dams, watersheds, flood plains and the like which can and should be utilized for public use. The Corps has recognized this potential to a limited degree but they should be encouraged to expand their public use programs a thousand-fold.

A careful perusal of the hundreds of thousands of acres of land that are publicly controlled by various tax supported agencies throughout the land and which could be used for public recreation would be revealing. Even a casual perusal of this problem would uncover a tremendous waste of resources that could and should be used for public recreation. This need not be limited to land use but should also include the available public buildings that are used for a small fraction of time and in some instances will go unused.

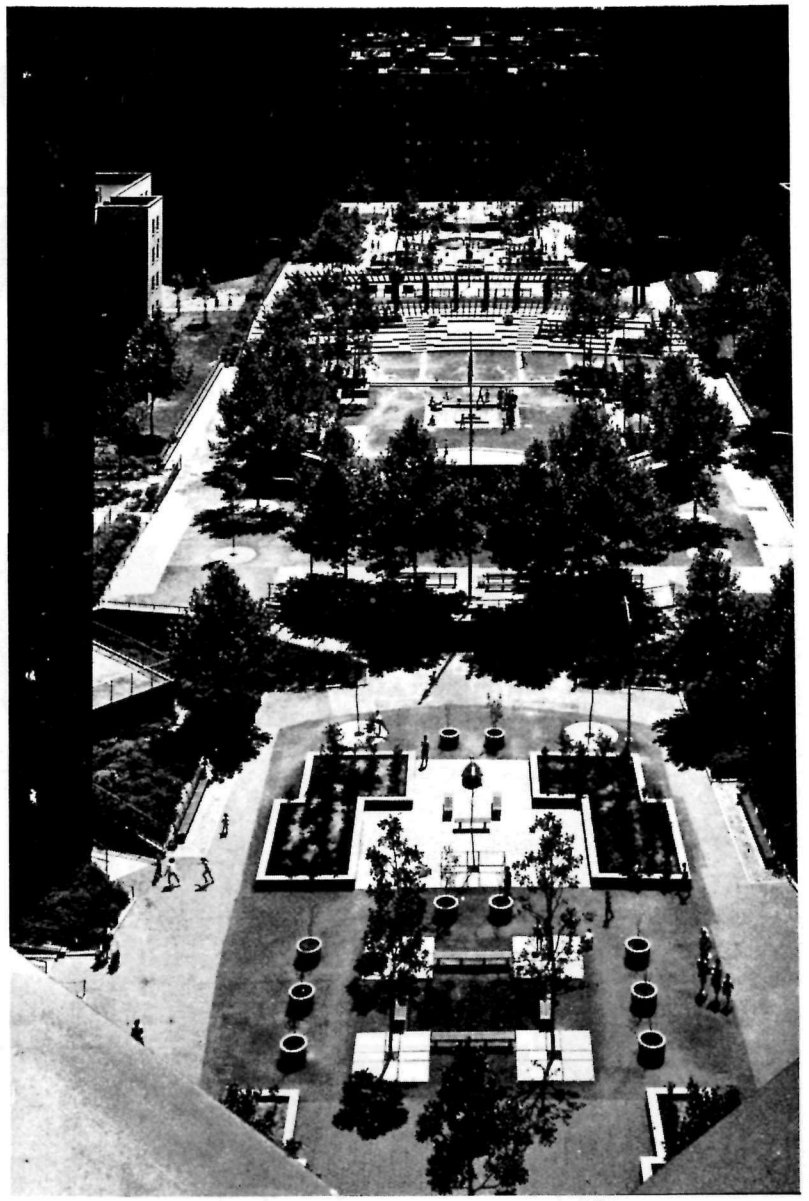


Photo courtesy of AIA JOURNAL

Amphitheater and pool at Manhattan's Carver Houses, invite residents to relax or play—contrasting with the drab, uninviting grassy tracts common to most housing projects.

Already there is a perceptible drop in school registrations in some areas. If the birthrate in the United States continues its downward trend the school population will drop proportionately resulting in unused school space that should be used for other public use. Therefore, school building design should include recreational facilities for use when not needed for educational purposes. School authorities all the way up or down to janitors who are insensitive to the fact that school buildings are publicly owned and as such should not have their use limited to 185 days per year at eight hours per day need an awakening.

The Park-School Concept

There has been much written about the park-school program or the school in the park program. Actually there has been a great deal of lip service in this endeavor. The first park-school in the United States is recognized as having been the North Park School in Glencoe, a small suburb

along the North Shore of Chicago. The division lines between a park and school-owned properties on an irregular shaped property were ignored in the development of this site. In the physical development of this property, school and park board prerogatives were subjugated to the best possible use of the land for community purposes. The superintendent of parks and recreation also served as an assistant superintendent of schools in this community and the superintendent of schools was Dr. Paul J. Misner who was a recognized leader in the elementary school field. Subsequently all school properties in Glencoe were developed within this pattern.

The significant point in the development of the Glencoe Park-School was not limited to the economical and practical development of contiguously owned properties of the school board and the park board but in the total planning concept. As an example, all school buildings were designed to serve the neighborhood educational-recreational needs and desires of the community served. This eliminated the building of separate park structures. Another interesting aspect of this plan was that there was a close alignment between the school faculty and the recreational staff.

The teachers in many instances were selected for their interest, training and proficiency in recreation. Sometimes a school class would continue through after school hours with the same teacher conducting an activity that started as a part of a school program and ended as a recreational activity. The line of demarcation between education and recreation was practically eliminated. The teachers' salaries for activities beyond their normal school work were absorbed by the recreation board.

This kind of program was later adopted and expanded by Dorothy Endress in Milwaukee and to a greater or lesser degree by other communities throughout the country. However, since World War II this concept has gradually receded into the background and both education and recreation have lost ground as a result.

There are some situations where the educational systems either run programs parallel to the community recreation programs or have absorbed the entire recreation responsibility. While the ultimate objectives of education and recreation are similar, people—and especially children—shy away from being "educated" while "re-creating." Moreover, there is no room for competition between two public agencies for the affection or time of children.

In two or three instances we have been building specialized recreational facilities adjacent to schools. I am thinking particularly of wildlife preserves, propagating houses, greenhouses, conservatories and the like. In one instance, we developed a wild flower sanctuary on park property contiguous to a K-6 elementary school. Children in this school, as

"Children shy away from being educated while recreating," but the two can be combined in park-school environments

Photo by Public Recreation Commission, Cincinnati, Ohio

Photo by Julianne Warren, Cincinnati, Ohio Public Recreation Commission

a part of their science work and with the aid of 7th and 8th graders in another school, collected wild flower seed from nearby forest preserves. These seeds were stratified and propagated in the park district greenhouses and later the small plants were transplanted into the sanctuary - 50,000 of them. This particular program was abandoned during World War II and was unfortunately never re-established.

In another instance, school children in a natural science class actually made cuttings and propagated 15,000 to 17,000 shrubs and trees. Later these plants were used to beautify an entire large acreage park-school. While it is difficult to find the line between parks and recreation in situations of this kind, it was not at all difficult to understand why vandalism in this development was practically nil.

Getting the Money

Financing still presents the single most pressing problem. Here complete unanimity exists. Cities must increasingly look to the State and Federal governments for aid.

Until recently, the States have contributed little. Fortunately, Federal aid has been more abundant. All major cities now receive some Federal funds and anticipate greater participation. However, cities need funds that will provide a stable annual financial income rather than those granted for one project. We have too many outstanding examples of over-designed and over-built monuments that were built with State or Federal assistance, but could not be supported with local tax revenues.

Cities will still need to find new revenue sources. Some of these might include State and local bond issues, user fees, concessions, sales of auto windshield stickers or a tax on motorboat fuel.

Attracting capital from private foundations and industry for inner-city facilities could offer another alternative. Tax subsidies or rebates for facilities provided by private industry would make recreation attractive to industry. A city might explore a special tax on sporting goods items for park and recreational uses.

Taxpayers have shown a willingness to tax themselves for their own benefit. There have been rumblings about a "taxpayers strike" but the writer who is of the "old school" observes that while we all object to taxes in varying degrees, we can't complain too bitterly if we have reason to believe that we are getting our money's worth.

Once a city gets the money it must spend it wisely. Private engineering— architect— consultant firms can be helpful. For example, our firm has what we call the M & E Plan. Basically, it introduces modern planning and construction techniques into the recreation field.

The plan includes three principal steps. First, we survey an area to find out what the needs and desires are. Then, working in cooperation with the park and recreation boards, we draw up a master plan based on what the community should have, what it wants, and what it can afford.

Secondly , based upon the study, the board can determine the best way to finance a project. In some cases, it may require a referendum for a general obligation bond issue. If so, we assist the board in explaining the project's benefits, costs and uses to the taxpayers. Generally, a well-informed public will recommend and pass the issue. Or, we may suggest a combination general obligation-revenue bond issue.

Thirdly, we assist the board in acting as its own general contractor by preparing all working drawings, specifications and other construction documents at the sub-contractor level. All awards being made to the subs after due bidding process. We put a full time co-ordinator on the job and use modern techniques for complete project controls. The board is kept apprised of progress weekly. The results have been very successful and satisfying.

Finally, we in planning, need to know that "ivory tower" or imposed planning is no longer in vogue. Successful park and recreation programs hinge on what people want—not what the "hired hands" believe is best. Get people involved. Have them serve on park and recreation boards, advisory boards, planning commissions or other groups designated to study these problems. You might try surveying area residents prior to any planning or scheduling of facilities or programs.

You may not like what they say or do and you may cringe in putting your professional stamp of approval on some of their wants and suggestions, but it is surprising how many times the "common people" demonstrate common sense. After all, why shouldn't they have something to say about the parks? I read somewhere that those parks belonged to them — the people.

MAJOR FEDERAL AID PROGRAMS FOR PARKS AND RECREATION

Program title	*Authorizing legislation*	*Administering agency*	*Program description*
Land and Water Conservation Fund	Land and Water Conservation Fund Act of 1965	Bureau of Outdoor Recreation, Department of the Interior	Grants to and through states, to local governments, for planning, acquisition, and development of public outdoor recreation areas and facilities. Grants finance 50% of allowable project costs.
Neighborhood Facilities	Housing and Urban Development Act of 1965	Office of Urban Neighborhood Services, Department of Housing and Urban Department	Grants to local governments to help finance neighborhood or community centers providing a variety of social services. May cover up to two-thirds of project costs, or up to three-fourths in redevelopment areas.
Community Action Programs	Economic Opportunity Act of 1964	Office of Economic Opportunity	Through the Community Action Programs grants are made for public or private nonprofit anti-poverty projects. Outdoor recreation projects are included as eligible programs. Covers 50% of program costs.
Model Neighborhoods	Demonstration Cities and Metropolitan Development Act of 1966	Model Cities Administration, Department of Housing and Urban Development	Grants to local governments to plan, develop, and carry out comprehensive programs for rebuilding or restoring slum and blighted areas through coordinated use of all available federal programs and private and local resources. Covers 80% of the cost of planning, developing, and administering programs, and up to 80% of non-federal contributions required under federally assisted projects.
Open-Space Land	Housing Act of 1961	Office of Urban Neighborhood Services, Department of Housing and Urban Development	Grants to state and local governments for the acquisition of land for permanent open-space use. Basic improvements on the land also qualify for grants. Matching funds for both acquisition and improvement.
Urban Beautification	Housing Act of 1961	Office of Urban Neighborhood Services, Department of Housing and Urban Development	Grants up to 50% to state and local governments to help beautify publicly owned land in accordance with an overall beautification program.
Federal Surplus Real Property	Federal Property and Administrative Services Act of 1949	Property Management and Disposal Service, General Services Administration	Surplus land, buildings, and other real property no longer required for federal use may be transferred to state or local governments for park and recreation uses at 50% of the fair market value. The Bureau of Outdoor Recreation assists in determining if property is suitable and desirable for public park or recreation area use.
Beach Erosion Control	River and Harbor Act of 1962	U.S. Army Corps of Engineers, Department of Defense	Prevention of damage to beaches from wave and current action. Grants to state and local governments for up to 50% of the construction cost for protecting publicly owned or used beaches, and up to 70% for protecting publicly-owned shore parks or conservation areas.

