Beating the Hurricane

By William G. Shepherd

Here's the story of the man who drew the teeth of the September hurricane. For 250 hours Charles L. Mitchell of the weather bureau plotted the course of its smashing charge. He cleared its path. For the first time in history man was able to outwit a twister. Mitchell's predictions saved innumerable lives and millions of dollars in shipping.

Charles L. Mitchell, forecaster at the weather bureau in Washington, D. C.

BY HIS long-distance forecasts of the September hurricane, Charles L. Mitchell astonished newspaper readers throughout the world. He gave warnings 48 and even 60 hours in advance; he cleared the storm lanes of all shipping so that not one ship was lost; he told the people of the Florida coast a dozen hours in advance when the storm would hit them. More than that, he indicated exactly what place on the Florida coast its center would strike.

Twenty-eight years ago six thousand people were drowned by the sea in the Galveston hurricane, when they might, with twentieth-century forecasting, have gotten out of the storm's way. This year in Florida, householders had one whole day in advance in which to do carpenter work, boarding up windows of the homes so that when the storm struck they could take their families to strong public buildings, or the steel and concrete hotels. They received plenty of warning and plenty of reason from Mitchell to mistrust the salty sea. The tragedy of the Florida storm, with the loss of 2,000 lives, was that no one foresaw in the face of Mitchell's storm warning that the walls of the fresh-water Lake Okeechobee would be broken down by the hurricane and the lake partially emptied over the countryside. Not more than ten persons were killed by the sea on the Florida coast itself.

The Eye of Twentieth-Century Science

The eye of the Creator of storms could not have followed this storm of 1928 more closely than did the eye of twentieth-century science. It has already become a historic storm because the weather bureau was able to watch it longer and more closely than any other hurricane ever known.

A weather forecaster reminds you somewhat remotely of a theatrical star as you see him at work in the weather bureau in Washington.

Every morning at 8 o'clock, Sunday, holiday or whatnot, and every evening at 8 o'clock six men seat themselves on high stools on opposite sides of a long, breast-high desk, with maps before them.

At the end of the desk stands a young man who from time to time reaches behind him into a tiny elevator, which comes up from the telegraph-room below, and draws therefrom a handful of messages typed on yellow tissue paper. You couldn't read them; they're in a strange code.

He decodes these messages, which come by wire and radio from about 300 weather observers throughout the land, from remote islands in the Atlantic and Pacific and from ships at sea. You must have a special pass to sit in this room during one of these periods. You hear the decoder read out what seems to be a hopeless muddle of facts about winds, barometric measurements, temperatures and so forth; snow here, rain there, all kinds of weather everywhere. The map men setting down these facts work quickly and silently. After about half an hour all the messages have been read.

Now the maps are ready! Into the great long room comes the forecaster. He stands at the breast-high desk, with a strong light flooding the markings which the map men have put down. Through the eye of the science of meteorology, after long training, he is able to read sense and meaning into the flood of facts which has just been received.

