

earth are impossible, its designers say, and Apollo 9 provided only self-tests, in which electronic signals simulating speed and distance information were fed into the radar's analytic circuitry.

Even moonbound Apollo 10, in which the LM will descend to within 50,000 feet of the lunar surface while the command module waits in orbit 60 miles up, will provide only a rough evaluation. The landing radar is designed to report accurate height data from only about 25,000 feet on down, and velocity from about 18,000. Thus, no one will know how good the landing radar is until the LM actually has to use it to land.

Apollo 10 is still scheduled for May 17, first day of that month's launch window, with Apollo 11, the first manned lunar landing mission, aimed at July 15. Apollo 10 is physically incapable of being used for a lunar landing, largely because of the weight of its lunar module ascent stage (SN: 3/1, p. 218), although the minute, and extremely under-doggish possibility exists that Apollo 10 could simply be pushed out of the line-up by an early Apollo 11. This would bank everything, however, on Spider's one manned trial last week. Successful as this was, many high officials in the National Aeronautics and Space Administration feel that the vehicle's complexity and troubled past warrant a second try-out. The decision is due this week or next.

One strong argument in favor of orbiting the moon with Apollo 10 is the chance to study the changes caused in spacecraft orbits, particularly low ones, by varying mass concentrations beneath the lunar surface. These irregularities caused the roundness of Apollo 8's lunar orbit to change by more than five miles, as well as making it lag as much as three miles behind and almost half a mile above or below where computers on earth predicted it would be. Mission planners want to be able to predict at least two orbits in advance exactly where the LM will be when it must start its descent to the surface, so any variations due to the mass concentrations are undesirable, and possibly dangerous.

Apollo 8 astronauts took altitude measurements with both a telescope and a sextant during their 20 hours in lunar orbit, and the two kinds of measurements did not agree. Thus, faced also with the untried landing radar, officials have double grounds for concern about accurate orbital computation. Flight Operations Director Christopher Kraft Jr. has even proposed that Apollo 10's stay-time in lunar orbit be increased from about a day, similar to Apollo 8, to as long as 63 hours to gather more data on orbital perturbations caused by the mass concentrations. ◇

MINE SAFETY

A pair of bills, a brace of problems

Although most mining deaths come from unspectacular mishaps or occupational disease, it usually takes a disaster to get Congress to pass major coal mine legislation. Miners had to lose their lives in an explosion in Centralia, Ill., in 1947 and more had to die in 1951 in West Frankfort, Ill., before the 1952 Federal Coal Mine Safety Act was enacted. It is still the chief legislation regulating coal mine operations. Out of the deaths of 78 miners last November near Farmington, W. Va., will come a new coal mine safety act (SN: 12/7, p. 568).

Bills from both the Nixon and Johnson Administrations are working in the Congress. A tally by Senator Jennings Randolph (D-W.Va.) at a Senate subcommittee hearing last week showed agreement between the Johnson bill, which he introduced last year, and the Nixon bill, on about 16 provisions out of 23.

Most significantly, both bills would vest authority in the Secretary of the Interior to set mandatory health and safety standards. Under the 1952 act this authority belongs to Congress. But to Interior Secretary Walter J. Hickel and others, Congressional decree is an inefficient and cumbersome method to bring about needed health and safety measures in the ever-changing coal industry.

Hickel points out that many suggested revisions have not been enacted because the authority rests with Congress. "It is not practicable," he says, "to expect Congress to enact specific and detailed health and safety standards. The fact that Congress has changed the coal mine safety standards only three times in the last 30 years demonstrates the inadequacy of the legislative route for establishing mine health and safety standards. We must allow sufficient flexibility in the setting of standards so that new technology can be utilized for the benefit of the miners."

In what seems like a case of strange bedfellows, the coal industry and the United Mine Workers of America oppose the transfer of power. The UMW, preferring to work through Congress as in the past, feels that such a transfer could be used to weaken as well as strengthen safety requirements. Representative Ken Hechler (D-W. Va.) has accused the UMW of dragging its feet in the area of mine safety. "Loud talk in public," says Hechler, "cannot cover up the private conspiracy with management which has resulted in high wages, high production, high accident rates, high level of coal dust and high inci-



United Mine Workers Journal

Dr. Goldman: coal and black lung.

dences of black lung." Hechler has been a focus for corrective action.

It is the problem of black lung which constitutes the major difference between the Nixon and Johnson Administration bills. Black lung disease (coal pneumoconiosis) afflicts 125,000 U.S. miners (SN: 6/3/67, p. 521). As described by Dr. I. E. Buff, a Charleston, W. Va., physician who has worked closely with miners and who was a leader in the fight to get workmen's compensation for black lung in the state, coal dust collects around the small arteries of the lungs, eventually choking them off.

The constrictions, make breathing difficult by depriving the lungs of blood and therefore causing lung cells to die. This produces a back pressure on the heart, which is working overtime to bring in oxygen to compensate for the lung tissue that has died. At the same time, carbon dioxide build-up poisons the body. The end results range from heart attack to emphysema to general deterioration of the body.

Additional evidence on black lung was presented by Dr. Joel Goldman of the UMW-supported clinic in Centerville, Pa.

According to Dr. Buff, in practice the compensation laws of the three other states that have them—21 mining states do not—are inadequate because the states presume a miner not to have black lung, and he must prove otherwise. About 80 to 90 percent of the cases of the disease will not show up on the typical X-ray demanded by the states for the miners to be compensated. Even West Virginia's new law, the result of a wildcat strike, is considered an unsatisfactory compromise by the miners because of insufficient medical benefits and restrictive requirements.

