

but cannot study physics successfully without some knowledge of mathematics; and for a successful understanding of chemistry we must know something of physics, and so on. It must, of course, be remembered that this division is purely one of convenience, and the different sciences mentioned above are often found to overlap and run into one another. Thus, there are many parts of physics that cannot be properly understood without some knowledge of chemistry.

If, in working at a science, we are concerned simply in building up a knowledge as complete and accurate as possible of the facts and principles concerned, without any regard to their application to useful ends, we produce what is called a pure science. If, on the other hand, our object is to discover and classify facts and principles in order to apply them to certain useful ends, then we are working at an applied or practical science. (Pure science may be regarded as water pumped into a reservoir, capable of doing useful work if properly applied, and the cultivation of pure science is like pumping more water into this reservoir for future use; while applied science may be regarded as some of this water actually running over a water-wheel and thus driving machinery.) Chemistry may be studied both as a pure and as an applied science.

In studying certain classes of actual phenomena, we often draw on several sciences, the result being sometimes called a mixed science, which, in its turn, may be either pure or applied. Thus geology is a mixed science, certain portions of physics, chemistry and biology being employed to explain or account for the structure of the earth as we know it to-day. If the object of the study be merely to do this as completely as possible, the result is a pure (mixed) science; if, on the other hand, the intention is to use the facts and principles thus arrived at for certain useful ends, as the location of coal deposits, the tracing of metaliferous veins, &c., then we have an applied (mixed) science. Similar remarks apply to medicine and many other branches of learning.

When we look around us attentively, *i.e.*, observe, we find the space about us filled with a great many different kinds of solids, liquids and gases, which we call collectively, matter. Further, we notice that this matter is continually undergoing change. All the matter in this world, for instance, is moving—it is undergoing change in position as it whirls round the axis of the earth and also round the sun. It also undergoes changes in temperature, being sometimes warmer and sometimes cooler. Then, we notice other kinds of changes, such as the burning of wood, the rusting of iron,