Robert Everly

Mr. Everly is president of McFadzean & Everly Ltd., landscape architects, engineers and community planners, Winnetka, Ill. He served as parks superintendent of Glencoe, Ill., from 1930 to 1960. Among his achievements is the origination of the park-school plan for community recreation. He also has been referred to as North America's No. 1 architect to the animal world for his pioneering zoo designs. He is a registered professional engineer and a licensed landscape architect. Some of his many honors include distinguished fellow of the American Park and Recreation Society and honorary fellow of the American Institute of Park Executives. He holds memberships in the National Recreation and Park Association (trustee 1965-66), the Midwest Institute of Park Executives (pres. 1936-37) and the U.S. Park and Recreation Council (pres. 1950-51).

POWER ISSUE: TO STRIP THE LAND OR NOT

This article is reprinted from the May 29th issue of the NATIONAL JOURNAL.

By Richard Corrigan

Two congressional subcommittees are drafting legislation to tame, but not outlaw, the strip-mining of coal.

The legislation would be directed against the shovels, draglines and drills now gouging from the land a quarter of a billion tons of coal a year in 23 states.

The subcommittees have not joined a conservationists' campaign to put an end to stripping.

But that campaign has helped push the subcommittees toward approving a tougher regulatory approach than is advocated by the Nixon Administration or the coal industry.

Rising production: Stripping now accounts for half the nation's coal production.

It is a quicker, cheaper and safer method of extracting coal than the traditional underground-mining process, industry spokesmen say.

Statistics also indicate that the fast-spreading stripping process now provides more fuel to generate electric power than any other energy source.

Strip-mined coal now provides nearly 30 per cent of electric utilities' energy needs.

And the extent of stripping, unless checked by federal legislation, is expected to increase dramatically within the next decade —to provide more fuel for the utilities and to provide a source of synthetic natural gas.

Federal overview: But stripping has left a trail of scarred mountains, torn-up land, polluted and silted waters and other environmental damage, and has stirred up strong public opposition.

Despite the coal industry's efforts to convince critics that strip-mined land can be reclaimed, there is widespread support for legislation to establish a federal overview of stripping practices.

The mining industry has endorsed this concept, while insisting that states should have the primary role in any regulatory program.

"I think I've become more convinced that some federal legislation is a must," said Rep. Ed Edmondson, D-Okla., chairman of the Mines and Mining Subcommittee of the House Committee on Interior and Insular Affairs.

Edmondson credited some states with recently making "some very valiant efforts" to control stripping, but said he now believes that states have been less effective than he originally thought.

"You're not dealing now with the abstract question of whether to strip," said Sen. Howard H. Baker Jr., R-Tenn., sponsor of a strip-control bill. "You're dealing now with the mitigation of an environmental disaster. . . .

"The Cumberland Mountains are just about stripped," Baker said. "Strip-mining legislation now is going to be just about too late for them."

Stripping Issue

The emotion-charged controversy over stripping pits the coal industry and its allies against an array of environmental and citizens' groups.

Other hard minerals that are amenable to stripping—copper, iron ore, phosphate and others—also may fall under the coverage of the pending legislation.

But coal is the prime target for federal control in the immediate future.

"We're going to get it no matter what happens (to other minerals)," said Joseph W. Mullan, vice president-government affairs of the National Coal Association.

Blackouts versus devastation: One side warns of blackouts, brownouts and other calamities if stripping is forbidden or sharply curtailed.

The other side warns of devastation from Appalachia to the Far West if it is not.

The issue thus boils down to a question of energy production versus environmental protection.

There are signs that the mounting talk of an impending energy crisis has blunted the political power of the environmentalists.

"The energy-demand question has become so prominent now that it just offsets this opposition (to strip-mining)," said Sen. Frank E. Moss, D-Utah, chairman of the Minerals, Materials and Fuels Subcommittee of the Senate Interior and Insular Affairs Committee.

"I think there would have been much more total opposition to strip-mining a year ago," Moss said. "I think the tide has receded somewhat. So I guess it's more propitious to have it (the legislation) now than then."

Nevertheless, Moss advocates adoption of federal standards to govern stripping operations.

Abolition: The public debate over stripping has revolved around a bill sponsored by Rep. Ken Hechler, D-W. Va., who wants to ban the practice outright.

Hechler lists 88 House co-sponsors for his bill (HR 4556). A companion Senate measure (S 1498) has six sponsors, including Democratic Presidential candidates George S. McGovern of South Dakota and Hubert H. Humphrey of Minnesota.

But no one rates Hechler's bill as having much chance of passage. Hechler himself conceded, "I wouldn't be very optimistic about the committee endorsing this view" and "I don't see in the structure of Congress that a floor fight would be successful.

"But it's absolutely necessary," he said, "to plant the flag on the hillside this year. . . .I would vote against any bill that's not an abolition bill."

(Hechler scored a solid victory over Rep. James Kee, D-W. Va., a defender of coal stripping, in the May 9 West Virginia primary election. The two were thrown into the same district through a legislative redistricting plan, and the contest was viewed in part as a test of voter sentiment on strip-mining.)

Sen. Moss said of the abolitionists, "They didn't convince me nor the subcommittee. The subcommittee never felt at any time it was feasible to prohibit stripping."

Similarly, in the House subcommittee, no sentiment to abolish stripping has been evident.

Rep. James A. McClure, R-Idaho, ranking minority member of the Edmondson subcommittee and chairman of a House Republican task force on energy policy, said, "Coal production has got to go up because it's the only abundant energy fuel we have."

Regulation: Thus, the real issue facing all parties to the dispute is how strict the federal regulatory approach should be.

Among the major questions still before the subcommittee are:

- How much reclamation should a strip-mine operator be required to perform? What guarantee should he make that reclamation will be performed? What penalty should he face if he reneges?
- Which lands should be open to stripping, and which if any should be off limits? For example, should the legislation directly or indirectly ban the earthmover machines from mountain slopes, where reclamation can be especially difficult and costly?
- Should the federal government or the states have primary standard-setting, licensing and enforcement authority?

If the federal government takes control initially, under what conditions should authority be delegated to the states? Which federal agency should have the lead role —Interior Department (the likely choice), Agriculture Department or Environmental Protection Agency?

- What should be done about reclaiming lands that have been strip-mined and abandoned? If a federal reclamation program is undertaken, how should it be financed and who should reap the benefits of increased property values?
- Should the legislation regulate the above-ground environmental effects of underground coal mining as well as strip-mining? Should the other minerals be included too?

All of these questions have been raised in various bills, and some tentatively have been settled in recent weeks at a series of closed-door executive sessions of the subcommittees.

But the fine points have yet to be drawn even where general policies have been agreed upon.

It is on these questions that hard lobbying will be taking place in the coming weeks.

Administration Proposal

On April 24, President Nixon wrote the chairman and ranking minority members of the Senate and House Interior committees to

Landscape view of reclaimed coal strippings in Western Kentucky.

Photo courtesy Bureau of Mines, USDI

urge passage of the Administration's proposed Mined Area Protection Act (S 993, HR 5689).

The letters also recommended passage of two other pending bills, the National Land Use Policy Act (S 992, HR 4332) and a bill relating to management of public lands, the National Resource Lands Management Act (S 2401, HR 10049).

The letters were sent along with letters to other committee chairmen plugging the Administration's legislative package on environmental matters. Thus far this year, none of the Administration's environmental bills has been passed by Congress.

"The country needs these bills urgently," Mr. Nixon told the Interior committees. "And as you well know the time for action by the 92nd Congress is growing short."

Background: The Administration's strip-mining bill was proposed by the President in his 1971 environmental message to Congress.

The legislation was based on a Johnson Administration proposal, which was submitted to Congress in 1968 and got nowhere. The Nixon Administration expanded the proposal in several respects.

Mr. Nixon had not proposed strip-mining legislation in 1969 or 1970. The 1971 bill was drafted largely by the Interior Department in coordination with the Council on Environmental Quality; CEQ had come into being during 1970 as the President's executive advisory arm on environmental affairs.

"When we made overtures to the Interior Department, they were already going over the Johnson Administration bill," said William T. Lake, a council attorney who deals with the mining legislation.

Provisions: The Administration bill provides generally for state regulation of mining operations under federal review. It would cover not only coal but all other surface mining activity as well.

The bill also calls for regulation of the environmental effects of underground mining, such as subsidence (slippage of land above mining areas) and acid drainage, a troublesome source of water pollution.

But the bill is directed toward controlling future mining activity, not repairing past damage.

States would be given two years, following enactment of the bill, to submit mining-control plans to the Interior Department for approval.

The department could issue and enforce its own regulations for states that did not present satisfactory plans.

Abandoned lands: The Interior Department had proposed that the bill include a massive federal program to reclaim the abandoned mining sites known as "orphan lands."

In September 1970, John R. Quarles Jr., then assistant to the Secretary for policy planning and research, sent a memorandum to CEQ suggesting a long-range $695-million restoration program.

Quarles, who soon after left Interior to become assistant administrator for enforcement and general counsel of the new Environmental Protection Agency, outlined in a lengthy memorandum the mining damages that needed correction: 495 burning piles of coal waste, 237 other coal-mine fires, two million acres of land that has subsided because of mining activity, another two million acres of unreclaimed surface - mined land and 145,000 acres of lakes and ponds and 18,000 miles of streams damaged by siltation and mine-acid drainage.

Quarles proposed a two-year, $14-million restoration program as the first phase of this effort.

But the program was not included in the bill. The Office of Management and Budget raised questions about the cost, according to one source close to the proceedings, and other questions cropped up about the mechanics of such a program and the "windfall" aspects of restoring private land at public expense.

In a Sept. 17, 1971, letter to the House Interior committee, Under Secretary of Interior William T. Pecora said:

"We feel that the first priority in mined area protection legislation must be to arrest the damage presently being inflicted on the land and that federal funding to restore lands damaged in the past cannot be justified at this time."

Reclamation: One of the biggest question marks about the Administration bill is how much reclamation it would require.

The Administration bill defines reclamation as "activity which is taken during and following a mining operation to avoid or correct adverse environmental effects of mining operations."

The bill includes criteria to be used by the states in developing their mine-control programs, but the criteria do not specify the extent of reclamation required.

The bill also includes a provision saying federal guidelines to the states would be issued after enactment. The guidelines "shall attempt to assure that state regulations provide the operator of a mining operation sufficient flexibility to choose the most economically efficient means" of meeting

Damage caused by subsidence over a limestone mine in Kansas.

Photo courtesy Bureau of Mines, USDI

a state's reclamation requirements, the bill says.

The bill adds that the federal guidelines "shall be based on consideration of. . .the available technology. . .(and) a comparison of the costs and benefits."

Criticism: This provision was criticized by the Appalachian Regional Commission, which had taken part in the interagency review of the Administration bill.

"We are deeply concerned about the possible effect of this language since it embodies the crux of the arguments which the industry has used in the past in opposing mining control laws at both state and federal levels," Appalachian Regional Commission Federal Cochairman Donald W. Whitehead said in a March 16, 1971, letter to CEQ.

As soon as reclamation requirements get too expensive, Whitehead said, or are "not 'technically practical,'" the industry has argued that they should not be required."

Explanations: When Chairman Russel E. Train of CEQ testified before the Edmondson subcommittee, he was asked to define what the Administration means by "reclamation."

"I suppose ideally, if we were living in a perfect world, the goal of reclamation would be to return our land exactly to the state of nature in which it was before it was mined," Train said.

"But I think that all of us would readily agree that this is often impossible. So we are talking about a matter of degree; we are talking about cost-effective programs, and the willingness of the public to bear costs.

"I believe that our goal in reclamation should be to correct, substantially correct, the major adverse effects. . . ."

Edmondson said the question of what constitutes adequate reclamation "is the key phrase in the Administration bill," and needed further explanation.

In a subsequent letter to Edmondson, dated Jan. 11, 1972, Train again offered a general definition: he said, for example that land should be restored "to an approximation of its original contour, unless preferable future uses make a different contour appropriate."

Edmondson later put the same question to Hollis M. Dole, assistant secretary (mineral resources) of Interior: "What do you regard as 'adequate reclamation'?"

