

as Dr. Benson believes is more likely, the Gulf is the first known example of a large section of earth's crust falling so far. "The bottom really dropped out," he says.

After such momentous findings only one percent of its way into its journey, the Challenger headed east of San Salvador in the Bahamas, where bottom samples delivered a mild blow to the increasingly popular theory of continental drift by sea floor spreading.

According to the theory, heat currents in earth's mantle force material up at the mid-oceanic ridges, from which it moves outward on either side. The oldest sediments thus would be those furthest from the ridges, since they would have had the most time to spread. By figuring backwards, scientists had come to the general conclusion that the spreading began between 100 million and 125 million years ago, before which the continents were joined together.

Sediments brought up by the Challenger, however, reveal that there has been deep ocean around the Bahamas for 150 million years or more. The likelihood is that the complicated estimation of the age of the continental split is inaccurate — "You hope you're within 100 percent on calculations like that," says one NSF scientist—but the ancient sediments could mean that the continental drift idea needs readjusting.

From San Salvador, the next stop was the Bermuda Rise, an area about 600 miles wide and 900 miles long on the route north to the Challenger's first landfall and resupply stop in Hoboken, N.J. The rise was the last major scientific drilling site in the first of the nine legs of the journey, and it was there that the researchers encountered an unsuspected problem that could plague them repeatedly during their 40,000-mile journey—and plague future seabottom drillers as well.

Turbidites, sediments deposited by turbidity currents, were previously thought to be relatively common on ocean floor rises but much less so in the deep ocean. To their surprise, the Challenger scientists found the turbidites to be almost equal in volume with the finer, ordinary sediments, and to include several layers of hardened chert (amorphous silica) and limestone which played havoc with their drill bits. One bit, which had successfully ground through several hundred feet of lava on land, was so badly mangled that it could not even be refitted with new diamond cutting points to salvage it. If the Challenger's indications hold true, such layers, impeding the way to deeper sediments, could be found almost anywhere in the oceans.

Last week the Challenger sailed for Dakar, Senegal, on the second leg of its journey.

SYPHILIS

Epidemic in rural Mississippi

Syphilis rates tend to be high in cities, and constant surveillance is needed to keep the disease under control. Rural epidemics are rare, so when the number of reported cases in a northwest Mississippi county rose from six in 1967 to more than 90 in the first nine months of this year, an alarm went out to the National Communicable Disease Center in Atlanta.

Both whites and Negroes are spreading the disease. One explanation, according to Dr. Durward L. Blakey of the state health department, is that though Coahoma County is largely agricultural, with more mechanization in farming, workers travel back and forth to Memphis and other cities for temporary jobs, thus spreading infection from urban pools.

Another reason for the increase is that more teenagers are becoming infected. The ages of contacts in Coahoma and adjoining counties range from 13 to 86, but 20 percent are teenagers. It is hard to deal with teenage contacts; educational programs in the schools are being set up in hope of preventing initial infections.

Coahoma County, Miss., does not have funds for a full-time health officer. Dr. Blakey of the state health department drives over from Jackson every two weeks to catch up on the accumulation of work referred to him as acting county health officer.

"The lack of funds for personnel is not confined to Mississippi," Dr. Blakey emphasizes. "It is nationwide. People are needed for interviewing suspects and giving blood tests after they are found. Only 35 percent of syphilis patients recognize the symptoms in the early stages. We have received help from NCDC for rounding up contacts and treating infected persons."

Nationwide, says Dr. William J. Brown, chief of the venereal disease branch of NCDC, teenagers and adults under 25 years account for 48 percent of syphilis cases. Those under 20 years of age make up 19 percent.

Despite the epidemic in Coahoma County, national figures show a decline in the past three years. In fiscal 1965 there were 23,250 cases reported; this year the total so far is 20,200.

Penicillin remains effective in the treatment of syphilis, although there is a growing resistance to the antibiotic by the gonorrhea organism. A vaccine for syphilis is being sought but, although the outlook is promising, it will be several years before it is ready for use.

One of the methods for uncovering more syphilis cases is called "cluster

testing." A patient is interviewed to determine his sexual partners and then for persons among his acquaintances who he believes are having the same partners. In one instance, a cluster interview of 285 early infectious syphilis cases brought an additional 153 to treatment.

There is no doubt that venereal disease is seriously under-reported, and that most cases are reported and diagnosed late. Health departments are asking private physicians to report more of their cases. With only 20,200 syphilis cases reported this year, the true number is estimated at about 100,000. One of the problems in reporting is that of homosexuals who fear exposure. Between 12 and 15 percent of reported syphilis cases are among homosexuals.

Gonorrhea is still out of control nationally, with 400,000 cases reported last year, a rise of 25,000 cases over the previous year. Sixty percent of these are under 25 years old and 24 percent are under 20.

"The reason for the greater amount of gonorrhea," Dr. Brown says, "is that we do not have a good test as we do for syphilis. The CDC is at work on a blood test that researchers hope to perfect in the next year.

"Patients are not unwilling to come into a clinic or doctor's office for blood tests, but they will not volunteer for physical examinations, especially women."

