coals-pits of Newcastle, Durham, and other places, large heaps of small coals, covering many acres. Those coals have been deposited there, owing to their small value; and you will find that they are always on fire. Perhaps you will imagine that the coals were set on fire? No such thing: they took fire by themselves. When I state to you that the coal contains sulphuret of iron (iron pyrites) you will be at no loss to ascertain the cause. The action of oxygen on the sulphuret of iron is such as to produce heat, and the continued action of this heat causes the coal to take fire. Many singular phenomena of which we occasionally hear, as, for instance, smoking and burning cliffs, near the sea, are due to the action of oxygen on recently-exposed iron pyrites.

But more still. This oxygen, this universally-acting busybody, has something to do with volcanoes and earthquakes. We find that these volcanos burst out with tremendous force in some places, emitting large bodies of fire. Whence does this arise? This fire is doubtless the product of combustion. And what an enormous power must be generated to produce such awful results as the overthrowing of Herculaneum and Pompeii, the awful visitation of Calabria, or the destruction of the city of Lisbon!

In connexion with volcanoes, it should be borne in mind that they are always near the sea. You know that when you look for their positions on the map, you keep your eye to the coast. Etna, Hecla, Vesuvius, *Stromboli, the burning mountains of the Andes, and* the volcanoes in the East Indies, are all to be found near the coast. There can be no doubt that water has something to do with them; and water, recollect, contains a great deal of oxygen.

It has been supposed that the matter of the interior of the globe consists chiefly of the metallic bases of the earths: and these, it is well known, have the power to decompose water, uniting with its oxygen and liberating the hydrogen.

Now, if by any means the ocean water penetrates to these metallic bodies, most intense action will be the result; heat will be liberated, and effects produced quite sufficient to account for the phenomena of volcanoes and earthquakes.

There are a few other points which I wish to bring before you. This oxygen is the means appointed for the destruction of all vegetable and animal substances. Every one of us is undergoing its action. We breathe *it, but we return less of it to the air than we took* from it. What we inhale produces heat, and this is the reason why your bodies are warmer than the stone walls around you. Without any very great stretch of the imagination, or any very forced comparison, your bodies may be likened to little steam-engines, or blacksmith's fires. Your lungs operate as a pair of bellows, your mouth is the chimney, and the food is the coal. Your bellows are always going; if you are prevented from breathing for two minutes you will die. Yet, if it were not for the action of the oxygen on your body, you could not live; for from its continual consumption of the muscles of the body, you derive your physical energy and power. If you did not eat, what would be the consequence? Would the bellows cease to work? No; they would go on working till every particle of available fuel (flesh, fat, &c.) was consumed. This shows that, if you take no food to supply the waste of the muscles, you must, like a fire, ultimately *go out.* If food be withheld, the parts of your body, such as the fat, the muscles of the cheeks, o. . e breast, and any other available parts, would be consumed by the action of the inspired air before the bellows would cease to work; and lastly, the brain would be attacked, and you would die. Now, this always takes place when, by any means, food is not taken or not properly digested. On the other hand, if the blacksmith overloads his fire, and does not blow his bellows enough, the flame goes out; and you, if you are always eating and never blowing your bellows enough, you are still liable to *go out.* You are putting on too many coals, and that is the reason why I recommend you to enjoy yourselves at play, without which you can never expect to grow strong. Our life, and the life of all animals, therefore, depend on the action of oxygen *and the supply of food.* When these two are in a state of equilibrium or balance, we are in a state of *health.* When either one or the other are in excess, our normal state of health ceases, and various maladies ensue, which continue until the cause is removed Eventually, however, the oxygen obtains the mastery, and these bodies of ours, like those of our ancestors, will be overcome by this powerful agent, and their elements will be returned into the great laboratory of nature, to furnish the principles of life and existence to succeeding generations of animated beings.

All vegetable matters undergo a similar change, and they also are eventually decomposed, to furnish again the elements of vegetable life

All animal and vegetable substances, therefore, unless preserved in some peculiar manner, are resolved into their original elements. But, if protected from the action of oxygen, they may be preserved for an indifinite period of time. Wood is painted to pre*serve it from contact with the oxygen of the air, and it* thus lasts much longer. Again, coal is the remains of immense forests of primeval periods, and it has not yet been decomposed into its elements. These immense deposits of vegetable matter were, when deposited, covered with soft mud, so that the oxygen was prevented from coming in contact with them, and by the constantly-increasing pressure from superincumbent deposits, the mud became a rock, and the action of the oxygen became less and less for each succeeding year. The consequence is, the mass has been preserved for an immense period of time.

Animal matter may also be easily preserved out of contact with air. The finest salmon of Scotland, the most beautiful soups, game, fowls, and fish of all kinds, are now packed in air-tight tin cases, and can thus be sent to all parts of the world. The travellers across the desert of Suez, in their journey to the East Indies, often enjoy the luxury of *fresh* Scotch salmon.

Oxygen, then, is one of the most important elements that we know: everything else yields to it in importance; it is found to pervade all nature; it is necessary for the existence of animal life, and is an essential of vegetable growth; and, in order that you may be able to trace its effects, for practical purposes, in the economy of the farm, I have endeavoured to explain its properties and tion, not only on vegetables and animals, but also ..i many elementary bodies not directly connected with vegetation.

Before I conclude, I shall submit a few interesting experiments, showing the very powerful affinity which oxygen has for some substances, and likewise the intense heat produced when oxygen and hydrogen gases are burned together.

When the two gases, oxygen and hydrogen, are mixed together in any vessel, a most violent explosion will take place, on the application of a light. This arises from an immediate union between the two, and the vapour of water is the result of the combination. If you try to cause the mixture to burn silently, like common gas, by means of a jet, the flame will immediately retreat through the jet, along the interior of the pipe, to the magazine of the mixed gases, and a most frightful explosion will be the result. Mr.