PHYSICS

band, it pulls equally hard on both hands. Now gravity pulls a body toward the earth; but, like the rubber band, it cannot pull the body without pulling the earth just as hard. Hence we may imagine that the force of gravity acts like an elastic cord stretched between the center of gravity of the body and that of the earth; and so it constantly tends to pull them toward each other along the straight line joining their centers of gravity.

9. Action and Reaction. When a boy lifts a heavy stone he must stand with his feet on the earth and his hands under the stone, and push downward against the earth with his feet just as hard as he pushes upward against the stone



with his hands. In this, his action is like that of a coiled spring that is compressed between two massive blocks (Fig. 14).

If the spring expands and moves the blocks, it must push on both bodies equally and in opposite directions.

In like manner, when a man slides a heavy box along the floor, he pushes with equal force forward on the box with his hands and backward on the floor with his feet. If his feet slip on the floor, the box does not move. This is because he cannot push any harder against the box than he pushes against the floor, and the greatest force that he can exer⁺ on the slippery floor is less than that required to move the box.

Whenever a force acts, two bodies are equally and oppositely affected. This very important fact is known as "Newton's third law of motion." It is usually stated as follows:

"To every action there is an equal and contrary reaction."

10. Mass. If the two blocks (Fig. 14) consist of equal quantities of iron, then, when they are pushed apart by the compressed spring, one moves just as fast as the ... But