

METEOROLOGY

Hurricane Season Here

From now through September the chances are high that one of the mighty tropical storms will slam into the United States mainland.

By ANN EWING

THE SEASON FOR HURRICANES is here. One of the giant storms has already slammed into Honduras and Guatemala.

Others, born in disturbances in the easterly winds at low altitudes, will churn northward and may hit the United States mainland.

Winds must reach a strength of at least 74 miles an hour for a tropical weather disturbance to be called a hurricane. Wind speeds of 150 miles an hour are quite common in hurricanes striking a coast.

From structural damage caused by winds, scientists have estimated that speeds may reach as high as 200 miles an hour.

However, it is not the high winds but the high water inundating coastal lands that causes most of the deaths and destruction from hurricanes. Inland, heavy rains may also flood rivers, especially in mountainous areas.

"Storm surges"—hurricane-caused rises in sea level—may be as much as 10 to 15 feet above normal tide. This rise above normal tide is due, among other factors, to the pile-up of water along the coast by continued onshore winds in advance of the storm and a build-up of a wave accompanying the storm center.

This storm wave is usually only two or three feet high over the ocean, and results from the lower barometric pressure at the hurricane's center. However, as the storm crosses a coastal line, the shoaling of the water may result in a build-up of the wave to a height several times that over the ocean.

Where Hurricanes Form

Hurricanes usually form over remote areas of tropical ocean, where warm air carries a heavy burden of moisture. Its violent whirling winds are set in motion when air is drained away from one area by currents in motion at high levels, causing pressure at the surface to fall. As air near the surface surges in toward the region of lower pressure, it is deflected by the earth's rotation into a spiraling path and rises.

The heavy rains that develop in the rising air release latent heat of condensation, the fuel the hurricane uses for its energy and growth.

Hurricanes move at an average rate of 12 to 15 miles an hour in the tropics. The rate of motion often increases to twice this amount, at times even reaching 60 miles an hour, when storms come out of the tropics and hit the U. S. coast.

The factors determining how and where a hurricane will move, and especially changes in path, are found mostly outside the storm itself. To forecast its motion, meteorologists study conditions far from the storm's center.

The farther in the future the forecast is made, the farther away from the storm meteorologists must look for the controlling factors. For a one-day prediction, observations within a thousand miles of the hurricane center will usually be sufficient. Weather events in the central and northern United States and in the higher altitudes of the Atlantic Ocean are of particular importance.

For a 48-hour forecast, current weather events in temperate and polar zones over the whole Pacific and Atlantic Oceans, in addition to North America, must be taken into account.

For periods of five days and longer, meteorologists are studying ways of prediction useful as a general guide of the hurricane's path. No scientific basis exists for predicting months in advance when and

where a hurricane will form or enter the coast.

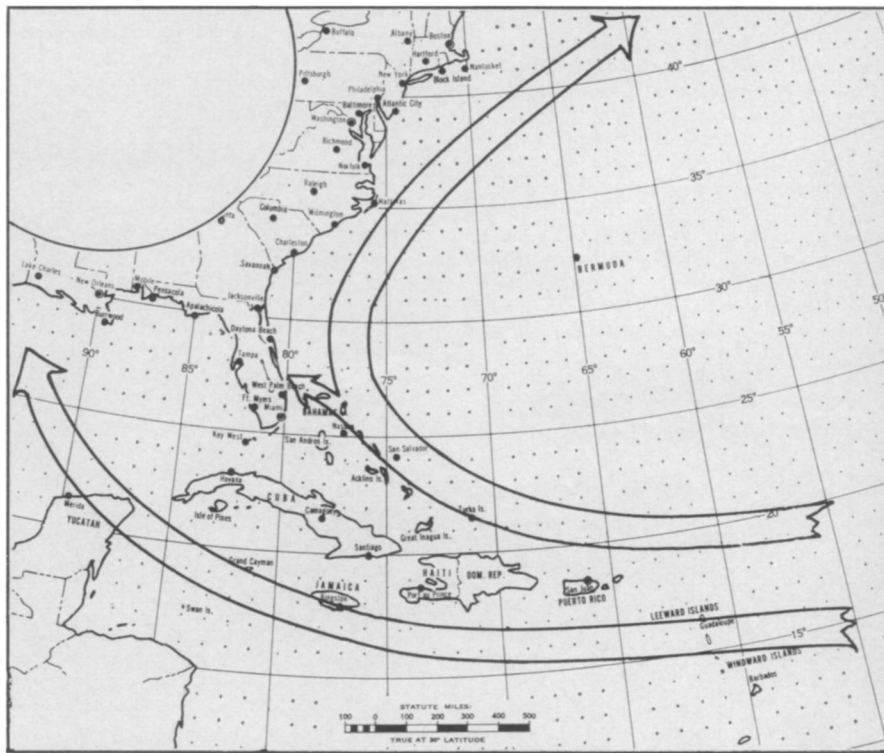
As soon as there are indications a hurricane is forming, no matter where, the storm is given a name and the U. S. Weather Bureau begins issuing "advisories." When the storm threatens the mainland, hurricane "watch" notices are included in the advisories, and gale and hurricane warnings are issued.

