This plays a threefold part: its first action is to render the mould more soluble; this action it possesses in common with the fixed alkalies, potash and soda. All the alkalies put a large, but undefined portion of mould into a state fit to become food for plants. The second action of ammonia is this, it hastens decay. It is the bellows, we may say, kindling the slow mouldering fire. The third action of ammonia is to combine with any free acids, such as vinegar, or even an acid formed of mould itself, but especially with aquafortis, or nitric acid, which is always produced where animal or vegetable matters decay. This is a highly important fact. The result of this action, the production of ammonia and aquafortis during the formation of mould, is, that a kind of saltpetre is thereby produced. That is, the ammonia and aquafortis unite, and form a salt with properties similar to saltpetre. But we want the first and second action of ammonia to occur, before the third takes place. Consider now, reader, whether a more beautiful and effectual way can be devised to hasten decay, and render mould more fit for nourishing plants, than this which nature has provided. The ammonia is volatile. It remains, not like potash and soda, where it is put, incapable of moving unless dissolved by water; but ammonia, like steam, pervades every part. It is as expansive as steam. Heated up by the slow mouldering fire of decay, it penetrates the whole mass of mould. It does its work there. What is that work? It has already been told. But, if it finds no acid to combine with, it then unites with the mould itself. It is absorbed by it. The mould holds it fast; it stores it up against the time when growing plants may need it. Now it is only where the abundance of ammonia produced satisifies these actions of hastening decay, making mould soluble, and filling its pores without combining with it, that the formation of saltpetre takes place. So where animal matters, which are the great source of ammonia, decay, there we may expect all these actions to occur.

How important, then, is that action of mouldering which produces ammonia, If, reader, you will reflect upon the consequences of this action, you will at once see, that if the mould is in too small a quantity to retain the ammonia, it may escape. If, by wasty exposure, you allow your mould to dissipate itself in air, as it certainly will, you not only incur the loss of that part of the mould, but you diminish, at the same time, the chance of keeping the ammonia which has been formed. No doubt all cattle-dung exposed to air, forms more ammonia then it can retain. Hence the necessity and the reason of forming composts with this substance. "Keep what you have got, and catch what you can," must never be lost sight of in manure.

The third action of mould is, the production of heat. Little need be said upon this. That a slight degree of heat hastens the sprouting of seeds, you well know. That different manures produce different degrees of heat; that some are hot, some cold, you well know, and adapt your seed and manure to each other. The degree of heat depends upon the rapidity with which decay occurs. And this is affected by the quantity of ammonia which each manure can afford. The great point to which your attention should be directed, when considering the power of mouldering to produce heat, is, that it shaill not go so far as to burn up yonr manure, just as hay will heat and take fire.

[To be Continued.]

EXPLANATION OF 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.

2nd. They combine with alkalies, and thereby form various kinds of salts.

Thus the combination of muriatic acid with soda forms common 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 gass. 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 bed chambers, warmed by burning char coal 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 pearlash 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 effervesence.

48. *Atmospheric air*—or the air which surrounds this 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 decribed.

It is well known that no animal will live, or 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 candle-stick, 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 a wide mouthed decanter, invert it, and let it down over the candle till the brim shall dip into the water. As the candle continues burning, the water will be seen rising in the decanter, till it shall be about one quarter part full, when the candle will suddenly go out. Now the reason of the water's rising in the decanter is, because the oxygen is gradually consuming 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 lenght of time, and converts it into rust, it unites with melted pewter or lead, and converts them into dross, or oxyde, as it is called, it unties with another kind of gas, called hodrogen, and forms water. Yes, what perhaps it may surprise you 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, or oil of vitriol, as it was formerly called; it unites also with carbon or charcoal, when burning, and forms carbonic acid gas, already decribed; and hence, we see how the carbonic acid gas, which sometimes proves fatal in close shut bed-chambers, heated with burning charcoal, is produced. The oxygen in the atmosphere unites with the charcoal or carbon in burning, and thus produces this gas, so deliterious 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. We shall have further occasion to speak of these substances in the Cabinet; it is important, therefore, 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:—

49. *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.

50. *Hydrogen*—is one of the constituent principles of water; it is very inflammable, and was formely 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 puterfaction afford it, and it is evolved from various mines and volcanoes.

51. *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 atmophere 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 abudantly in nature, forming the greater part of the atmophere, and is one of the principal ingredients in animal substances.

52. *Carbon*—is the pure part of charcoal.

Carbon forms a large proportion of all vegetables; it exists also in animals, but its quantity is small.

53. *Carbonic Acid*—is a combination of carbon and oxygen, in the proportions 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 abundance in many mineral waters, as at Ballston and Saratoga, in the State of New York; it is produced by the combustion of wood and charcoal, by the fermantation of liquors, and by the decomposition or putrefaction of vegetable substances, but the largest store of it is that enormous quantity solidified or rendered solid in all the immense beds or chalk and limestone with which every part of the globe abounds.

Of limstone, 45 parts in every 100 are computed to be canbonic acid.

As before observed, when uncombined with any other substance, it always exists in the state of gas. It is heavier than atmospheric air. If this gas be poured from a wide-mouthed jar upon a lighted candle it will be as effectually extinguished as by water.

54. *Effervescence*—is a sudden disengagement of gas taking place within a liquid and separating from it with a hissing noise.

55. *Chemical Affinity*—is a term used to signify the attraction or tendency there is between the particles of certain substances, of different natures, to unite, thereby forming a third substance possessing properties altogether different from those of either of the two substances of which it is composed.

Thus, potash and oil have a tendency to unite, thereby forming soap, which is a third substance very different either from the oil or the potash, of which it is composed.