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THE CYCLONE-WATCHER WHO FORECAST THE GREAT BRISBANE FLOOD OF '74 REVEALS: "WHY THE WEATHER IS GETTING SO DANGEROUS"

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When the great flood hit Brisbane in 1974, inundating 10,000 homes and drowning 15 people, I immediately went looking for just one man: a bloke called Arch Shields.

Two years earlier Arch Shields - then long-time director of the Bureau of Meteorology in Queensland - had told me I should write a story on how Brisbane was destined to be hit by a devastating flood. I had been to see him because my editor wanted a story on cyclones, so I thought it strange that he kept talking about floods.

Not only do editors not want flood stories when they are thinking cyclones, but hadn't I been born and bred in Brisbane? Sure, in 30 years I'd seen a few gutters overflow, but Mum and Dad and Grandpa and Grandma had never mentioned the danger of drowning inside the Regatta Hotel.

I decided Arch Shields was a mildly paranoid weather forecaster, perhaps hit by too many thunderstorms. But, at the same time, I was impressed that one small head could carry so much knowledge about cyclones.

The people who worked with him said this was because he had tracked cyclones and predicted the weather for Australian bombers in Timor and Darwin during World War II when he was senior forecaster for planning operations with the First Tactical Air Force.

With a degree in science, after the war he'd been assigned as a senior forecaster to Brisbane. And, in 1959, Arch Shields got the top job, so it was surprising to find he knew so little about Brisbane. Or so I thought until the Australian Day weekend 12 years ago this weekend.

Down the rain came non-stop from cyclone Wanda until you could, for the first time in memory, hear the Brisbane River in the distance.

By the time the Park Royal Motel foyer in the city was under muddy water and the tenth row of seats at the Milton tennis courts were part of the Brisbane River I was out looking for Arch Shields.

His home was cut off by floodwaters, but, being such a key man, the Government had had him picked up by boat.

Hearing this, I rushed to the Weather Bureau high on the hill at Wickham Terrace - only to find it shut. They had recently moved down into the city to the 15th floor of the new Commonwealth Centre - and flood waters were being pumped out of the basement to keep the lift machinery working so the weather forecasters could get to work.

"How did you know about the flood?" I asked the tall, calm Shields somewhat accusingly, as if it was his fault I hadn't believed him. He pulled out some old files which showed that between 1840 and 1900 Brisbane had been hit by three floods much bigger than the 1974 one and another three at least as big. "That sort of meteorological event would certainly recur. The only question was when," he said.

Arch Shields spoke with a candor one never gets from senior public servants, whose usual thought is to protect their or the publicity rights of their minister.

Four cyclones had dropped their water on Brisbane in one month in 1893 - on one day the city got an unbelievable Australian record rainfall (still standing) of almost a metre (35 inches). The city had two floods within a fortnight - both more than three metres higher than 1974. "If such a flood came today the damage would be colossal: it would be beyond comprehension," he said.

Without consulting his political masters he observed that a lot of people in Brisbane had, he thought, built IN the river and the creeks rather than ON them, because the Somerset Dam above Brisbane has created "misplaced confidence". And, despite what government was saying at that time, he predicted that the proposed (now open) Wivenhoe Dam would have to be managed properly to cut down on flooding the way they said it would.

"Full dams hold no water," he said gravely, with the clarity of expression which goes with speaking your mind.

At the time Arch Shields was in the middle of an argument with politicians who, as it turned out, ignored his pleas and shut the Somerset Dam gates to get the flood level down as quickly as possible once it stopped raining. But Shields told me: "If we were to develop another cyclonic disturbance within a week (with the dam full) we would be in for a much bigger flood. The weather is very unsettled over inland Queensland."

As it happened, another cyclone did come down the coast, but thankfully, it (just) missed Brisbane.

