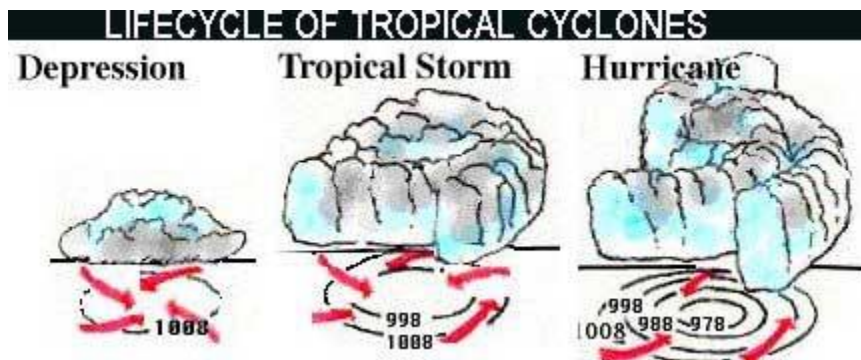


## Always a near miss for Barbados

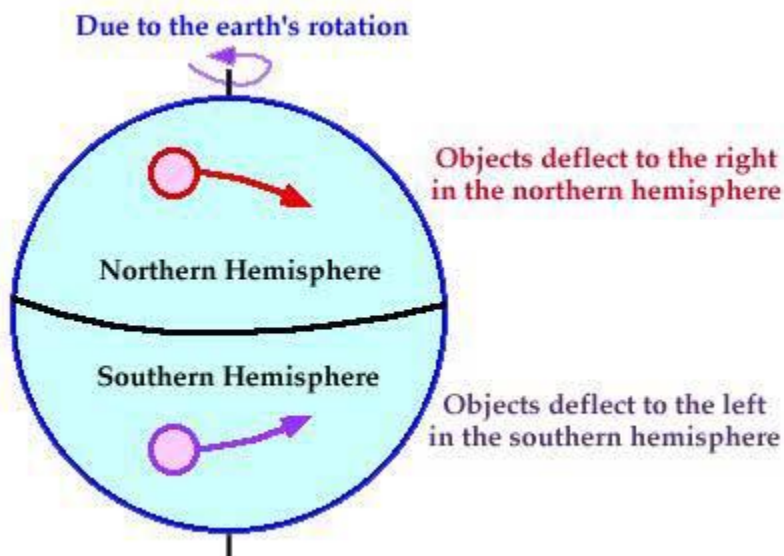
WHY DO hurricanes always tend to veer off Barbados? Or do they? Some say it's divine providence, others attribute it to the island's geographical location, yet others believe there is a 50-year cycle and Barbados is due for another strike soon. What really is the truth?

These are some of the questions which this article explores in light of near misses, forecasters' predictions and religious prophecies. In fact, hurricanes used Barbados for target practice in the last 300 years, but compared to the 1600s, the 1700s, and the 1800s, this century has been quiet. Between 1627, when Barbados was colonised, and 1899, 23 hurricanes directly affected Barbados, caused billions of dollars in damage (at today's prices), killed thousands, and destroyed the economy on more than one occasion. In the 1600s, four hurricanes devastated Barbados, in the 1700s five systems directly affected Barbados, two causing devastation, and in the 1800s there were 17 hurricanes. The majority of these systems went right over Barbados.



Source: WW2010, Department of Atmospheric Sciences,  
University of Illinois at Urbana-Champaign

## Coriolis Force



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University of Illinois at Urbana-Champaign



Map created using [Hurricane Watch 2000](#) with data from Colorado  
State/Tropical Prediction Center hosted by [Unisys Weather](#)

### Major impacts

This century there were five "impacts" including **Hurricane Janet**, a small but powerful system, the centre of which passed not far off the South Coast in 1955 mainly impacting the southern part of Barbados. It killed 35 people, destroyed 8 100 homes and left 20 000 homeless. **Allen** in 1980 was a big hurricane which passed north of Barbados destroying 35 homes and damaging more than 200, especially in St. Andrew. **Edith** in 1963 passed 50 miles north of Barbados, dumping seven to nine inches of rain on the island. On July 2, 1901 Tropical Storm #2 passed seven miles south of Barbados dumping more than 20 inches of rain in St. Peter, killing one man. This was known, for a period of time afterwards, as the Jordan's Flood. On August 31, 1949 **Tropical Storm #3** dumped over 10 inches of rain in St. Thomas, St. George, St. Joseph, and St. John and five to six inches in northern parishes. A **tropical depression** on October 1, 1970 also triggered massive floods in St. Michael and Bridgetown which became known as the 1970 floods.

