

# A Rhapsody in Blue

This spectacular blue diamond from the Orapa Mine in Botswana is the largest of its kind found in the country to date. Blue diamonds are extremely rare—and those of this size, even more so. Its extraordinary blue color comes from trace amounts of boron in the crystal structure of the diamond.

## Okavango Blue Diamond

Diamond

20.46 carats, brilliant oval cut

Fancy Deep Blue

Orapa Mine, Botswana

Courtesy of Okavango  
Diamond Company

## What Makes Blue Diamonds Special?

Blue is among the rarest colors found in natural diamonds. While most diamonds contain small amounts of nitrogen, blue diamonds contain some boron atoms and fewer nitrogen atoms in their crystal structure, resulting in a captivating hue. The presence of nitrogen, common in brown and yellow diamonds, quenches the blue even in otherwise colorless diamonds.

## Cutting for Color

Cutting and shaping a gem as special as the Okavango Blue requires great care and planning. Given the rough stone's shape, color and clarity, an oval shape and brilliant cut were selected to emphasize the gem's size and rich blue color. The diamond was cut slowly over the course of a month, allowing gem cutters to adjust the cut as needed in order to capture more light and intensify the color.

# Run of Mine

This parcel of rough diamonds, weighing a grand total of 235 carats, illustrates the range of sizes, shapes and quality of diamonds from mines across Botswana. These packages are referred to as a “run of mine.”

## Diamonds: A Community Investment

The strength and beauty of natural diamonds have long been associated with wealth and power—meaning these irresistible gems have at times been used to fuel conflict and exploitation. But Botswana is rewriting this story. In 1966, the newly independent nation entered into agreements with local leaders that made diamonds a national resource. This powerful bargaining chip enables the government to negotiate equitably with diamond mining and marketing firms worldwide, with profits directly reinvested in education, infrastructure and public health.



Revenues from Botswana's diamond industry fund education initiatives, including free universal primary school and scholarships for students at the University of Botswana (*above*). PER-ANDERS PETTERSSON/GETTY IMAGES



# Diamonds by Size

Diamonds are weighed in carats, a unit that equals 0.2 grams. Only 2% of diamonds recovered from Botswana each year weigh more than one carat; those in this case range from less than half a carat to over 8 carats.

- A 0.2 carats
- B 0.3 carats
- C 0.5 carats
- D 0.8 carats
- E 1.1 carats
- F 2.1 carats
- G 3.3 carats
- H 6.8 carats

## Why Are Diamonds Different Sizes?

Rough diamonds vary greatly in size: some weigh only a fraction of a carat, while the famed Cullinan weighed 3,106 carats. Why the disparity? Diamond crystals form at high pressures and temperatures in Earth's mantle. The factors that permit diamond crystals to grow—carbon availability, mostly introduced by rare fluids—varies throughout the mantle, with more of both resulting in larger diamonds. Diamonds are then brought to the surface by kimberlite magmas that form pipes, column-shaped volcanic features caused by their explosive eruptions.



The Orapa Mine (*above*), located on two kimberlite pipes, is the oldest of four diamond mines operated in partnership with the government of Botswana. As the steward of its own natural resources, Botswana is able to minimize the environmental impacts of diamond mining while maximizing the benefits to its citizens.

STEFANO DE LUIGI/VII/REDUX

# Diamonds by Shape

Rough diamonds are sorted by shape before processing. Diamonds naturally grow as eight-sided octahedrons (*A*); broken or misshapen crystals (*B*) are common. Less common are macles, twinned crystals with flat, triangular faces (*C*). Botswana is a major global source for relatively rare, cube-shaped rough diamonds (*D*).

- A Octahedrons
- B Misshapen crystals
- C Macles
- D Cuboids

## Why Do Diamonds Have Different Shapes?

Diamonds form at the high pressures and temperatures found in Earth's mantle. Most crystals grow as octahedrons or triangular intergrowths called macles. The molten rock carrying the diamond may also change the shape of crystals as they dissolve in the magma like melting ice cubes leaving behind a diamond in a changed, or even irregular, shape.



Most rough diamonds are octahedrons (*left*) or macles (*right*), but some are crystals that have grown together or, rarely, cube-like in shape. Others are the result of diamonds partially dissolving in magma. © AMNH/ERICA AND HAROLD VAN PELT



# Diamonds by Quality

Not all rough diamonds are destined to be gems; experts must sort through and assess the quality of each stone. Those classified as “near gem” have imperfections that require additional processing before being sent to market.

Industrial diamonds, though not gems, are far from worthless; they have important uses in construction, manufacturing and other sectors.

- A Industrial
- B Near gem
- C Gem



The government of Botswana has harnessed its celebrated diamond wealth for its citizens. The capital city, Gaborone, is a global hub for not only mining enterprises but also valuing, sorting and trading diamonds.

SERGE SIBERT/REA/REDUX

# Diamonds by Color

Pure diamonds are colorless; however, chemical impurities or changes to the crystal structure result in diamonds of a multitude of colors. Here, rough diamonds are sorted by color and intensity, from colorless to yellow and brown shades caused by nitrogen impurities. Other elements and their arrangements in the crystal structure can cause spectacular colors to appear, as seen in the Okavango Blue Diamond in the center case.

A **Colorless**

B **Near colorless**

C **Faint yellow**

D **Very light yellow**

E **Light yellow**

F **Yellow**

G **Light brown**

H **Brown**

I **Dark brown**

J **Gray**

## The Value of Color

A chemically pure, flawless diamond crystal is colorless, but diamonds occur in many colors. Gem-quality colorful diamonds—called “fancy”—are valued by hue, tone and saturation. Natural diamonds in rare hues are the most highly sought after, notably richly toned reds, greens, violets and blues. Brown diamonds are the most common, followed by yellow; both colors are caused by nitrogen impurities in the diamond crystals.