line drawn from the center of gravity of the stone to that of the earth passes within the base even after the stone has been turned through quite a large angle.

It takes work to tip the stone over because in doing this its center of gravity must be raised to a higher level; on this account the stone, when so placed, is said to be in stable equilibrium. In like manner, the toy (Fig. 7) and the pencil with the knives stuck into it (Fig. 8) are in stable equilibrium when they are standing upright, because then their centers of gravity are as low as possible. Hence the conclusion: *A body is in stable equilibrium whenever it cannot be tipped without raising its center of gravity.*

We can now understand better why the ruler (Fig. 3) or the circular board (Fig. 4) remains balanced in any position when supported on a pencil point applied at the center of gravity. When a body so supported is tipped, its center of gravity stays on the pencil point and so neither rises nor falls. If a ball on a level table (Fig. 11) be rolled about, its center of gravity remains over the point of support and so is neither lowered nor raised by the motion; therefore, the ball remains in equilibrium wherever it is placed.

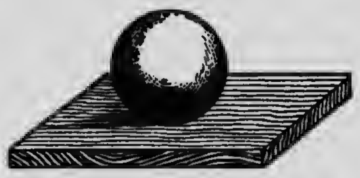

Fig. 11

Bodies that remain in any position in which they are placed (Figs. 3, 4, 11), are said to be in neutral equilibrium. *A body is in neutral equilibrium whenever tipping neither raises nor lowers its center of gravity.*

All cases of equilibrium under the action of gravity are included under the following principle:

A body is in equilibrium under the action of its weight when it is so supported that its center of gravity cannot descend to a lower level. This condition is fulfilled when the vertical line through the center of gravity passes within the base or through the point of support.

7. Degree of Stability. When the stone shown in