There were another 13 systems which passed within 40 miles of Barbados this century.

The worse systems which levelled Barbados were 1675, 1780, and 1831. On August 31, 1675 the hurricane appeared to have passed off the West Coast destroying numerous plantations, especially along the western side of the island. On October 10, 1780 a very slow moving hurricane struck Barbados on a Tuesday evening and battered the island "*almost without intermission for nearly 48 hours*" leaving the island looking like "*a country laid waste by fire*

*and sword*", Commander-in-Chief Major General Vaughan wrote to England. There was near total destruction with 4 326 dead and over £1 million in damage.

Retired meteorologist, Deighton Best, said the hurricane which struck on August 10, 1831 was perhaps the most powerful ever to hit Barbados.

"I would rate the winds at 200 miles per hour. It left damage at more than £2 million and about 1 525 dead, though the figure could have been as high as 2 500. I would rate this similar in strength to Hugo when it was approaching the Eastern Caribbean," he told the **NATION**.

The 1831 hurricane struck at 5 p.m. and battered Barbados for 12 hours. A writer of the day said the rain "was driven with such force as to injure the skin and was so thick as to prevent a view of any object". Waves broke over the North Point cliffs which were 70 feet high. Barbados has not seen this kind of activity this century and as a result, a popular notion has arisen that there must be some special providence protecting the island because cyclones do not hit Barbados. While this is debatable, there are physical reasons why systems curve northwest, bypassing Barbados and other Caribbean islands. These include the location of the system when it forms, its strength and how rapidly its strength increases as well as other atmospheric factors.

AN average of 100 tropical waves emerge from Africa each year, but only a small number develop into tropical depressions. When a group of thunderstorms band together for long enough and develop constant winds near the centre of 23 to 39 miles per hour, they form a tropical depression in which the winds revolve anticlockwise. When the wind speed at the centre increases to a point where they are constant at more than 40 miles per hour and the pressure at the centre drops, it becomes a tropical storm, at which time it is given a name. As the pressure continues to drop and the wind speed increases and reaches a constant 74 miles per hour, a hurricane is born which is classified as one of five categories on the **Saffir Simpson** scale relating to maximum sustained wind speed at the centre. The most severe hurricanes to strike the Caribbean are known to be the **Cape Verde hurricanes** because it was shown that they became well developed shortly after emerging from Africa. The strength and speed of the winds, which revolve anticlockwise around a low pressure centre, dictate the direction the cyclone will travel, under normal atmospheric conditions.

"If a hurricane forms to the east of Barbados, there is a 90 per cent probability that it will pass to the north of the island and this is because of the Coriolis Force," explained Best.

Because of the earth's anticlockwise rotation and the direction of the Trade Winds, air movement is deflected to the right in the northern hemisphere and to the left in the southern hemisphere: all things being equal. This is the **Coriolis Force**.

Slow winds will deflect only a small amount while stronger winds will deflect more. The winds deflect even less when they are close to the equator. Hurricane Beulah in 1967 is an excellent example of the Coriolis Force.

It starts off as a tropical depression with 30 mile per hour winds and seems to head for Barbados, then as it becomes a tropical storm it deflects to the right, and gradually strengthens to a

hurricane but on its approach to Haiti, winds dropped from 126 to 92 mph reducing the angle of deflection. Winds drop all the way to 58 mph very far south of Jamaica and then as the winds increase to hurricane strength, its deflection increases, taking it over the Yucatan Peninsula where it loses strength and some of its deflection. The winds increase in the Gulf of Mexico and Beulah continues its curve to make landfall in Texas, where it loses its strength and curve on becoming a tropical depression.

### **Other factors**

However, all things don't play out to the Coriolis Force plan because of other factors such as a high pressure system, which at this time of the year, is perched in the northern Atlantic Ocean and extending as far as the Eastern Caribbean island chain. This is one of the "steering currents" which causes the hurricane to travel along the periphery of the high pressure system and curve northwest when conditions permit. But sometimes cyclones behave erratically, reversing or doing loops, such as Hurricanes Flora and Ginny in 1963.

Hurricane researchers say that the Atlantic is entering an active phase. The record shows that the mid-1940s to mid-1960s was an active period for intense hurricanes, then a lull came in the 1970s to mid-1990s. Activity started again in the mid-1990s leading researchers to believe that a new multi-decadal activity period has started again. Hurricane researcher Professor Bill Gray of Colorado State University, in an interview with the Nation at the National Hurricane Conference earlier this year, said that because systems will be forming further south this year, the island must be watchful. He said that storms forming around eight degrees north would put the island at greater risk.

