

In connection with definitions, it should be understood that the actual form of words used is not so very important, provided that the definition is definite, *i.e.*, contains all that it should and nothing that it should not, expressed in such a way as to allow of no misconception. The pupil, in testing a definition, and after seeing that it is complete, should ask himself, not "can this be understood," but "can this be misunderstood," and then act accordingly.

While it is generally very easy to say to which class a certain change belongs, *i.e.*, to say whether an alteration in composition has taken place or not, there are cases in which it is difficult—indeed scientific men are still very doubtful as to how they should be classified. For instance, the changes of water into steam and steam into water; or the changes of water into ice and *vice versa*, are generally called physical changes, as is also the dissolving of sugar or salt in water, and so on. But many of the leading chemists to-day think that these should be classed rather as chemical than physical changes. However, we may remember that they are still generally spoken of as physical and, until we have a good deal more knowledge of them, we cannot decide definitely.

We now have a preliminary idea as to what chemistry is. An answer to the second question asked at the beginning of this chapter, *i.e.*, why should it be studied, has only been hinted at, but will become clearer as we go on. Let us keep in mind, however, that the study of any subject is valuable in two distinct ways: first, for the actual facts and methods which it teaches us; and, secondly, for the mental gymnastics—the training of the mind—which it provides. How much of this latter good we get depends mainly on ourselves. Just as in ordinary gymnastics, it is necessary to exercise all parts of the body in proper proportion, even if what we desire is special strength in one part; so, in our study, we should exercise all our mental faculties and not, as is often the case, train our memories at the expense of our reason. It is an excellent thing to remember: it is a more excellent thing to understand.

#### QUESTIONS

1. To what class of changes does each of the following belong, and why (a) the converting of logs into boards, (b) the burning of wood, (c) the cooking of meat, (d) the grinding of a scythe?

2. What are the principal pure sciences? Briefly characterise each.