Dole answered, "Adequate reclamation will vary from place to place. I think it would be determined by the terrain, the value of the mineral, population density, atmospheric conditions, soil types, and other environmental resources within the area. . . .It would depend upon the topography, whether it was extremely steep, whether it was rolling. This would have to be a judgment made after a study of the area in depth, and of the type of reclamation methods that would be necessary to put it in a desirable condition."

Dole later in that hearing told Rep. McClure, "you are bound in many instances to rely upon our judgment" as to what reclamation should be required.

"I think that broad guidelines developed by this committee and by the Congress would be most

Abandoned coal stripping landscape in Butler County, Pa., before reclamation.

Photo courtesy Bureau of Mines, USDI

On-going coal stripping operation in Colorado.

Photo courtesy Bureau of Mines, USDI

helpful," Dole said, "but I am confident in my mind that judgments must be made by those who are natural resource experts."

Dole, former state geologist of Oregon, added later, "We feel very strongly that this responsibility should rest largely with the states. . .I can tell you that personally my desire for state control, if anything, has been fired by my duty back here (in Washington)."

"Reclamation hasn't been considered impossible yet," CEQ's Lake said of the Administration's bill. He said some strip-mined land "looks like someone fought World War III out there" but that the purpose of the bill is not to stop stripping but to "goose the states into coming up with tough programs."

Lake, a 28-year-old Stanford Law School graduate and former Supreme Court law clerk, was asked how the Administration had ascertained the position of the mining industry during the preparation of the bill.

"There's no problem in getting a feel for the mining industry's views," he said. "That comes in through the Interior Department."

"We're not saying you've got to plant trees or you've got to plant grass or you've got to make it an industrial park," said John B. Rigg, deputy assistant secretary for mineral programs at Interior. The goal is to return the land to "a usable condition," he said.

"There are areas where you must prohibit mining if you cannot satisfactorily reclaim the land," said Rigg, a professional mining engineer.

Rigg said of the worst examples of strip mining: "It's horrible. Some of it is even worse than people describe it. You can get emotionally involved in it. You can carry a torch and get people to join you."

The problem, he said, is that proper reclamation is hard to specify. On western lands, he said, "when you take out a 100-foot seam of coal, you will never go back to the original contour."

Rigg said there would be no point in outright prohibition of, for example, contour mining.

"You still lose a resource (coal), so you are not practicing good conservation," said Rigg, 46, who before joining Interior in 1969 was manager of the Colorado Mining Association.

Asked about the position of the National Coal Association and the American Mining Congress, which have endorsed roughly the same legislative approach as the Administration, Rigg said, "Needless to say, we're delighted."

TVA: The Tennessee Valley Authority is a major consumer of strip-mined coal, using some 16 million tons of stripped coal a year and making itself a target of environmentalists' attacks.

TVA Chairman Aubrey J. Wagner has defended his agency's use of stripped coal and has said TVA was a pioneer in requiring contractors to perform reclamation work.

TVA's reclamation requirements recently were tightened after the agency's compliance with the National Environmental Policy Act was challenged by the Natural Resources Defense Council Inc.

Impact statement: In an environmental-impact statement prepared in conjunction with the legislative proposal, the Interior Department said:

"No major or permanent adverse environmental problems are expected to result from the proposed program.

"Inasmuch as the impact of the proposed legislation on the environment is beneficial and has no probable adverse environmental consequences, the analysis of alternatives (to the proposed legislation) becomes essentially a question of the degree of reclamation that should be required."

The statement was filed in accordance with the National Environmental Policy Act (83 Stat 852).

The statement did not examine the question of whether strip-mining could or should be curtailed and whether alternative fuels would be available.

Subsequent court decisions suggest that the impact statement might have examined possible alternative actions. For example, the Interior Department's plan to lease Gulf of Mexico tracts for offshore oil and gas exploration was halted by a court challenge, based in part on the department's failure to examine possible ways of meeting energy demand without offering the leases.

Environmental Campaign

"Coal has always cursed the land in which it lies. When men begin to wrest it from the earth it leaves a legacy of foul streams, hideous slag heaps and polluted air. It peoples this transformed land with blind and crippled men and with widows and orphans. It is an extractive industry which takes away all and restores nothing. It mars but never beautifies. It corrupts but never purifies."

Kentucky author, lawyer and politician Harry M. Caudill wrote those words in the preface to his 1963 book, *Night Comes to the*

A giant coal auger bores holes 42 inches wide and 200 feet deep into coal seams.

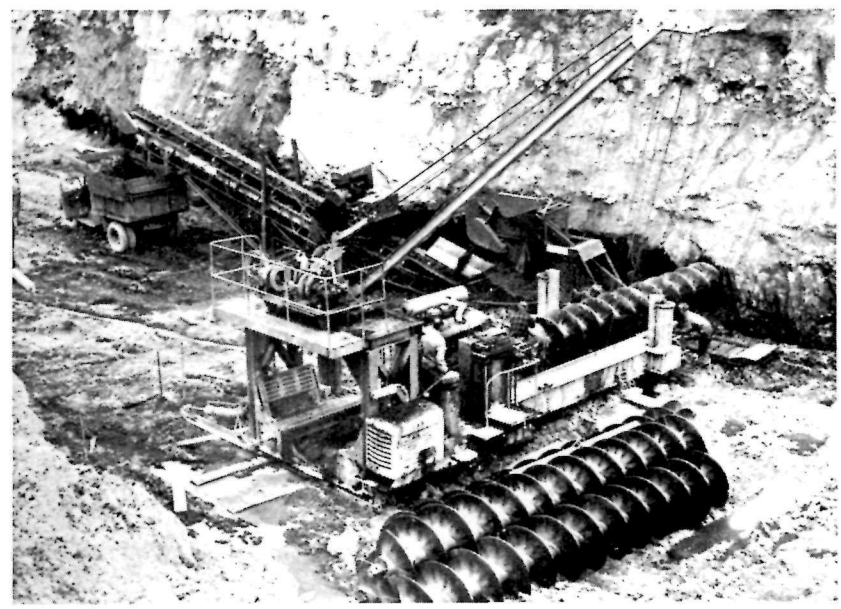


Photo courtesy of World Book Encyclopedia

Cumberlands: Biography of a Depressed Area (Little, Brown & Co.). The book, a bitter account of the coal industry's impact on Caudill's native region, was especially critical of strip-mining.

In the years since Caudill's book appeared, the extent of stripping in Appalachia and elsewhere has increased sharply.

So has the extent of opposition to it from those who, like Caudill, say government must act to halt the ruination of their land.

The Senate subcommittee heard one story about a West Virginia woman who was enraged because a stripping operator had caused the flooding of her community and the destruction of a neighborhood cemetery.

When the earthmover approached her yard, she reportedly told the operator:

"If you dump one dipper full of that mud over next to my yard, I am going to shoot you off of that shovel and I will kill you."

Similar stories abound—tales of uprooted graveyards, boulders crashing through roofs, landslides inundating property.

The stripping issue has provoked some of the most dramatic attacks of any environmental controversy in recent times.

State failures: A recurrent theme of the environmentalists is that state regulation has been a failure.

In a statement submitted to the House subcommittee last fall, Caudill said:

"As a member of the Kentucky legislature in 1952 I voted for Kentucky's first strip-mining law. That law was 'improved and tightened' in 1960 and I supported the changes. In 1960 I sponsored the Reclamation Act that, as amended, went on the books that year.

"I have maintained a constant interest in my state's laws and regulations in the sincere hope that they would protect its western plains and its beautiful, timber-covered eastern hills. It is with sadness that I tell you Kentucky's 17-year struggle has been a failure and that the ruin of its land continues unabated.

"These experiences led me long ago to conclude that only

Aerial view of coal stripping spoil piles in New Mexico. *Photo courtesy of Bureau of Mines, U.S. Department of the Interior*

federal legislation of the sternest character can be effective." Caudill called for legislation to prohibit stripping in some areas, require "total restoration of the land" where stripping is permitted and authorize a massive federal program to reclaim lands that have been stripped and forsaken.

Similar testimony came from Paul J. Kaufman, director of the Appalachian Research and Defense Fund, who as a West Virginia state senator participated in developing that state's 1967 strip-control legislation. Kaufman told the House subcommittee on Nov. 30:

"There had been those who advocated abolition—but I stood firm—secure in the knowledge imparted to me by coal industry spokesmen that the excesses of strip mining could be eliminated. . . .

"I am here to tell you that I was terribly wrong. The ensuing four years of control and reclamation have simply increased the havoc and the horror stories. Neither production nor destruction has been curtailed.

"Whether the industry is uncontrollable or whether a good sound law is unenforceable or a combination of both—I don't know.

"But take it from one who, from bitter experience, is in a position to know—any step short of limiting the extraction of coal to methods other than strip mining is not going to work, if once beautiful West Virginia hills are seen as an example.

"The very industry which now insists that reclamation can work will see to it that it won't. The cost of good reclamation is prohibitively expensive, and higher profits is the name of the game."

Washington campaign: The campaign for federal legislation is being coordinated in a faded Capitol Hill townhouse.

The third-floor office of the new Environmental Policy Center is headquarters for a federation called COALition Against Strip Mining.

The coalition claims support from a number of national and local groups, including the Sierra Club, Friends of the Earth, Environmental Action Inc., the Wilderness Society, the Appalachian Coalition, Save Our Kentucky, Save Our Cumberland Mountains, Black Lung Association and Citizens to Abolish Strip Mining.

The Environmental Policy Center is a new lobbying organization formed after a shakeup of Friends of the Earth.

Louise C. Dunlap and Bruce C. Driver, of the staff of the Environmental Policy Center, are coordinators and spokesmen for the coalition. Both say that the campaign against stripping began at the local level and has remained essentially a grass-roots effort, unlike other environmental causes that are taken up and led at the national level.

Miss Dunlap, 26, is a former legislative aide at Friends of the Earth, where she was in charge of the head-counting system in the environmentalists' campaign to help defeat the supersonic transport.

She is a Duke University graduate who did postgraduate work in urban planning at the University of North Carolina and has worked at the HUD Department and the National Parks and Conservation Association.

An energetic and fast-talking lobbyist, she denounces the coal industry's reclamation work as "camouflage" but says she recognizes that Congress shies from the abolitionists' campaign.

"The word 'ban' just scares the hell out of them," she said, because of what she called a "scare campaign" by the coal industry.

Driver, 29, holds a history degree from Yale, a master's degree in business administration from Columbia University and a law degree from the University of Michigan.

He worked briefly for a Manhattan law firm whose clients included Consolidated Edison Co., then served as a consultant to the Conservation Foundation on a study of strip-mining before joining the Environmental Policy Center.

Driver, who wears work shirts at the office and jackets and ties on Capitol Hill, joined with friends in purchasing farmland in West Virginia—using stock in Standard Oil Co. (New Jersey), a gift from his father, to buy the land.

Driver has specialized in studies of energy demand and coal reserves, reflecting the environmentalists' realization that they had to respond to the energy-crisis theme in their campaign against stripping.

"Damn it, we could have a total ban on all new contour (mountain) and area (flatland) stripping next year and no lights would have to go out," Driver insisted after poring through Interior Department and industry statistics. He dismissed the Administration's bill as "outrageous."

Advantages: In their campaign against stripping, the environmentalists have had some factors working in their favor.

- The environmental damage wrought by stripping has gained nationwide publicity in recent years.
- In states with extensive stripping, political pressure has been mounting for a crackdown on the coal operators.

Developments in states—Recent developments in three states illustrate the growth of political pressure to control stripping:

In Ohio, Gov. John J. Gilligan, D, has just signed a strong regulatory bill that sailed through the legislature despite the strenuous objections of coal-industry leaders.

West Virginia Secretary of State John D. (Jay) Rockefeller IV, campaigning on a stop-the-stripping platform, won a lopsided victory in the May 9 Democratic gubernatorial primary, and other anti-stripping candidates reportedly fared well there.

Kentucky Gov. Wendell H. Ford, D, called a moratorium on new stripping permits, later relenting but requiring more thorough reclamation planning before allowing new stripping to proceed.

Publicity—With the aid of local and state environmental organizations, the Washington Opponents of stripping have worked to strengthen public opposition to the practice.

For example, the COALition Against Strip Mining and the Sierra Club prepared a report, dated February 1972, of projected strip-mining by state and county.