Even when there were close brushes, Barbados misses the strongest winds which are normally in the northern eyewall, said Gray. He also explained that if Barbados takes a direct hit, it is likely to be very bad not only because of those northern winds but because systems which are likely to hit the island will be strong given the location of formation and direction they will travel. Best concurred that systems forming close to Barbados posed greater risks, though if they formed too close they are not that severe because there is not much time for development of the strong winds, though rainfall would be a factor. He agreed that the storms likely to hit Barbados were the ones forming between  $8\frac{1}{4}$  and  $11\frac{1}{4}$  north and as long as they were east of Barbados, they were always a threat.

"As long as they form east of Barbados my advice to the public is: be alert but be extra careful if they form east-south-east of Barbados," said Best.

## Saffir-Simpson Scale

The chart color codes intensity (category based on Saffir-Simpson scale):

Type	Category	Pressure (mb)	Winds (knots)	Winds (mph)	Surge (feet)
Depression	TD	-----	< 34	< 39	
Tropical Storm	TS	-----	34-63	39-73	
Hurricane	1	> 980	64-82	74-95	4-5
Hurricane	2	965-980	83-95	96-110	6-8
Hurricane	3	945-965	96-112	111-130	9-12
Hurricane	4	920-945	113-134	131-155	13-18
Hurricane	5	< 920	>134	>155	>18

**NOTE:** Pressures are in millibars and winds are in **knots** where one knot is equal to 1.15 mph

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### Hurricane impacts since colonisation

- **1660, December:** Hurricane. Vessels ran aground.
- **1674, August 10:** Very strong hurricane. 300 buildings destroyed; 200 dead; no sugarcane for two years.
- **1675, August 31:** Strong hurricane. Island devastated
- **1694, October 17:** Weak hurricane passes. Ships thrown ashore.
- **1780, October 10:** Slow moving hurricane. Barbados battered for 48 hours. 4 326 dead; £1 million damage.
- **1786, September:** Severe gale. Every vessel driven ashore. Great damage to homes and crops. Many people killed.
- **1813, July 22:** Tropical storm passed north. Ships damaged.
- **1815, September 29:** Hurricane passed north of island. Gale force winds experienced.
- **1816, September 15:** Hurricane passed north. Heavy rains; severe flooding; stores damaged.

- **1817, October 21:** Passing hurricane damaged ships;
- **1819, October 13:** Hurricane. Two dead; heavy rains; Foster Hall landslides; ships wrecked;
- **1822, December 19:** Hurricane passed north; winds from south and west; very heavy seas.
- **1831, August 10:** Severe hurricane. Over £2 million damage; 1 525 dead.
- **1837, July 9:** Tropical storm hit island. Vessels thrown ashore; one church destroyed; chimneys blown down.
- **1846, September 11:** Severe tropical storm passed south and drove vessels ashore.
- **1848, September 18:** Tropical storm passed north dumping much rain.
- **1855, August 24:** Tropical storm killed three; drove boats ashore. Rainfall was 9 inches at Edgecumbe and 10.36 inches at Bayfield.
- **1872, September 8:** Severe thunderstorm. Between 8.01 and 11.02 inches of rain.
- **1877, September 21:** Tropical storm passed over Barbados. No serious damage.
- **1886, August 15:** Hurricane passed 40 miles north of Barbados. Gale force winds; 7-9 inches of rain; floods in St. Michael; landslides in St. Joseph and St. Thomas
- **1894, October 12:** Tropical storm passed north-west. Destroyed hundreds of homes; 18 fishermen missing.
- **1898, September 10:** Strong hurricane passed south. 83 dead; 9 937 houses destroyed, 4 519 damaged; 50 000 homeless.
- **1901, July 2:** Tropical storm passed south. Severe floods, more than 20 inches of rain in St. Peter killing one person.
- **1949, August 31:** Weak tropical storm dumped over 10 inches of rain in St. Joseph, St. John, St. Thomas, St. George; 5 to 6 inches of rain in the north.
- **1955, September 22:** Hurricane Janet passed south of Barbados. Winds over 110 mph damaged or destroyed 8 100 small houses, 20 000 homeless.
- **1963, September 24:** Hurricane Edith passed 50 miles south; 7 to 8 inches rain.
- **1970, October 1:** Tropical depression. Flooding in Bridgetown and St. Michael.
- **1980, August 3:** Hurricane Allen passed north of Barbados. Destroyed about 35 houses and damaged 200 more.

## **SOURCES:**

- **A former Director of the Barbados Meteorological Service Deighton Best**
- **The Barbados Museum and Historical Society**