

## METEOROLOGY

# Man's Natural Enemies

**Tidal waves, typhoons, hurricanes, tornadoes, drought, avalanches, volcanoes and earthquakes are natural enemies against which man has little defense, Lillian Levy reports.**

► A SHOCKING TOLL of human life and property is claimed each year by natural disasters, mankind's most vicious and implacable enemies.

Tidal waves, typhoons, hurricanes, tornadoes, blizzards, avalanches, dust storms, drought, flash floods, volcanoes and earthquakes are among the terrible destructive elements in nature against which, thus far, there is scarcely any defense or deterrent.

Each of these killers has a force ranging from a hundred to thousands of times that of an atomic bomb. Combined, they have destroyed millions of lives, more than have been lost in all the wars in history.

## No Nation Immune

No nation or people, however rich and powerful, is immune or safe from an onslaught of one or more of these natural enemies. More often than not, the attack may occur without any advance detection or prediction. Without any warning, for example, a major earthquake struck Iran Sept. 1 of this year. With the force of thousands of atomic bombs, the tremors leveled the northwestern countryside of Iran, killing or injuring more than 20,000 persons. The devastation was intensified by a severe freeze with temperatures falling well below zero.

Significantly, it is not uncommon for natural destructive forces to combine and accumulate in a strike against man. The earthquake that took 12,000 lives and destroyed the city of Agadir in Morocco two years ago (March 1, 1960) was followed by a fierce tidal wave.

Large earthquakes recently shook Japan, Russia, Turkey, China, Chile, Colombia, Italy and Alaska; but only five near population centers caused deaths. Theoretically, such quakes occur every 18 months, but actually there is insufficient evidence to adequately substantiate this.

In spite of recent advances in seismology, the scientific study of shocks and motions of the earth, earthquakes cannot be predicted. There is no way, therefore, to give advance warning and evacuate a threatened area.

However, there has been an improvement in the understanding of the movement of rock masses so that buildings can be constructed to withstand quake tremors. In sections of the world where large quakes have occurred recently, as in Agadir and northwestern Iran, earthquake-proof structures are rising amid the rubble of the shattered cities.

Greater advances have been made in understanding and controlling avalanches, earth, ice, snow and rockslides, on the surface of the earth. These generally occur

around glacial lakes and approach the energy of earthquakes and tornadoes. Surveillance and control of the lakes by draining or damming them during thaw periods can prevent most avalanches, according to geologists and glaciologists.

The awesome slide of snow, ice, rock and earth in Peru in January, 1962, which killed more than 3,000, was preventable, according to Dr. Victor Oppenheim, geologist and explorer who surveyed landslides in the Andes for the Peruvian Government. He said that if precautions he advised had been taken, the avalanche would never have happened.

Teams of avalanche hunters in the United States have prevented similar disasters by checking potential avalanche regions and, wherever possible, triggering avalanches with explosives after removing people from the sites. Fortunately most avalanches occur in remote unpopulated territories. But a slide aimed at a populated section can, in a matter of minutes, sweep up earth, boulders and trees, smash houses, obliterate streets and highways, and crush concrete and steel bridges.

There is no way to alter the path or reduce the violence of a tornado, the smallest and most dangerous of all storms. Fortunately, the average tornado extends to a distance of only 16 miles. It travels at from 25 to 40 miles per hour, bringing with it

whirling winds as high as 500 miles an hour. The tornado is characterized by a spinning funnel-shaped cloud, ranging from black to gray.

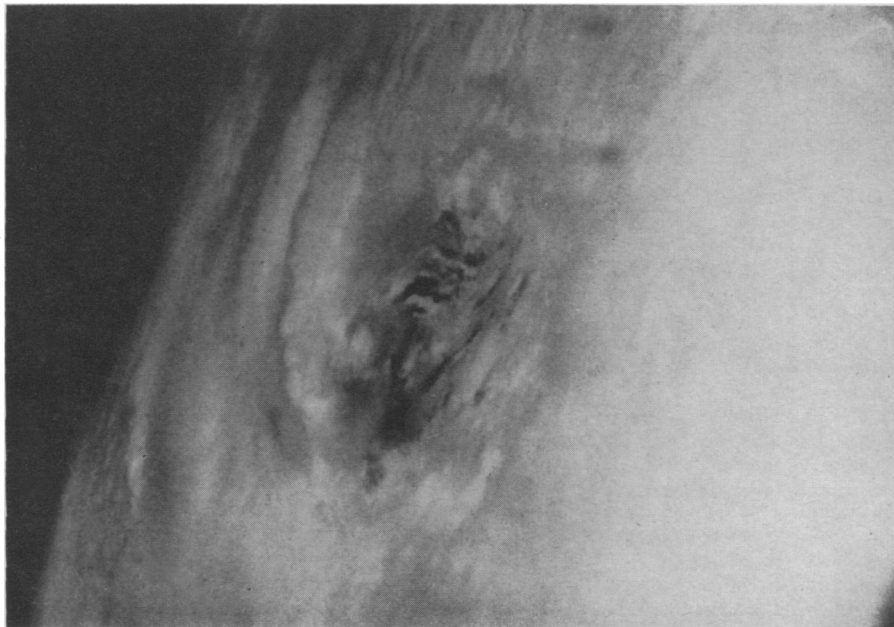
Because a certain combination of atmospheric conditions creates tornadoes, they can be forecast so that lives can be saved even if the destruction of property cannot be prevented. The average number of tornadoes in the United States is over 200 annually, most of them occurring from April through June.