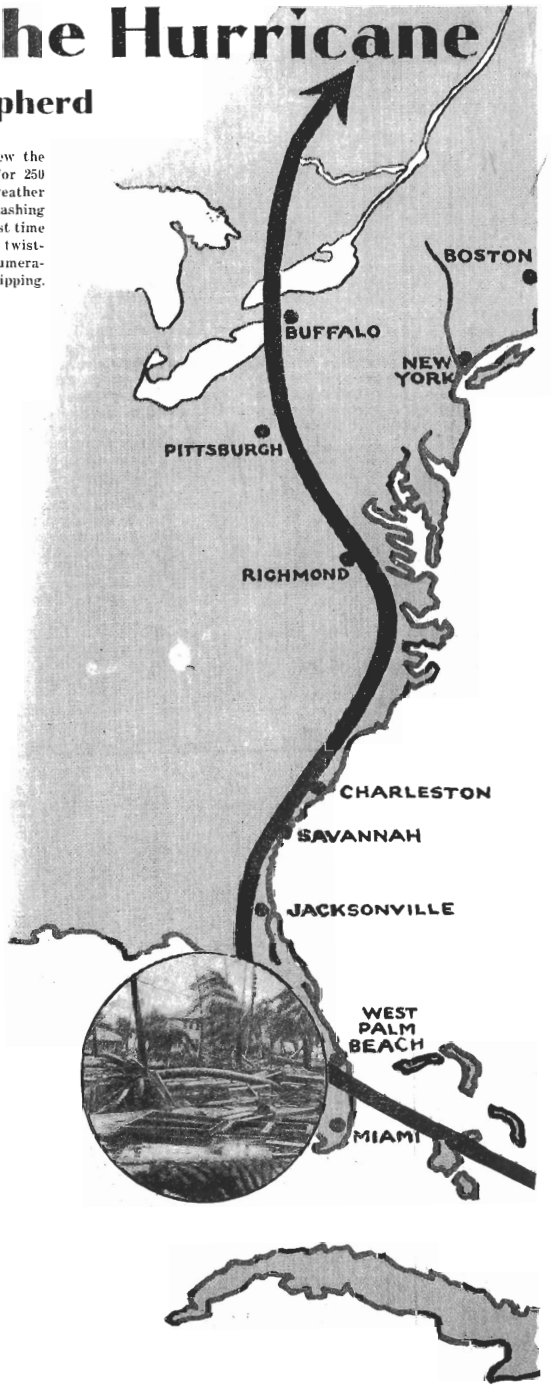
The Forecasters of the Future

In Roman days the augurs used to read prophecies in the entrails of chickens which had been opened for them by servants. This twentieth-century weather bureau prophet finds more sensible material for prophecy in the data that the map men have made ready for him.

He's a star in the map-room. Everyone waits silently for him to speak. No wonder every young man in the weather bureau office is struggling to be a forecaster some day. These youths practice daily at making forecasts and an inspector checks up on these forecasts for the purpose of selecting our forecasters for the future.

I saw the now-famous Mitchell read his forecasts one evening, during the tag end of the ten-day hurricane. He scanned the maps and then he began to talk slowly. A young man at a typewriter took down what he said. It was a short message. You probably read it in your morning newspaper the next morning. As soon as he had concluded this message a radio operator came in from a side room and took the copy from the typist. Within a moment we heard the deep roaring of the gigantic Arlington station which was sending out to France, England, Germany, Italy, Mexico, South America, Sweden, Russia and elsewhere the prophecy which Mitchell had just made. For 20 minutes Mitchell continued to read: tomorrow's weather for 19 different states; the next day's weather in 5 different flying zones across the continent, at altitudes of from 1,000 to 10,000 feet and a special Atlantic weather prophecy for Cesare Sabelli, aviator, who was planning to fly from Maine to Rome.

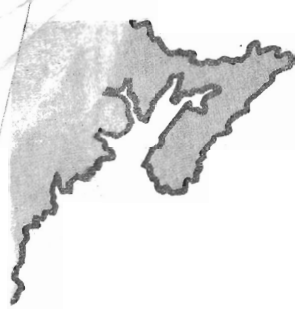
These forecasts were all wired from the telegraph-room downstairs to more than 1,100 points.



To top it all off a second radio operator went into another radio-room and there read out the various forecasts that not only the land-bound folks along the Atlantic coast but ships at sea might also hear the news. Rapid typesetters in a corner of the room were putting into type the words of the prophet, for the purpose of printing them on weather charts. There's plenty of romance in being a forecaster.

We've been in the forecasting-room; now let's get out on to the ocean where the storm started. There are two other heroes of this story beside Mitchell. They are two American ship captains.

This story indeed really begins with them and their two small American



freighters out in the middle of the Atlantic.

