of small bladders filled with light gas, and by means of these buoys, the flower-stalks are raised to the surface, where the fructification takes place, and after the seeds have grown to maturity they drop to the bottom of the water, from which they spring up again at the following season.

Having now paid some attention to those plants which are accustomed to grow in soil and water, we will now turn to the parasites—such plants, as are in the habit of growing on trees, or stones and rocks, &c. Those who have not visited primeval forests can form no idea of the beauty and the magnificence of such an appearance. In the forests of the tropics we frequently find trees of the greatest age and the most gigantic forms covered with those parasites from the bottom to the point. They generally belong to the tribes of ferns, lycopodia, bananas, orchids, &c. Such an old tree represents somewhat a botanical garden, where a botanist can easily spend a month or more in order to make his studies and collection. The most interesting among these parasites are the orchids, particularly remarkable for the shape of their flowers, the brightness and great contrast of their colours, &c., for which reason they are now so frequently cultivated in our hothouses. The parasites are used to live at the expense of the moisture of the atmosphere. We now arrive at that class of plants which commonly grow on mouldering wood, on stones, rocks, &c., namely, the mosses, ferns and lichens, and by illustrating their habits we shall find that their functions in natural economy are of much higher importance than would be generally supposed. These plants may be regarded as the true pioneers of vegetation. It has already been stated that the seeds of these families are so very light and dust-like, that they are taken up by the wind in large quantities and carried away to great distances, and frequently reach stones, rocks, and even distant barren islands, where they often germinate and grow, supported by the moisture of the atmosphere. When in course of time these plants or parcels of them die and decay, a small layer of humus will be produced, in which the second generation, however, will grow and prosper more rapidly. By this continued change of growth and decay such an increased humus is produced—though often not till the expiration of centuries—that larger plants and even the largest trees can grow and prosper in it. If we had the means of tracing back to its origin the history of many an island, especially of coral-reefs, we should in all probability become convinced that vegetation on them began and continued in this very manner.

Among all the different functions of vegetables none are more interesting and of higher importance in regard to our own existence and health, than the manner in which these are instrumental in purifying the air by decomposing the poisonous carbonic acid gas of the atmosphere, and reproducing therefrom the necessary quantity of oxygen gas.

Although the explanation of this process is somewhat circumstantial and the comprehension of it requires some knowledge of chemistry, I will endeavour to the best of my abilities to illustrate this process in the most popular way.

In order to reach this my aim I am obliged to start with the explanation of many other facts, connected with the phenomenon alluded to. We are all familiar with the fact, that no being that breathes through lungs is able to live for even a short time without inhaling atmospheric air. Besides, that by the condensation of this air the animal heat is produced and sustained, the same effects also a very important alteration in our blood. When the air, consisting, as we all know, of about sixty-six per cent. nitrogen gas, and thirty-three per cent. oxygen gas—comes in connection with the so-called chyle in our lungs, both of them (namely, the air and chyle) undergo thereby a strange alteration. The white chyle deprives the air of a part of its oxygen, changes thereby its white colour into red, and is thereafter real blood, which is then pumped by the pulsation of the heart through the veins of the whole body, for the purpose of developing and nourishing the same to the remotest extremities.

As equivalent for the oxygen received, the chyle, however, delivers to the oxygen of the atmosphere a part of the superfluous carbon, producing thereby carbonic acid gas, which after this process is exhaled in company with the unchanged atmospheric air, nitrogen gas, and some moisture, which will intermix with the atmosphere.

Beside by exhalation, carbonic acid gas is produced by the process of burning, of fermentation, putrefaction, by volcanic eruptions, by escaping from natural mineral springs, and many others. If we now consider how many millions of human beings and animals have already lived and breathed since the Creation; how much combustion has taken place, and how many substances, both vegetable and animal, have gone to decay, &c.; and if we consider furthermore, that by all these occurrences oxygen is constantly absorbed from the air and carbonic acid gas produced in return, one would fear that after the lapse of time the oxygen would decrease, while the carbonic acid gas would increase in such proportions that animal life could no longer be possible.

The learned men of the olden times entertained this idea, hinting frequently at this danger, and as the effect of the carbonic acid gas is suffocating, when exceeding the proportion of four per cent. in the atmospheric air, they feared the time would arrive when animal life on our globe would entirely cease to exist. Most happily for us, however, as well as for our descendents, the apprehensions of the old naturalists have proved to be unfounded; for since the science of analytical chemistry has attained so high a degree of perfection that its results may be considered scrupulously correct, the atmospherical air has frequently been analysed at regular intervals and in very different places and localities, the result always demonstrates that the proportion of the carbonic acid gas to that of the atmosphere is nearly constant, and in no place whatever exceeds one per cent.

For a long period the scientific world had speculated as to what became of the carbonic acid gas thus produced, until finally the German chemist, Liebig, proved, by facts, that the plants dissolve and decompose the carbonic acid gas of the atmosphere by absorbing its carbon for the formation of their growth by leaving the oxygen to escape as