

OZONE IN THE ATMOSPHERE.

The following very interesting extracts on this subject are taken from a lecture by Professor E. Frankland, F. R. S., lately delivered before the Royal Society, and published in the *Chemical News* :

Hydrogen is capable of uniting with one equivalent of oxygen, forming water ; with two equivalents of oxygen to form binoyd of hydrogen ; and with three equivalents to form "ozone," or, at all events, to form teroxyd of hydrogen, the existence of which is theoretically indicated, if ozone be not this very compound. What is this ozone ? Some chemists suppose it not to contain hydrogen ; others think it does contain hydrogen ; and a series of analyses certainly did seem to prove that hydrogen, in the proportion I have stated, was a constituent of ozone. Now, ozone is produced in two or three different ways. One of the most peculiar is by means of the electrical machine.—There is a peculiar odor in the neighborhood of an electrical machine when worked, and that odor is usually supposed to be due to ozone. It is caused by electric sparks passing through the air. We can collect this ozone in a variety of ways ; but before doing this, I must refer you to the liquid contained in this glass vessel, which furnishes a very delicate test for the presence of ozone, and of other matters, too, as we shall presently see. It consists of a solution of iodide of potassium and starch. Ozone, containing as it does, three equivalents of oxygen, readily gives up oxygen, and it is capable, in this way, of oxydizing the iodide of potassium and converting the potassium into potash.—The iodine thus liberated forms an intense blue solution with the starch. Here I have a Ruhmkorff's coil, which will give us a series of sparks. You see by the working of this air pump the so-called ozonized air passes through the liquid which becomes blue. You see we have now got a very decided blue coloration here. That is one mode by which ozone is produced ; but we shall see that the blue color is not entirely due to the presence of ozone. Now, another mode for the production of ozone is by placing moist phosphorus in a close air jar. Here is some filter paper which has been imbued with the solution of iodide of potassium and starch, and which will become blue when it is plunged into this vessel containing ozone produced by this process. This constitutes what is generally known as the usual test for ozone in the atmo-

sphere. Then we have another mode of producing ozone, and that is by electrolysis. When water is mixed with some highly oxydizing substance, such as chromic acid, we have this ozone produced when the water is decomposed by the current of electricity. It was from this source that ozone was produced for analysis, and it was from this that the formula I have here used was formed—namely, HO_3 , three equivalents of oxygen and one of hydrogen.

Ozone, as I have said, is supposed to be present in the air, and many very careful observers are at the present time making observations upon the relative quantities of ozone present in the air. Papers of this kind [exhibiting ozone papers] are exposed to the atmosphere for certain fixed and definite lengths of time, the amount of blueness which they manifest in that time is carefully noted, and the intensity of this blue color is supposed to represent the comparative quantity of ozone present in the air. Now, it is greatly to be regretted that such an amount of labor should be expended upon a matter which is utterly and entirely valueless, because this so-called "test" for ozone is really only a test for a great number of things which may—nay, do—exist in the air, and from which ozone may be really absent. We may say that there is not, up to the present time, a single experiment which demonstrates that ozone is present in the atmosphere ; and certainly these tests, so far from proving its existence, do not even infallibly demonstrate the presence of an oxydizing influence in the air. It is quite possible that this bluing of the paper may be produced in a condition of the air very different from that in which ozone is present. Ozone being a highly oxydizing substance, is supposed to decompose organic impurities in the air, and therefore the air which contains the largest quantity of this ozone is supposed to be the most wholesome. You have only to have present, in the air, some acid gas—you have only to go into the neighborhood of some chemical works, for instance, where hydrochloric acid gas is evolved—and you will there have plenty of these manifestations of the presence of ozone. Here we have some solution of iodide of potassium and starch and I acidify it with acetic acid.—You see we have abundance of acetic acid indicated, but it is said that ozone is never present in this part of London. The liquid has become of a dark blue color. The reason is, that the iodide of potassium which is contained in this liquid, and in

all these test papers, is decomposed by acids, and hydriodic acid, a compound of iodine and hydrogen, is immediately formed. It is only necessary to bring this hydriodic acid in contact with free oxygen, when the hydrogen is oxydized and the iodine is liberated, so you see this so-called "test" for iodine is perfectly unreliable.

AUNTIE TO THE BOYS.

Boys, did any body ever pat you on the head, and say "You'll be a rich man before you die ?" Did it please you very much ? I presume it did. You think it would be a fine thing to live in a large house, with a beautiful garden around it, and ride in a new carriage.

But there is *danger* in growing rich. I presume you think I mean the danger of taking dishonest ways of making money—cheating, stealing, forging and such, but I do not mean any of these.—There is danger that in becoming rich, you will also become *selfish*. You may be so engaged in making money, that you will forget to make yourselves noble men—forget to cultivate your minds—forget to govern your tempers—forget to polish your manners ; and on the contrary, become as hard-hearted as the copper cents you so much admire, and as dull and rusty as the oldest one you ever saw. Then do you suppose good people will respect you, just for your money ? No, indeed. A gentlemanly, intelligent and generous man of wealth is respected, but one who has only his money to recommend him, is poor indeed.

The Bible says, "If riches increase, set not your hearts upon them." There is the secret—"set not your hearts upon them." Put your money to some good use, and then it will not rust your soul.

INSECT MUSIC—All that we read is not gospel. Buffon, Goldsmith, and others, tell us that flying insects, like musketoes, locusts, and so on, make the humming noise they do by beating the air with their wings. It's all a mistake. They sing, just like ourselves, only their vocal organs are deposited, not in their throats, but along the sides of their bodies. They use (so the microscope assures us) a windpipe, the outlet to which is furnished with a vibrating valve, like that employed on the accordion ; but then a man has only one of these arrangements, while most insects have at least a dozen, and through each of the dozen, as they fly, the air is made to rush with prodigious effect and some degree of melody.