This fact makes just a little dash of geography necessary. We North Americans somehow think that about as much Atlantic Ocean lies between South America and Africa as lies between New York and England. Nothing like it. From Kansas City to Spokane is an easy tourist's ride of about 1,600 miles. Well, the shores of Africa and of South America at one point bulge out in the Atlantic toward each other until there is a gap between them only 1,600 miles wide.

A Tragic Week

Down in this part of the world, on the afternoon of Saturday, September 8th, while America was enjoying its autumn half holiday in motor cars, at ball games or otherwise, two American ships were approaching each other.

Each was a week out from port; each had more than a week to go on the lonely Atlantic.

One of these ships was the Commack. She had passed through the gap between South America and Africa and was heading toward Boston.

The other was the Clearwater. She was heading toward the gap on her way from New Orleans down toward Rio.

They were both freighters; they had been built during the war in those days of riveting races in our wartime shipyards.

These two ships were about 250 miles apart, out there, that Saturday afternoon. It was hot on their decks; 82 degrees. There is not much wind down there ordinarily; so the sea was calm and smooth.

"But I didn't like the looks of the sky that Saturday night at sunset," Capt. Leonard Watkins of the Commack told me after he had reached port. "Something about it looked strange. Things still seemed sort of queer Sunday morning and as Sunday wore on my barometer didn't seem right. So I began trying to talk with whatever ship might be around me. I picked up Capt. A. O. Oden of the Clearwater. That Sunday afternoon I was pretty sure a storm was brewing."

A storm brewing! Sunday afternoon! He was right. One entire week and still another tragic Sunday were to pass before that brewing storm would cease its wrecking and its slaughter. Three days after Capt. Watkins first sniffed it, it was to kill 600 people in the French islands; four days later it was to strike Porto Rico and kill 1,000 more. It was to live throughout the week and on the following Sunday afternoon it was to strike the coast of Florida and was to drown over 2,000 people in the overflowing waters of Lake Okeechobee. It was to range sea and land for ten days; drive ships into overcrowded harbors all along the Atlantic coast, clear into Maine, kill people with falling signs in the far-away city of New York, and, expiring, was to pass inland into Canada over Buffalo and ruffle the Great Lakes.

Capt. Oden talked to Capt. Watkins.

"My barometer is dropping at the rate of one fifth of an inch every two hours," he told Capt. Watkins.

"What is your barometer now?" asked Watkins.

"Thirty naught eight," replied Oden. "Mine is twenty-nine ninety-four," announced Watkins.

The two captains figured out this puzzle on their respective ships. Their barometers were one seventh of an inch apart, a tremendous divergence near the equator; their ships were only 100 miles apart. The puzzle was all the greater because neither had any wind to speak of; one 34 miles an hour, the other 10.

But they both knew that the weather somewhere in their neighborhood was upside down.

Capt. Oden began trying to talk to other ships that might be in the vicinity; so did Capt. Watkins. They picked up a British ship, believed to have been the Erdine, 100 miles to the northwest. Out there in mid-Atlantic the three ships went into conference by radio. They made the astonishing discovery that the wind, though it was not heavy, was blowing in a different direction for each ship.

A Hurricane Expert

More figuring and calculating. Each captain decided that the facts could mean only one thing: a hurricane was raging in the area between them. They had been talking through it. Each ship was on the outside edge of the storm. The Clearwater was right in front of it and slanting into it. The Commack was on the northeast side of it, passing away from it and the British ship was on the northwest side of it, heading toward it.

Steamship captains these days, like weather bureau officials, know more about hurricanes than they did back in the Galveston storm period. Forecaster Mitchell himself described a typical hurricane for me:

"Out there, between these three ships, was a great whirling circle of wind, about 100 miles in diameter. The whole great circle was moving forward toward the west.

"A hurricane may revolve at a speed anywhere from 100 to 250 or even 500 miles an hour. But the whirl itself moves at varying degrees of speed.

