their simple constituents, combined together in certain unions, and these constitute the solid portions. Hydrogen separates from the Oxygen, and enters into union with carbon to form oil, resin, gum, and other matters, and the superabundant oxygen escapes in the gaseous form or in union with caloric.

It has been found by frequent trial, that vegetable substances generally vary much in their properties, according as they contain more or less oxygen. When they contain a large proportion of oxygen for their quantity of Hydrogen, taking water as the standard, they are always acid—when they contain a small proportion they are generally resinous, oily, or alcoholic ; and where the oxygen and hydrogen are in nearly the proportion to form water, they are generally in a state resembling sugar, gum, mucilage or starch, or woody fibre.

We shall now endeavour to discover how the atmosphere acts, and is reacted upon, in the beautiful and secret process of germination and vegetation. When a seed is buried in the ground, care must be taken that it is not buried too deep, otherways, although its vegetative powers may not be destroyed, yet, by placing it at such a depth, it will not germinate. It is thus deprived, at all events, of one of the primary conditions necessary to germination, the presence of oxygen gas, which we have shown to exist as a principal constituent of the atmosphere. Neither will germination take place without the aid of moisture ; and a temperature of 32 Far : is not sufficient for its developement ; as water, the great vehicle of vegetable nourishment, everywhere, at this degree, assumes the solid form, and is thus incapable of supplying nutriment to vegetables. The specific temperature required depends much on the nature of the plant ; as also does the depth at which the seeds will germinate.

The first process towards germination, after the seed has been sown, is the absorption by it of moisture through the hilum, that part, or point, by which the seed was originally attached to the parent, and through which it derived nourishment during the period of its growth,—imbibed the juices of the mother plant. Soon after a quantity of carbonic acid gas is expelled, and replaced by a corresponding volume of oxygen derived from the atmosphere. During this process a considerable degree of heat is produced, and this is an unfailing consequence of the condensation of oxygen. The measures of hydrogen and oxygen,—by the absorption of these two constituents of air and moisture,—are increased, and that of carbon diminished :—and one can easily satisfy himself, by an examination, of the change wrought in the substance of the seed. The farinaceous matter has been converted into starch, gum and sugar,—the solid substances have changed into a sweet mucilaginous fluid, which appears to be the appropriate nourishment for the embryo. The young root is the first part which appears in all cases, but the future process is not uniform in all plants. A seed contains the embryo embedded in one, or between two or more seed lobes, or cotyledones. In plants with one cotyledon, called monocotyledones, as in the cereal grasses, the farinaceous cotyledon, or, as it is sometimes called indeed, albumen, seems merely intended to nourish the embryo with its own proper substance in its early stages. In plants with two cotyledones, decotyledones, as in the Field Bean, it is different. So soon as the root of the embryo is fairly esta-