As you can see, a knowledge of the nature of the body's motion proved useful in finding the tension of the string. ◊

 . If I understand all this correctly, then, knowing the interaction of bodies, you can find the forces applied to one of them; if you know these forces and the initial conditions, you can predict the nature of the motion of the body (the magnitude and direction of its velocity at any instant).

On the other hand, if you know the kind of motion of a body you can establish the relationships between the forces applied to it. Am I reasoning correctly? ■

 **4.14.** Quite so. But let us continue. I want to propose a comparatively simple problem relating to Newton's second law of motion.

Two bodies, of masses M and m, are raised to the same height above the floor and are released simultaneously. Will the two bodies reach the floor simultaneously if the resistance of the air is the same for each of them? For simplicity we shall assume that the air resistance is constant. ◊

 . Since the air resistance is the same for the two bodies, it can be disregarded. Consequently, both bodies reach the floor simultaneously. ■

 **4.15.** You are mistaken. You have no right to disregard the resistance of the air. Take, for example, the body of mass M. It is subject to two forces: the weight Mg and the air resistance F. The resultant force is $Mg - F$. From this we find the acceleration. Thus

$$a = \frac{Mg - F}{M} = g - \frac{F}{M}$$

In this manner, the body of larger mass has a higher acceleration and will, consequently, reach the floor first.

Once more I want to emphasize that in calculating the acceleration of a body it is necessary to take into account all the forces applied to it, i.e. you must find the resultant force. In this connection, the use of the term *driving force* is open to criticism. This term is inappropriate. In applying it to some force (or to several forces) we seem to single out the role of this force (or forces) in imparting acceleration to the body. As if the other forces concerned were less essential. This is absolutely wrong. *The motion of a body is a result of the action of all the forces applied to it without any exceptions (of course, the initial conditions should be taken into account).*

Let us now consider an example on *Newton's third law of motion*. A horse starts to pull a wagon. As a result, the horse and wagon begin to travel with a certain acceleration.