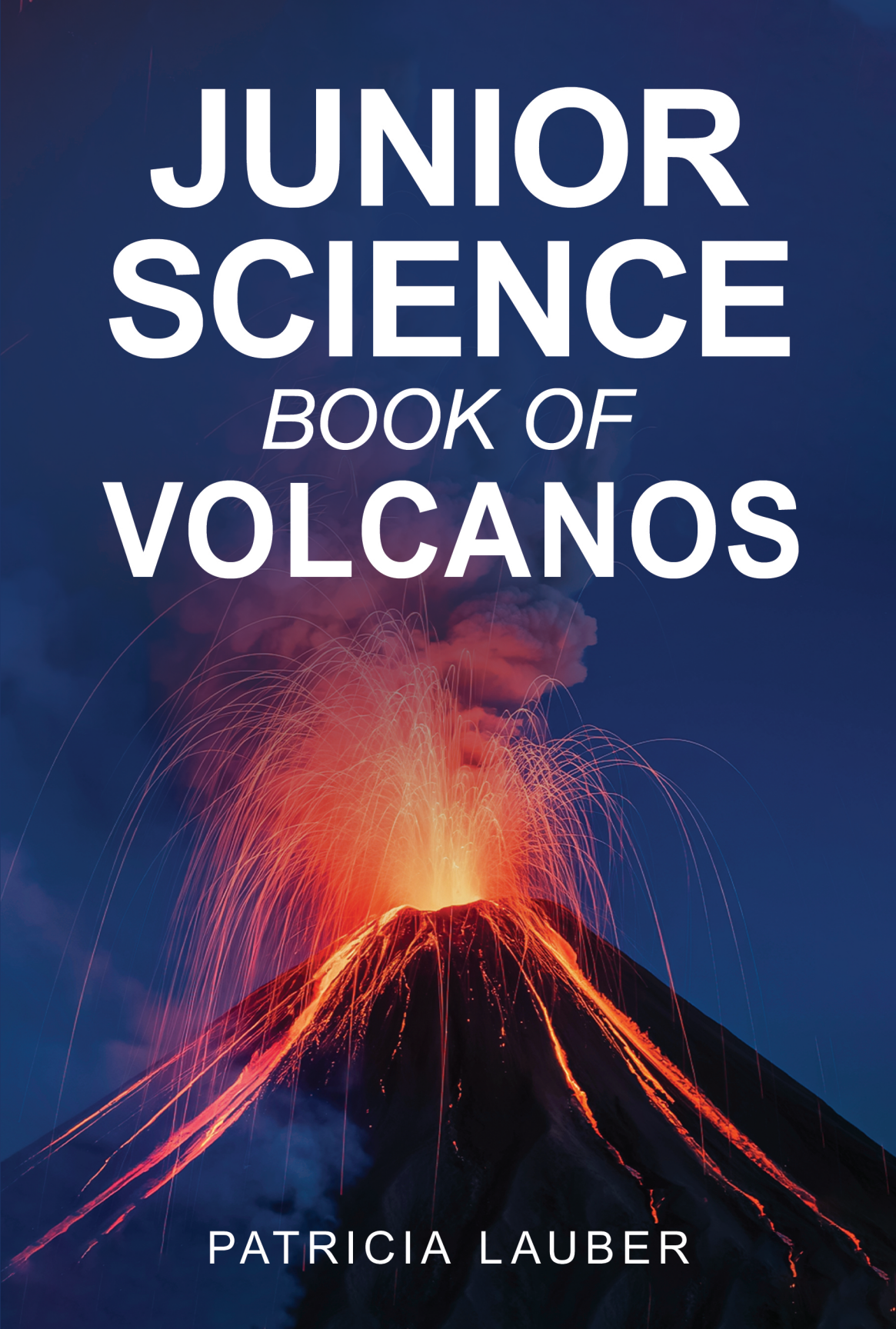


JUNIOR SCIENCE

BOOK OF

VOLCANOS



PATRICIA LAUBER

This book was edited under the supervision of Nancy Larrick, Ed. D.

Junior Science Books are dedicated to all children who are eager to know more about nature and the world they live in. Written especially for young readers, each Junior Science Book has been carefully tested by the Spache Readability Formula. These books can be read by primary grade children and enjoyed by young readers through the elementary grades.