"Most West Indian hurricanes, such as this last one, start in the doldrums near the Cape Verde Islands, off Africa, when two winds get to blowing parallel to each other, but in opposite directions. They seem to join together there and start a whirl, which grows in intensity as it moves across the Atlantic toward the Caribbean.

"Most of the hurricanes I have studied do not strike the coast of the United States. They may hit a small island or two, though the chances of that are slight. Most of them are born in the ocean, pass northward across the Atlantic without touching land and die out up in Iceland, Greenland, Sweden or Russia.

"And this was the kind of storm those ship captains discovered that day."

Ship Captains Aid Weather Bureau

Those two American captains did a most praiseworthy thing: they figured out and guessed the exact location of the center of the great storm that was being born in their midst. Capt. Oden turned his chart-room into a mid-ocean miniature weather bureau. He put together all the facts he had gleaned from near-by ships in the storm council of captains and on Monday morning sent a message to the weather bureau in Washington. It read, translating liberally for the benefit of us land-lubbers:

"Summary of ship reports which I have gathered in this area indicates that a storm area is centered between 48 and 51 west longitude and about 14 degrees thirty minutes north latitude."

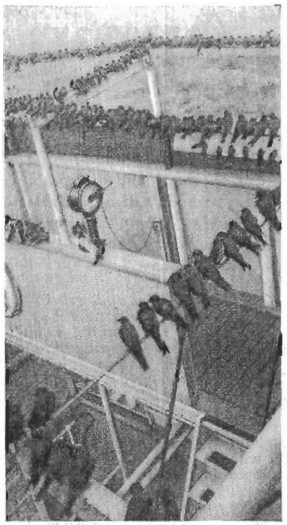
All three of these ships scampered out of the zone of the storm and never felt even an extra-hard puff of wind. But they had done their job well. They helped the weather bureau to keep, literally, scores of other ships out of the course of the storm.

Now, back from the sea, where the captains for two days have been puzzling about the weather, to the forecasting-room in the weather bureau in Washington.

As usual, on this eventful evening of Monday, September 10th, the map men sit on their stools, in the glare of the electric lights, while the decoder calls out the hundreds of weather reports. They make strange markings on their great squares of paper. The usual signal is sent in to the forecaster's room to tell him that the maps are ready for him to read.

It happens that the forecaster for this month of September is Charles L. Mitchell. It also happens that Mitchell is one of the world's experts on West Indian hurricanes. For years he has studied—almost at the risk of being called a "nut"—the history and the routes of over 300 great hurricanes. He has learned their habits and their courses. He has even made an imposing book of his findings. He's perhaps the one man in all America for this night's work.

Way off in one corner of his map, that evening, he saw marked the positions of the two small American freighters which that day had sent in their usual



Harbingers of the hurricane. Birds take shelter on passing vessels

8 A. M. reports, as every American ship captain is expected to do.

What's this? Here are two ships 100 miles apart, with a difference of almost one seventh of an inch in their barometers. And here's something more: the ship that is farther north has the lower barometer. It ought to be the other way about. This condition means that the weather balance is upset. Here's a storm!

The two telegrams which the ship had sent in were read again. Here's what they said in code:

"SS Commack, to Govt. Observer, Washington, via Tuckerton.

"Carbuncle bine gobelin tefsa dafer."

"SS Clearwater, to Govt. Observer, Washington, via Tuckerton.

"Carbuncle benefit mudrug outsail debuke."

"Carbuncle" means "morning;" the other words mean other things concerning winds, temperature, barometer, the ship's position and so forth.

With the facts verified Mitchell drew isobars, those wavy lines you see on official weather maps, which mark the boundaries of various weather conditions. He was able there at his desk in Washington 3,000 miles away to decide as definitely as had the two ship captains, on the very edge of the storm, just exactly where the center of the storm was situated. And that's how the weather bureau caught the storm so early. It was certainly not many hours' old when it was first noticed. "Two vessels in the Atlantic, fully 600 miles east of the farthest outpost in the Lesser Antilles, sent in indications of the storm," is how the weather bureau officially reports this earliest catch in all weather bureau records.

