

which can be decomposed are called compounds. We have therefore the following definitions :

An Element is a substance which cannot be broken up into two or more substances of unlike properties.

A Compound is a substance that can be broken up into two or more substances of unlike properties.

It is very important that these definitions should contain the phrase "of unlike properties," or its equivalent. A definition frequently given for the term element is "a substance that cannot be broken up." This is obviously incorrect. Copper is an element and a piece of copper wire can very easily be divided into many parts or pieces, be broken up. The same is true of any other element. The parts must be of *unlike properties*, if they are to satisfy the requirements of this definition.

Compounds must be carefully distinguished from mixtures. A compound is a substance, a mixture is not a substance but is made up of two or more substances which still preserve their identity, merely existing side by side, as in a mixture of grains of sugar and sand. A compound may be built up from two or more substances, as may also a mixture; but, in the case of the compound, the original substances lose their own properties, the compound having properties of its own; while in the case of the mixture, the original substances retain their own properties, those of the mixture being more or less the sum of these.

EXPERIMENT.—Mix two or three grams of fine iron filings with about twice its weight of powdered sulphur. Examine a little of the mixture carefully, drawing out some of the iron with a magnet. Place the rest of the mixture in a test-tube and heat carefully, noticing what happens, till the mixture is red hot. Cool, and examine the product. Find out whether it is magnetic.

Solutions are more or less intermediate between mixtures and compounds. A solution is *homogeneous throughout* and in this resembles a compound and not a mixture; but a solution is *variable in composition* and in this way resembles a mixture and not a compound. Solutions may be gaseous (air), liquid (brine), or solid (brass). The true nature of solutions is not at present satisfactorily understood.