

## EXPLANATION OF CHEMICAL TERMS.

Acids are substances of a sour taste. The acids are very numerous—their most distinguishing properties are—1st. They change to red those colors of vegetable which the alkalies change to green. 2d. They combine with alkalies, and thereby form various kinds of salt.

Some of the acids are met with in a solid state—others in a fluid state, as vinegar—and others in a gaseous state. Of the latter is Carbonic Acid, which requires a more particular description.

The carbonic acid, when uncombined with any other substance, is always met with in a state of gas, and hence it is called carbonic acid gas. It is the same substance which was formerly called fixed air. It exists in a small proportion in the atmosphere. It destroys life and extinguishes the light of a candle when immersed in it. It is disengaged largely from liquors, such as Beer, Cider, or Wine, when in the act of fermentation. It is this gas which produces the many unhappy accidents in some subterraneous caverns, in closed cellars, containing large quantities of fermenting liquors, in some deep wells, and in bedchambers warmed by burning charcoal in pans.

This acid combines with a great variety of substances, which are then called carbonates. It exists in marble, chalk and limestone, in different proportions, all of which are called carbonates of lime, and the burning of limestone is for no other purpose but to expel the carbonic acid, which is done by heat, in which operation the limestone loses nearly half its weight.

The alkalies attract it from the atmosphere. It is present in pot and pearl ashes, from which it is disengaged by the addition of a stronger acid, as every one may have seen in throwing pearl-ash into cider, as some people do to drink in the morning. The acid in the cider in uniting with the pearlash displaces the carbonic acid, which rises in the form of gas through the liquor, producing much foam with a hissing noise, called effervescence.

**ATMOSPHERIC AIR**, or the air which surrounds this earth, is a mixture of two different kinds of earth, is a mixture of two different kinds of air, called *oxygen* and *azote*. It likewise contains a small proportion of carbonic acid gas, a substance already described. ♦

It is well known that no animal will live nor fire burn without air, but it is that part of the air called *oxygen* which is necessary for both. It is this which supports life and combustion; and where there is no oxygen an animal will die and a light will be extinguished as suddenly as where there is no air at all.

All this may be made plain by a very easy experiment. Take a little candle, put it into a candlestick, and set it into a pail of water so deep as that the light of the candle may rise three or four inches above the surface of the water. Then take a deep tumbler or wide-mouthed decanter, invert it and let it down over the candle till the brim shall dip in the water. As the candle continues burning, the water will be seen rising in the decanter until it is about a quarter part full, when the candle will suddenly go out. Now the reason of the water's rising in the empty decanter is, because the oxygen is gradually consumed by the lighted candle: and the reason that the candle goes out is, that the oxygen at that instant is all gone, or has all been expended in the combustion. What is then left in the decanter will be the other part or kind of air called *azote*, and if a small animal should be introduced into this air, it would die as suddenly as if it had no air at all.

Oxygen gas, (for you must remember that every substance in the form of air is called a gas) is a very wonderful substance. It unites with iron when exposed to the atmosphere for any length of time, and converts it into rust; it unites with melted pewter or lead, and converts it into rust; it unites with melted pewter or lead, and converts them into dross or oxyde, as it is called; it unites with another kind of gas called hydrogen, and forms water. Yes, what perhaps it may surprise you to know, water is not a simple as most people suppose, but a compound substance composed of oxygen and hydrogen gas. Both its decomposition and its composition are common experiments in every chemical room.

Oxygen likewise is one of the ingredients in the composition of acids, all of which are compound substances; hence, oxygen has been called the great acidifying principle. Thus, it unites with sulphur in the act of combustion, and forms sulphuric acid—oil of vitriol, as it was formerly called; it unites with carbon or charcoal, when burning, and forms carbonic acid gas, already described; and hence we see how the carbonic acid gas, which sometimes proves fatal in close shut bedchambers, heated with burning charcoal is produced. The oxygen in the atmosphere unites with the carbon or charcoal when burning, and thus produces this gas, so deleterious to life, when breathed without a due proportion of atmospheric air mixed with it.

These four elementary substances—oxygen, hydrogen, azote and carbon, possess a very wonderful agency in nature, and every one who has any wish to look beyond the mere surface of things, cannot but be gratified in knowing more about them. It is important that the character and distinguishing properties of each should be well understood. These are given in the following concise definitions which are not to be forgotten, viz:—

*Oxygen* is one of the constituent principles of water; it is called vital or respirable air and essential both to the support of life and combustion. This substance performs an important part in most of the changes which take place in the mineral, vegetable and animal kingdoms.

*Hydrogen* is one of the constituent principles of water; it is very inflammable, and was formerly called inflammable air. It is the lightest of all ponderable substances. This is the substance generally used in filling air-balloons. It is readily obtained by the decomposition of water. Vegetables and animals also in a state of decay and putrefaction, afford it, and it is evolved from various mines and volcanoes.

*Azote* is that part of Atmospheric air which is incapable of supporting life or combustion. All combustible substances burn violently in pure oxygen gas, and if it was not diluted in the atmosphere by a large portion of azote, it would be impossible to extinguish any considerable fire when once lighted up, and something like the general conflagration of the world would immediately commence. Azote exists abundantly in nature, forming the greater part of the atmosphere, and is one of the principal ingredients in animal substances.

*Carbon* is the pure part of charcoal. It forms a large proportion of all vegetables; it exists also in animals, but its quantity is small.

*Carbonic Acid* is a combination of carbon and oxygen in the proportion of 18 parts carbon to 82 parts oxygen.

An account of this substance has already been given under the article "Acids." It may here be added that the sources of this acid are immense. It exists in the atmosphere; it is found in abun-