"If stripping is allowed to continue," the joint study said, "in the 15 states surveyed, 36 billion tons of coal will be produced at the expense of 8,455.1 square miles of land, not including spoil-bank and off-site damage.

"The strippable reserves of these 15 states constitute only 4.8 per cent of the total recoverable coal reserves in this nation. Yet, the pursuit of this 4.8 per cent will create a wake of devastated lands equivalent to a path two and a half miles wide from New York City to San Francisco."

The report said 112 counties in 11 states "will lose more than 10 percent of their total land areas" if stripping continues, and that 19 of those counties could lose more than half their land to stripping.

In its state-by-state breakdowns, the 24-page report listed coal-state Senators and House Members by district. An asterisk by a name indicated a co-sponsor of the Hechler bill; another mark indicated a county in which stripping might effect 10 per cent or more of its land.

Several thousand copies of the report were mailed out, Miss Dunlap said.

Though the Environmental Policy Center operation has a haphazard appearance, it has stayed well abreast of events and has helped keep the pressure on Congress: generating mail, coordinating calls on congressional offices for out-of-state visitors, suggesting language to counter any trend toward what they regard as toothless legislation.

One sign of their strength was the Interior Department's effort to enlist their help against legislation dealing only with coal.

On April 18, according to Miss Dunlap, several environmental spokesmen were invited to a meeting in the office of Frank A. Bracken, the department's legislative counsel.

The department was upset because Edmondson, on March 15, had signaled his intention to push a bill excluding other minerals.

"They kept accusing us of having only one issue—coal," Miss Dunlap said.

"You're always telling us we're asking for too much," she said she replied; the environmentalists were only trying to be "reasonable."

Actually, she said, "We're delighted with the fact that it's only dealing with coal. We don't have to get involved with gravel pits versus phosphate mines."

The environmentalists generally say an all-minerals bill would have to be so broadly phrased it would be meaningless.

Obstacles: But if the environmentalists have had some factors working for them, their campaign still has been a long-shot effort.

Besides the obvious difficulty of seeking to outlaw or phase out a major U.S. industry, these obstacles include:

- Opposition to their cause by the Administration;
- Opposition within the Interior committees and subcommittees, which are dominated by Westerners and which the environmentalists do not regard as sympathetic to their efforts on most matters anyway;
- The sudden prominence of the energy-policy issue, which has forced them onto the defensive to try to show that stripping could be stopped without blackouts, brownouts, or over-reliance on imported energy sources;
- Arguments that, by stopping strip-mining, the environmentalists would be shoving more miners into underground work—thus condemning men to die or contract black lung disease.

On the energy question, Driver has completed a report dealing with underground reserves of low-sulfur fuel and power needs; he concluded that the reserves are available and could be deep-mined at an additional cost of $100 million, or less than 50 cents a year for each person in the United States. On the safety question, the environmentalists' response has been that deep-mining can be made safer if laws are fully enforced, and that coal companies are not investing adequately in safety measures because of the competition from lower-cost stripped coal.

Industry Response

At a panel discussion on energy-policy issues in New York on April 19, National Coal Association President Carl E. Bagge said of the stripping controversy:

"We want this issue put behind us once and for all. . . . We're asking on the Hill—literally begging—for the Congress to enact legislation."

Bagge branded the Hechler bill a "totally irresponsible" measure, and said the Administration bill was a "rational" approach.

The National Coal Association, the Washington spokesman of the big coal companies, represents producers and marketers of bituminous coal. It has been the leading industry voice on the stripping issue.

Association position: At the association's glossy black headquarters building on 17th Street in midtown Washington, William E. Hynan Jr., vice president-legal affairs, gestured toward a nearby construction site and said:

"I could go out here on Connecticut Avenue and take pictures of the subway and label it, 'The Destruction of Connecticut Avenue.' "

Hynan's point was that strip-mining might look awful while it is going on, but that with proper reclamation the damage can be repaired.

"This is at least one time," Hynan said, "when industry has come in and said, 'We support legislation. . . .' The most amazing thing that has happened on the Hill is the realization, even after our testimony has been presented, that we don't oppose federal legislation."

In 1968, the association had opposed any federal regulation of strip-mining, as suggested by the Johnson Administration.

Hynan said the association's directors agreed to support federal legislation after the Administration in early 1971 offered its proposal.

The association staff, after drafting a legislative approach, obtained the unanimous approval of the board through a series of telephone calls, he said.

Mullan, vice president-government affairs, was asked about the reaction of coal industry executives to the legislative issue. "You tell them the facts of life," he said. "If you want to stay in the coal business you have to reclaim the land."

Mullan added that many companies already were active in reclamation work "and were concerned with the guys who weren't doing something."

Testimony: The association formed a blue-ribbon delegation to appear at the Senate and House subcommittee hearings last November.

Appearing as witnesses were:

Bagge, the president, a Republican who served on the Federal Power Commission from 1965 to 1970;

Edward R. Phelps, president of Peabody Coal Co., the nation's biggest coal producer;

Ralph W. Hatch, president of Hanna Coal Co., a division of the second biggest coal producer, Consolidation Coal Co.;

Paul Morton, president of Cannelton Coal Co., a smaller company that has strip-mining operations in West Virginia and is a

subsidiary of Algoma Steel Corp. Ltd. of Canada.

They presented extensive statements, statistics, charts and comments on the stripping issue. Their theme was that reclamation can work, that the states can be made to see that reclamation is performed and that prohibition of strip-mining is unnecessary and would lead to grievous conditions.

Bagge summed up their position in saying: "We support federal surface mining legislation which sets forth broad mandatory criteria for the states to follow in developing the specific regulations."

The association opposes any prohibition of strip-mining except on a case-by-case basis.

On the question of reclamation, the association favors a definition of returning a mined area "to productive use, compatible with the climate, soil, vegetation and other conditions of the surrounding area."

The association opposes inclusion of underground mining in the legislation.

Except for the latter point, the association—while not endorsing any particular bill—is generally aligned with the Administration proposal.

The association also prefers the Interior Department as the agency that should play the lead federal role.

Industry problems: Bagge, a silver-haired, pipe-smoking lawyer with a scholarly and stylish delivery, came to the association at a time when the coal industry faces major problems.

Coal is the nation's most plentiful energy source, with reserves far exceeding in energy value the known domestic reserves of oil and gas.

These reserves include coal in deep and shallow reserves. The Bureau of Mines has estimated there are 31 billion tons of low-sulfur strippable deposits nationwide.

Bagge, on a constant round of speechmaking, has been promoting coal as the savior of the nation's energy needs.

(The speeches usually are drafted by veteran writer Herbert Foster, former United Press International reporter; Bagge adds his own oratorical flourishes.)

But coal is in trouble at both the marketing and production ends. While strip-mined coal has risen to about 50 per cent of total coal production, the total tonnage for strip and underground coal dropped in 1971 from 1970.

Electric utilities, faced with new air-pollution standards, have been converting to other fuels because no commercial method is yet available for removing sulfur from stack gas. Sulfur oxides are a prime ingredient of air pollution.

"Coal is being legislated out of business as far as the electric utilities are concerned," according to W. Donham Crawford, president of the Edison Electric Institute.

The coal association says the coal industry lost 22 million tons of sales in 1971 through conversions by utilities to other fuels, and has asked for legislative relief from the 1970 Clean Air Act amendments (84 Stat 1676).

(One element of coal sales is not affected by these air-pollution standards: exports of coal to Japan, Europe and elsewhere, mostly highgrade coal used in industrial operations, account for some 10 per cent of total production.)

At the producing end, the coal industry faces the environmental problems associated with stripping and the safety problems involved in underground mining.

"In New York City today, for the first time in 90 years, not one pound of coal is being burned by Consolidated Edison Co.," Bagge said.

Bagge told the House Interior Committee at an April 11 hearing on energy policy that the number of East Coast utilities burning coal has dropped from more than 100 to 27 since 1964.

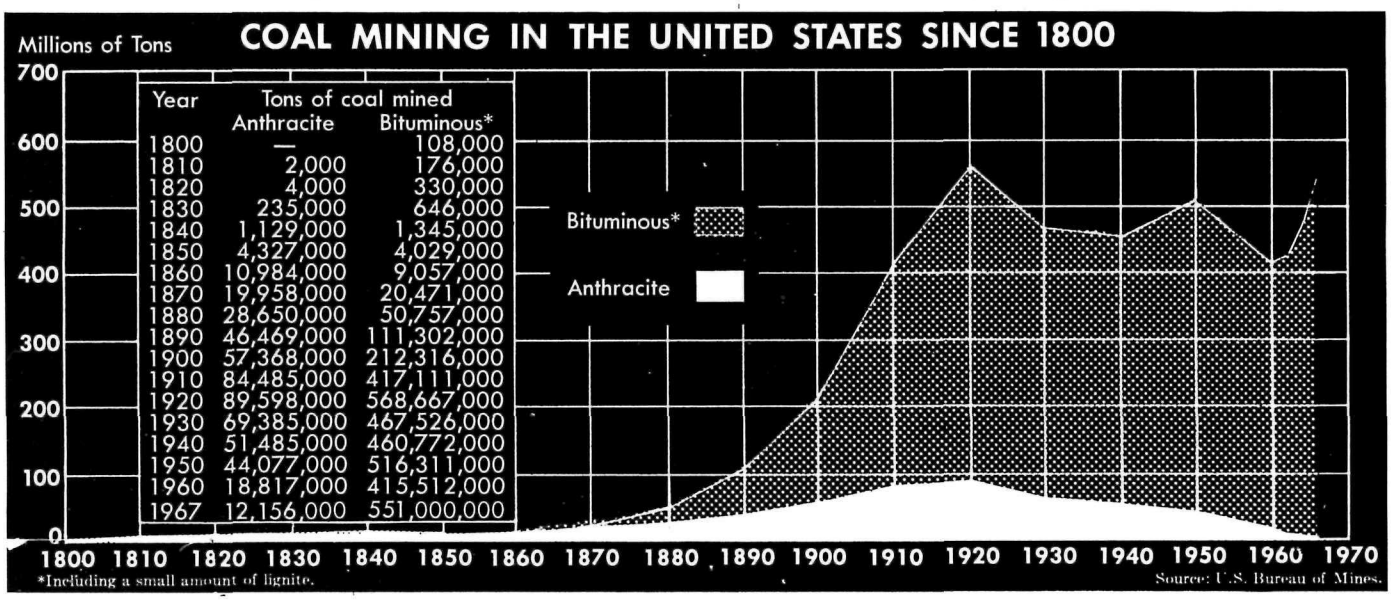
The 1969 Federal Coal Mine Health and Safety Act (83 Stat 742), requiring control of dust and other measures to protect deep-mine workers, has added to production costs. One of the reasons widely cited for the most recent and projected growth of strip-mining is the impact of that law.

Future production: But while the industry faces problems now, its future may be bright.

Millions of acres of western lands under federal control have been leased for possible mining of coal.

Much of this coal would be strip-mined, with the low-sulfur coal products used in power generation or for conversion to gas.

The Administration, in joint planning efforts with the Ameri-



Year	Tons of coal mined Anthracite	Bituminous*
1800	—	108,000
1810	2,000	176,000
1820	4,000	330,000
1830	235,000	646,000
1840	1,129,000	1,345,000
1850	4,327,000	4,029,000
1860	10,984,000	9,057,000
1870	19,958,000	20,471,000
1880	28,650,000	50,757,000
1890	46,469,000	111,302,000
1900	57,368,000	212,316,000
1910	84,485,000	417,111,000
1920	89,598,000	568,667,000
1930	69,385,000	467,526,000
1940	51,485,000	460,772,000
1950	44,077,000	516,311,000
1960	18,817,000	415,512,000
1967	12,156,000	551,000,000

can Gas Association and the National Coal Association, has placed high priority on developing technology to produce synthetic natural gas from coal.

The Bureau of Mines has forecast 60.5 million tons of coal production from federal, public or Indian lands by 1980.

In the four states of Utah, Arizona, Colorado and New Mexico, the bureau forecast 1980 production of 36 million tons.

These four states are involved in development of a complex of massive power generating stations, designed in part to meet electric power demand in southern California.

