

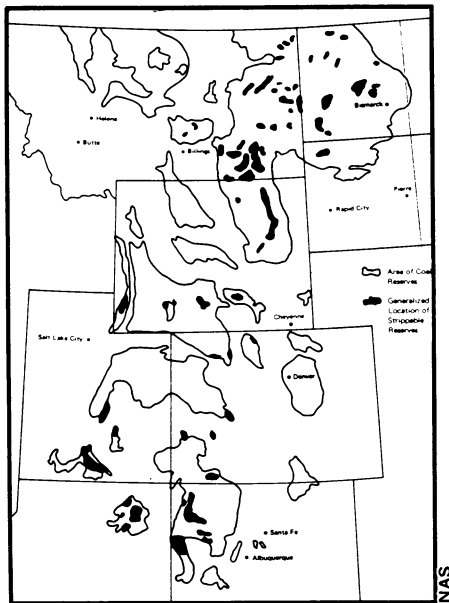
## Restoring the face of the land

Much of the land covering rich deposits of coal in the western United States need not be permanently scarred by strip mining. Much of it can be successfully reclaimed, a National Academy of Sciences committee reports, but the chances for success will depend on the geography of the land and the intensity of the national commitment to reclamation efforts. An NAS study committee on the potential for rehabilitating surface-mined land submitted its final report to the Energy Policy Project of the Ford Foundation this week, and held a news conference in Washington. The report stresses the problem of protecting the fragile ecosystems of arid western lands and suggests strong policy measures for ensuring completion of reclamation projects.

The report concludes that about 140 square miles of land surface would be disturbed by surface mining by 1990 and about 300 square miles by the year 2000. This amount, although large, is considered conservative by some. But it is still less than the total amount of eastern U.S. land surface already disturbed by strip mining, says committee member Thadis W. Box, dean of the Utah State University College of Natural Resources. Before any western coal is mined, the committee recommends, complete rehabilitation plans as part of the industry's environmental impact statement should be submitted to a non-industry monitoring and evaluation group. State and Federal laws, "vigorously enforced," would be needed to insure continuing reclamation efforts, Box says. Minimum Federal standards governing rehabilitation should be promptly established.

The potential for reclamation (the reestablishment of a stable ecosystem as close as possible to the original) varies with the geography of the land. Desert areas have very low chance of being reclaimed, and the chances are poor for sagebrush foothill regions. Only mixed grasslands and areas of pine and mountain brush stand a good chance of being reclaimed, and this terrain covers about 66 percent of the coal deposits.

Although the original charge of the committee was to study only the reclamation potentials, the committee, says Box, "went beyond that and studied the water supply problems" that might result from large-scale strip mining. Water will be the main limiting source in western fuel production, the committee predicts, but existing data on the availability, price and transportation of water is practically nonexistent. It reports that enough water is available but



Stripable coal deposits in the West.

probably would need to be transported to the specific mining sites. Not enough water exists, however, for large scale conversion of coal to electric power at the site of the mines.

The question remains, will industry, government and the public be committed enough to land reclamation to prevent permanent disruption of western ecosystems? The costs, Box says, should not be prohibitive, only "mills or pennies per ton of coal." And although history has not shown an enthusiastic or vigilant commitment to land reclamation, the committee sees little choice for the future. One member, M. Gordon Wolman of Johns Hopkins University, says, "The real issue is whether to handle it in this manner or not to at all. Only through programs at the state and Federal level, can reclamation be dealt with in a rational way." □

## Diagnosing severe heart attacks

An acute myocardial infarction—a severe heart attack—consists of an abrupt obstruction of the flow of blood to heart tissue, resulting in the death of that tissue. To save the lives of patients who suffer an acute heart attack, physicians need to determine the extent of heart damage as quickly and accurately as possible. Symptoms can be misleading. Two-thirds of patients who complain of chest pain are subsequently found not to have suffered an acute infarct. Conversely, patients who suffer an acute heart attack often do not show the classic electrocardiographic changes early in the course of their disease. In recent years investigators have learned that one or several enzymes often rise

in the blood of patients before an acute heart attack. But, again, not always.

A diagnostic test that promises to supplement if not supersede existing tests for acute heart attacks is now reported in the June 3 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* by Harry J. Saranchak and Stanley H. Bernstein of the Mount Sinai Hospital in Hartford, Conn. It consists of measuring the protein myoglobin in the urine of patients with a technique called radial immunodiffusion assay. Myoglobin is a normal constituent of heart muscle. It ends up in the blood and urine after heart damage. The test can be easily adapted to the coronary care unit, the emergency room and even the bedside, they claim.

Using the technique, the Connecticut physicians found that urine myoglobin markedly increased in 59 of 60 patients with acute myocardial infarction. The level of urinary myoglobin determined by this technique exceeded 5 milligrams per 100 milliliters for patients who had suffered infarcts. Higher levels were associated with more massive infarction. In one third of the patients studied, myoglobin in the urine preceded enzyme rises in the blood and electrocardiographic changes that indicate acute heart attacks. When chest pain was associated with congestive heart failure without infarct, no myoglobin in the urine was recorded. □

## Signaling the muscles

Electrical stimulation of biological organs has come a long way since Luigi Galvani first shocked a frog's leg into movement. Lawrence R. Pinner and his associates at the Stanford Research Institute are using a computer to produce motor functions by electrical stimulation of the brain (ESB). First, areas of the brain are located that are related to elementary movements. Electrodes are implanted in these areas and linked to a computer that is programmed to fire them in sequence to produce useful motions. Such programs have so far enabled a monkey to reach for and bring food to its mouth, to extend its arm for climbing and to scratch its back. Such technology, the researchers feel, will eventually restore movement to human stroke victims. □

