FLY INTO THE HEART OF A TYPHOON

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Heroic in peace as in war, B-29 crews roam the wide Pacific exploring the turbulent hearts of typhoons

Look a Typhoon in the Eye

By George Scullin

HER NAME was Beverly, and when she was born she was just another puff of cloud on the northern edge of the doldrums. Millions like her had been born that day, and they lay in the warm sun above the equatorial current like a blanket of cotton balls all the way from Borneo to the coast of the Americas. All day they floated in the hot, moist air, their shadows barely moving on the dead blue water below, and that night in the coolness they slowly sank and vanished. All except Beverly.

Sometime during that December

Lt. Lykins makes a careful instrument check before take-off on perilous flight into storm

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afternoon the stagnant air held within the strange walls of the doldrums had spilled over, and Beverly was carried north on the overflow. That night there was no warm air beneath her in which to sink into oblivion. Instead, a refreshing cool stream from an air mass to the north slid below, and she found herself being hurried up its slope. Around her in the darkness were other vague shapes and, as she rose higher, they fell in behind her and began joining their forces to hers. Before dawn, swollen into a vast, towering mass, she expressed her resentment of her uncomfortable condition by releasing bolt after bolt of lightning into the cold air that had caused it all.

The next day did nothing to improve her temper. She found herself squeezed into a narrow valley between two domes of cool air, and while it was easy to drift down the valley, every hour carried her farther and farther away from the quiet doldrums. It was getting colder. The left side of the valley was steep and rough; the right side sloping and smooth, and the obstructions kept dragging at her left side, holding her back. As she flowed north at 15 miles an hour, she encountered a new annoyance. Down around the equator the pull of the spinning earth had been constant, almost as straight as gravity itself, but up around latitude 15, North, its pull was weaker on her north side than on the south. Twisted by the pull of the earth and snagged by the obstructions on her left, she began to turn like a chip in a swirling stream. So Beverly drifted north and east, fuming and spluttering and drawing to her assistance all the warm, moist air from a hundred miles around. Occasionally, her rage overflowed and she would drench the ocean with lakes of water, or she would lash at an island with venomous fury, tearing out giant palms like dandelion tufts.
On her third day, grown now to a hundred miles in diameter and still circling sluggishly while awaiting reinforcements, she made a trial test of her strength. While an alarmed skipper saw the bottom fall out of his barometer, she hit his freighter a quartering blow with a 60-knot gust that drove the starboard rail into the water. She hit him again before the ship could right itself, but she had neglected to pile up enough of a sea to smash him down for keeps. The ship lurched out of the danger area, but with no radio left to notify the world of its experience. Beverly lashed on, pounding the seas with such violence that the bottom three miles below shook.

On the island of Guam, a thousand miles to the east, the ultrasensitive seismograph of the U. S. Navy’s weather station picked up the vibrations of the ocean bottom. A few minutes later the seismographs at Okinawa and Manila were taking bearings on Beverly’s outburst, and within an hour her position had been pegged. She was, the Navy announced, a big storm that had ambitions to become a dangerous typhoon.

The boys at the U. S. Air Force weather station on Guam had not been caught napping. They had noticed an hour earlier an almost imperceptible drop in the barometer. On this island, where the weather is always perfect, a change of any kind can be only for the worse, and a pressure change so light as to be ignored elsewhere is here regarded with deep suspicion. The radio, too, was bringing in the repercussions of Beverly’s electronic indigestion.

The next morning there was no need for seismographs or barometers to warn of Beverly’s approach. A roller longer than the whole island heaved out of nothing and smashed upon the coral. A long pause, as though the sea were taking a deep breath, and another roller foamed up the beach. After that you could see them, a quarter of a mile from one round crest to another, each roller firmly rounded in front and then gently sloping back in a long smooth fetch to the base of the next. In the west the blue of the sky was cloudless, but the
milky whiteness that usually lay low upon the horizon now extended well up into the heavens, and it was no longer friendly.

The time had come to do some flying.

The big B-29, peregrinating weather laboratory of the 514th Reconnaissance Squadron of the 2143rd Air Weather Wing, is gassed for very long range, and the ground crew again goes over her sun-bleached, rain-scarred skin, looking for ripples in the aluminum fairing and for loose rivets. She is a tough old bird.

