combination with something else, as we shall see later. The plants set it free, unlock the combination—by making others more complex.

Certain aids are required by the plants to enable them to work. They must be alive and green, and must have a supply of chemicals to use, and they must have sunlight. The green coloring matter in the leaf has the power with solar light of combining water and carbonic acid gas with ease and quiet. It goes on noiselessly and continuously all the time these conditions are present. This green substance in the leaves of growing plants is called chlorophylle. Experiment shows that these things will not combine simply by putting them together.

Glucose is a form of sugar made by the addition of one molecule of water to each molecule of starch. This is a further building up done by the plant —a making of more complex from simpler forms.

Other sugars are made—some by addition and others by substraction of water.

Glucose is made from the starch in grains by germinating—the act of sprouting—the starch being stored away in the grains or seed pods with the germ to feed the young plant during the days of its helplessness.

In the formation of alcoholic drinks from grains this process of change from starch to glucose by sprouting is taken advantage of. The grains are exposed to heat and moisture until the germ swells ready to grow, and its influence has changed the starch into grape sugar (glucose), which is then made to ferment. This action is a reversal of the natural one—a pulling apart—and it is done by microscopic animals. Thus alcohol is not a natural result of plant action, but a plant product made by aborting the usual routine of life. This is a subject more for animal Physiology than that of plants.

By other processes in the plant's life, the chemistry of which is at present unknown, sugars and starches are built up in the plant economy into oils and fats of vegetable origin. A few examples will show how complex the chemical formulæ of these substances are. Palmatine obtained from the seed of an African Palm is not by any means the most complex of the vegetable oils. Its formulæ is $C_{51}\ H_{98}\ O_6$. That of oleine is $C_{57}\ H_{104}\ O_6$. A glance at the large number of atoms in each molecule shows how complex they are.

To return to our cycle of food production, let us take a brief view of the other side of the circle. The animals either carry on the building process further by forming more composite substances in the animal or they tear down the molecules made by the plants, and excrete, the very substances the plants used to build them with, thus supplying the plant with water, carbonic gas, etc., upon which to feed. When the destiny of the plant formed molecule is a more complex animal molecule the result is not changed. The process is only prolonged. The complex molecule is either torn apart in the life of the animal by waste, or it is eaten by some other animal and there goes through the various processes of absorption, assimilation, destruction, and elimination.

There are many curious questions in plant growth. They are easier to see than to explain. They serve to show the mysteries continually met in the study of life.

The plant's life is from seed to plant, to flower, to seed again. It may be of interest to follow it. Take an acorn for the example. The heat and moisture make the germ begin to swell and grow. It bursts the shell, and out come a tiny stem and a slender root. There is no uncertainty on the part of either as to how it shall proceed. The root goes down into the ground at once, while the stem comes up for air and sunshine. The position of the acorn does not change this in the least. Each goes its destined way, and will overcome considerable difficulties in order to do so, if they are encountered.