Mitchell there at his desk that evening read out his first warning—a storm 3,000 miles out in the Atlantic; almost one eighth of the way around the earth from the coast of North America and Florida.

Other ships began sending in reports on Tuesday. (*Continued on page 40*)

The path of the great September hurricane. Insets show glimpses of the havoc wrought along its route

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Mitchell was able to work out the speed at which the storm was moving, about 450 miles every 24 hours.

His years of studying the habits and courses of such hurricanes helped him now. He had the terrible wild thing in hand, because he knew what it would do. He began sending out advisory notices and storm warnings twice a day.

It was one of the most brilliant pieces of forecasting ever done in weather bureau history. First he began to warn the Antilles Islands. He warned British and French islands. He was able not only to tell where and when the storm would strike but his warnings relieved the minds of hundreds of thousands in other island points who had no need to worry.

He practically told where the storm would not strike. For instance, all those south of Martinique were relieved of all fear even when the storm was nearest to them.

But within 60 hours from the first notice of the storm a strange thing happened. Ships in its path stopped talking; all were silent. That meant the ships had gotten out of the way. Thus facts and figures for forecasting were missing from the actual storm area.

Right at this point came in the most brilliant of Mitchell's work. He had to deal with sheer mathematical calculations, for about 48 hours. But he knew the course of such storms; this storm would have to be very different from any of its 299 brothers which Mitchell had studied if it didn't follow certain course.

The Navy Department began sending out Mitchell's warnings to all ships at sea; the great Arlington station boomed them to all the world.

There came a time when the islands themselves became silent; that very silence meant that the storm had struck them. Mitchell used these various silences in estimating the course and speed of the storm.

A Tiny Dot in the Sea

By Thursday morning he realized that the Atlantic had one of the most violent hurricanes of history on its bosom. The storm was becoming as vicious as any recorded scientific records. It would in a general way move as other hurricanes had done; there could be no doubt about that.

Turk's Island is a tiny dot in the sea. It—

"The center of the storm will pass near Turk's Island tomorrow night," prophesied Mitchell 24 hours before it struck there.

"By Sunday noon," prophesied Mitchell, about 48 hours in advance, "there will be hurricane winds about 60 miles southeast of the coast of Florida."

Mitchell was working 24 hours a day on the fifth day of the storm; so was the entire weather bureau force. The Navy was asking questions; so was the Red Cross; so were all the shipping companies; so was the American Automobile Association, which wanted to know whether the storm would strike the South (as it did); so were business concerns of all kinds. Mitchell had to give quick and sure answers.

Storm warnings went up along the coast at his orders. Ships went into ports until harbors were choked with shipping.

There was one more puzzle for Mitchell to solve while the storm was off the coast of Florida that second Sunday morning. It was this: would the storm turn north into the Atlantic and not touch Florida's shores? Hurricanes, as we have seen, frequently do this. If all the West Indian hurricanes that start in the Atlantic were to strike Florida during their favorable months of August and September the place would be uninhabitable at that period. It never could have been built up as it is. Upon Mitchell's answer to this question depended the lives of tens of thousands of human beings.

He studied his maps after the eight-o'clock readings that Sunday morning. Way up North, across the Canadian border, was an area of "low barometer" reaching out into the Atlantic.

A "low" is an obstacle for a hurricane. It hems it in like a gigantic sky-high stone wall.

Mitchell saw, in that Sunday-morning reading, that this "low" would keep the storm from turning up the Atlantic outside the coast. He decided that it would hit Florida full force. He had already ordered up more "storm warnings" for Florida many hours previously. But at 10:30 that Sunday morning he changed these to "hurricane warnings."

Telling me later about the storm, Mitchell said of the two American sea captains, "They certainly knew their onions."

All America that came within the zone of this hurricane may well say of Mitchell that his own onions were not unfamiliar to him. This twentieth-century weather forecaster, working with twentieth-century tools and twentieth-century facts, actually pointed out the very spot at which the storm would hit the Florida coast—the little town of Jupiter.