## Tornado Forecasts Issued

The U. S. Weather Bureau issues tornado forecasts to alert the public if conditions become threatening. When a tornado has been sighted, warnings are issued immediately so that those in its path may seek shelter. Underground excavations are the only universal protection against tornadoes. However, if such shelter is not available, a ditch or ravine offers some shielding as do inside walls and the lower floors of buildings.

The hurricane (also known as typhoon or severe tropical cyclone) is the big sister to the tornado. It has been estimated that a typical hurricane during its lifetime has the force and energy of 10 million atomic bombs. During every second of its existence, the hurricane releases ten times as much energy as the A-bomb which destroyed Hiroshima during World War II.

A hurricane can cover a path hundreds of miles long and its wind speed may vary from 75 to 150 miles per hour. September is the peak month for these huge storms



NASA

**HURRICANE DEBBIE'S EYE**—A camera in a Mercury spacecraft caught Debbie's "eye" 12 minutes after launch from Cape Canaveral in September 1961.

which begin over the waters of the oceans. Observations from ships, balloons, planes and satellites now enable U. S. meteorologists to locate and spot hurricanes as they begin forming. They are tracked also by radar when close to the U. S. Ample warning in advance of a hurricane strike can be given.

This advance warning capability made it possible to evacuate 300,000 coastal residents on the Texas coast in September, 1961, before Hurricane Carla struck. Without this capability, thousands of lives would have been lost in addition to the property damage suffered.

U. S. Weather Bureau scientists are now attempting to find a vulnerable point in the hurricane's system in the hope of using this "Achilles' heel" to change the hurricane's path or trigger the release of its tremendous energy far from land.

Tidal waves are the link between earthquakes, avalanches and hurricanes. The tidal waves or tsunamis (Japanese word meaning harbor wave) are produced by earthquakes in the ocean, earthslides and volcanic explosions as well as hurricanes.

Hundreds of fishing boats off the coast of Japan were destroyed recently by the destructive force of a tidal wave believed to be induced by an earthquake beneath the ocean. During October, 1960, the storms and tidal waves of a tropical cyclone or hurricane inundated the coast of East Pakistan causing the death of almost 10,000 persons. The tidal waves that followed the earthquake in Agadir already have been mentioned.

These phenomena can be predicted and in the United States facilities are at hand to evacuate large population groups. In

less developed countries, such as Communist China, India and Pakistan, building of primitive earth platforms stored with food and water and furnished with some makeshift shelter have provided life-saving protection against the tidal waves.

Because of the frequency with which tidal waves hit Japan, Japanese scientists are now studying ways by which this water power may be harnessed.

While some regions of the world suffer from too much water, others get too little. Drought is a serious problem in the more arid territories of the world and occasionally it strikes some parts of the temperate zone. Hurricanes sometimes provide fringe benefits to drought areas by sending them rain-producing clouds. Predictions of drought are difficult to make and there is little that man can do to alleviate its consequences.

However, scientists have observed that areas of drought generally are balanced off by areas of severe rainstorms. It is becoming more evident that the various stresses of nature are interdependent. As a consequence, different scientific disciplines are joining in research to understand more completely the cause and effect of the vast destructive energies in, on and above the earth.

Nations as well as scientific disciplines are combining efforts to learn about the workings of the earth and its environment as a whole, through such international bodies as the World Meteorological Organization and the International Committee of Scientific Unions. Continued cooperative efforts aimed at disarming these common enemies, it is hoped, ultimately may move nations to disarm themselves.

• Science News Letter, 82:258 October 20, 1962

## TECHNOLOGY

# Medical Computer Center

► THE NATION'S first large-scale health sciences computer center will be operative by the end of the year at the University of California, Los Angeles, Medical School.

The new computer center will be largely devoted to processing of medical research data. It is planned that laboratory data such as brain wave recordings, electrocardiograms, and blood flow data, may be fed by direct wire from the laboratory to the computer, and thus processed immediately.

Patient data, such as clinical laboratory and radiological procedures, may also be stored in the computer's memory units with an eye to future statistical studies which will utilize data from such procedures.

The facility will also be used for training programs designed to acquaint students with the medical uses of computers and for the graduate training program for specialists in biostatistics in the School of Public Health.

The \$3,300,000 computer center was made possible by grants from the U.S. Public Health Service.

The computer, an IBM 7094, is the first system of its kind to be delivered outside of Federal agencies. The 7094 is a speedier version of the powerful 7090 installed at

UCLA last year to serve the Computing Facility which provides general computing for UCLA's scientific and other researchers, and the Western Data Processing Center, which emphasizes research in the field of business and which serves 74 other educational institutions in the West.

The outgrowth of a research project initiated August 1961 by Drs. W. J. Dixon and F. J. Massey of the Department of Preventive Medicine and Public Health, the center is a joint project of UCLA's Schools of Medicine and Public Health.

"The availability of computing equipment of this magnitude will open new doors in medical research and permit the development of new techniques to deal with some very old and difficult problems," Chancellor Franklin D. Murphy said.

The completion of the Health Sciences Computer Center will make the UCLA Medical Center the leading institution in application of computer techniques to medical problems, Vice Chancellor Stafford L. Warren pointed out. A smaller computer facility has already been established in the Brain Research Institute for use in the investigative program there.

• Science News Letter, 82:258 October 20, 1962



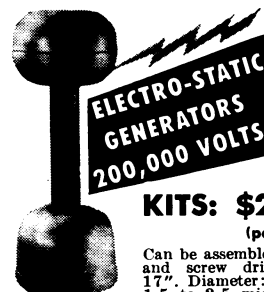
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