

## Harking back to 1899

Last February, President Nixon sent Congress a comprehensive program for control of water pollution as part of his 37-point program for protection of the environment (SN: 2/14, p. 168). Among his proposals were measures to establish and enforce more effective water quality standards. None have yet found their way into law.

Last week, the President took direct action by issuing an Executive order to set up a program requiring facilities discharging wastes into rivers and streams in the United States to obtain permits from the Army Corps of Engineers.

The action was, essentially, an application of the 71-year-old Refuse Act, "an act whose potential for water pollution control," noted the President in a statement accompanying the order, "has only recently been recognized."

The Refuse Act of 1899 prohibits the discharge of refuse matter, except that flowing from streets and sewers, into navigable waters or their tributaries without a permit. The law provides for both criminal penalties and civil proceedings against violators. A fine of \$2,500 may be imposed for each violation, and up to \$10,000 per day for violation of injunctive action obtained by the Government.

"Through a more activist utilization of this act," said Mr. Nixon, "we will be able to require industries to submit to state authorities and the Federal Government data concerning effluents which they plan to discharge into navigable waters."

The Executive order applies both to plants now operating and to new installations. Permits for the latter must be obtained immediately. Existing facilities must apply for permits by July 1, 1971.

Under the permit program, the Secretary of the Army will have authority to grant, deny, suspend or revoke permits or to grant conditional ones. The Environmental Protection Agency will determine applicable water quality standards and make findings regarding compliance with these standards in particular cases. In turn, the EPA will consult with state or interstate agency water quality officials in making these determinations. Permits will be automatically denied to firms that fail to qualify for certification under the Federal Water Pollution Control Act.

Reaction to Mr. Nixon's move was generally favorable, with reservations. Russell Train, chairman of the Council on Environmental Quality, the agency that will coordinate the activities and policies of the various Government agencies involved in the permit pro-

gram, called it the "single most important step to improvement of water quality that this country has taken."

Rep. Henry S. Reuss (D-Wis.) and Sen. Philip A. Hart, (D-Mich.), chairmen of the House and Senate conservation and environmental subcommittees, were pleased that the President had issued the order but voiced concern about its implementation. A spokesman for Hart said that neither the Army Corps of Engineers nor the EPA has a large enough staff to check up on industries before issuing the permits to them. This places the Government in the position of having to depend on the industries to make complete and honest reports. □

## SEISMOLOGY

### Tilt warning on quake

For years scientists have been seeking ways to predict the occurrence of serious earthquakes. Correlations have been found between earthquakes and a number of other phenomena, such as ground lightning (SN: 12/12, p. 453) and variations in subterranean fluid pressure (SN: 10/10, p. 302).

Now three California scientists, Dr. M. Darroll Wood and Rex V. Allen of the U.S. Geological Survey's National Center for Earthquake Research in Menlo Park and Stephen R. Levine, a Stanford University graduate student, have added another possibility to the list.

They found that in the days before the two largest earthquakes that occurred near the little town of Danville, Calif., last June 11 and 12, the entire San Francisco Bay area tilted slightly toward the epicenter of the quakes.

Levine had collected data from tilt stations at Berkeley and the San Francisco Presidio and about 100 seismometers scattered along fault lines from Santa Rosa to San Juan Bautista for use in a class computer project.

A computer-animated picture of the data for 10 days preceding the Danville earthquakes showed that minor seismic events steadily increased in number as the time of the quake approached.

But the real surprise was a change in the direction of tilt. Before the quakes, the region tilted southeast on a line roughly parallel to the Calaveras fault. About 29 days before the first large earthquake, the researchers announced last week, the direction of tilt shifted suddenly toward Danville. From then on, the degree of tilt increased steadily up to ten hours before the tremor, when it seemed to zero in on the quake epicenter and froze. Immediately after the quake, the researchers found, the direction of tilt shifted again, realigning itself with the Calaveras fault, but in the opposite direction.

This would indicate, the scientists say, that the epicenter area, relieved of strain by the quake, had sprung upward and thereby reversed the direction of tilt. The actual amount of tilt was minute, amounting to only 0.19 microradians (about 1/100,000 of a degree) at its maximum.

The scientists examined the data carefully to make sure that the observed tilt was not due to instrument errors, meteorological activity or tidal effects, and concluded that it was indeed due to earth movements. Furthermore, they point out, because such a large area was affected, the tilt could not have been caused by the usual shallow fault shifts in the first 12 miles of the earth's crust. It must have been caused, they say, by "some deeper seated process, probably deep creep, that was progressively loading the shallower zone" of the quake epicenter near Danville.

Though the researchers caution that it is too early to talk of using their discovery for earthquake prediction, they don't rule out the eventual possibility. □

## SCIENCE NEWSBRIEFS

### Radiation standards

The challenge by the state of Minnesota to the Atomic Energy Commission's right to be the sole judge of radiation standards for nuclear power plants failed last week when U.S. District Judge Edward Devitt ruled that Congress had given AEC preemptive authority in the field of radioactivity standards. An appeal will be made.

A Minnesota water pollution agency had wanted to set far more stringent radioactivity standards from the Northern States Power Co.'s Monticello nuclear plant than the AEC. A number of other states had joined with Minnesota in its claim that the AEC standards were too low to protect public safety. □

### Institute of Medicine

The new Institute of Medicine of the National Academy of Sciences was formally activated last week. NAS President Philip Handler appointed as its acting president Dr. Robert J. Glaser, a medical educator now vice president of the Commonwealth Fund in New York City.

Creation of the Institute is a response to the need to find ways to deal with the problems of health care in the United States. It represents a less ambitious alternative to proposals by some medical leaders for a National Academy of Medicine to operate independently of the NAS (SN: 8/15, p. 147). The Institute's charter membership of 29 will be expanded by the NAS to 100 this year and eventually to 400. At least one-fourth will be nonphysicians. □