BOSTON
Journal of Chemistry
DEVOTED TO THE SCIENCE OF HOME LIFE

CHEMICAL SELECTION IN PLANTS.

BY ELMER GATES.

One of the most illustrative experiments was made upon one of the edible mushrooms (Agaricus campestris). By using artificial heat under a thin layer of earth, upon which was sprinkled a thin layer of manure, it was not necessary to manipulate large heaps of manure and soil, which usually constitute the largest part of the labor of mushroom-growing. Besides, by using a small quantity of manure it was easy to sterilize it and destroy the spores of other forms of fungus. By artificially maintaining the moisture and temperature, a successful crop of mushrooms can be raised about every eleven weeks.

It is well known that offspring are never exactly like the parents in any anatomical, physiological, physical, or chemical particular. The relative proportions of the different chemical compounds vary in the different individuals of the same species, and in different parts of the same individual, and in different ages of the same plant. Variation is not the occasional exception, it is the invariable rule. It extends to every fiber aud cell of every organism and even to the constituent molecules of the protoplasm. It is conspicuously great in about ten per cent. of all progeny.

If any one function can be augmented, independent of others, all other functions will be correspondingly modified in the same organism.

Just before a mushroom was ready to shed its spores, a small section was punched out and the hole refilled with a waxy aseptic material. If on analysis the section was found to contain a larger proportion of fat than that of any previous section that had been examined, the spores of that mushroom were caught in a paper receptacle placed under and around the mushroom, and all of the other mushrooms destroyed in that bed. These spores were preserved and marked with the percentage of fat in the mushroom from which the analyzed section was taken. In this manner the entire crop was examined, and the spores from the mushroom containing the largest amount of fat were used to start another crop. In six generations the percentage of fat was increased nine per cent. beyond that of the largest amount ever previously found, but the increase was more the last two generations than in either of the two previous generations, i. e., the tendency to variation increases cumulatively.

In a similar manner the amount of proteid-containing materials was increased seven per cent. in nine generations. The amount of free sugar was increased in another series of crops of mushrooms five per cent. in eight generations. The evidence is that we can artificially increase the amount of any chemical constituent in a mushroom regularly each generation.

By cataphoretic staining, it was discovered that the tissues of the mushrooms which had an increased amount of fat, had also undergone changes in other chemical constituents, for the staining indicated colorings not producible by the differences in amount of fat. The same was true of the tissues containing increased amounts of proteids and sugars. To augment any one chemical constituent of a plant is to modify the proportion of all other chemical components. Conversely to deprive the plant of any chemical component is to modify the entire metabolism of its tissues. Hence all cosmical stimuli such as light, electricity, temperature and moisture produce metabolic changes. The economic bearing of these experiments is obvious. It is perfectly practicable to augment the proportion of any one of the nutrient components of any plant, and to eliminate any undesirable constituent.

The scientific bearing of these experiments is the demonstration that a variation in the amount of any chemical component in a protoplasmic tissue, is a change in the total chemical environment of the other molecules within that cell or fiber, and that all variations of cosmic stimuli and all variations of functioning commence in the metabolism of organic tissues, and that microscopic and macroscopic morphology is causatively produced by metabolic functioning. Another line of research proves that metabolism is a psychologic functioning. I am now carrying on experiments having for their purpose the systematic improvement of cereals, fruits and vegetables by the augumentation of their desirable chemical components.

Restoring Gelatin Prints.

It is said that gelatino-chloride prints that have faded may be restored by stripping them from their mounts and well soaking in water. The prints are then treated with an acid solution of hydroquinone and a few drops of silver-nitrate solution, to which a little acetic acid has been added. As soon as about half the desired intensity is obtained, the prints are washed and fixed. It would seem that it would be well for those who suffer from faded gelatin prints to seriously consider abandoning this paper and using collodio-chloride paper, of the permanency of which there is little doubt.—Merck's Rep.

A Complex Compound.

Messrs. C. Loring and H. A. Torrey, of Harvard University, have investigated the oxide of dichlormethoxyquinonedibenzoylmethylacetal.

Solid Argon.

A specimen of the element was solidified recently by means of liquid air at a temperature of more than 200 degrees below zero.—Chem. News.