This edition published 2026
by Living Book Press

ISBN: 978-1-76183-161-4 (hardcover)
978-1-76183-106-5 (softcover)

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any other form or means – electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner and the publisher or as provided by Australian law.



A catalogue record for this book is available from the National Library of Australia

JUNIOR SCIENCE BOOK OF
VOLCANOS

by

PATRICIA LAUBER

ILLUSTRATED BY

MATHEW KALMENOFF

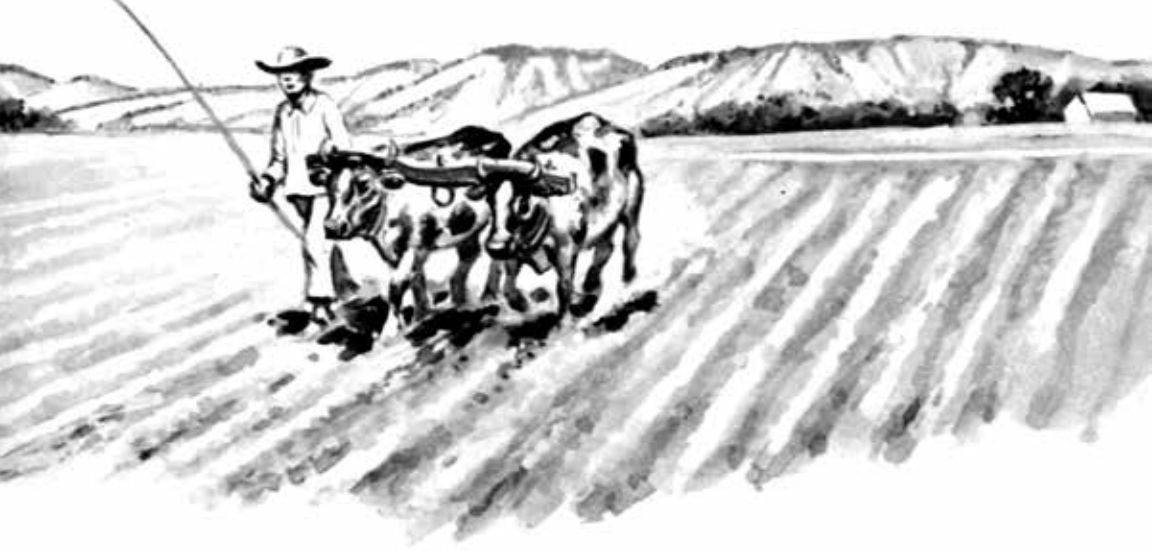




KILAUEA IKI, IN HAWAII







A Volcano Is Born

The day began like any other for a Mexican farmer named Dionisio Polido. He rose early. He had breakfast with his wife and son. Then he set out for his cornfield. He planned to spend the day clearing rocks off it.

Almost at once, he discovered that this day was not just like any other. Several times he heard noises like thunder. Yet there wasn't a cloud in the sky.

Polido arrived at his cornfield. There he discovered an even stranger thing. Smoke was rising at one end of the field. Was something on fire? Puzzled, he hurried toward the smoke.

What he saw filled him with terror. The very earth seemed to be on fire. The ground had cracked open. Smoking, gray-white stuff was bubbling noisily out of the crack.

Polido felt sure the world was coming to an end. He ran to find his wife and son. The family fled to the little village of Parícutin. Polido told of the awful sight he had seen. The villagers gathered in the church.

Time passed, and nothing happened. So one of the men said, “Perhaps you made a mistake, Dionisio. Perhaps there was no smoke but only dust. Let us go and see.”

Some of the men went back to the Polido farm. There they saw a terrifying sight. The earth had opened, forming a long crack. At one end was a big, pear-shaped hole. Smoke, sparks, ash, and dust poured from the hole. Red-hot stones were tossed into the air. The air itself was filled with a sharp, unpleasant smell that made the men choke.

The villagers went back to the church. Among its books, they found one that told

them what was happening. They had seen the birth of a volcano.

By night, the volcano was roaring. Matter exploded out of it. Flashes of lightning crackled in the column of smoke and ash. A cone-shaped hill was piling up around the opening. Two days later, lava started to flow from a nearby crack in the earth.