Parts of this complex, the sponsors of which include the Interior Department's Bureau of Reclamation, already are in operation:

- At Farmington, N.M., Utah International Inc. operates a strip mine that produced nearly seven million tons of coal in 1971 for the nearby Four Corners power plant.
- At Black Mesa, Ariz., Peabody Coal Co.'s strip-mining operation is sending coal to the Mohave power plant in Nevada. The coal is moved in slurry (liquid) form through a 273-mile pipeline.

Black Mesa also will furnish coal for the Navajo power project under construction in Arizona.

Concentration: Legislation dealing with stripping will affect not just coal companies but major corporations that have entered the coal picture through acquisitions:

- Peabody Coal Co., the leading coal producer by tonnage in 1971, is owned by Kennecott Copper Corp.
- Consolidation Coal Co., the second-ranking producer, is owned by Continental Oil Co.
- Island Creek Coal Co., the number-three company, is owned by Occidental Petroleum Corp.
- Pittston Co., number four, is an independent firm.
- United States Steel Corp. is the fifth-ranked producer.
- American Metal Climax Inc., a diversified mining firm, is ranked sixth.
- Bethlehem Mines Corp., a subsidiary of Bethlehem Steel Corp., is seventh.
- Eastern Associated Coal Corp., owned by Eastern Gas and Fuel Associates, is eighth.
- General Dynamics Corp. is ranked ninth.
- The tenth-ranked firm, Old Ben Coal Corp., is owned by Standard Oil Co. of Ohio, an affiliate of British Petroleum Co. Ltd.

(These rankings for bituminous coal and lignite production are quoted from the February 1972 *Keystone News Bulletin*, a McGraw-Hill Inc. publication.)

Lobbying: At National Coal headquarters, congressional affairs director John B. Howerton keeps watch on developments in the strip-mine legislation and has primary responsibility for Senate matters. Howerton is a former aide to Rep. Watkins M. Abbitt, D-Va.

On the House side, the association is represented by Carter Manasco, a 70-year-old veteran lobbyist and former Democratic Representative (1941-49) from Alabama.

Manasco—described by one acquaintance as "always peering out from under a half-smoked cigar"—could not be reached for an interview.

Association officials said he has no office on the Hill, preferring to keep moving from place to place; they say even they have trouble locating him at times.

But they value him highly as an intelligence agent with unusually good contacts.

One story is told about Manasco's taking Bagge around the Hill for a get-acquainted tour after Bagge became president of the association.

Walking unannounced into the darkened office of one venerable House committee chairman, the story goes, Manasco snapped on the lights, swept the chairman's feet off the desk and said, "Wake up—I want you to meet my new boss."

Bagge reportedly was mortified by this intrusion but quickly recovered on seeing that the chairman was not at all upset.

Mining congress: Early this year the American Mining Congress submitted to the Interior committees a 13-page letter suggesting language for a strip-mining bill. The mining congress, in previous testimony to the committees, had endorsed the concept of federal legislation to regulate strip and surface mining.

The association, speaking for all segments of the mining industry, had called for general federal guidelines covering the mining of all minerals, not just coal.

Amendments—The mining congress, in its letter, proposed specific language to soften the impact of federal legislation. (The coal association also offered similar comments.)

For example, in a proposed definition of reclamation, the letter said in effect that the mine operator should determine how much work would be required.

The letter also said state agencies should decide whether performance bonds should be required, that the states—not the federal government—should have jurisdiction over mining on federal public lands and that criminal penalties should not be included.

Coverage—The mining congress advocated legislation covering all minerals, although it now appears that coal will be most affected by pending bills and that other minerals will be treated vaguely, if at all.

Edward A. McCabe, counsel to the mining congress, was asked why the organization was asking for regulation of minerals that Congress may not want to include.

"There were a number of proposals moving on both sides of the Hill under quite substantial sponsorship," McCabe said. "So it appeared to the industry that Congress was gearing up to regulation in this area....

"In that setting, the industry took stock of what the governmental situation appeared to be ... saying in effect, 'Since you appear to be moving in this direction ... do it this way.'

"It wasn't a matter of industry's asking to be regulated," he said, but of industry's responding to a situation and "responding to requests from the leadership involved" for its views.

If Congress decides to "take a smaller bite" and not include all minerals, he said, "that of course is something the board of directors of the mining congress would have to take a look at."

McCabe, an attorney in the Washington firm of Hamel, Park, McCabe and Saunders, and former (1953-55) counsel of the House Education and Labor Committee, said the mining congress' suggested amendments were presented to congressional figures.

"We had a number of meet-

ings...with some of the very senior people on both sides of the political aisle," he said. He said these visits were led by J. Allen Overton Jr., president of the mining congress.

"We went to the power centers," said McCabe, who declined to name the Members of Congress who were seen. "We have the feeling that the efforts of the mining congress were appreciated and understood."

He said Overton has maintained "a continuing alert to his company officers" on the progress of the legislation, noting for example that a communication from Overton dated April 27 gave a report on that morning's executive session of the House subcommittee.

Power companies: Also keeping track of the strip-mining legislation is the National Association of Electric Companies, the Washington lobbying arm of the nation's private electric utilities.

"We have no active campaign at the present time," said Charles Matthews, who covers environmental affairs for the association.

"The only concept that we would be supporting is one that would allow continued surface mining. . . .We certainly would be very strongly opposed to any moratorium."

The Edison Electric Institute, which speaks publicly for the power companies, did not testify at the congressional hearings.

The American Public Power Association, representing publicly owned electric utilities, likewise did not testify. A task force of the association has been developing a policy position on the stripping issue.

Miners' View

The United Mine Workers union drafted a legislative approach that was introduced by House Interior Committee Chairman Wayne N. Aspinall, D-Colo. (HR 10758), and by Sen. Mike Gravel, D-Alaska (S 2777), who is a member of the Moss subcommittee.

Provisions: The UMW bill would require all stripping to be regulated initially by the federal government.

The Secretary of Interior would issue permits after reviewing reclamation plans; operators would have to post performance bonds of at least $1,000 per acre or a minimum total of $10,000; lands would have to be reclaimed "to a condition where (their) surface value is at least as great" as before mining; penalties would include fines up to $50,000 and two years' imprisonment.

Enforcement powers could be delegated to the states on a revocable basis.

The bill also would authorize a $100-million revolving fund for the reclamation of abandoned lands.

Interests: In testimony before the subcommittees, UMW officials criticized the damage wrought by stripping but said the practice could not be abolished without causing severe economic hardships.

In a column headlined "Reward Our Friends—Defeat Enemies," UMW President W. A. (Tony) Boyle said in the Feb. 15 issue of the *United Mine Workers Journal:*

"There are some now running for office who, in the name of a clean environment, would shut down the works and, in the process, leave thousands unemployed and deprive the nation of vitally needed electric power."

The UMW represents miners at some stripping operations as well as underground mines. For example, the union has organized workers at the massive Peabody Coal Co. strip mine at Black Mesa, Ariz.

Strip mines under UMW contracts pay 60 cents per ton of coal mined to the union's welfare and retirement fund, giving the union a direct economic stake in the continuation of coal stripping.

Wracked by scandals involving murders, rigged elections, illegal political contributions and mismanagement of the pension fund, the UMW leadership has been severely shaken and its influence has been diminished.

"Needless to say, our clout is not what it was," said one UMW official. "We're not exactly the most wheeling-and-dealing influence this week."

Nevertheless, the UMW did campaign successfully for congressional expansion this year of black-lung benefits, over the objections of coal companies.

The union official said the UMW's strip-mine bill, which it does not publicly claim as its own handiwork, has come to be rated generally as "one of the strongest vehicles around" in comparison with other pending bills.

(The Environmental Policy Center, in a March 2 letter to the Senate subcommittee, rated the UMW bill's definition of reclamation as "the most comprehensive" yet proposed.)

Different view: Opposition to strip mining has been voiced by the Black Lung Association, a miner's group first formed to lobby for black-lung benefits in West Virginia.

The association, which has challenged the UMW leadership as spokesmen for coal miners, now claims 30 chapters in eight states. Its influence is centered in West Virginia.

Arnold Miller, 49-year-old miner disabled by black lung and arthritis, the spokesman for the association, said of the strip-mine operators:

"They not only shut down the deep mines when they move in here, they push all this mud on us." He said stripping is costing the deep miners their jobs and is damaging the land on which they live, hunt and fish.

"I'm not optimistic about getting it stopped," Miller said, but he said the campaign against stripping is like a bargain session over wages:

"If you expect to get half a dollar, you don't ask for half a dollar. You ask for two."

Miller said of the hazards of deep-coal mining that he could not encourage young men to go into the mines under present conditions. But deep-mining work can and must be made safer, he said, and a responsive union can help ensure that conditions are improved.

(More than 100,000 miners work in underground coal mines; strip mines employ some 25,000.)

Congressional Views

"I introduced the first strip-mining bill in the Ohio legislature," Rep. Wayne L. Hays, D-Ohio, told the House subcommittee last Sept. 20, "and the lobbyist, who is now dead, for the Ohio Coal Association came to me and said, 'Well, buster, you won't be in the next session of the senate,' and I wasn't.

"Somebody said, 'Why haven't you introduced a strip-mining bill (in Congress) before?' The answer is because I never felt we had a real chance to get one passed until now; and I think we do, but to show how the climate has changed, that same lobbyist back-

in the 1940s was indicted for bribing 12 Ohio state senators.

"Their salary in those days was $2,000 a year. The case kicked around for a long time. He was taken before a friendly judge in Columbus who fined him $1,000. I thought this was kind of an insult to the senators because that wasn't even $100 a head."

House action: Hays is the sponsor of a bill (HR 6482) that is being used as the basis for the Edmondson subcommittee's approach.

Hays' bill deals only with coal. Asked by chairman Aspinall why other minerals were not included, he said, "I believe in taking on about what you can handle at one dose, and I don't want to make any more enemies, have any more lobbyists involved than I can help."

The Interior subcommittee is moving toward a coal-only bill.

Aspinall, in a Feb. 28 memorandum to committee members, raised a long question about whether all minerals should be covered.

Edmondson, who is running for the Senate, said later, "Our subcommittee has concluded informally that the bill will concentrate on coal." And, he added, Aspinall "has adopted the view that we had better stick with coal."

McClure, also a Senate candidate, prefers an all-minerals bill but said, "I'd rather pass one that dealt only with coal strip-mining than fail to pass anything."

Regulation: A committee print of a draft bill indicated that the members are considering provisions to limit stripping on steep slopes (slopes greater than 14 degrees).

"We need some language to deal strongly with steep slopes," Edmondson said.

The committee print also contained authorization for a $100-million reclamation fund, federal licensing and enforcement of stripping permits (subject to delegation to the states) and a definition of reclamation as restoring an area to a condition allowing "the same or other useful purposes" as prior to stripping.

Edmondson, on hearing that a reporter had obtained a committee print, stressed that no official document had been released and that the print should be viewed as only a tentative version.

However, it seems clear that the subcommittee, while not following the environmentalists' views, is not adopting the opinion of Rep. Kee either.

Kee, the subcommittee member defeated by Hechler in the primary, said at a hearing last fall, "Strip-mining is a blessing in disguise" because it helps stop forest fires and allows wildlife to "go out to the open areas; they enjoy the sun and they eat."

Chairman Aspinall, meanwhile, is withholding his views. He told a reporter, "I'm not stating my views until the legislation comes out of committee." He did say, however, "there is a demand and a necessity" for legislation.

Rep. John P. Saylor, R-Pa., normally a champion of the environmentalists' views and a long-

Back-filling of strip-mined area in section of Morain State Park, Butler County, Pennsylvania.

Photo courtesy Bureau of Mines, USDI

time proponent of strip-control legislation, is the committee's ranking minority member. He has been critical of the Hechler measure, and relations between him and the environmentalists have been strained.

Senate: On the Senate side, there have been few indications of what form the bill will take.

"We see as the greatest need," said Moss, "to have first of all a standard that all states must meet."

He also said, "We decided we ought to accelerate the impact by requiring the federal guidelines to be prepared within 90 to 120 days and be effective at that point."

Moss also talked of a bill dealing with all minerals, with one section dealing with coal and a broader section for the others.

