

## PETROLEUM GEOLOGY

### New rules on shelf operations

New regulations governing oil and gas leasing and operations on the United States' outer continental shelf became effective Aug. 22.

They contain strengthened provisions for protection of the environment. Sparked in part by the Santa Barbara oil well leak in January (SN: 2/22, p. 183) the new rules call for full consideration of all environmental factors, including aquatic resources, aesthetics and recreation before leases are put up for sale. Any operation can be suspended if the authorized government supervisor decides it threatens life (including aquatic organisms), property, mineral deposits or the environment.

In case of accident causing pollution, the lessee is responsible for the control and total removal of the pollutant, wherever it is found, at his expense.

Technical requirements for well drilling, casing and cementing have been stiffened, and plans for exploration, drilling and development must be carried out in greater detail than before.

## MAN-IN-SEA

### Divers' speech-garble improved

Engineers at Standard Telecommunication Laboratories in London claim to have solved one of the many serious problems which beset divers—the speech distortion caused by the helium-oxygen mixture they use to avoid nitrogen narcosis problems. Sound travels about twice as quickly in the vocal tract when helium is being used, so that the diver's voice has a peculiar squeaky quality.

By processing the diver's speech signals electronically using a device known as HUSTLE (helium underwater speech translating equipment), the engineers can restore the speech almost to complete normality.

The device makes use of the channel vocoder principle, a speech analysis-synthesis system originally devised for the reduced-bandwidth transmission of digitized speech.

## MINING

### Dead Sea magnesia reserves

Some \$11 million is to be invested in a major Israeli mineral extraction facility, to make use of the so-far unexploited magnesia content of the Dead Sea.

Magnesium chloride is a major component of the mineral-rich Dead Sea waters; this highly saline inland lake has a content of about 30 percent dissolved minerals, compared with a concentration of only about 3.5 percent in most oceans.

The new project will be owned in equal parts by Israel's Dead Sea Works, which already extract potash, bromine and table salt from the Dead Sea, and by the Austria-America Magnesite Co., a major Vienna-based chemical concern. The new plant, possibly to be located at Arad, will base itself on the freely available magnesium chloride, a by-product of potash production.

Tests already carried out showed that the Dead Sea material could be used to produce refractory bricks

capable of withstanding higher temperatures than ever before. Di-calcium phosphate will be an additional major export item. Another product to be turned out is hydrochloric acid, important to Israeli industry.

## OCEANOGRAPHY

### Sea-floor sonar device

A powerful side-scanning sonar—capable of producing detailed topographical maps of the sea floor from beneath ships out to a distance of 10 miles—has successfully completed sea trials on tow behind the British National Institute of Oceanography vessel *Discovery*.

The side-scanning device, called *Gloria* (for geological long-range inclined asdic), can couple up to 60 kilowatts of acoustic power into the water. In use at sea for the first time in the western Mediterranean, the device produced acoustic maps of the sea floor beneath extremely deep water off the continental shelf.

## METEOROLOGY

### Australia plans automatic weather stations

The Australian Bureau of Meteorology will set up 15 automatic weather stations across the northern part of the continent, at a cost of more than one million dollars.

The stations, to be established over the next two years, will form an arc from Browse Island, off the northern coast of Western Australia, to the Coral Sea off the Queensland coast. Each installation will be equipped with recording instruments to monitor surface meteorological conditions.

The bureau also plans to set up stations along the upper reaches of rivers in northern New South Wales to give advance warnings of flash floods. At present, it is investigating the effect on rainfall forecasts of some unusual isolated cold air pockets discovered in the same part of the state.

## SEISMOLOGY

### Patterns of earthquakes

The nearly random occurrence of earthquakes makes forecasting seem a far-off goal. But a recent series of large earthquakes in the Middle East suggests that there may be a pattern to regional seismicity on a broader scale than is usually conceived.

Three earthquakes of magnitude 6.0 or greater that occurred successively in western Turkey, Sinai and the Afar region of Ethiopia show a remarkable time-distance relationship, Dr. P. A. Mohr of the Smithsonian Astrophysical Laboratory points out in the Aug. 23 *NATURE*.

The time and distance intervals, he says, could be due to the migration south along the Red Sea of a hypothetical stress-release front traveling at 16.6 kilometers per hour. This velocity would also indicate that smaller earthquakes later in the Sudan and Malawi might be related to the initial Turkey event.

Irregularities occur in the patterns he has seen, but already there seems to be one case of a prediction in advance of two June earthquakes in Ethiopia using the relationships he saw earlier.