# CONVERSATIONS

ON

# CHEMISTRY.

## CONVERSATION I.

### ON THE GENERAL PRINCIPLES OF CHEMISTRY.

MRS. B.

AS you have now acquired some elementary notions of NATURAL PHILOSOPHY, I am going to propose to you another branch of science, to which I am particularly anxious that you should devote a share of your attention. This is CHEMISTRY, which is so closely connected with Natural Philosophy, that the study of the one must be incomplete without some knowledge of the other; for, it is obvious that we can derive but a very imperfect idea of bodies from the study of the general laws by which they are governed, if we remain totally ignorant of their intimate nature.

CAROLINE.

To confess the truth, Mrs. B., I am not disposed to form a very favourable idea of chemistry, nor do I expect to derive much entertainment from it. I prefer the sciences which exhibit nature on a grand scale, to those that are confined to the minutiæ of petty details. Can the studies which we have lately pursued, the general properties of matter, or the revolutions of the heavenly bodies, be compared to the mixing up of a few insignificant drugs? I grant, however, there may be entertaining experiments in chemistry, and should not dislike to try some of them: the distilling, for instance, of lavender, or rose water.....

MRS. B.

I rather imagine, my dear Caroline, that your want of taste for chemistry proceeds from the very limited idea you entertain of its object. You confine the chemist's laboratory to the narrow precincts of the apothecary's and perfumer's shops, whilst it is subservient to an immense variety of other useful purposes. Besides, my dear, chemistry is by no means confined to works of art. Nature also has her laboratory, which is the universe, and there she is incessantly employed in chemical operations. You are surprised, Caroline; but I assure you that the most wonderful and the most interesting phenomena of nature are

almost all of them produced by chemical powers. What Bergman, in the introduction to his history of chemistry, has said of this science, will give you a more just and enlarged idea of it. The knowledge of nature may be divided, he observes, into three periods. The first was that in which the attention of men was occupied in learning the external forms and characters of objects, and this is called *Natural History*. In the second, they considered the effects of bodies acting on each other by their mechanical power, as their weight and motion, and this constitutes the science of *Natural Philosophy*. The third period is that in which the properties and mutual action of the elementary parts of bodies was investigated. This last is the science of CHEMISTRY, and I have no doubt you will soon agree with me in thinking it the most interesting.

You may easily conceive, therefore, that without entering into the minute details of practical chemistry, a woman may obtain snch a knowledge of the science as will not only throw an interest on the common occurrences of life, but will enlarge the sphere of her ideas, and render the contemplation of nature a source of delightful instruction.

CAROLINE.

If this is the case, I have certainly been much

mistaken in the notion I had formed of chemistry. I own that I thought it was chiefly confined to the knowledge and preparation of medicines.

MRS. B.

That is only a branch of chemistry which is called Pharmacy; and, though the study of it is certainly of great importance to the world at large, it belongs exclusively to professional men, and is therefore the last that I should advise you to pursue.

EMILY.

But, did not the chemists formerly employ themselves in search of the philosopher's stone, or the secret of making gold?

MRS. B.

These were a particular set of misguided philosophers, who dignified themselves with the name of Alchemists, to distinguish their pursuits from those of the common chemists, whose studies were confined to the knowledge of medicines.

But, since that period, chemistry has undergone so complete a revolution, that, from an obscure and mysterious art, it is now become a regular and beautiful science, to which art is entirely subservient. It is true, however, that we are indebted to the alchemists for many very useful discoveries, which sprung from their fruitless attempts

to make gold, and which, undoubtedly, have proved of infinitely greater advantage to mankind than all their chimerical pursuits.

The modern chemists, instead of directing their ambition to the vain attempt of producing any of the original substances in nature, rather aim at analysing and imitating her operations, and have sometimes succeeded in forming combinations, or effecting decompositions, no instances of which occur in the chemistry of Nature. They have little reason to regret their inability to make gold, whilst, by their innumerable inventions and discoveries, they have so greatly stimulated industry and facilitated labour, as prodigiously to increase the luxuries as well as the necessaries of life.

EMILY.

But, I do not understand by what means chemistry can facilitate labour; is not that rather the province of the mechanic?

MRS. B.