"We didn't have any serious cleavage" in the subcommittee, he said. "There was good agreement."

But the subcommittee has yet to report a bill.

Baker, who is not on the Interior committee, said the key to his bill (S 3000, co-sponsored by Sen. John Sherman Cooper, R-Ky.) is reclamation.

"The real question is whether you can put the damn thing back the way you found it," he said.

Baker also wants EPA given a strong voice in the federal jurisdiction. His office has been in touch with EPA officials, who express keen interest in gaining a role in the program.

Outlook

The Moss subcommittee scheduled a tour of mining operations in several western states on May 22-24.

The panel will look at copper, sand and gravel, magnesium, rock, phosphate and uranium operations, then return to Washington for further sessions on the legislation. Another executive session has been tentatively set for June 1.

Edmondson's subcommittee has scheduled further executive sessions June 1, 6, 8 and 13.

The National Coal Association's annual convention is scheduled to open in Washington June 18. A reception for Members of Congress will be held June 19.

The environmentalists hope to have some of their forces in town at about the same time.

Once the measures reach the House and Senate floors, more attacks against stripping can be expected.

Hechler, his hand strengthened by the West Virginia primary returns, has vowed to seek outright prohibition.

Failing in that effort, the environmentalists would be likely to seek more limitations on stripping operations, such as a phase-out of contour strip mining.

Joseph N. Kemple, president of the Marion Power Shovel Co. in Marion, Ohio, a major manufacturer of strip-mining machinery for coal operators, was asked how he rates future business in light of pending congressional action.

"I see the prospects of our machines in the future as increasingly good," he said.

Kemple said he does not object to legislation requiring reasonable reclamation, but "not necessarily to make a silk purse out of a sow's ear."

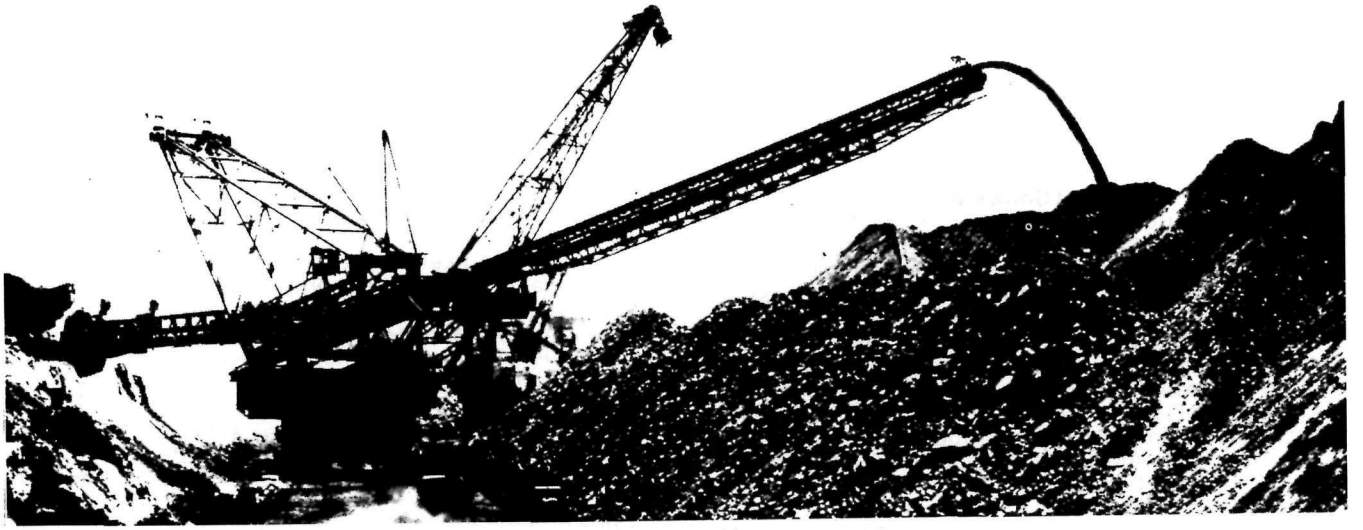
As to the cost of reclamation, he said, "There is no question who is going to pay the cost of reclamation. It's not the coal company, it's not the power company, it's the consumer. The consumer is the one who always has to pay."

Hollis Dole of the Interior Department told the National Independent Coal Operators Association in an April 22 speech at Abingdon, Va., that the industry faces problems but:

"I do not know of another fuel that has a more promising outlook for expansion over the next two decades than coal....A billion tons a year is not an unreasonable production rate to expect before the end of the century."

Richard Corrigan

Richard Corrigan has been reporting on federal environment policy for National Journal since its inception in 1969. Prior to that he was a reporter with The Washington Post for seven years, and before that with the St. Petersburg Times and The Atlanta Constitution. In 1968, he won the American Political Science Association award for distinguished reporting.



ALTERNATIVES

This article is excerpted from the November 1970 issue of Environmental Quality, Volume 2, Issue 2.

Suggesting alternatives to strip mining and fuel burning power plants is a complex undertaking. Not because there are no alternatives, but because there are so many. Certainly some of them are not feasible with our present technology. Some options are rather silly; others are highly practical and could be accepted by even the most devout coal-burning advocate.

Hydroelectric power, power from tides, and power from streams and rivers has been in use for centuries. It is the process of harnessing the energy in currents of water. Hydroelectric power has a tendency to desecrate our natural canyons and valleys, and since the reservoirs used to store the water evaporate rapidly, there is an addition of high salinity to waters further downstream.

Tidal power is a source of great energy. Over 500 million kilowatts of electricity are stored in our tides and currents. The tidal method is widely practiced in France and other European countries.

Nuclear power could possibly be the power source of the future. While there are presently too many dangers associated with radioactive wastes, a possibility might be in locating the plants underground. If they were deep enough, and encased in concrete, the danger from nuclear radiation poisoning might be lessened.

Magnetohydrodynamics (MHD) is a process which converts burning coal directly into electricity. While used both in the Soviet Union and Spain, the need for coal negates its further consideration here.

Burning wastes is also another consideration. For centuries farmers have burned garbage, dung and wood to generate energy. While somewhat archaic by today's standards, it's a good way to dissipate mounds of garbage.

A highly advanced method for capturing energy is solar power. The sun obviously has unlimited power for electricity. Our astronauts used the sun's power on recent moon shots. Possibilities include building a giant magnet to harness the sun's energy, or sending enormous power-catching units out into space and beaming the energy back to earth. This is a variation of photosynthesis, wherein plants use the sun to grow. In this case, though, we would use the sun's power for electricity.

There are further possibilities. We could, for example, revise our present rate structure for electrical consumption. Under current standards, those who use the most electricity receive the cheapest rates. This policy could be altered to allow the electrical conservationist the better price, while charging the large user a higher rate.

We might also consider a massive educational campaign to encourage conservation of electricity. This could be done in the schools and throughout the media.

Of course, limiting the population would be the best alternative, since with a leveled-off population, the need to conserve electricity wouldn't exist. This solution might be the answer to all of man's environmental problems.

The final alternative we suggest is geothermal power, saving it for last, since it might be the best approach to our environmental power hazard.

Geothermal power is better known as steam. Presently, there is enough steam under the earth's surface in the Southwest alone to generate 15 times the electricity of Hoover Dam. The cost of building a geothermal plant is one-half the cost of building a conventional power plant, with the same output. Also, the steam could be condensed to yield a huge new supply of fresh water.

In the Imperial Valley of the U.S.-Mexican border, the pure fresh water available after harnessing the steam is about 7 million acre-feet per year. And, best of all, there is no pollution involved, since no coal or oil is burned.

The steam under the Southwest could produce 20,000 megawatts for the next thirty and perhaps the next three hundred years. This steam, then, obviously negates the need for coal burning power plants, since this is enough power to supply the Southwest for years.

Presently, there are steam plants in Iceland, Mexico, Japan, Italy, Hungary, India, New Zealand, Indonesia, the Philippines and the Soviet Union. Boise, Idaho and Klamath Falls, Oregon also rely on steam for energy.

And plans for steam power plants continue. Witness the Japanese turbines presently under construction in Mexico, to be operative in 1972. The capacity of these power plants will be 75,000 kilowatts, and there are plans to quadruple that output.

A United Nations official recently said, "We used to think a geothermal field would last only forty years at most before becoming exhausted. We are now beginning to think that a geothermal field, properly managed, may last forever."

Quite possibly, we may not need any of the aforementioned alternatives. *Playboy* magazine reports that Federal Power Commissioner John N. Nassikas admitted in Congressional testimony that "the net dependable capacity of the 48 contiguous states is 326,667 megawatts, (with) an estimated peak demand of 257,419 megawatts." That leaves us with a surplus of 27 percent, and a surplus of only 15-20 percent is considered necessary.

Where then, is all this extra power? Could it be that some "utilitarians" are keeping it for themselves? To solve our energy crisis, should we check some Swiss banks to see how much power is stored in unnumbered accounts?

Plant Shows Way

In 1967 American Metal Climax, Inc., (AMAX), acquired a zirconium sponge plant in West Virginia that had been constructed by another company in 1957. It also acquired a considerable air pollution problem. Atmospheric conditions in the area, as well as emissions from neighboring plants, were also factors, but AMAX was determined to clean up as much as possible their addition to the overall condition. Working with Federal and State pollution control agencies, they instituted a $450,000 program. Many people contributed to the success of this cleanup — AMAX's own operating, maintenance, and management personnel; AMAX suppliers; government representatives; and local residents.

The cleanup program began in 1967 when AMAX found that both solid and gaseous emissions from the plant could be reduced through proper changes in the raw materials used and in the scrubbing of exhaust gases. As a result of considerable research, negotiation, engineering, and construction modifications, provisions were made for use of alternate raw materials that allowed shutting down one department in 1969, thus reducing particulate emissions by 97 per cent, and closing a second department some months later, reducing chlorine emission by 45 per cent.

In early 1970 a new gas scrubber system was installed that further reduced chlorine emission to the point that the two improvements combined dropped total chlorine emissions by 90 per cent. And, finally, an intermittent source of particulate matter was significantly reduced by scrubbing devices installed for the reduction furnaces. Their achievements won AMAX an air pollution control award from *The Environment Monthly*.

Efforts continue at this facility to further reduce emissions, in spite of the fact that the three-part program has achieved total reductions of 97 per cent of particulates and 90 per cent of chlorine that had been emitted when the plant was taken over by AMAX.

Farms Follow Strip Mining

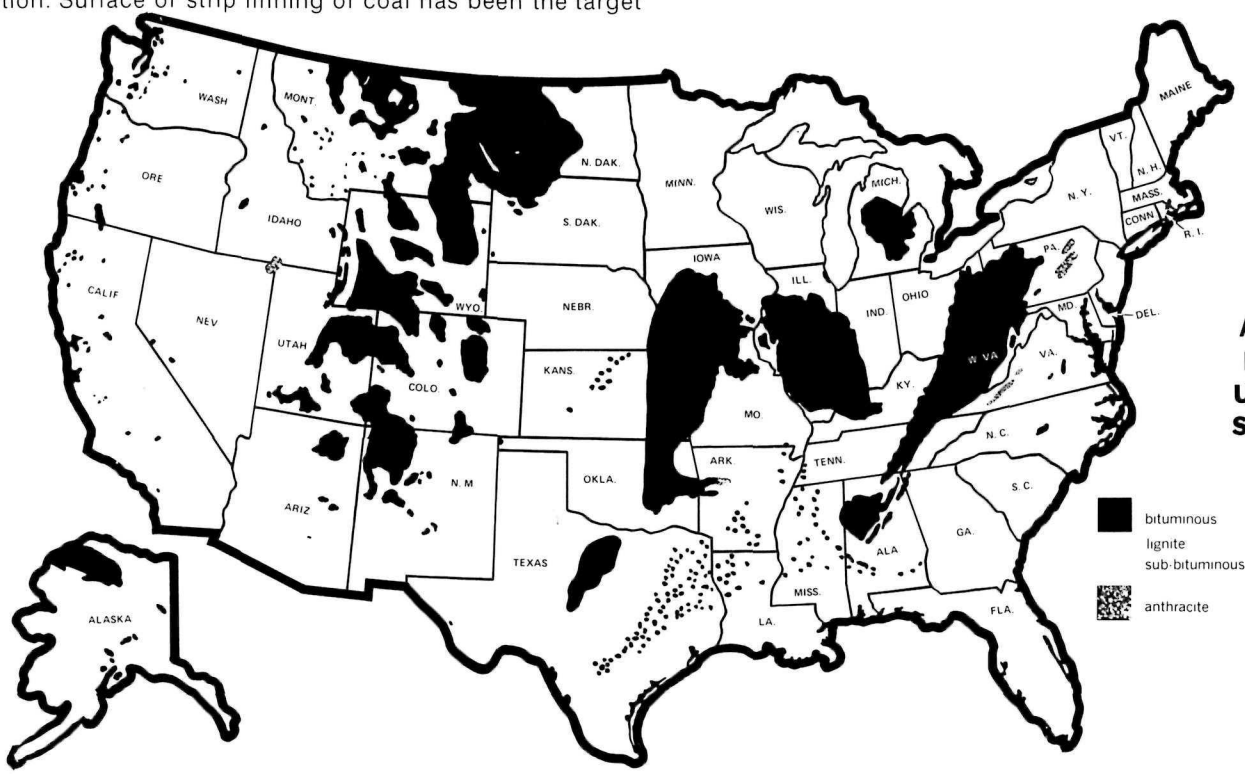
Another example represents a completely different situation. Surface or strip mining of coal has been the target of increasing criticism in recent years. It is practiced when it is economically possible to remove or strip the overlying earth to get at coal seams only a few feet thick which may run from close to the surface to depths of as much as 100 feet.