PULSARS

Counting the subpulse

The puzzle of the pulsars—what sort of object can account for the extremely regular pulsed radio signals coming from 11 known locations in the sky—may now be even more puzzling. A very short period subpulsation has been discovered superimposed on the main pulsations of two of the objects. A resumption of the search for an optical counterpart is a likely result.

Dr. Frank D. Drake of the Arecibo Ionospheric Observatory of the Cornell-Sydney University Astronomy Center in Puerto Rico reported to a seminar last week at the National Radio Astronomy Observatory in Green Bank, W.Va., that he and Dr. Harold D. Craft Jr., have discovered pulsations of about 10 milliseconds duration superimposed on the one-second fluctuations of two pulsars—AP-2015+28 and CP-1919. (Letters in the designations refer to discovering observatories, A for Arecibo, C for Cambridge; the numbers refer to locations in the heavens.)

The 10-millisecond pulsation is in the range of period that would be expected

from a vibrating neutron star—one of the earliest suggestions as the source of the signals. The problem with the suggestion up to now has been that observed pulsar pulses have been in the one-second range. This is far too long a period for a neutron star—theorists like Drs. Kip Thorne of California Institute of Technology and D. W. Meltzer and John A. Wheeler of Princeton calculate that the size and density of a neutron star would make it vibrate much faster than once a second if it vibrates at all.

Dr. Drake believes that a rotating, pulsating neutron star with a diameter of less than 30 kilometers can account for either of the two pulsars in question.

The neutron stars would be so dense— 4×10^{15} grams per cubic centimeter—that the earth, if equally condensed, would sit in the 300 foot telescope at Green Bank like a scoop of ice cream.

Such a star, which would contain no form of matter but neutrons, would have a temperature of 10 million degrees Kelvin and be radiating energy predominantly in X-rays. But, Dr. Drake believes, something, quite possibly an orbiting satellite, could set the neutron star in vibration.

Searches are now being made for X-ray signals from the pulsar locations by a group at the Naval Research Laboratory under Dr. Herbert Friedman and at American Science and Engineering under Dr. Ricardo Giacconi.

Optical astronomers—as soon as they learn of the discovery of the sub-pulses—are expected to begin looking for light pulses in the 10-millisecond range rather than the one-second range where they have been looking and not finding any. However, if Dr. Drake is right about the neutron stars, the optical observations will uncover nothing at this frequency because neutron stars are not expected to put out light signals.

PERSONNEL CUTS

Shuffle and phase out

For science administrators around the country this is the season of the personnel shuffle, the unfilled job and the trip not taken.

Although no senior scientist, a definition not so much of age as of achievement, is going to be walking the streets looking for work, budget cuts are forcing government laboratories and Federally financed researchers to find every way of cutting corners. At least one agency—the National Institutes of Health—is even asking its grantees for some money back.

Most of the personnel belt tightening, now averaging the replacement of only seven out of 10 who quit or retire,

is being done by normal attrition. Those who leave are replaced by other bodies, although quite often not driver for driver, but driver for secretary, or scientist for secretary.

Further fund curtailment for any individual unit or laboratory comes out of travel and equipment; the latter ranges from non-starts on new instruments to sharpening pencil stubs.

Another approach some agencies are taking is to make their contracts for 18 months, say, instead of the three or four years they would have specified a year and a half ago.

The firing of an estimated 1,900 persons in Naval research installations around the country (SN: 10/5, p. 340) appears to have no counterpart as yet elsewhere in the Government. It was done as part of the Defense Department's effort to trim \$3 billion in non-Vietnam spending to meet Congressional economy demands.

Most of the Navy dismissals will not be effective for at least two months after the employees receive notification; some will take a year to phase out. Selection of the individual to be dismissed is entirely at the discretion of the director of the installation, but the impact on the scientific community will not be either sudden or drastic.

"A ripple, not a wave," was the way one manpower specialist in Washington pegged the situation, stressing at the same time that this does not lessen the hardship of any individual secretary, technician or scientist who has to make a move. Industrial employers in the Washington area, for instance, are delighted to have even this limited source of new employees.

It is, however, a ripple the effects of which will certainly be felt later if the budget squeeze continues. Some scientists argue that even the few doctoral and post-graduate students so far affected by firings or cutbacks are irreparably lost to the universities or the Government, either being absorbed by industry or leaving scientific research permanently.

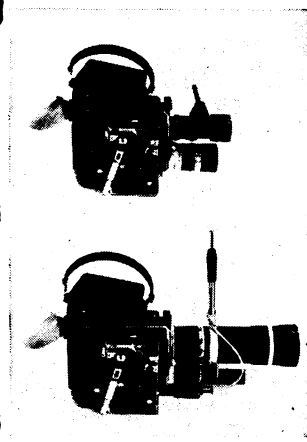
The new Ph.D. will find a job although he may have some difficulty getting exactly what he wants, especially if his goal is basic research for the Government. The graduate student, however, is in a more difficult position.

As an example, take the university professor who has planned his research for five part-time graduate student assistants. Whether the research is in biophysics, supported by NIH, aerodynamics by the space agency, nuclear physics by the Atomic Energy Commission or astronomy by the National Science Foundation, he may now have funds only for four. The student who is eliminated might then drop out of advanced training, never to return.

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