Two years later Arch Shields retired to his home in Brisbane's western suburbs to plant avocado trees. In the meantime, Australia has cut back so

drastically on its weather forecasting system that all forecasts are now being issued with the rider: "Meteorologists warn that this forecast is based on inadequate information."

I didn't know if this meant the forecasters were just whining, or that Australia's ever increasing coastal populations were in danger of being hit without enough warning by a cyclone. I thought I'd check with an independent expert: Arch Shields, a man who used to stay in the office for up to three days and nights watching cyclones without so much as a whimper.

Arch still lives high on the same hill where he gets a good view of the weather, and, at bottom, he wishes Australia had a lot more paid observers along the coast watching the sky, the sea and the wind - as he says used to be the case. For although he used satellite pictures, computers, and automatic weather stations for years, Mr. Shields feels Australia is now placing too much reliance on these instead of trained observers - precisely the point being made by the weather forecasters.

"Computers are creating a problem for our forecasts. There is a marked tendency now to treat it as the most important item of equipment. And it's not. It's a good aid, but it's got to be used properly," he said.

"The computer is a marvellous way of analysing data and it's the only way we'll ever solve the problem of long-term forecasting: the four-day forecast, the 30-day forecast. But it's not as good for short-term six-hour prediction as a smart professional meteorologist because he's able to make a very fine judgment."

The computer was, he said, of limited value for such short-term predictions and, in some ways, was a restriction.

"People tend to take the broadscale picture of what the computer has given them and forget what's happening locally. That's a very serious deficit. Before I retired people were always looking for the satellite picture and the computer statement and the prognostic from the computer instead of doing their own analysis. A computer will only do what you tell it to do and, eventually, this is self-defeating because you don't have anybody in the system who can tell it what to do."

"Of course, a forecaster needs to be fairly bold to make up his own mind about what is going to happen and adjust the computer model to his local conditions. Because if he is wrong then they say at the inquiry, 'Why didn't you follow the computer?' And all the times you beat the computer they don't say a word. So forecasters are in a cleft stick."

Personally, he had always used the computer model as a guide: "Then you put your own detailed embroidery on it. Minor things, particularly in the tropics, are terribly important in producing weather. Minor troughs, upper troughs, small lows that develop in the tropics overnight. The computer will ignore those. It has to, because it hasn't got the fine network."

The computer did the opposite of the things he was taught.

"Our boss used to say, 'You've got to milk all the data. You've got to look at every report you get with a fine tooth comb. And if there's something happening you've got a find an answer'. It always meant you were very aware of everything that was happening."

And this is why Arch Shields would like to see more rather than less trained observers reporting from the ground: "If money is spent on meteorology I would rather it spent on people, key people: observers and meteorologists."

A lot of the minor reporting stations were no longer there because a lot of the smaller post offices had closed. "The old skilled postmaster used to stay in the one spot for many years and was a very keen weatherman. They don't seem to exist any more. Yet you've got to be a trained observer to give really good reports. If you ask the average person to estimate the wind speed when its over 15 knots they wouldn't know what it was. They wouldn't know to allow 30 per cent for gusts or that in rough country you get more severe gusts or that they might be on the lee side of a mountain. It is very disturbing when you believe you know where a cyclone is heading and a bloke comes in from there and reports there is no wind at all."

"That is why to interpret data properly you have to have regular inspection of the sites of observations, which all costs money."

More trained weather observers even closer to the action had been lost because lighthouses had been going automatic.

"An automatic weather station isn't as good as a top-class observer like those old lighthouse keepers, they were terrific. They'd sometimes ring up and say, 'There's something out there' and you could bet there was.

"Whereas the automatic weather station doesn't give you anything in relation to swell, it doesn't give you a lot of cloud details, and the rainfall is useless because the birds bung up the catchment all the time. They seal it off."

Mr. Shields said the Queensland coast was protected by an off-shore automatic station network that was "just adequate" when he retired: "It depended entirely on all stations operating because the gaps between them were fairly large - from memory about 300-400 km. That's a fair way - it would allow a small cyclone through."

