aimed at cutting the estimated 20 percent administrative overhead on welfare programs. Even so, the price tag could be as high as $5 billion a year.

"If we get a national standard now," says Prof. Piven, "it will make life a little easier for those who have stayed in the South, many of whom are old or sick, but it won't affect migration much."

Prof. Piven believes that there is now enormous pressure on the financial structures of northern cities and states in welfare expenditures, and that the Federal Government will have to relieve them in some way. Mike Monroe, assistant to Presidential urban affairs adviser Daniel Patrick Moynihan, acknowledges that the problem is under intense study. "I expect some pretty dramatic developments in the next couple of weeks," he says. ◇

HALOTHANE

Side effects again

The once controversial anesthetic, halothane, is back in trouble again.

It has been popular because it is nonexplosive, allows easy control of consciousness during an operation and induces little nausea in the wakened patient.

Because it is chemically similar to dangerous substances such as chloroform and carbon tetrachloride, halothane has been carefully scrutinized for dangerous side effects.

After a massive study by the National Academy of Sciences examined 856,000 patients in 34 hospitals over a four-year period, the anesthetic was pronounced safe.

Now, however, new evidence—including the illnesses of an anesthetist—throws doubt on the substance. In a few patients halothane damages the liver.

The anesthetist, who suffered from hepatitis whenever he gave the anesthetic, is a 44-year-old physician with a history of hay fever and asthma. After repeated admissions to Columbia-Presbyterian Medical Center, he was referred to Yale-New Haven Hospital for investigation, and a second examination revealed cirrhosis of the liver. After changing jobs to a hospital where it would not be necessary to administer halothane, he no longer became ill.

Physicians say his hepatitis attacks were attributable to hypersensitivity. His history of allergy before he became an anesthetist may have possible importance. Each time he was at home or hospitalized, the hepatitis cleared.

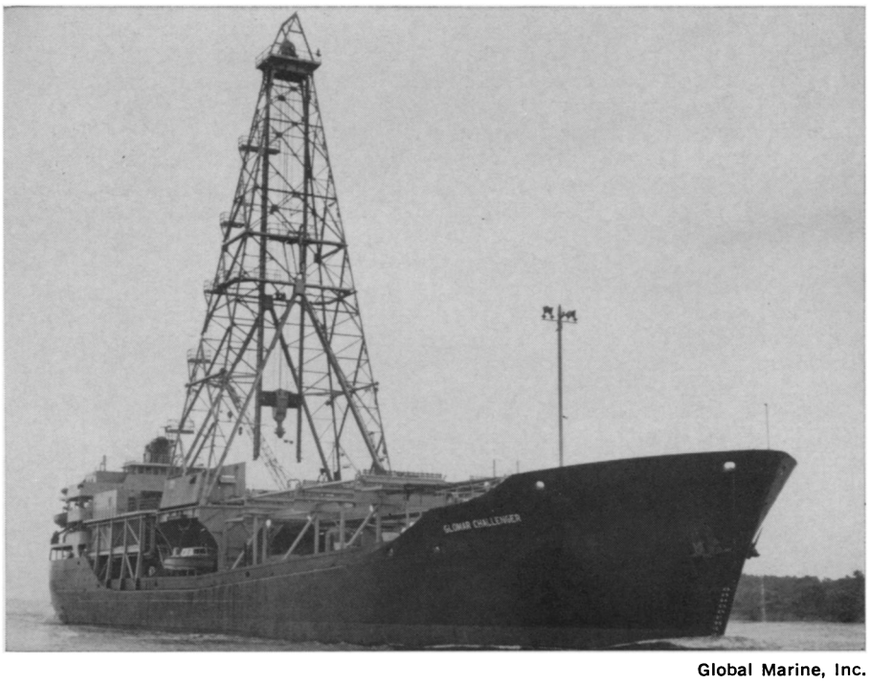
Drs. Gerald Klatskin of the Yale University School of Medicine and Daniel V. Kimberg of Columbia University College of Physicians and Surgeons report in a recent issue of the NEW ENGLAND JOURNAL OF MEDICINE that "additional strong evidence that halothane induces liver damage is provided by reports in the literature of at least eight cases in which recurrent episodes of jaundice have appeared after separate exposures to halothane."