The major issue between the Nixon

and Johnson bills is the permissible level of coal dust in a mine. The Johnson bill calls for a standard of 3.0 milligrams of coal dust per cubic meter of air, a figure recommended by the U.S. Public Health Service based on research in England, where it was found that at 3.0 milligrams there was a significant reduction in the incidence of black lung; at 4.5 milligrams there was an increase found for each added milligram. The Nixon Administration bill calls for the 4.5 standard to be reached six months after the bill becomes law and 3.0 as soon as possible. The Johnson bill also sets no specific date for its 3.0 standard to be reached.

The U.S. Bureau of Mines feels that with existing technology, the 3.0 standard is not feasible for all mines, whereas 4.5 is. According to Dr. John Holtz, acting research director for the Health and Safety Research and Testing Center of the bureau in Pittsburgh, the more advanced the technology a mine has, the greater its dust problem. Modern mines with continuous mining machines using high-speed drills grind out more coal dust than those mines with slower equipment that bites off large chunks of coal.

Dr. Holtz feels that 4.5 is easily attainable with present equipment in the larger mines: "I personally feel that if we get in there and carry out practices properly, 4.5 is not an unreasonable figure. The 4.5 could be met today, but 3.0 could not."

Abatement procedures consist of ventilation and damping down the dust by water sprays. Added wetting agents, such as alcohols, cause water to spread more easily over a surface and therefore could assist in holding down dust levels, but few mines employ them.

For the future, the bureau is looking into different types of cutting bits to give larger lumps of coal. Slower machines or slower bits are another answer, but they are not likely. The number of coal mines is decreasing; the remaining mines will have to speed production rather than slow it.

Of the 25 major coal mining states, only four—Pennsylvania, Virginia, Alabama and now West Virginia—have workmen's compensation laws for black lung. Preferring to regard this matter as one between the states and industry, neither the Johnson or Nixon bills provides or requires the states to compensate miners who have been disabled by the disease.

The present Administration's bill is in many respects the more comprehensive. It involves providing standards and requirements for such things as underground shelters, illumination and communications as well as a new section on electrical equipment.

Both bills are actually dual bills, en-

compassing both health and safety. The UMW has presented two separate bills. Explains president W. A. Boyle, "We are fearful that combining of these two basic questions could very well cause a weakened bill to be voted upon and also could conceivably result in no bill at all."

Secretary Hickel was emphatic about that point when he told the Congress: "Let me at this point make this Administration's position very clear on the subject of a single health and safety bill versus two bills—one on health and one on safety. We recommend and strongly

urge one bill covering both subjects. The health and safety of the coal miners are so closely interwoven that it is inappropriate to even contemplate their consideration as separate issues. Miners are dying from accidents in the mines and from occupationally caused disease. In our opinion, those who oppose health legislation are the same people who oppose safety legislation. We firmly believe that the Congress, like the Executive Branch, can consider the subjects simultaneously, one bill covering health and safety. We urge you to do so."

TUBERCULOSIS

Problem-child of alcoholism

People in the upper socio-economic levels of society have thought for years that tuberculosis was a thing of the past. Early treatment with powerful drugs has reduced the number of deaths, but there are still about 350 hospitals in the United States with more than 30,000 beds occupied by TB patients in any one year.

And 22 percent of all these patients are alcoholics.

They are the derelicts who, in every city, live their lives as bed brothers of all kinds of germs and are easy prey to TB. When and if they get cleaned up in a hospital they are problem patients. They tend to go home too soon in spite of doctors' advice, and although they are given prescriptions they are often too intoxicated to remember to take their drugs.

The problem of the hospitalized tuberculous alcoholic "has been of considerable interest since the early 1950's," a team of researchers at the University of Washington in Seattle points out.

Dr. Robert J. Rhodes, now of the Neuropsychiatric Institute of the University of California at Los Angeles Center for the Health Sciences, and his co-workers, sent questionnaires to all hospitals and sanatoria having more than 20 beds.

Ninety hospitals reported that alcoholism greatly complicated the effectiveness of tuberculosis treatment. Eighty-eight said it was a moderate problem and 56 indicated that it was minimal. Only 19 reported that alcoholism was not a problem. This 19 held the fewest number of alcoholics.

The major problem was the high rate of discharge against medical advice and absence without leave, reported by 62 percent of the hospitals polled. Fifty-eight percent of the alcoholic patients posed a disciplinary problem; 53 percent had a higher readmission rate than nonalcoholic patients; 39 percent had a longer hospital stay and 33 percent were uncooperative patients.



Sartwell

Tuberculosis is a skid-row problem.

Dr. Rhodes worked in another study which deals with tuberculous skid-row alcoholics. The findings indicate that it is mainly in the lower socio-economic group that the combination of diseases is found. Those with both problems have higher relapse and lower recovery rates than those who have one or the other disease alone.

These studies are borne out by Dr. Julia Jones, who is head of chest-disease treatment at Harlem Hospital. She finds that few alcoholics among the educated and higher-economic group have tuberculosis because they have not been exposed to infection in the same way their poorer brothers-in-booze have been.

Poor nutrition often exists among alcoholics, and the skid-row types are exposed to all possible germs. Further studies might reveal a tendency among alcoholics to a combination of infectious diseases other than TB.

It has been pointed out that the chief way doctors learn to treat alcoholics is in hospitals. However, alcoholics are still being turned away from most hospitals, and medical schools ignore alcoholism.