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70th Anniversary of the first hurricane seeding experiment

Project Cirrus crew and scientists pose in front of B-17 used in the hurricane seeding. (US Navy)

On the afternoon of October 13, 1947, an Air Force B-17 aircraft penetrated a hurricane 415 miles (667 km) east of Jacksonville and dumped several pounds of crushed dry ice into the storm, just to see what would happen. This was the first attempt to modify a tropical cyclone by seeding it with freezing nuclei. It was almost the last.

The previous year, Vincent Schaefer working at General Electric (GE) Laboratories discovered that by introducing dry ice (solid carbon dioxide) into an environment with supercooled water (water that was colder than 32°F [0°C] but had not yet frozen) he could induce the water to freeze into ice. He realized that this could be done in the free atmosphere and could spur microphysical reactions that would alter clouds and precipitation. At his urging, GE Labs reached an agreement with the the Naval Research Laboratory and Army Signal Corps (dubbed Project Cirrus) to carry out experiments where Air Force aircraft would 'seed' clouds and fog with dry ice to see what changes occurred. It wasn't long before plans were made to try a seeding experiment in a hurricane.

However, it wasn't until late in the following hurricane season that Air Force planes and Navy personnel became available to carry out the mission. On Oct. 12th, a hurricane (designated "King" by the Air Force Hurricane Office) moved northeastward over Florida, dumping tropical downpours on the southern end which caused damaging flooding that persisted for days. The next day the storm moved off the coast and continued out to sea. This seemed an ideal case for Project Cirrus, as the hurricane was no longer interacting with land and should not affect anyone after the experiment. That afternoon, two B-17s and a B-29 left Mobile, AL and flew

eastward to intercept the hurricane. The first bomber flew at cloud top level and did the seeding. Large chunks of dry ice were fed into a crusher on the plane and dumped from the belly into the clouds below. The second B-17 followed a half-mile behind and 3000 feet (900 m) above to document the cloud changes. The trailing B-26 was the control aircraft and carried Schaefer to monitor the changes and direct the other two planes. The aircraft lacked sophisticated homing gear, so it was decided not to penetrate the eye or heavy rainbands of the hurricane, but seed the outer clouds.

They first made a half-hour run over 100 miles (175 km) long dumping 80 pounds (36 kg) of ice along the way. They backtracked then to see what the clouds had done. Next they did two mass droppings of 50 pounds (23 kg) each into one large cumulus top and orbited the cloud to see any changes. They noticed that after the first run, the cloud deck below began to break up. After the second test, the cloud top continued to grow. Satisfied with their effort, the airplanes returned to base.

Track of 1947 hurricane "King" (Unisys)

The scientists were eager to examine the storm the following day. However, when they flew to the predicted storm location, they had trouble locating the eye. After some hunting around, they found the hurricane center nearly 100 miles (160 km) west of where they expected it to be. To their astonishment, the hurricane had made a 135 degree left turn and was now moving due west. On top of that, it was strengthening! By the afternoon of the 15th, Hurricane King struck Savannah, GA. One person died in the storm surge and US$2 million in damage was done to Georgia and South Carolina.

The public was outraged that the scientists had caused the storm to swerve into Georgia and threats of lawsuits were thrown about. GE's case was not helped when the head of its Laboratories, Dr. Irving Langmuir, issued a statement that he was "99% sure" the storm had changed course due to the seeding. Chief of the Weather Bureau, Dr. Francis Reichelderfer, thought differently and appointed three of his weathermen to find a case where a hurricane had followed a similar track but had not been seeded. The case was published, demonstrating that hurricanes could swerve like that without the used of dry ice, and the threats of lawsuits eventually evaporated.

But the public's early enthusiasm for weather modification slackened. In an era when many science fiction movies featured mad scientists threatening world destruction (or worse) from their hubris, this event seemed to fit the trope. For many years after, no scientist dared mention 'weather modification' and 'hurricane' in the same sentence. Eleven years later, the National Hurricane Research Project carried out very modest seeding equipment tests in a hurricane, but kept things on the "down low" until they were sure the storm wasn't going to pull a swerve on *them*. It wasn't until 1962 that the U.S. Weather Bureau and Department of Defense reached a formal agreement to carry out Project STORMFURY, and attempted to seed hurricanes again.

References

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P.S. Thanks to David Reade for some corrections to this post

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