

METEOROLOGY

Compute Hurricane Arrival

An objective method that will enable meteorologists to warn a locality a hurricane is imminent may help in deciding whether or not precautionary measures are needed.

► A NEW METHOD has been developed for deciding when a hurricane will be close enough to any locality to threaten the area with sufficient damage to warrant issuing a hurricane warning.

Dr. Thomas F. Malone of The Travelers Insurance Companies, Hartford, Conn., said the method could be used to calculate objectively on an electronic computer the probability that a hurricane will come within any specified distance of a particular locality.

Knowing this, he told the American Meteorological Society meeting in Chicago, weathermen could then decide whether to issue a hurricane warning based on the cost of precautionary measures and the loss that would be incurred if such measures were not taken.

Pin-point precision in the prediction of a hurricane's position 24 hours in the future is not likely to be achieved in the immediate future, Dr. Malone said. The weatherman is therefore faced with deciding when a hurricane constitutes a threat to a certain area. It would be too expensive to take precautionary measures every time a hurricane threatened, so the cost of repeatedly taking such steps must be weighed against the damage that might result if the tropical storm should strike.

Dr. Malone's method is based on a study of the movements of 447 hurricanes in the North Atlantic Ocean and Gulf of Mexico during the period from 1928 to 1953. His

final result is a series of ellipses showing the probability that the hurricane will fall within the area enclosed by that ellipse, either within 24 hours, or at any time during its lifetime.

Using this probability figure, Dr. Malone reported, the decision on issuing a hurricane warning could be made according to a simple mathematical formula. As an example, he said, if the cost of precautionary measures is \$5,000 and the possible loss is \$25,000, the measures should be taken when the probability that a hurricane will come close enough to cause a loss is one-fifth, or 20%.

Finding River's Flow

► A NEW WAY of finding the highest flows to be expected in rivers and streams has been devised by two University of Chicago meteorologists.

Of great importance in building dams and planning for the multiple use of watershed areas anywhere in the world, the method was reported to the Meteorological Society meeting by Dr. Horace R. Byers. Dr. Byers said he and Dr. Herbert Riehl had found that modern meteorological methods could replace previous ways of determining maximum river and stream discharges.

The only information needed is the value

of wind speed and direction up to 10,000 feet above the earth's surface for the watershed area being studied. From this Drs. Byers and Riehl can construct a model of the average storm, and then of the worst possible storm to be expected.

Using the model, they can estimate how much precipitation falls during the passage of an average storm, and also of the most intense storm.

The values of flood flows thus obtained can be compared with stream flow characteristics of the region under consideration.

This method makes the collection of water run-off data and other factors for a period of many years, sometimes as many as 50, unnecessary. It can be used for any area in the world where the wind pattern is known. This includes most countries, except for many in South America.

The question of what maximum flood stages to provide for has been a problem ever since man started to build dams and other structures along rivers. The United States, perhaps exceeded only by China in the magnitude of flood problems on its great rivers, has been concerned with the so-called "maximum design flood" for many years, Dr. Byers said.

He said the method holds special promise for estimating precipitation over large basins. It does not, however, apply to thunderstorm-type rains, which are critical over small basins, because the weather features involved occur on too small a scale.

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PSYCHOLOGY

Tranquilizers Cause Inaccurate Reactions

► TRANQUILIZERS cause a trained monkey to respond less accurately.

Experiments so far show clearly that a monkey's performance of learned responses and cues becomes lessened after administration of chlorpromazine, a tranquilizer, Dr. Robert Berryman, a psychologist at Columbia University, said.

A monkey learns to estimate his own response, Dr. Fred S. Keller, professor of psychology at Columbia, explained. For instance, he will learn to hit a bar enough times to receive an award of food. This is comparable to counting.

When the same monkey is tranquilized, however, he will overshoot or undershoot the correct number of taps on the bar.

In other words, while free of the drug, the monkey is able to determine and react to a certain number of taps on a bar which are followed by a reward. Under the effects of a tranquilizer, the monkey's ability to sense his own behavior is altered, the psychologists said.

"The effect of drugs upon an organism's discrimination of its own behavior, or the sensory feed-back from this behavior, is a major problem," they emphasized. The effects of tranquilizers upon the ability of automobile drivers has not yet been determined.

Working with the two psychologists is William Wagman, research assistant.

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TRANQUIL MONKEY—Cookie, Columbia University research animal, takes time off from work for a refreshing drink. Cookie, together with pigeons and white rats, is "employed" by the department of psychology for experiments in studying the effects of tranquilizing drugs on organisms.