Lava buried the Polido farm and moved on, stretching out over the land. Ahead of its reach, trees died. Ash settled out of the air. Animals fled. Birds flew away. Parícutin and another village were buried. Only the church steeples showed where they had been. The Mexican government moved all the people away.

The new volcano was named Parícutin for the village it destroyed. It grew and grew. Born on February 20, 1943, it grew 300 feet in the first five days. By the end of the year, it was 1,410 feet high. Then its growth slowed. In the next eight years, it grew only 100 feet more. On February 25, 1952, Parícutin suddenly stopped erupting. It became one more of the quiet cones in the area.



LAVA FROM PARÍCUTIN SWALLOWED TWO VILLAGES. ONLY THE CHURCH STEEPLE REMAINS TO SHOW THAT PEOPLE ONCE LIVED IN THIS VILLAGE.

For that part of Mexico has many small volcanoes. And this is a clue to why a volcano was born in Dionisio Polido's cornfield.

FARMHOUSES AND FIELDS WERE BURIED BENEATH VOLCANIC ASH.



What Causes Volcanoes?

A volcano is an opening in the earth's crust. It is an opening where gas and rock come from inside the earth onto the surface. The rock is usually very hot—so hot that it is **MOLTEN**, which means “melted.”

Scientists call this molten rock **MAGMA**. It is a special kind of rock. It contains crystals of minerals. Usually, the crystals are dissolved in the hot magma, somewhat as salt or sugar dissolves in hot water.

Magma also has gases in it. The gases may be dissolved in the magma, or they may occur as bubbles. The chief gas is steam.

Perhaps the best way to understand magma is to compare it with soda pop.

Soda pop contains sugar. You can taste the sugar. But you do not see the crystals because they are dissolved in the liquid.

Soda pop also contains a gas called carbon dioxide. Carbon dioxide makes the bubbles in soda pop.

Suppose you take a new bottle of soda pop



and hold it up to the light. You will not see any bubbles in it. That is because the carbon dioxide is dissolved in the liquid.

Open the bottle gently, and you see some bubbles. The gas is slowly separating out of the liquid as bubbles.

But suppose you shake the bottle before opening it. Then the gas will rush out, carrying a spray of liquid. The more the bottle is shaken, the bigger the explosion.

Much the same thing happens with magma when it reaches the earth's surface. If the magma is liquid, its gas may bubble out gently. Then the magma flows out quietly. If the magma is thick and sticky, the gas may separate violently. Then the magma bursts forth.

The same thing may happen if the magma contains an especially large amount of gas.