In the weather shack of the U. S. Air Force Weather Central at Harmon Field, the weather forecasters and analysts of the Typhoon Warning Network were going over their charts with Lt. David W. Lykins, in command of the flight, his two co-pilots, his weather observer and his navigator. The charts showed Beverly had tightened up considerably during the night, and although her top was spread like an umbrella over 200 miles of sky, she was winding up around a central core of less than 50 miles in diameter. Wind velocities on the northeast side were pounding at the 100-knot mark, while those in the southwest quadrant were hitting 70 and 80 knots in gusts.

"She seems fairly well behaved," says the chief observer. "Not as bad as Ione or Karen or Libby. We'd like to have you hit her at about 10,000 feet and penetrate to the eye."

"Any special instructions?"

The chief hesitates. "Well, yes," he admits. "When you get inside the eye, you might buzz around a bit, then drop down to 1500 feet and break through her wall at that level. We're getting a good picture of typhoons at high level, and we know from ships what they do at sea level. Now we would like a cross section at low level."

An aircraft carrier rides out a typhoon in South China Sea. Despite the extreme roll and apparent danger, at least one crewman grins with confidence.

Light cruiser is tossed around like a rowboat in heavy typhoon sea. Below, destroyer looks half submerged but is only caught in trough of giant waves.

Bedlam in the cockpit is portrayed on opposite page as the B-29 worked its way out of the typhoon eye. The crew said it was like "hitting Niagara Falls".
The three pilots exchange glances. The navigator gulps. The weather observer looks eager. “Yes, sir,” he says.

No plane, or at least none ever seen again, had tackled a typhoon at low level before.

At 3 p.m. the B-29 leaves Harmon Field and heads due west. On board, in addition to the men listed above, are a radar operator, a radio man, a flight engineer and two scanners, one for each side of the plane, to watch for damage during those moments of extreme turbulence when not even the loss of an engine would be felt by the pilot. Flight lunches and all gear are carefully stowed. Safety belts and shoulder straps are checked again for the 20th time.

Two hours out the first feathers of a high fan of cirrus clouds reach their tips over the plane, and the weather observer, seated in the nose between and slightly below the pilots, estimates their altitude at 30,000 feet and their length at 100 miles. Lykins is holding the plane at the 700-millibar level, and the radar altimeter by the navigator shows a true altitude of 10,000 feet. Under normal weather conditions the barometric altimeter scaled in millibars drops 34 millibars for each thousand feet of climb from a standard of 1013 millibars at sea level, and a quick comparison of the two altimeters shows that Beverly’s presence has caused little drop in barometric pressure.

Ahead the swells on the sea are growing closer together and higher. They are like the spreading ripples of a stone dropped into a millpond, closest together near the scene of the disturbance, but now, even from 10,000 feet, the sea is no millpond.

Whitecaps appear on the swells, and then the whitecaps are blown to a froth that whips away at right angles to the direction in which the waves are moving. The navigator estimates the swells rolling east at 26 knots, the wind swirling north at 50 knots. A high-reaching gust flows beneath the plane and gives it a playful toss the height of a five-story building, and then drops it ten. The radar operator, tuning in on the eye, has his hand wrenched from the knob by the toss, and has to begin over.

And then Beverly looms before them.

Radar operator on weather plane found weak spot in typhoon wall through which Lykins’ plane “escaped”
Low at first, only her crown of innocent puffs gleaming white beneath the late sun. To north and south the roof of clouds lie, almost in a straight line, and the B-29, much smaller now, moves toward them as if drawn by some superior power. Minute by minute the clouds seem to grow higher. The sun is swallowed, leaving a blazing halo on the topmost puffs, while the solid wall beneath turns from gray to black. Lightning flashes inside the blackness like the opening and closing of doors in a blast furnace. A deck of strato-cumulus clouds slides beneath the plane, looking amazingly smooth and calm after roiled waves, lashing out in all directions.

The radar operator has the eye of the storm on his screen, high and to the right. Lykins swings the plane 25 degrees to the right, and stretches against the shoulder straps that are pressing him into his seat until his backbone seems permanently curved. The picture of the eye is clear, like an X-ray in green of the bow of a man's rib. Occasionally, lightning flames across the screen, but the eye always returns.

The navigator makes his final notations as Beverly towers above him, her 40,000-foot summit suddenly wiped out in a blast of rain. His pencil bites deep into the paper on an updraft. "Surface winds, 70 knots from 180 degrees." A downdraft lifts him hard against his shoulder straps but his trained pencil, barely touching the paper, records, "Temperature still 10 degrees Centigrade at 7:56Z."

The weather observer had quit making notations on paper, and is now talking into a voice recorder. "Moderate rain. Ex-oooh-treme turbulence."