A hurricane's energy budget is impressive: A typical hurricane takes in about 20,000,000 tons of air every minute at its lower levels. This air rises swiftly and is thrown out at the top, some 40,000 feet above. The process is like an enormous wringer, squeezing moisture out of the air. The moisture condenses and produces heat energy at a rate equivalent to about 600 atom bombs, exploding every minute, Weather Bureau experts calculate.

Storm May Last Ten Days

A typical hurricane lasts about ten days, liberating heat by condensation of water in an amount equivalent to something like 10,000,000 atom bombs, enough to supply all the electrical needs of the United States for the next 600 years.

Trying to control such a storm is far beyond today's capabilities, Weather Bureau



HURRICANE TRACKING CHART—This map shows the areas where hurricanes are formed and the tracks they are likely to take. It gives a good over-all picture, but does not indicate any of the seasonal variations in the whirling storms' paths.

officials believe. There is hope, however, that by locating weak spots when the storm is in its formative stages, scientists might find some way to prevent the storm from growing or to change its path.

More methods than ever before will be used this season to study these mighty storms. The Weather Bureau will fly three especially equipped research planes into the raging winds and quiet "eye" of the hurricanes.

The aim of these flights is to gather more detailed information about the birth, growth and death of the tropical storms, which will aid in predicting the path of future storms.

Weather satellites, such as Explorer VII, rocket photography of the storms, hurricane beacons placed in the relatively calm "eye," and increasing numbers of powerful radar will also be used to study the hurricane.

Names of hurricanes for the 1960 season range from Abby to Winny. Starting this year, a list of four sets of names will be used in rotation, beginning with the first name in the group each year.

The 1960 names are, besides Abby and Winny, Brenda, Cleo, Donna, Ethel, Florence, Gladys, Hilda, Isbell, Janet, Katy, Lila, Molly, Nita, Odette, Paula, Roxie, Stella, Trudy, and Vesta.

For persons not familiar with hurricanes, including newcomers to Florida, the following safety precautions include those urged by the Weather Bureau as a guide to the action to be taken when warnings of an approaching hurricane are issued:

1. Keep your radio or television on and listen for latest Weather Bureau warnings and advisories. If power fails, use a battery-powered radio.

2. Pay no attention to rumors.

3. Get away from low-lying beaches or other locations that may be swept by high tides or storm waves. If passage to high ground is over a road likely to be underwater, leave early. Do not run the risk of being marooned.

4. If your house is out of danger from high tides and is well built, then it is probably the best place to weather the storm.

5. Be alert for high water in areas where streams or rivers may flood after heavy rains.

6. Board up windows or put storm shutters in place. When you board up, use good lumber securely fastened. Makeshift boarding may do more damage than none at all. Have strong bracing for outside doors.

7. Get in extra food, especially things that can be eaten without cooking or with very little preparation. Remember that electric power may be off and you may be without refrigeration or ordinary cooking facilities. If your house is strongly built, your preparations must include provision for neighbors who may call upon you for shelter.

8. If emergency cooking facilities are necessary, be sure they are in working order. Solid alcohol stoves are good for heating water.

9. Sterilize the bathtub, jugs, bottles, cooking utensils and fill with drinking water, since city water service and private pumps may be interrupted.

10. Have flashlight and/or other emergency lights in working condition and keep them handy.

11. Be sure to have gasoline in your car. If electric power is off, filling stations may not be able to operate pumps for several days.