There are many ways by which labour may be rendered more easy, independently of mechanics; but even the machine, the most wonderful in its effects, the Steam-engine, cannot be understood without the assistance of chemistry. In agriculture, a chemical knowledge of the nature of soils, and of vegetation, is highly useful; and, in those

arts which relate to the comforts and conveniences of life, it would be endless to enumerate the advantages which result from the study of this science.

CAROLINE.

But, pray, tell us more precisely in what manner the discoveries of chemists have proved so beneficial to society?

MRS. B.

That would be an injudicious anticipation; for you would not comprehend the nature of such discoveries and useful applications, as well as you will do hereafter. Without a due regard to method, we cannot expect to make any progress in chemistry. I wish to direct your observations chiefly to the chemical operations of Nature; but those of Art are certainly of too high importance to pass unnoticed. We shall therefore allow them also some share of our attention.

EMILY.

Well, then, let us now set to work regularly. I am very anxious to begin.

MRS. B.

The object of chemistry is to obtain a knowledge of the intimate nature of bodies, and of their mutual action on each other. You find therefore,

Caroline, that this is no narrow or confined science, which comprehends every thing material within our sphere.

CAROLINE.

On the contrary, it must be inexhaustible; and I am a loss to conceive how any proficiency can be made in a science whose objects are so numerous.

MRS. B.

If every individual substance were formed of different materials, the study of chemistry would, indeed, be endless; but you must observe that the various bodies in nature are composed of certain elementary principles, which are not very numerous.

CAROLINE.

Yes; I know that all bodies are composed of fire, air, earth, and water; I learnt that many years ago.

MRS. B.

But you must now endeavour to forget it. I have already informed you what a great change chemistry has undergone since it has become a regular science. Within these thirty years especially, it has experienced an entire revolution, and it is now proved, that neither fire, air, earth, nor water, can be called elementary bodies. For an

elementary body is one that has never been decomposed, that is to say, separated into other substances; and fire, air, earth, and water, are all of them susceptible of decomposition.

EMILY.

I thought that decomposing a body was dividing it into its minutest parts. And if so, I do not understand why an elementary substance is not capable of being decomposed, as well as any other.

MRS. B.

You have misconceived the idea of *decomposition*; it is very different from mere *division*. The latter simply reduces a body into parts, but the former separates it into the various ingredients, or materials, of which it is composed. If we were to take a loaf of bread, and separate the several ingredients of which it is made, the flour, the yeast, the salt, and the water, it would be very different from cutting or crumbling the loaf into pieces.

EMILY.

I understand you now very well. To decompose a body is to separate from each other the various elementary substances of which it consists.

CAROLINE.

But flour, water, and other materials of bread,

according to our definition, are not elementary substances?

MRS. B.

No, my dear; I mentioned bread rather as a familiar comparison, to illustrate the idea, than as an example.

The elementary substances of which a body is composed are called the *constituent* parts of that body; in decomposing it, therefore, we separate its constituent parts. If, on the contrary, we divide a body by chopping it to pieces, or even by grinding or pounding it to the finest powder, each of these small particles will still consist of a portion of the several constituent parts of the whole body: these are called the *integrant* parts; do you understand the difference?

EMILY.

Yes, I think, perfectly. We *decompose* a body into its *constituent* parts; and *divide* it into its *integrant* parts.

MRS. B.

Exactly so. If therefore a body consists of only one kind of substance, though it may be divided into its integrant parts, it is not possible to decompose it. Such bodies are therefore called *simple* or *elementary*, as they are the elements of which all other bodies are composed. *Compound*

*bodies* are such as consist of more than one of these elementary principles.

CAROLINE.

But do not fire, air, earth, and water, consist, each of them, but of one kind of substance?

MRS. B.

No, my dear; they are every one of them susceptible of being separated into various simple bodies. Instead of four, chemists now reckon upwards of forty elementary substances. The existence of most of these is established by the clearest experiments; but, in regard to a few of them, particularly the most subtle agents of nature, *heat*, *light*, and *electricity*, there is yet much uncertainty, and I can only give you the opinion which seems most probably deduced from the latest discoveries. After I have given you a list of the elementary bodies, classed according to their properties, we shall proceed to examine each of them separately, and then consider them in their combinations with each other.

Excepting the more general agents of nature, heat, light, and electricity, it would seem that the simple form of bodies is that of a metal.

CAROLINE.

You astonish me! I thought the metals were only