

## THE GREAT STONE PICTURE-BOOK.

You know that the world has been many thousands of years the workshop of the winds and waves. If any one had been in America, say ten or twenty thousand years ago—for no one can say exactly when it happened—he would have found that it was a pretty cold country. North America was nearly the same shape that it is now, but a strange thing had happened. All the upper part had been lifted up out of the sea, and it was so terribly cold that the whole country was covered with a thick sheet of ice. The ice covered all New England and the Middle States, and stretched clear across Long Island Sound and Long Island, and out into the sea, just as it does in Greenland to-day. There were glaciers such as we see in Switzerland and in the valleys of the Connecticut, the Hudson, the Mohawk, and the St. Lawrence.

Then the land began to sink down again into the sea, and the summers grew warmer, and the ice began to melt and form lakes and pools, shallow bays and rapid rivers. The whole mass of the ice began to slide down into the sea. It ploughed up the loose earth, and tore off the rocks, and rolled them over and over, crushing and grinding them into sand and gravel. If we had lived then we should have said the sea was invading the land; the fact is, the land was sinking in the water, and every year the beaches moved farther into the country. There were travelling beaches, and there were great fights

between the rivers of ice water and the stormy waves that tore up the sand and flung it down before the floods from the hills. Every railroad cutting made through a gravelly hill will show you rounded pebbles and stones, layers of sand and gravel, all sorted out exactly as we see them on the shore to-day.

Look about and see if you can find a sand bank or a gravel hill. Sand is used in house-building, and the masons in your town will be pretty sure to find a place where they can dig it out to put in their mortar beds. Look at one of these sand pits. The sand is arranged

in layers and sheets. Take these round stones sorted out according to their sizes in the hill. You cannot think the sand made itself. You cannot imagine the Creator rounded all these stones and placed them in layers merely for amusement, or to make something to puzzle us. Everything we see in the world had a cause, and if you find something far back in the country that seems just like the sea shore, you may be very sure the sea was once there. Sand and gravel are made by the waves where