The researchers say the current status of halothane liver damage has gone beyond the question of whether it exists. "It is now necessary to obtain information about the frequency of this complication" and its overall contribution to post-operative illness and death. They believe liver damage is undoubtedly higher than published mortality figures indicate.

Drs. Klatskin and Kimberg point out that danger from an occasional exposure to halothane may not be limited to anesthetists but may include surgeons, other operating room personnel and industrial workers who manufacture and package the anesthetic.

CONTINENTAL DRIFT

Time for a theory



Global Marine, Inc.

The Glomar Challenger: Evidence of sea-floor spreading from deep drilling.

Hypotheses of a continental drift were first put forward 50 years ago by scientists who noticed how well certain continents would fit together. They got some support from paleontology, which found fossils of the same animals in different continents (SN: 3/23, p. 280), and from geology, which found structures and mineral deposits on different continents that fitted together like lines in a jigsaw puzzle.

But the idea went into disfavor because it was hard to imagine what would generate the large forces that would cause such motion. Another objection was that if such large forces were operating within the earth, they would have damped the earth's rotation and brought it to a stop by now.

The forces are still hard to imagine, and this appears to be an area that needs extensive study. Nevertheless, the evidence that the motion is going on is building up to convincing levels.

It is time for hypotheses of sea floor spreading, continental drift and plate tectonics to be acceped as a basic theoretical model in geophysics, says Dr. Lynn R. Sykes of Lamont-Doherty Geological Observatory. He finds it as well established today as continental glaciation was in the 19th century when it was accepted.

The theory of continental drift was once very highly debated, he says, "but we now have a great deal of evidence from several disciplines, and we are beginning to have a fairly complete picture of major displacements on a global scale."

Until recently, Dr. Sykes feels, geophysicists were in a data-gathering stage, trying to sort out what was happening from masses of measurements. Now, he says, a model is emerging, a model that can and should be used to make predictions, even possibly predictions of earthquake activity.

Nowadays people generally use the term plate tectonics to describe the

general model. It proposes that the surface of the earth is divided into a number of plates that float on some viscous underlayer and move around and grind against each other like ice floes in a river. The continents form part of the plates and move with them.

Until just recently hypotheses of sea floor spreading rested mainly on evidence based on the magnetism of ancient rocks. Magnetic elements in liquid rocks take on the orientation of the earth's field, and when the rocks solidify, this orientation is frozen in. Since the earth's magnetic field changes from time to time, magnetic orientations can be used to date the rocks.

Studies of this kind give evidence that sea floor rocks near the edges of the Atlantic, for example, are older than those near the mid-Atlantic Ridge.

To these data Dr. Arthur Maxwell of the Woods Hole Oceanographic Institution now adds evidence from deep sea drilling, and Dr. Sykes brings in evidence from seismological studies. Both reported to the American Geophysical Union annual meeting in Washington (see page 454).

Dr. Maxwell did a study of ocean bottom cores drilled up by the research ship Glomar Challenger (SN: 3/22, p. 285). On a course that ran roughly from Luanda in Africa to Rio de Janeiro in South America, Challenger made a series of seven cores that crossed the mid-Atlantic Ridge and ran nearly to the coast on the west side of it.

"This is the first time we were able to drill to basement rock over such a series," says Dr. Maxwell. This allowed the scientists to compare the sediments that lay just on top of the base rock in each hole. Dating showed that the lowest sediments grow progressively older the farther from the ridge the hole happens to be.

The relation between age and distance came out to be a direct proportion, and this leads to the conclusion that the rate of spreading has been uniform. Dr. Maxwell and his co-workers deduce a spreading rate of two centimeters per year. They give 150 million years ago as the date when South America and Africa split apart.