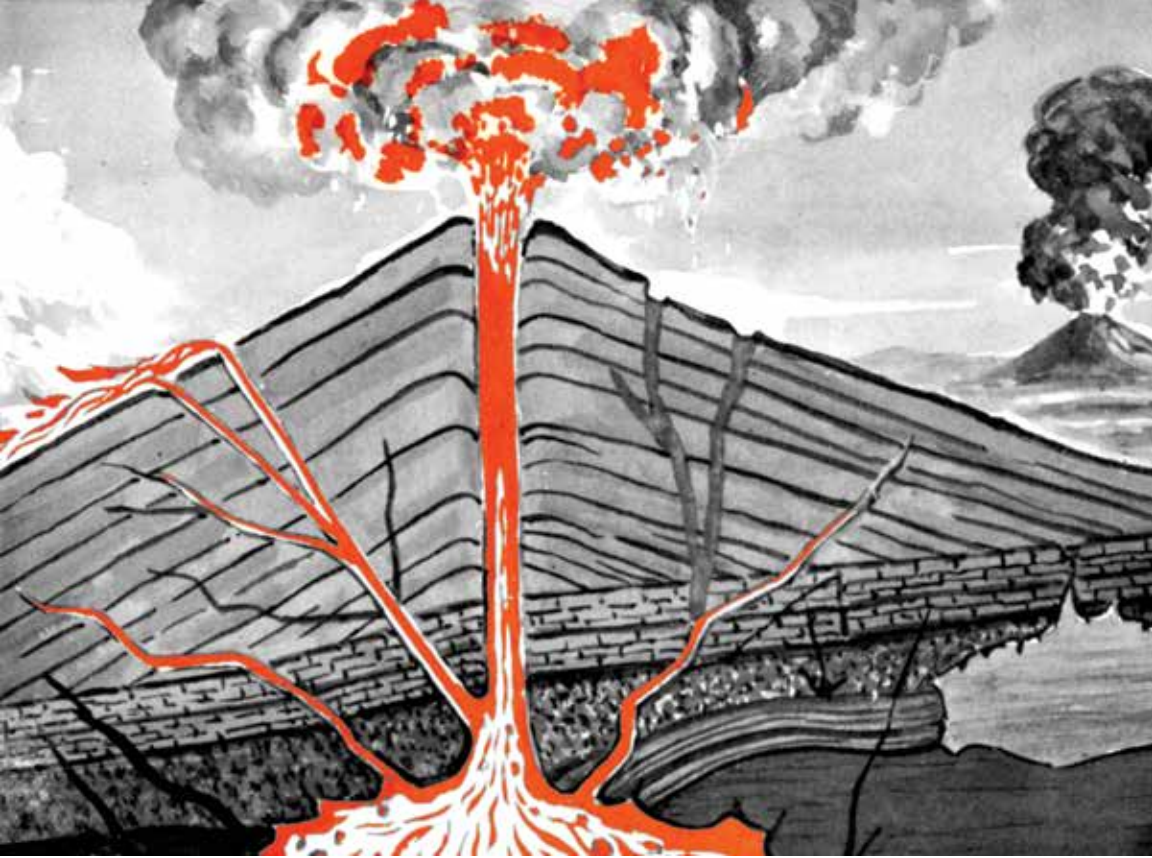
Either way, you say that the volcano is ERUPTING. Or you can say that a VOLCANIC ERUPTION is taking place.

Magma that has reached the surface is called LAVA. When lava cools and hardens, it can be called LAVA or LAVA ROCK.

Knowing about magma helps you understand why volcanoes erupt.

In some parts of the earth, there are pockets of magma beneath the surface. The magma presses against the rock of the earth's crust. When the magma finds a weak spot, it forces its way to the surface. That is what happened with Parícutin.

As the nearby volcanoes showed, there is magma under that part of Mexico. A crack in the rock of the crust led to Dionisio Polido's cornfield. Somehow, the magma forced its way through this crack. The crack widened into a hole. A white-hot column of magma burst through the opening. Chunks of rock



INSIDE OF A VOLCANO. MAGMA FORCES ITS WAY UP THE THROAT AND OUT THE VENTS.

were torn from the earth and hurled into the air. A volcano was born.

At first, Parícutin erupted violently. Then the eruptions died down. Parícutin became the quiet, cone-shaped hill that it is today.

The hill is also called a volcano, for the word has two meanings. VOLCANO can mean the opening where magma comes onto the earth's surface. More often it means the big hill or mountain that may build up around the opening.

The hill or mountain is built of material that erupted from the opening. This material can take many forms.

What Comes Out of a Volcano?


A volcano erupts when magma is forced to the surface.

As the magma cools, crystals separate out of it. If the magma cools slowly, the crystals are big. If it cools more quickly, then the crystals are smaller. If the magma cools very quickly, crystals may not form at all. Instead, the magma freezes, or hardens, into glass. Perhaps you have seen some of this natural glass. One kind is called OBSIDIAN.

Lava is usually made of glass or crystals or both.

Magma may pour out of a volcano in gentle streams called LAVA FLOWS. Or it may erupt violently because of the gas in it. The rushing gas carries along rock. Some of the rock is solid. Some is liquid. The rock is blown into the air. There the liquid rock usually hardens. All the rock falls back to earth.

There is a name for rock that is blown out



SOMETIMES MAGMA FREEZES INTO GLASS. ONE KIND OF NATURAL GLASS IS CALLED OBSIDIAN.

of a volcano and falls to earth. The name is PYROCLASTIC (PIE-row-CLASS-tick) rock. *Pyroclastic* means “broken by fire.”

Some pyroclastic rock is ripped loose from inside the volcano. Some is lava torn apart by the gas. The lava takes different forms. Each has its own name.

A BOMB is a rounded piece of newly hardened lava that takes its shape while flying through the air. A BLOCK is a piece of lava that has sharp corners.