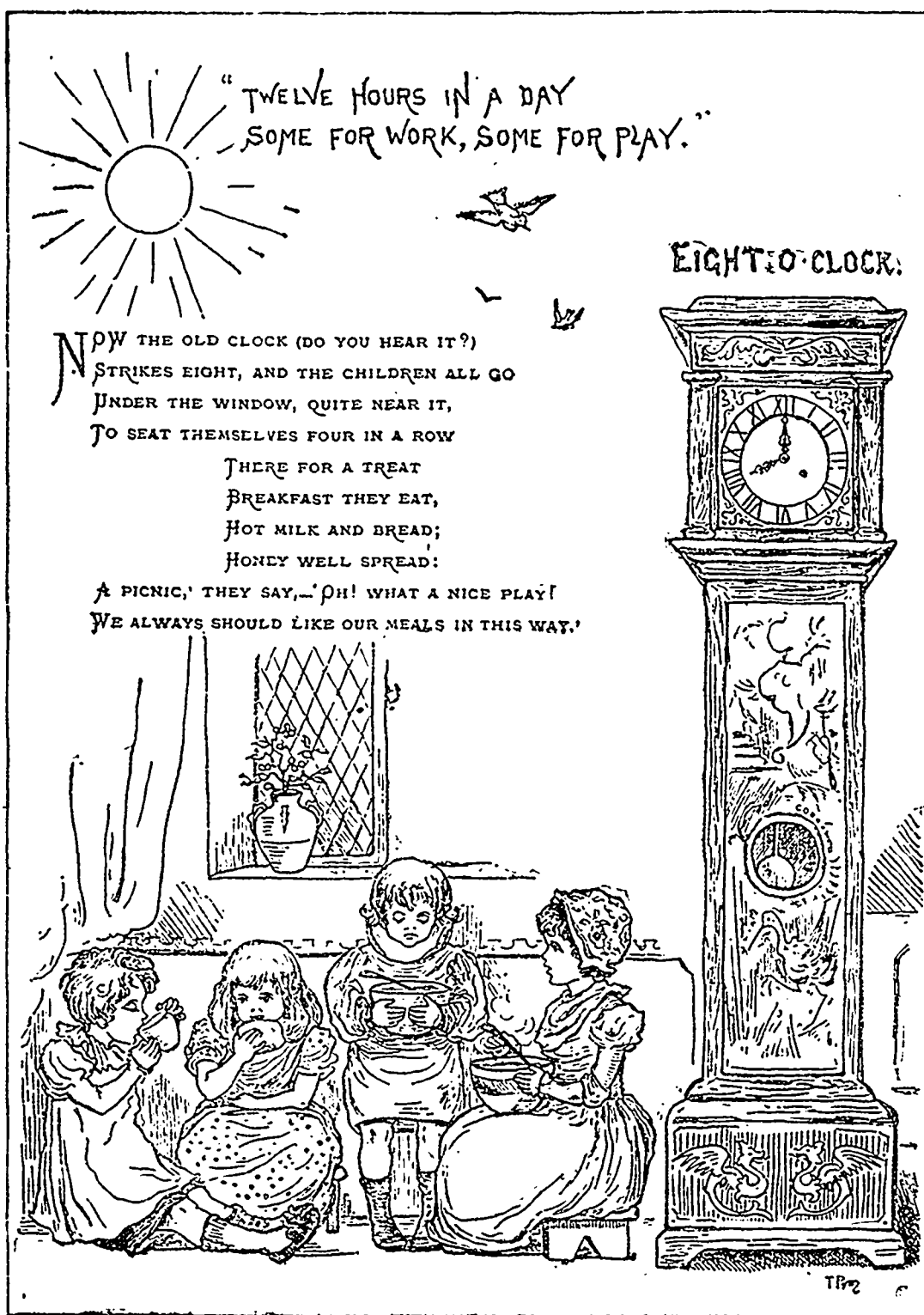
lifted up out of the water and let down again, and each time the coast line moved backward or forward. Continents became archipelagoes, and then scattered islands, and at last sank in the sea. Rivers turn into bays, and valleys became sounds and straits. Europe was once much larger than now, and once of wholly different shape. Ireland joined England, and England touched France.

Everywhere there has been change; not suddenly, but slowly, just as it is to-day. No

man has seen Sandy Hook growing, but it does grow. No one can measure how fast the hills fall into the sea near Boston, yet the work goes on all the time. The gravel heaps and sand banks of New England and the sandy barrens of South Carolina and Georgia are comparatively new. That last change when beaches extended far back into the country, was really only a little while ago, perhaps only half a million years, more or less. Behind all that were older seas and more ancient shores. As soon as there began to be land there was a beach. Perhaps the first land was only a sand-bar. Volcanoes threw out hot rocks and ashes, and these fell in the sea, and were ground up into sand. These old, old beaches, so venerable no man can count the years that have passed since the sea roared above them, are dead and turned to stone. To-day, as we know, they are called sand-stones. You can see the ripple marks and even the old shells in the stones we put into our houses.

People who have looked at the many

different kinds of rocks and have studied the work of the sea, the tides, and the waves, have tried to make a science out of it all. They call it geology. Perhaps you fancy that it must be a dry, dull science. Why, you are a geologist yourself. I have told you where these queer things about the rock can be found, and if you have seen them, or have tried to imagine how they look, then you have studied the science too. The next thing is to try for yourself, and see if you can turn over a few more leaves of the great stone picture-book.



they meet the land or roll down the river, so we feel sure wherever the sand is now that once the waves were there.

If you were ever down upon a low flat beach when the tide was coming in, you may have seen that as the water crept up, little capes, straits, islands, and so on, were formed along the edge of the water. Every change of level in the water changed the shape of the miniature continents. So it has been with the real continents. Neither Europe nor the Americas, Asia, Africa, or Australia are now the shape they were years ago. They have been