The radio operator has locked his mike in a bracket and is now pounding his key at a steady 20 words a minute as the navigator hands him position reports and the ob-server feeds him the last written notations. The third pilot, clinging grimly to any handhold, acts to relay the messages from man to man.

From Lykins report we get the following: "At 09:06Z we broke into the most beautiful and well-defined eye that I have ever seen. It was a perfect circle, about 30 miles in diameter, and perfectly clear overhead. The sides sloped gently inward toward the bottom from 25,000 feet, and appeared to be formed of a solid stratus layer down to...

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**Wartime typhoon caught USS Hornet and twisted her deck like a hot brim**
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The third pilot unbelts himself from his observer’s seat and lurches forward. An updraft crushes him to his knees, and a forward pitch tosses his head into the aluminum tubing of the captain’s seat. Another twisting dive slams his ribs against the copilot’s seat, but he gets a death grip on a cross brace. One big hand closes over the four throttles and the speed is brought under control.

But Beverly is not through. She shakes the B-29 until the rivets pop out of the flight deck. The aerial camera is torn from its rack, dashed against the ceiling and hurled to the floor. The radio operator’s earphones are torn from his head and then thrown back into his face. The navigator’s kit is emptied of maps, and they float in the air, obeying no laws of gravity.

Back in the cabin the two scanners, battered by flight lunches, Thermos bottles and life rafts, watch in consternation as sheets of aluminum torn from the wing fairings go flashing by in the brilliant glare of the Aldis lamps they have directed over the wings.

Says Lykins in his report:

“It is impossible for me to describe accurately or exaggerate the severity of the turbulence we encountered. To some extent is may sound utterly fantastic, but to me it was a flight for life. I have flown many weather missions in my 30 months with the 514th Reconnaissance Squadron. I have flown night combat missions in rough winter weather out of England, and I have instructed instrument flying in the States, but never have I dreamed of such turbulence as we encountered in typhoon Beverly. It is amazing to me the ship held together as it did.”

Suddenly it is all over. Beverly has lost her plaything. When turbulence has been reduced to ordinary cyclonic intensity, the crew has time to take stock of what has happened. The period of extreme violence has lasted six minutes. Present altitude, 6000 feet, a climb of a thousand feet a minute while trying to fly level, and in spite of downdrafts, some of which exceeded a thousand feet. The inside of the plane looks as though Beverly had blown through it instead of around it. The navigator crawls around on the floor, retrieving his gear. Green grass flickers across his loran screen, and then the signals come marching in, straight and true. He takes a fix and gives the heading for Clark Field, north of Manila. At 11:35Z the B-29 is on the ground again, staggering slightly as she rolls to a stop on the long runway.

The B-29 lived through that one by a narrow margin. Hundreds of rivets had (Continued to page 252)
been popped from her skin. The flaps were twisted. Great gaps showed in her fairing, and the R.F. unit in the center section of the bomb bay had been torn from its moorings. The fuselage was twisted. Whether she will ever fly again still remains to be seen after a survey of her internal structure is completed.

Beverly roared out on to sea, obeying no laws of meteorology. A nice trough developed into which she could drift northwest into China as do most of her sisters, but she broke through it. A steering wind at the 600-millibar level was guiding her north when suddenly she turned on it and ripped it to bits. Then when it looked like no power on earth could stop her, and the poor Aleutians were going to lose some more breakwaters, a great mass of polar air tore the heat out of her in great gouts of rain. When last seen on the weather map, she was just a mild speck in a cold winter.

The lakes of water carried by Beverly and the billions of tons of sea water she displaced were all wasted on the open sea. But it was only her own strange whims that kept her from assaulting the land with the same vicious force that destroyed 20,000 boats and killed a quarter of a million people in Bengal. A twist to the west, and she could have duplicated the typhoon that washed over Honshu in 1934, killing 4000, or she might have equalled the damage of her predecessor who hit India in 1942 and killed 40,000.

Modern structures and even great battleships mean nothing to typhoons like Beverly. In 1944 one caught the U.S. fleet off Japan, damaging 28 ships and rolling over and sinking three destroyers. More than 800 officers and men were lost in that blow. A few months later the heavy cruiser, Pittsburgh, had her bow cut off as though hit with a giant ax. Two other heavy cruisers were knocked out of commission, the great aircraft carriers Hornet and Bennington had their flight decks smashed to kindling wood, and 28 other ships of the fleet were too battered to continue the mission.