Sometimes liquid lava is blown into the air. It cools there, forming coarse pieces of rock called CINDER. Cinder is bubbly rock, puffed up by gas. If it is very bubbly and puffed up, it is called PUMICE. Pumice is *so* bubbly that it floats in water.



THE LAVA FLOW CALLED PAHOEHOE IS SMOOTH AND ROLLING.

Some pieces of rock are very small—the size of sand. These are called ASH. Ash forms when liquid lava is blown apart by gas. When ash becomes cemented together by water, it forms a rock called TUFF.

The smallest pieces of rock are called DUST. Some volcanic dust is very fine. A big explosion blows huge amounts of this dust high into the air. The dust particles are *so* small that they remain in the air for years. Volcanic dust makes itself felt in many parts of the world.

In the year 1783, for example, two volcanoes erupted violently. One was in Japan and the

THE FLOW CALLED AA IS TOPPED BY A LAYER OF LAVA FRAGMENTS.





PAHOEHOE LAVA FLOWS FORM TUBES. MOST ARE SMALL, BUT SOME ARE 20 TO 30 FEET WIDE AND LOOK LIKE TUNNELS. THE TUBES ARE COMMON IN HAWAII, WASHINGTON, OREGON, AND IDAHO.

other in Iceland. Dust from these eruptions was *so* thick that it cut off some of the sun's heat. The winter of 1783–84 became one of the coldest ever recorded in North America and Europe.

In the spring of 1963, a volcano erupted on the island of Bali in Indonesia. Dust from the explosion was carried around the world. It

caused bright red sunsets. Some scientists think it made a change in world rainfall patterns.

This fine dust finally settles to earth, looking like any other kind of dust. (You may have had some in your house without knowing it.) In this way, the fine volcanic dust vanishes from sight.

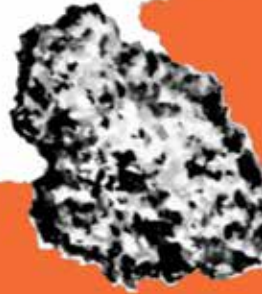
But other products of eruptions do not vanish. These materials build mountains. They also build broad plains called plateaus.



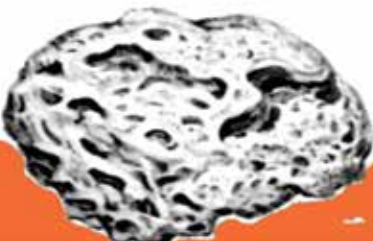
BOMB



BLOCK



CINDER



PUMICE



TUFF



THIS CAR WAS ALMOST BURIED BY PUMICE FROM THE VOLCANO NEARBY.
THE PICTURE WAS TAKEN IN HAWAII IN 1960

Plateaus and Mountains

The year was 1783, and the place was Iceland. In late spring, strong earthquakes shook the region near Mount Skaptar. They were a sign that magma was moving within the earth.

On Wednesday, June 11, the magma erupted to the surface. Floods of lava poured out of a 10-mile crack in the earth called the Laki fissure. Lava poured into the Skapta River. It dried up the river and filled the channel to overflowing.

A week later there was another great flood of lava. A third poured forth on Sunday, August 3. Lava filled what had once been a lake. It filled a huge gulf at the foot of a waterfall. Giant tongues of lava spread out over the land. They were 12 to 15 miles wide and 100 feet deep.

Finally, the fissure began to choke up, and the eruption came to an end.