I put it to him that in 1984 north Queensland Labor Senator Margaret Reynolds had called for repairs to three of these automatic stations - and that sources had told me that in 1985 up to five were out of order. "Under such severe conditions an automatic weather station is operating in a terrifically poor environment: howling winds and salt spray all over it. So maintenance is terrifically important. They should be in top-class condition. Some of those stations have been in about 15 years and need replacement.

"When I was there we had a top-class bunch of technicians looking after them and we had unlimited support from the ship the Cape Moreton. The captain used to cart our fellows over to do the maintenance twice a year. They haven't got the Cape Moreton any more ... and I know we used to have trouble if we had to hire a boat. We once sent a party out to Willis Island on a little ship. It was pretty wet and rough and they had a terrible time, and of course they got out there and they missed Willis Island, which is not hard to do because it's only two to three miles across. They arrived back in Cairns all violently ill, and the staff refused to go back."

This was what happened when funds were cut and staff frozen, as had happened to the bureau in 1979. "This was when we had to eliminate a lot of our observing points and cut out certain reporting stations. We also cut out sending as many telegrams to country radio stations. We used to send a forecast every six hours except in the middle of the night, and that was cut down to every 12. That caused a big storm because there aren't many people in this world who don't need a weather forecast for some reason or another."

While satellites had provided much better weather warnings in the last 20 years - saving many lives - they were not the perfect answer non-forecasters thought: particularly if they were not backed up by sufficient ground observers.

"With the satellite coverage, even if your automatic weather stations are not going, you can't miss a cyclone unless it's a tiny one hidden under a big cloud canopy, and that would be pretty small," Arch Shields said. "But the satellite gives you a warning that there's a severe storm there. It doesn't tell you much in the way of detail: you've got to interpret from a top cloud look, which is pretty insubstantial sometimes. You can be 150-200 miles out on location and sometimes you can't even see the centre in a satellite picture anyway. Thus you've got to have people who can interpret what's happening around them properly and report it, and report it promptly," he said.

"You see, in order to get a satellite picture it's got to go back to Japan and be processed and retransmitted back, and then it's got to be distributed to the cyclone warning centres and they've got to process it and interpret it, and that takes quite a few hours."

"So if you've got somebody on the spot who can ring you up or get on the radio and say 'Look, it's starting to blow like mad here, the wind's gusting up to 60 knots' - you know pretty well you're in business."

Arch Shields then told a story to illustrate his point: "I'll tell you the sort of thing you've got to be very careful of and this is only something you gain by many years of experience, and that's another point that the bureau's suffering from - a lot of their old experienced wartime forecasters have moved out in the last five years or so."

"In the cyclone that hit Hayman Island, 1963 if I remember exactly, we got a report from a ship that it was there, so we issued a cyclone warning.

It was well north-east of Hayman and we just kept on prognosticating it south-west, but we got no more information on it at all. It was small enough to get through our network, but, as I said, it is a pretty wide open network."

"At 9pm we reckoned it should be getting pretty close to Hayman but the local observer there reported south-east winds of 15 knots and the bar slightly rising, with no evidence of any swell around. I queried this but he replied 'There's not a cyclone within a bull's roar of here. As a matter of fact I'm just about to go to bed'."

"I said 'I wouldn't be too sure if I were you, there's something out there.' We never wipe a cyclone out until it's gone and last time it was seen it was heading direct for you so you'd better be warned.' He said 'No, she's right, I've been in a lot of cyclones in the Caribbean'. He knew all about cyclones."

"Then it started to blow and they sent two of their boats out from the jetty to take shelter at Hook Island. Luckily they didn't have crew for the third one because they never saw those two boats or the crews again. When you see the graph the barometer traced at Hayman for that cyclone it is unbelievable. It just dropped about two-and-a-half inches in about half an hour. It wouldn't have covered more than about 50 miles altogether. And if we'd have been relying on the information we had we would have cancelled the cyclone warning 24 hours earlier. A computer would have wiped it off. So that's the difference between a human brain and a mechanical brain. We know there's no reason for a cyclone to suddenly disappear."