Improperly handled, this type of mining can sometimes present enormous environmental problems. But with proper handling, the reverse can be true. After the coal deposits have been exhausted, the next step should be rehabilitation. The amount and kind of rehabilitation will vary according to the needs of the areas mined. Sometimes the best and most welcome rehabilitation to local people is a man-made lake, where people can fish and water ski. Or it may be a cattle farm with ponds and pastures.

The Ayrshire Coal Company has a division called Meadowlark Farms that makes a profit out of its farming operations on land prior to and following its being mined by Ayrshire. In 1970 Meadowlark put back into farming the same number of acres of land that Ayrshire put into mining. So we know it can be done.

Meadowlark Farms activities are centered in 85,000 acres in Indiana and Illinois. In this area its operations are divided into four properties managed directly by Meadowlark and 132 cropshare lease arrangements. A farmer who sells his land for ultimate coal mining does so in many cases under a contract stipulating that the land is available to him for working until it is actually mined. Following mining and rehabilitation, it is again available to him for working. Further, he knows that the land productivity in many instances will be as great, if not greater, after mining than before. He also has available to him during this entire period Meadowlark's expertise in animal husbandry and agronomics to assist him to achieve greater levels of production than was possible before his sale of the land.

On the average, 50-60 per cent of Meadowlark lands were tillable prior to mining. This percentage is increased wherever possible after mining. In many areas the land is unsuitable to farming and its rehabilitation is made in accordance with existing topography and water supply, and best possible ultimate utilization. This could mean a public recreational area, a man-made lake, a new highway route, or similar non-agricultural productive use. Obviously the time and money required for such rehabilitation relates directly to the nature of its ultimate use.



COAL AREAS IN THE UNITED STATES

GEOTHERMAL ENERGY

From earliest times, man undoubtedly wondered if he could put to effective use the spectacular bursts of natural steam that spurted from volcanoes, geysers, and boiling springs. The resource he thought of harnessing has come to be called "geothermal power."

In recent years, interest has greatly expanded in this potential new source of power. Although the magnitude of this resource is largely unknown, it has been estimated that if only one percent of the heat in the top 6 miles of the earth's crust could be developed, this source would exceed all known fossil fuel reserves. While much of this heat is of relatively low temperature and will probably never be developed, economically significant concentrations of geothermal energy do occur in local "hot spots" where high temperatures from 150° F to 650° F are found in porous rocks that contain liquid water or steam. Those concentrations are known as "geothermal reservoirs."

To have potential for commercial use, a geothermal reservoir must maintain a high temperature (150° to 400°), be shallow enough to allow drilling (currently, 10,000 feet or less), have rock permeability to allow water or steam to flow at a high rate, and adequate water to recharge its system.

Limited development of geothermal resources has occurred since around the turn of the century. In 1905, the first geothermal power station was built at Larderello, Italy. For the next several decades, there were no more major developments in the field, and even now Italy leads the world in power production from natural steam.

New Zealand began major exploration of hot springs and geyser areas in 1950. Today, the United States, Japan, and the Soviet Union are producing power from geothermal sources, and Iceland uses hot water from geyser fields for space heating.

About 1,200 thermal springs occur in the United States, located mostly in the Western States. California, Idaho, and Nevada contain about 200 sites each, and several hundred others occur throughout Oregon, Wyoming, Utah, Colorado, Montana, and New Mexico. All of these geothermal fields are associated with hot springs.

In the United States, the first commercial geothermal power plant was built by the Pacific Gas and Electric Co. in 1960 at "The Geysers," California, utilizing geothermal steam. Some 75 active wells have been drilled there and are producing about 200 megawatts of electricity annually.

The potential for geothermal development has not been fully tested because Federally owned geothermal resources became eligible for leasing only recently. Passage of the Geothermal Steam Act of 1970 (P.L. 91-581) gives the Secretary of the Interior authority to issue leases for the purpose of developing and utilizing geothermal steam and associated geothermal resources on Federal lands. Implementation of the Act will make possible the evaluation and development of geothermal resources located on the 700 million acres of Federal lands eligible for leasing.

The Bureau of Reclamation and Office of Saline Water are collaborating in an investigation of the technical and economic feasibility of the use of heat energy for desalting geothermal water as a supplemental water supply in the Lower Colorado River Basin. The main focus of this program is on development of the geothermal potential of the Imperial Valley in southern California.

The Geothermal Steam Act provided for classification of public lands with respect to their potential value for geothermal development, for development of regulations covering leasing and operations, and for competitive and noncompetitive leasing depending upon the potential for development. To date, some 1.8 million acres have been classified by the Geological Survey as Known Geothermal Resources Areas (KGRAs). Approximately half of the lands in these areas are in Federal ownership.

In addition, some 96 million acres have been designated as prospectively valuable for geothermal development. All the lands classified are in the tectonically active belt of the western States and Alaska. Competitive bidding is required for leasing in KGRAs; elsewhere leasing is under noncompetitive leasing provisions of the Geothermal Steam Act.

The Department's program is proceeding in three areas: (1) leasing of Federal lands with development by private capital, (2) continuing research on principles and processes controlling the occurrence of geothermal resources together with continuing evaluation and land classification, and (3) evaluation of the potential use of geothermal energy for production of fresh water from brines. Provisions of the National Environmental Policy Act of 1969, calling for preparation of environmental impact statements, are strictly complied with by the Department in carrying out its program.

Increased interest in geothermal steam is evidenced by Federal expenditures for geothermal resource investigations which have risen from less than $20,000 in fiscal 1968 to an indicated total of about $2,000,000 in fiscal 1972. Private expenditures in this field are not known, but will probably greatly exceed Federal expenditures.

The Geological Survey is continuing a research program aimed at obtaining answers to fundamental questions concerning the nature and distribution of geothermal resources in the United States. One phase of the program is the study of the hot water systems of Yellowstone National Park, one of the world's major hydrothermal areas.

Geologic mapping, extensive geochemical sampling and analysis of waters, coupled with geophysical studies and diamond drilling, have led to a new interpretation of the origin of the Yellowstone Park area and a better understanding of the mechanism of geyser activity. Several new investigations are being undertaken which include reconnaissance surveys and hot spring sampling in western states with emphasis on Oregon and Nevada; detailed studies of Long Valley, California—an excellent example of a hot water geothermal system—and studies of the Geysers-Clear Lake area, which contains the world's largest vapor-dominated geothermal system.

Survey research also will involve two efforts at regional assessment. One will focus on an area of high conductive heat flow recently recognized in the Battle Mountain area in Nevada. The other will examine geothermal manifestations in southeastern Oregon to select target areas held promising for more detailed studies.

Production of geothermal energy is not entirely free of environmental impacts. However, the Interior Department is taking this into account in planning its leas-

ing, and research and development programs. The most severe impacts are associated with large scale development of the resource and, depending upon local conditions, may include:

1. Noise from drilling and testing of geothermal wells. To the extent practicable such noise will be controlled through the use of noise control on drilling rigs and mufflers for venting steam.

2. Release of noxious gases, mainly hydrogen sulfide, from wells during testing and from power plants. Control measures include restricting test flows to limit gas releases to acceptable levels, and removal of noxious gases prior to release of steam at power plants.

3. Instability, including land subsidence and the problem of increasing seismicity. Both these effects are related to withdrawal and reinjection of geothermal fluids. The present plans for control of these effects envisage use of cool waste waters for reinjection into the reservoir. This will solve the problem of waste water disposal and provide for control of potential land subsidence and seismic problems as well.

State-by-state acreage classified under classification standards of the Geothermal Steam Act of 1970 is shown below:

KNOWN GEOTHERMAL RESOURCE AREAS (KGRA)

State	Acres
Alaska	88,160
California	1,051,533
Idaho	21,844
Montana	12,763
Nevada	344,027
New Mexico	152,863
Oregon	84,279
Utah	13,521
Washington	17,622
Total	1,786,612

LANDS POTENTIALLY VALUABLE FOR GEOTHERMAL DEVELOPMENT

State	Acres
Alaska	11,277,000
Arizona	1,473,000
Arkansas	11,000
California	15,737,000
Colorado	1,014,000
Idaho	14,845,000
Montana	3,834,000
Nevada	13,468,000
New Mexico	7,482,000
Oregon	15,048,000
South Dakota	436,000
Utah	4,511,000
Washington	5,759,000
Wyoming	824,000
Total	95,719,000

The coal industry, as represented by the National Coal Association, supports comprehensive Federal legislation which will establish criteria for achieving sound reclamation and which will require the states to develop and enforce regulations which will meet those federal standards.

The States should have the primary responsibility for implementing and enforcing the law, since climate and topography vary from State to State. However, if a State does not comply then the Federal Government should step in and set up regulations and enforce them in that State.

With realistic Federal legislation and the technology that already exists, effective reclamation can be achieved wherever surface mining takes place. Methods already exist for establishing successful vegetation on mined land, controlling erosion and landslides, isolating toxic materials and preventing mine drainage from surface operations. Those who would advocate prohibition simply are not aware that through current technology mined land can be returned to productive uses compatible with surrounding areas.

With sound Federal legislation the United States can continue to mine the surface coal which is so vital to both the energy needs and the economy of the country.

Carl E. Bagge, President
National Coal Association

Significance of

Coal plays a vital role in the rapidly expanding demand for energy in the United States—especially in the electric utility sector of the economy. In 1970, total bituminous coal and lignite production of 602.9 million tons accounted for 25 percent of the total production and 19.7 percent of total consumption of mineral energy resources and hydroelectric power in the United States. Excluding noncompetitive uses, such as gasoline for cars, coal's share of the energy consumption market ranged from 25 to 30 percent.

Of all the coal produced in 1970, 264.1 million, or 44 percent, came from strip and auger mines. The production of surface-mined coal was up 50.8 million tons, or 23.8 percent over the 213.4 million tons produced at surface mines in 1969, while underground production, due to labor difficulties and new mining legislation, was down 8.3 million tons, or 2.4 percent from the 347.1 million tons produced at deep mines in 1969. Further increases of surface-mined coal production are expected in 1971.

The growing contribution of surface-mined coal to the rapidly expanding U.S. energy needs is evidenced by the fact that surface-mined output increased from 9.4 percent of total coal production in 1940, to 44 percent in 1970. Today, as in 1940, surface mining is carried on in nearly every state where coal is mined. Surface-mined coal not only represents a substantial percentage of coal mined in the respective major coal-producing states, but is practically the only method of mining employed in some states. In fact, large reserves of western coals can only be extracted by surface mining.