Since the kind of sediment that appears also depends on the depth of the water at the time it was laid down, the study also shows that the floor of the ocean has gone up and down by as much as 2,000 meters during this period. The ocean floor appears to breathe, to use Dr. Maxwell's word.

Much of Dr. Sykes's evidence deals with the Pacific area. Here, unlike in the Atlantic, the plate boundary is on the eastern edge of the ocean; the San Andreas fault in California forms part of it.

The theory predicts that at the boundaries between plates there will be a large amount of earthquake activity because there is relative motion and rubbing and crunching. And the earth's major seismic zones are used to delineate the boundaries. Studying the lateral motion of the earth in earthquakes, Dr. Sykes and co-workers find a confirmation of the motion predicted by the theory. "We can say with fairly good certainty that there are blocks of earth moving around at rates of 5 to 15 centimeters a year," he says.

This remark does not conflict with Dr. Maxwell's two centimeters for the South Atlantic; Dr. Sykes's figures do not apply to that area.

An important point, says Dr. Sykes, is that "for most seismic zones we now have estimates of the rate of motion for the first time." Such information may be useful in predicting earthquakes, he suggests.

Important also is the effect of plate tectonics on geophysics as a discipline. The study unites many different subfields, such as seismology, volcanology, deep sea drilling and others. In the recent past these fields had been drawing apart as each pursued its own chief interests. "Now they are beginning to come back together," says Dr. Sykes.

TRANSPLANTS

Part of a whole eye

After an attempted cornea transplant failed, ophthalmologists in Houston, Tex., tried a more daring experiment to restore the vision of 54-year-old John Madden (SN: 5/3, p. 426).

According to a member of the operating team of Dr. Conrad D. Moore, they transplanted an entire eye from a donor who had died of a brain tumor, in the hope that some of the nerves of the donor eye would unite with Madden's nerves. That turns out not to be the case.

After the operation, and in the wake of his colleagues' outraged declarations that the optic nerve-keystone of such an operation could not regenerate itself, Dr. Moore qualified the initial report. He announced that only the front part of the donor's eye had been transplanted; the back portion of Madden's eye, including the optic nerve and part of the retina, had been preserved. This would avoid the necessity of connecting the nerves of the donor eye with the brain of the recipient.

Dr. Moore did not say how much of Madden's retina was left intact. How much of the donor eye's retina was transplanted also was not announced.

The success of the operation was still in doubt last week. The patient's eyelids were sewn together for three weeks to prevent infection.

TECHNOLOGY vs. ENVIRONMENT

Battling governmental torpor

Muskie: No way out yet.

It has been two years since a pair of proposals was placed before the Congress proposing the establishment of review panels to monitor the effects on the environment of advances in science and technology. One came from Sen. Edmund S. Muskie (D-Me.), whose concern grew out of his experience as chairman of the Senate subcommittee on environmental pollution. The other was introduced by Rep. Emilio Q. Daddario (D-Conn.), chairman of the House research subcommittee.

Daddario is still awaiting final reports from three separate surveys of the problem being done for him by the Science Policy Research Division of the Library of Congress.

Muskie is holding new hearings, in an effort to find a focus around which action can be organized.

"The torpor of Government at all levels, to put no stronger name on it, . . . will be a black chapter in the history books," Dean W. H. Ferry, vice president of the Center for the Study of Democratic Institutions, declared during the first of the new round of Muskie hearings. And his testimonial gloom was echoed by other scientists, including Dr. Barry Commoner of Washington University in St. Louis, who accused the nation of misspending its biological capital.

Dean Ferry, Dr. Commoner and other witnesses before the Muskie committee were in general support of the need for some kind of powerful Federal organization to work with the scientific community in tempering technological advance with ecological concern.

Nevertheless, there seemed to be general agreement as well that the problem is so great, the ground so new and the available solutions so drastic, that it may be another two years—or more—before anyone can come to grips with it.