12. Check on everything that might blow away or be torn loose. Garbage cans, garden tools, toys, signs, porch furniture, awnings and other objects become weapons of destruction in hurricane winds. Store them all inside if possible.

13. Be sure that a window or door can be opened on the side of the house opposite the one facing the wind. This is to prevent an explosion because of the pressure difference inside and outside. The door should be securely braced or tied open.

14. If the center, or "eye," of the storm passes directly over, there will be a lull in the wind lasting from a few minutes to half an hour or more. Stay in a safe place. If emergency repairs must be made outdoors during the lull, be quick. Remember the wind will return suddenly from the opposite direction, frequently with even greater violence.

15. BE CALM. Your ability to meet emergencies will inspire and help others.

• Science News Letter, 78:90 August 6, 1960

MEDICINE

Paraplegics Helped by Surgery and Antibiotics

PARAPLEGICS, persons with partial or complete paralysis of both legs, are being helped to normal lives today because of modern surgery, antibiotics and rehabilitation techniques.

A new Public Affairs Committee pamphlet, "Paraplegia: A Head, a Heart and Two Big Wheels," outlines recent "spectacular progress" in treating paraplegics. It was written by Jules Saltman in cooperation with the National Paraplegic Foundation.

Paraplegics are highly susceptible to disease, the pamphlet says. Especially their kidneys, bladders and other organs concerned with elimination may be affected.

Once a person's spine has been injured, a victim must be handled carefully on the way to the hospital. After early diagnosis, control of shock, repair of accompanying injuries, exploratory X-rays and possible traction (application of weight) in certain neck injuries, early treatment may include surgery.

Until a few years ago a paralytic had a short life. Today thousands of paraplegics are living active lives. They work, travel and drive cars with hand controls. One concern of wheelchair patients is to stop where accommodations are suitable, unimpeded by steps and with bathroom facilities not too cramped.

The family and social atmosphere for paraplegics should be one of mutual acceptance, without over-solicitude. Most paraplegics want to be treated like everyone else.

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AERONAUTICS

Fuel Tank Seen As Space Vehicle

AFTER THE fuel for launching men into space is used up, the astronauts could crawl into the empty fuel tank and use it for working quarters while in orbit, an engineer proposed.

Robert P. Haviland of General Electric Company said in Philadelphia that during ascent and descent the men would use a separate capsule. He proposed the novel satellite vehicle as a practical interim method of continuing space exploration with present rocket boosters and technology, until more powerful boosters capable of carrying larger payloads are developed.

Mr. Haviland envisions the fuel tank vehicle would be about 20 feet long and eight feet in diameter. Metallic items would be placed in the tank to serve as bed, chairs, tables, mountings for instruments and other required facilities. Equipment that could not be exposed to the fuel would be sealed in bays at the top of the tank, Mr. Haviland told members of the Air Force Association's Metropolitan Philadelphia Squadron.

The propellant tank could be used since the last stage of a missile goes into orbit with the payload. In Mr. Haviland's proposal, the payload would be a capsule where the astronauts would sit during the launching. The capsule would contain escape hatches as well as equipment for bringing the men back to earth safely in the event of a booster malfunction.

In orbit, the men would move to the empty fuel tank. Since it would not be practical for the tank section to re-enter because of its size the astronauts would return to the small capsule during re-entry into the earth's atmosphere. They would be protected from re-entry heat by a plastic shield similar to that now used in missile nose cones.

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MEDICINE

Live Polio Vaccine Successful in U. S. Tests

NOT A SINGLE CASE of polio has occurred in the Cincinnati area where 108,000 were vaccinated with a live polio vaccine and in Rochester, N. Y., where 150,000 were similarly protected, Dr. Albert B. Sabin of the University of Cincinnati's College of Medicine told the Fifth International Poliomyelitis Congress in Copenhagen.

This experiment demonstrates, Dr. Sabin told SCIENCE SERVICE, the safety of this kind of vaccine under the conditions of typical American cities.

Given proper leadership, Dr. Sabin believes, America could achieve as good results with live polio vaccine as in Soviet countries where such live vaccine has been used involving 80,000,000 people.

The widely used Salk vaccine in America is a killed virus vaccine.

• Science News Letter, 78:91 August 6, 1960