Surface-mined coal became increasingly important to the U.S. energy picture in 1970. Deep-mined coal production declined in 1970, the nuclear power program showed signs of not meeting expectations, natural gas grew short in supply and the domestic oil industry no longer had the capacity to meet U.S. utility and industrial demands. But in 1970, surface coal mining proved it had not only the reserves but also the capacity to expand and

meet, on short notice, a sharp increase in the demand for energy fuel, as evidenced by the increased production of 50.8 million tons in one year.

The 1970 production of surface-mined coal not only contributed substantially in assuring an adequate supply of coal for consumption by the electric utilities, but was also a major factor in enabling the utilities to rebuild coal stock-piles from a low of 49.5 million tons (58 days' supply) on March 31, 1970 to 71.3 million (75 days' supply) on December 31, 1970, as reported by the U.S. Bureau of Mines.

In 1970, 331.4 million tons, or 55 percent, of total 1970 coal production was shipped to U.S. electric utilities. Coal accounted for 46.4 percent of the total kilowatt-hours of electricity produced by U.S. electric utilities from all fuels and hydropower, as reported by the Federal Power Commission. Excluding hydropower, coal generated 55.3 percent of the kilowatt-hours of electricity produced by the utilities from all fuels. Surface-mined coal accounted for a major share of utility shipments.

Some 75 percent, or 198 million tons, of the 1970 surface-mined production of bituminous coal was shipped to U.S. electric utilities. These shipments amounted to 59.8 percent of the total bituminous coal and lignite tonnages shipped to the utilities in 1970.

The significance of the surface-mined coal sent to the utilities in 1970 is further evidenced in the following examples:

Strip-Mined Coal

(1) The estimated 198 million tons of surface-mined coal shipped to U.S. electric utilities in 1970 represents the equivalent of 431.8 billion kilowatt-hours of electricity. These 431.8 potential billion kilowatt-hours would amount to:

a. 28.2 percent of the total electric energy production of 1,529.6 billion kilowatt-hours produced in 1970.

b. 34.3 percent of the 1,259.5 billion kilowatt-hours produced by fossil fuels (excluding hydro and nuclear power).

c. 33.7 percent of the 1,282.3 billion kilowatt-hours produced by all fuels, including nuclear power, but excluding hydropower.

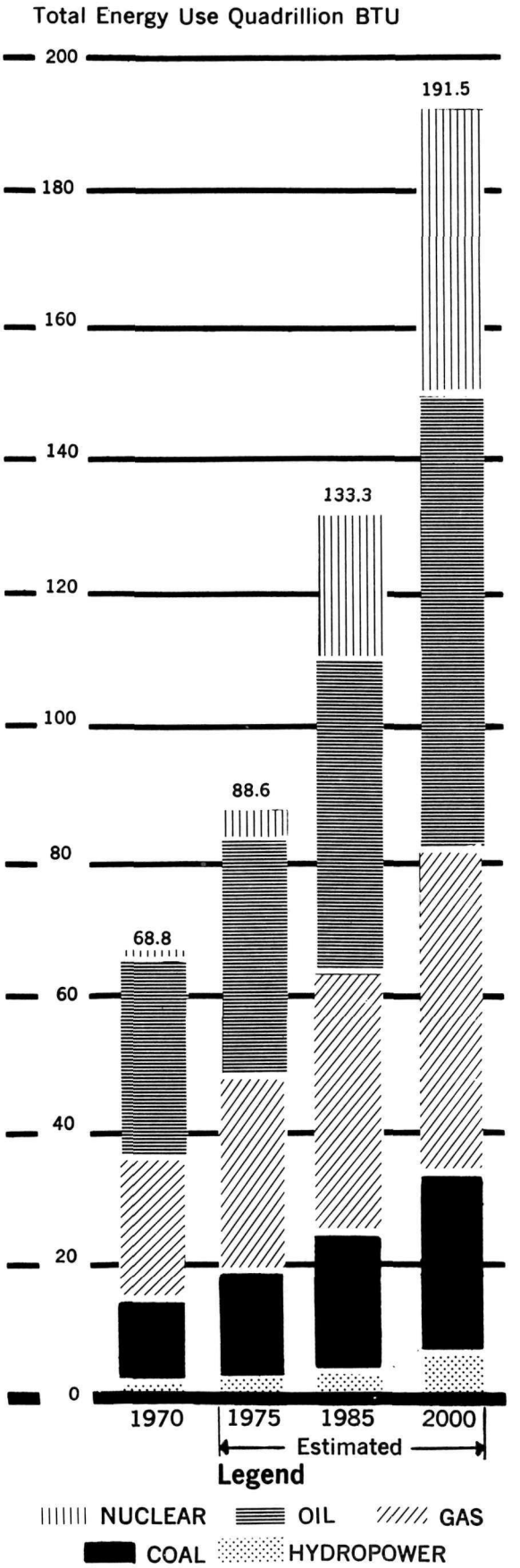
(2) The 431.8 potential billion kilowatt-hours generated from surface-mined coal closely approximates the total of 453.8 billion kilowatt-hours produced in 1970 in the New England, South Atlantic and East South Central Census Regions (18 states and the District of Columbia).

(3) The 431.8 potential billion kilowatt-hours generated from surface-mined coal would equal the output of some 62 nuclear generation plants of 1,000 MW capacity each, operating at 80 percent of plant capacity.

Any major curtailment of surface-mined coal production would result in not only a certainty of coal shortages but also in chaos in coal marketing and transportation. Additionally, replacement of surface-mined coal by deep-mined coal would require considerable time and money. Moreover, an attempt to replace surface-mined coal with alternative fuels would be fraught with many problems including defense considerations.

It is evident that a substantial increase in imports of foreign oil to replace surface-mined coal production would not only endanger the U.S. defense posture in the event of emergency, but would represent a substantial negative factor in the U.S. balance of payments in international trade. For example, the 264.1 million tons of coal produced at surface mines in 1970 equals 1,006.0

Trends of U. S. Energy Use



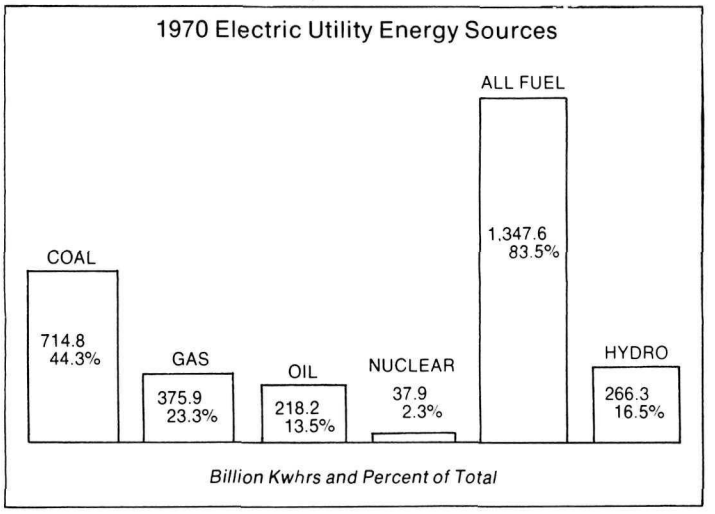
Graph from USDI Conservation Yearbook Series, Number 8, 1972

million barrels[1] of imported heavy fuel oil valued at over $3 billion, on an estimated 1971 basis of $3 per barrel.

If surface mine production were to be replaced by under-ground production, 264 deep mines of one million tons capacity each would be required. The capitalization cost of 264 deep mines would range from $3.2 billion to $3.7 billion ($12 to $14 per ton of annual capacity). Furthermore, it requires from 3 to 5 years for a new deep mine to reach full production.

In 1970, the 264.1 million tons of surface-mined coal was produced by 24,800 mine workers (excluding mill workers), according to preliminary data from the Office of Accident Analysis, Bureau of Mines. The production of a like quantity of coal at deep mines would require a force of some 78,358 miners (excluding mill workers), as estimated by NCA.

On a 1970 basis, the estimated wages and salaries (including vacation and holiday pay) of mine production workers (including supervisors and on-site office workers, but excluding mill workers) required to produce 264.1 million tons of coal would be $745 million from deep mines contrasted with $248 million from surface mines.



Energy Sources for 1970 Energy Utility Power Generation

(Billion Kwhrs)

	COAL	GAS	OIL	NUCLEAR	TOTAL FUEL[1]	HYDRO	TOTAL
	714.8	375.9	218.2	37.9	1,347.6	266.3	1,613.9
% of Total:	44.3	23.3	13.5	2.3	83.5	16.5	100.0
% of Total Fuel:	53.0	27.9	16.2	2.8	100.0		

[1]*Includes 1.0 billion kwhrs (0.1%) production from geothermal sources and wood and waste*
NOTE Totals may not add due to rounding
SOURCE Basic data from FPC News Release No. 17372, March 18, 1971.

On the basis of these comparative costs, it would have cost an additional $497 million just in wages and salaries to produce the 264.1 million tons at deep mines. This would represent an additional cost of $1.88 per ton in wages and salaries alone. Additional costs at deep mines, such as capital needed for openings and recruiting and training expenses would further increase the per ton cost of producing the 264.1 million tons at deep mines.

An additional complication in replacing surface-mined production with deep-mined production would be acquiring sufficient blocks of coal reserves to supply 264 new deep mines. There is an inherently greater rate of recovery of coal resources at strip mines than at deep mines. Official government sources[2] show the recoverability of coal resources at strip mines is 80 or 90 percent as compared with a recovery of approximately 50 percent at deep and auger mines. Therefore, deep mines would require some 60 percent more tons of coal in place than those required by surface mines to produce like tonnages. For example, deep-mined coal production of 264.1 million tons would require some 528 million tons of coal resources, whereas a like production at surface mines would require only 330 million tons. Therefore, without regard to rank of coal, the cost of coal resources required to produce 264.1 million tons of coal would be substantially greater at deep mines than at surface mines.

A study recently released by the Bureau of Mines[3] shows there was an estimated remaining strippable resource (based on defined limits of seam thickness and depth of over-burden) of 119 billion tons of bituminous coal and lignite in the United States as of January 1, 1968. Because of certain topographical and man-made limitations, only 45 billion tons of this resource are actually recoverable through existing technology and available at 1969 prices.

Of the 45 billion tons 31.8 billion tons, or 70.6 percent, are considered low-sulfur (less than one percent); 4.0 billion tons, or 9.0 percent, are medium-sulfur (1 to 2 percent); and 9.2 billion tons, or 20.4 percent, are high-sulfur (over 2 percent).

After allowance for cleaning, the 45 billion tons of strippable coal reserves are reduced to 39.6 billion tons of marketable coal as shown in the Bureau of Mines study. We estimate that, without regard to rank of coal, the total 39.6 billion tons would supply U.S. electric utility coal demand for over 100 years, at the current annual consumption rate of some 340 million tons.

In light of these facts, it is readily evident that any curtailment of coal surface mining would have a serious detrimental effect on the general U.S. energy sector and especially on electric power generation both now and in the future.

[1]Computed by National Coal Association on the basis of 24.0 million BTU per ton of coal and 6.3 million BTU per barrel of oil.

[2]"Coal Resources of the United States, January 1, 1967 (Geological Survey Bulletin 1275)" and "The Reserves of Bituminous Coal and Lignite in the United States (by staff, U.S. Bureau of Mines)." Later report updated and on open file at BOM.

[3]"The Reserves of Bituminous Coal and Lignite for Strip Mining in the United States (by staff, Bureau of Mines)." Report on open file at BOM.

Use of cemeteries as open space is not a new idea in the United Kingdom. Most cities in Britain are presently integrating old burial grounds into redevelopment programs without exhumation, although almost always with the removal of monuments.

The Gorbals Burial Ground in Glasgow, for example, was converted into a rest garden with play lawn for mothers and young children in the center of a modern housing development. The Greater London Council is converting the derelict 27-acre Tower Hamlets Cemetery in East London (see photos on page 2 and below) to public open space for passive recreation in an established woodland setting.

Since any action affecting cemeteries in London is the responsibility of the local council, the London Boroughs Association is examining problems and possibilities offered by burial grounds in that city, while the National Playing Fields Association of London is encouraging local authorities to use former burial grounds as playgrounds. The Association recommends that small grounds up to about an acre be used as tennis or basketball courts and that larger cemeteries provide space for football or cricket.

Photo by Harold King, Ltd.

Trends

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