It was a wild, tragic Lord's day, that Sunday of September 16th.

The storm had hit land. It would curve up northward along the richest part of the country. Ships were in port; even battleships of the navy. The Coast Guard was on the alert but no calls came from the sea for help. Citizens of the Florida coast, remembering the Miami storm of 1926, had taken shelter in public buildings, with their homes boarded up. Only in the interior of Florida, in the Lake Okeechobee district, where no one imagined that a lake, in a hurricane, could be more deadly than the hurricane-torn ocean itself, were people off their guard. They had been warned against wind. But no one could warn them that the dikes of the lake might burst.

Of Wide Extent and Severity

Here are Mitchell's three warnings sent out on that September Sunday:

"Hoist hurricane warnings 10:30 A. M. Miami to Daytona, Fla. Northeast storm warnings displayed north of Daytona to Savannah and northwest storm warnings south of Miami to Key West and north of Key West to Punta Gorda. No report this morning from Nassau. Indications are that hurricane center will reach the Florida coast near Jupiter early tonight. Emergency. Advise all interests. This hurricane is of wide extent and great severity. Every precaution should be taken against destructive winds and high tides on Florida east coast, especially West Palm Beach to Daytona."

At 1:05 P. M. this notice went out:

"Hoist northeast storm warnings north of Punta Gorda to Apalachicola hurricane center noon about 26° N. 79° W. moving northwestward. Its center will move inland between Miami and Jupiter probably late this afternoon. Increasing northeast winds along west Florida coast reach gale force Tampa to Apalachicola tonight."

At 5:15 P. M. another warning was issued:

"Change (from storm) to hurricane warning 6 P. M. Punta Rassa to Cedar Keys, Fla., and display northeast storm warnings west of Apalachicola to Mississippi coast. Hurricane center 4 P. M. near coast between Miami and Jupiter still moving northwestward unless course changes. Hurricane center will reach west coast not far from Tampa Monday morning. Emergency. Advise all interests to take precautions. This hurricane is of great intensity and wide extent."

After the storm was over—it lasted ten full days—the weather bureau said conservatively: "Few West Indian hurricanes have been so severe as this one for so long a time."

Safe to say it is the most violent that has ever struck America within modern times, including even the Galveston storm, which Mitchell, years later, traced clear up into the heart of Russia.

For four days after this storm lived through its second Sunday and wrecked the homes of Florida, Mitchell watched it night and day. He warned of its movements up the coast, clear to Maine, and, by his word, ships went into harbors, snug and safe, up to the northern border of the United States and in Canada. He had played tag with the hurricane—and won.

It was on a Wednesday evening, while the now weakening 10-day hurricane was heading toward the city of Washington itself, that I sat in the forecasting-room and saw the now thoroughly tired Mitchell reading his evening forecasts from the maps on the high desk.

There was no more warning to give, except that ships in harbors might safely leave for southern points but must not head north; high winds, but not of alarming hurricane force, might strike New York or Boston. Within 12 hours all ships safely put to sea.

Watching for Ten Nights and Days

"No one needs to stay here at the bureau during the night," Mitchell said to the staff. There was a sigh of relief from a dozen tired men.

Gusts of strong winds carrying rain were beating now and then against the windows of the weather bureau office, remnants of the storm, which, through the eye of the radio and of the science of meteorology, this tired man had been watching for 10 nights and days. On the porch outside the building small graceful potted palms from the Agricultural Department's hothouses were bending and twisting in the small gale, grim reminders of great palms which had been bending, cracking and breaking under the wind on Caribbean islands through many days past. I saw Mitchell look at the gracefully waving little palms as we passed out.

"Tag end of the storm," said Mitchell simply as we went out into the wet glare of Washington's street lights. The man who had written a book about hurricanes was going home for his first full night's sleep in over 250 hours.