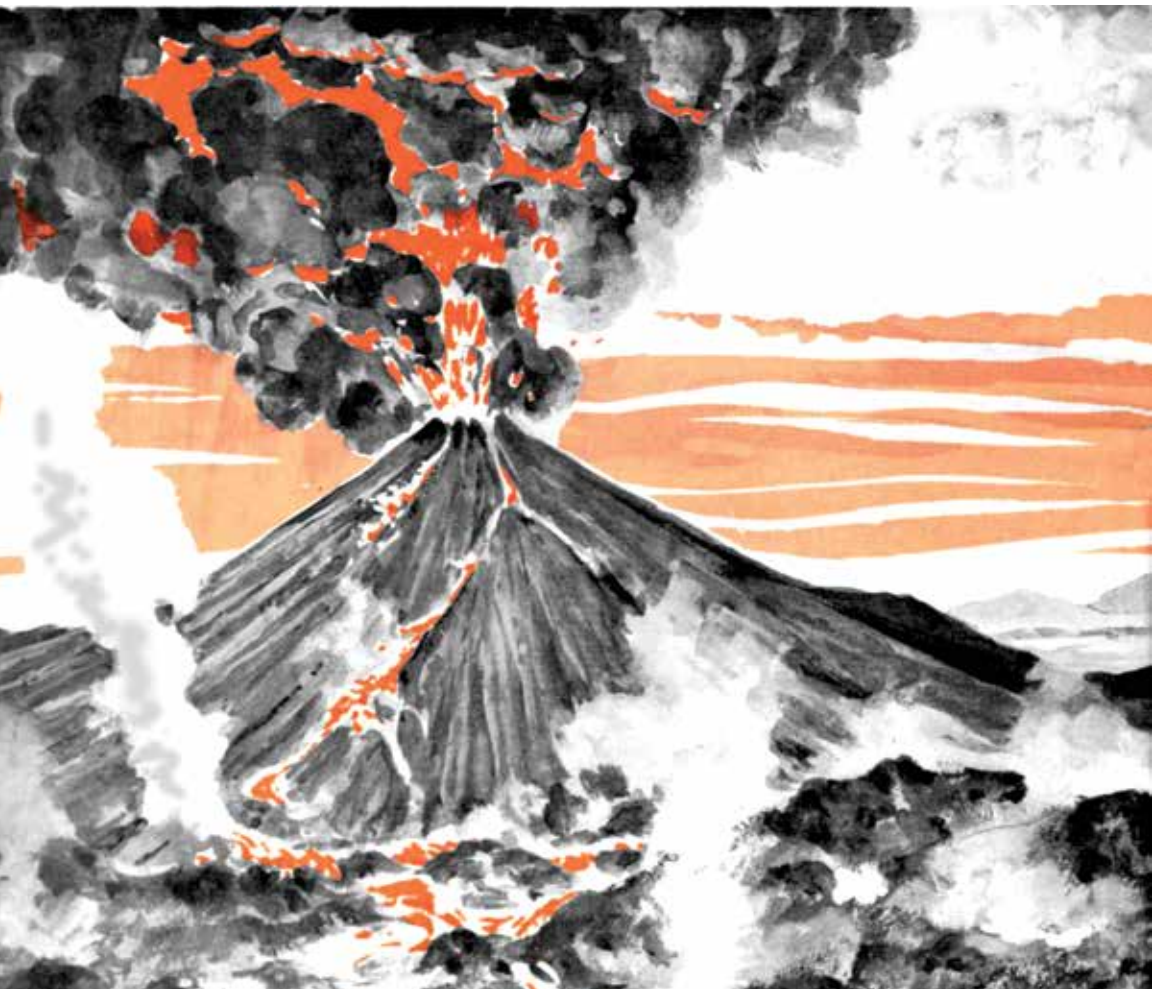
Fissures—giant cracks in the earth—have produced the world's biggest volcanic eruptions. The biggest are called FLOOD ERUPTIONS, because they pour out floods of lava. The lava is very liquid. A single flow may spread over hundreds or thousands of square miles. Such flows build plateaus, not mountains.

Rocks show that many flood eruptions have taken place in the past. Iceland was built by

lava floods that covered more than 200,000 square miles. The lava is about 9,000 feet thick.

Flood eruptions built big plateaus in North America. One of these is the Columbia Plateau in the northwestern United States. In places, the lava rock is 5,000 feet thick. The plateau itself covers more than 100,000 square miles.

Large parts of other continents have been built in the same way. But flood eruptions are



rare today. The 1783 eruption is the only one we have a record of.

The big eruptions we know are of a different kind. They take place through VENTS, which are pipelike openings. They build mountains, not plateaus.

Volcanic mountains have three main shapes. The shape depends on the kind of material that pours out of the vent, and on the shape of the vent.

Sometimes the material is chiefly liquid lava that pours out of long fissures in the sides of the volcano. Such eruptions build a broad, gently sloping mountain. This shape is called a SHIELD VOLCANO. It looks like a shield laid flat on the ground. Iceland has many small