

METEOROLOGY

Spot Hurricanes From "Moons"

Several satellites equipped with TV-like "eyes" could spot birth of a tropical storm and keep its changing path under constant surveillance, improving predictions of its course.

By ANN EWING

► MAN-MADE earth satellites equipped with TV-like "eyes" will soon be aiding weathermen spot and track hurricanes, the giant tropical storms whose yearly season officially started June 1.

From information on the earth's cloud cover relayed by a satellite, weathermen could detect the characteristic cloud formation of a hurricane long before the storm might otherwise be found.

Hurricanes are essentially oceanic. They are bred in tropical regions far removed from the dense network of observing stations on land areas. The easterly wave, or disturbance, in which hurricanes are spawned are often known only because a ship, by chance, happens to sail through the area.

A picture taken from afar covering a broad area of the earth's surface would very likely solve the problem of detecting hurricanes in their early stages.

Ideally, weathermen would like to have enough satellites in space to keep a hurricane under constant surveillance. The moons' electronic eyes would record the vagaries of a storm's motion much sooner and more accurately than possible either by airplanes or radars.

Satellite Patrol

Dr. Harry Wexler, director of the Weather Bureau's Office of Meteorological Research, has long been a strong proponent of using satellites in patrolling for severe storms. From a satellite, he told SCIENCE SERVICE, a hurricane would resemble a tiny pinwheel of clouds, with a spiral formation much like that found in the star systems called galaxies.

The first U. S. satellite to carry equipment for reporting earth's cloud formations is scheduled to be launched this year. However, until larger and more complex instruments in several satellites are available, weathermen are relying on tested methods for investigating and tracking tropical storms.

New facts about hurricanes have already been gathered in the Weather Bureau's stepped-up program for severe storm research. If this year's program confirms the recent findings, more accurate predictions of the births, paths and lifetimes of tropical storms will result, even without help from satellites.

Currently, a hurricane's structure can be considered similar to that of a gigantic smokestack, some 30,000 feet tall. Above 10,000 feet, the "smokestack" widens slowly,

and there is now evidence the environment between that level and 20,000 feet controls the storm's development. Cold air moving in and mixing with the warm can throttle its growth, and may also account for changes in its direction.

Hurricanes do not have the uniform structure once assumed. Systematic eddies whose cause is not yet known have been found throughout the entire storm. Some of these areas of seemingly ordered wind variations might be identified as false "eyes." Another new finding is that a hurricane apparently knows where it is going.

The organization of winds in the violent core immediately surrounding the center holds the clue to the storm's rate and direction of motion for the following 24 hours. The hurricane's future path can be plotted immediately in a reconnaissance airplane from readings of maximum winds taken in the four directions at equal distances from the storm's center as determined by radar. (See SNL May 17, p. 315.)

Such readings will be taken operationally this summer.

If the Weather Bureau's Hurricane Research Project's third year of investigations,

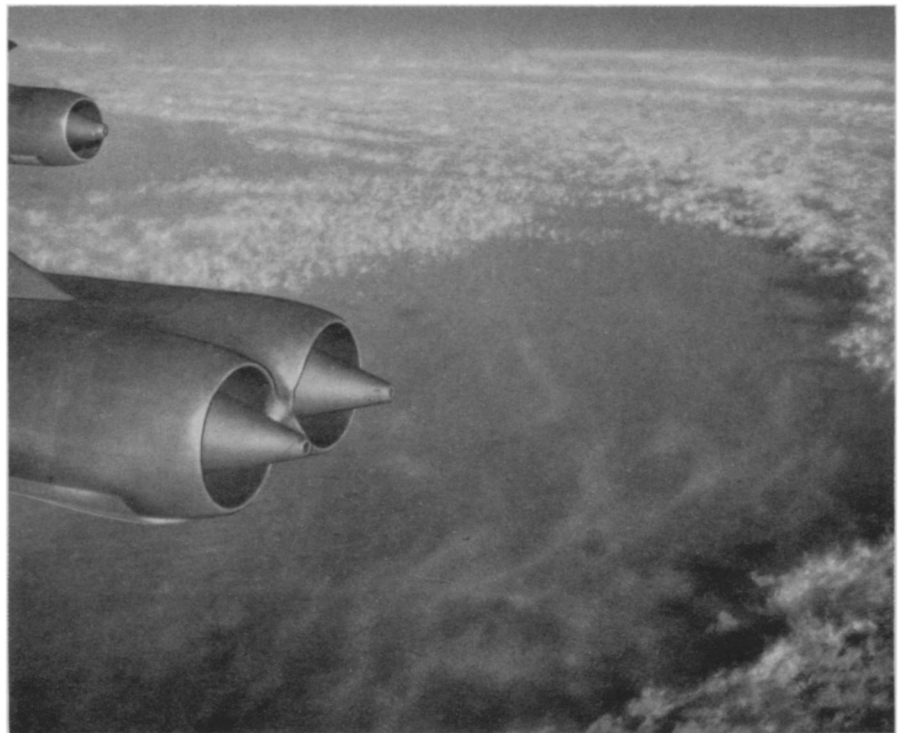
now starting, shows these conditions also hold for 1958 storms, an important step in understanding, and therefore in predicting paths for, hurricanes will have been made.