It is these small cyclones which Arch Shields thinks are Australia's biggest weather danger because they can beat the present forecasting system.

"The small cyclone is the most dangerous animal we've got. A big fellow takes a day or two to get off course but if he's small he can change direction fairly quickly. If you've got a big cyclone the loss of life is usually not great because people are well warned and they can take action if they've got enough sense."

"But it's the little fellows that really do the damage. They whip in on you unannounced. They cause an awful lot of loss of life. People are in their boats, or are in a flood prone area and they get drowned. It's pretty hard to cope with it but if you've got a good reporting network then you shouldn't let people get caught."

An extra danger from big cyclones came from the possibility of a storm surge. As Arch Shields sees it we've been pretty lucky over the years that most of the major cyclones have occurred at low tide. Tracey in Darwin and Althea in Townsville in the '70s both missed high time.

Asked to describe a storm surge, he said he could not do better than quote from the diary of a minister of religion caught in the Gulf of Carpentaria in 1913. "He wrote merely 'there was a great invasion from the sea' because he didn't know about storm surges."

In that case a 10-metre high wall of water flattened the mission station at Groote Eylandt, but the last major cyclonic storm surge recorded in Australia was almost 100 years ago at Bathurst Bay on Cape York when the fishing fleet was sunk and more than 300 whites were lost (in those days they didn't count the Aborigines).

I put it to Mr. Shields that I had heard that the waves crossed the coast 15 metres high and went five kilometres inland.

"They exaggerated a bit in those days and there was no way of checking up on it, but that could be of the right order. In Bangladesh in the '60s hundreds of thousands of people were drowned when the surge came right up the Bay of Bengal and washed everybody out with it."

The good news is that a storm surge only comes in very unusual circumstances.

"You've got to get the combination of the strong winds banking up the water at the right angle plus high tide, plus the centre of the storm coming pretty close to that spot," Arch Shields said. "But if that happens it surges in through the estuaries and across the shoreline and, on top of the damage from the wind, it floods everything and washes people away because it's coming like a wall of water."

That was why detailed information on every cyclone was so important: "to pinpoint it within 20 to 30 miles".

So that was it. I, at least, was satisfied that our forecasts ARE based on inadequate information because of a bureau rundown that began in the '70s. I was reminded of something Senator Margaret Reynolds said to me recently: "We spend a fair slice of our GNP on defence because we say we have to be prepared. But, hopefully, there's a greater chance of natural disaster than of a war disaster. Anyway, in the long run it's going to cost Australia a lot more if we're not prepared for a cyclone or for a disastrous bush-fire as occurred on Ash Wednesday."

As I left, remembering the Brisbane flood, I asked Arch Shields if he had any more predictions.

"I don't know what they've done to protect people in the Broadwater on the Gold Coast and some of those high-rise buildings right on the beach there at Surfers Paradise. Some of those will go in the water one of these days, with a persistent cyclone gouging away at the foundations. I don't know how well they're built but there'll be a few problems in some of those

installations. And particularly at that new breakwater casino they are building at Townsville, I don't know about that. I wouldn't invest any money in it."

"By the time cyclones hit the Gold Coast they have just about had it, but they can get a pretty good blow there still with a lot of water. I don't think it would be catastrophic, but there'd be a lot of inundation."

"Any coastal installation can be subject to severe storm surges, particularly if there's a very big drop of pressure in a short time. You get high tides, then you only need to lift the water a foot or two above what they're designed for and you flood all the basements and all the machinery goes out."

"Remember 1974 in Brisbane? They used to put all the computers and the lift machinery in the basements before that - because they didn't think the basements were ever going to get flooded."

And we both had to laugh. Nervously, I thought.