Only the warnings of the typhoon trackers prevented greater loss when the worst typhoon in 20 years struck Okinawa in October 1945, killing 43 Americans and leaving 50,000 homeless. All that was loose was blown away, and then the ropes and anchor chains were torn from everything thought secure. Almost all food was lost, and 130 vessels of all kinds were sunk, crashed into the beach, or swept far inland.

Sometimes not even taking refuge in storm cellars will help. The typhoon that hit the Philippines in 1911 dropped 46 inches of rain in 24 hours (approximately New York’s annual rainfall) and then backed up to drop four feet more in the next three days. An eight-foot lake covered all level ground.

Last year, with the seismograph boys bringing their new science of storm detection through earth tremors to perfection, and the typhoon trackers riding hard on all storms, the damage was greatly reduced. But that only applies to ships and aircraft that can be moved out of harm’s way. In January 1948, Karen nearly washed away the island of Yap, the only food left being the taro roots deeply embedded in the ground. Libby moved in on Okinawa again, doing $10,000,000 in damage, but this time no lives were lost. Tone slammed into Tokyo with a heavy toll of life and damage.

All told, the 514th has flown more than a hundred typhoon-tracking missions in a single year with eight storms developing into full-fledged typhoons. The average is 25 a year. There is no such thing as a typhoon season; it’s just that they get a little worse in August and September. Nor is there such a thing as a typhoon belt. In general, typhoons seem to show a tendency to drift northwest, dissipating over North China, but any one of them is just as apt to take off for the Aleutians or North America, or to turn around and go back where it came from. Some just can’t make up their minds, like the one that blasted Okinawa in 1945. It went by, backed up for a second crack, and then just lay there in indecision, its trailing cone of intense wind flicking back and forth over the island like the tail of a stalking cat.

The typhoon, from the Chinese t’ai fung (great wind) or the Arabic tufan (tempest) does not qualify as such until its velocity reaches 75 miles. Some have been known to reach 175 miles per hour.

Technically, there is no difference between a Pacific typhoon, an Atlantic hurricane, an Australian willy-willy, or an Indian Ocean cyclone. All are born of the warm, moist air girdling the earth at the equator, a stagnant belt known as the doldrums. If they move north, they pick up the spin of the earth at about 15 degrees latitude and begin to twist in a counterclockwise direction. If they move south, the spin is reversed to a clockwise direction. Some hold that the Pacific typhoon is more violent than the Atlantic and Caribbean hurricane, but if this is so, it is only because typhoons have vaster areas to get up momentum before encountering obstructions. The hurricane that wiped out Galveston, killing 6000 in 1900, or the one that roared over Florida in 1928, blowing
the water right out of Lake Okeechobee and drowning 2000 persons, can hold their own in any typhoon league.

Only in the last five years has man had the means and the courage to study typhoons inside out and from top to bottom. The airplane, radar and the seismograph are revealing a lot of their mysteries, but so far nothing is known why they behave as they do, and go where they go. The seismograph is the latest instrument to be brought into play in tracking the typhoons. The Rev. J. E. Ramirez, while at work at St. Louis University, was first to notice that heavy storms produced enough earth tremors to be picked up by a sensitive seismograph, and in 1943 the Navy began experimental work along his suggested lines. Today, microseisms reveal the presence of small storms as far as 300 miles away, and the giant typhoons can be detected more than 2000 miles away. With several seismographs taking bearings on the disturbance, its path can be followed minute by minute with an accuracy of 20 miles.

In the meantime, the typhoon trackers and the hurricane hunters continue to slice through the tempests in their study of typhoon anatomy. It is doubtful that ever again will any existing planes make a low-level assault such as Lykins' attack upon Beverly, but much still remains to be learned at the upper levels. Maybe somewhere between 10,000 feet and 50,000 feet will be found the secret of where the storm is going next.

Thanks to their work, the death toll has been reduced from 80 lives per $10,000,000 damage to four lives. It is true that this picture is not entirely accurate, property values having increased tremendously, billions of dollars in crops and industries having been developed in the Pacific within the last 20 years, and more billions along our Gulf Coast. But by the same token there has been a huge increase in population density. And, thanks to the warnings, property damage has been greatly reduced by proper precautions, and the heavy loss in shipping has been nearly eliminated by getting ships and airplanes out of the threatened area.

Whether or not ways can be found to prevent typhoons remains to be seen. Since the typhoon's power is based on its latent heat, it may be vulnerable to attacks by Dry Ice, but one dry comment to this is that there isn't that much Dry Ice in the world.

Until some way is found to stop them, the Navy has prepared detailed instructions on how to sail through a typhoon, the instructions applying to all craft up to battle wagons. In full they read: STAY WELL OUT!