One definite plan to be tried for the first time in 1958 is to place constant-level balloons equipped with radio transmitters in the storm's calm center. Several will be dropped in each hurricane's eye in order to obtain a constant record of the storm's course.

The balloons will not only aid forecasters in tracking, but will give them information on the forces at the storm's center that could not be obtained in any other way.

Three Hurricane Probes

Three research aircraft, equipped with the latest meteorological instruments, accurate navigation instruments and radar, will fly into the storm simultaneously. With the cooperation of the U. S. Navy and Air Force, the planes will be used to get an overall picture of the storm's structure—temperature, pressure, wind, humidity, cloud composition, etc. They will sweep through all portions of the hurricane along one path at a selected level in order to obtain such information simultaneously. One aim is to find out if or how much the storm changes while its structure is being measured.



"EYE" OF HURRICANE—From a high-flying airplane a hurricane's "eye" and the immediately surrounding cloud structure have been photographed. Careful study of such photographs and other storm conditions is yielding important new information about tropical storms.

Also planned for this summer's research is the launching of Navy rockets from the Wallops Island, Va., facility of the National Advisory Committee for Aeronautics. The idea is to take a picture of the storm's cloud system and its environment, covering a radius of about 1,000 miles, from a height of about 100 miles.

A different method of taking a hurricane's picture is also a Navy project: the hurricoon, a giant Skyhook balloon carrying a camera gondola. It can be sent to roughly the right area and later recovered because of a high altitude wind reversal occurring during summer in the latitude of the United States. The hurricoon will take one picture about every 15 minutes for 12 hours or more.

Cooperating this summer in the Bureau's hurricane research will be meteorologists from the University of Chicago, led by Dr. Herbert Riehl. They have been developing mathematical methods of predicting hurricane paths, some of which require electronic computers for solution.

One experiment the Weather Bureau is "ready and willing" to try, according to its chief, Dr. F. W. Reichelderfer, is to attempt to change a baby hurricane's direction of movement or intensity before it develops into a full-scale storm. Such an attempt would be made, however, only when conditions are right and there is no chance any harm might result.

Science News Letter, June 7, 1958

EVOLUTION

Fossil Skulls of Dog-Like Animal Go to Museum

► **FOSSIL SKULLS** of a dog-like creature that probably is related to the ancestor of today's dogs—an ancestor's ancestor—have been acquired by the Smithsonian Institution.

There is evidence this early "dog" was less intelligent than dogs now are.

The two "excellent" skulls of Daphoenus, an animal about the size of a collie, have both dog- and cat-like characteristics. This reflects the fact that Daphoenus lived some 35,000,000 years ago at a time when the dog and cat lines were less widely separated than today.

All the brain areas, as reconstructed from the skulls, were relatively smaller than those found in modern breeds of dog. This was especially true of the frontal lobes, said to be the seat of animal intelligence.

Daphoenus had a moderately long skull, a short face and a short muzzle which narrowed abruptly in front of the eyes. The smallness of the frontal lobes of the brain presumably accounts for the narrowing of the skull.

Dr. C. L. Gazin, Smithsonian curator of vertebrate paleontology, took the skulls from a fossil bed north of Harrison, Nebr.

Science News Letter, June 7, 1958

ASTRONOMY

Dispute Origin of Tektites

The origin of the mysterious tektites is currently being disputed, with evidence being offered that discredits theories claiming they come from the moon.

► **THREE SCIENTISTS**, one a Nobel Prize winner, disagree strongly with the theory that tektites are lunar particles ejected from the moon by impact of meteorites.

Tektites are glassy objects found in widely scattered groups around the world. Their origin has been a mystery since they were discovered, and many theories concerning their source have been proposed.

Recently Drs. C. M. Varsavsky of the Smithsonian Astrophysical Observatory, J. A. O'Keefe of the Army Map Service and T. Gold of Harvard College Observatory have all argued for the lunar origin of the tektites.

Not so, say Virgil E. Barnes of the University of Texas, Prof. Zdenek Kopal of the University of Manchester, England, and Dr. Harold C. Urey, University of Chicago Nobelists. In three separate reports in *Nature* (May 24) each presents his disproof of the lunar origin.

Mr. Barnes argues that tektites are found in groups, not as randomly arriving objects. Those found in different regions display different characteristics. This separation, both in time and in characteristics, "should

be sufficient in itself to discredit" the theory of lunar origin.

Dr. Kopal points out that probably the "most significant fact known about the terrestrial tektites is their clustering in certain localities constituting only a tiny fraction of the total solid surface of the earth. This fact suggests strongly that their origin must be sought much nearer to the terrestrial surface than the moon."

Nobelists Urey, who has suggested tektites may be associated with the impact of material from comets, explains that they have chemical compositions consistent with those of earthly sedimentary rocks. However, Dr. Urey reports it is very unlikely the moon underwent the same processes that produced the terrestrial sediments. Therefore, he argues, it is necessary to assume that igneous processes on the moon produced the very acid tektites. This is also improbable.

"In this case, the chemical processes on the moon have differed from those on the earth, because only rare terrestrial igneous rocks have compositions approaching those of tektites," Dr. Urey concludes.

Science News Letter, June 7, 1958

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