5. *Perfectly irregular bodies.*
16. In milk-sap of many tropical Euphorbiacæ.

III.—GRANULES COMPOUND.
(United in masses.)

1.—*The individual granules without hilum or cavity.*
17. In roots of Marantaceæ, Aponogeton, Bryonia, Sarsaparilla (bark or root).

2.—*Component granules nearly of equal size, each having a distinct hilum or central cavity.*
A. Granules from 2 to 4 in each group.
18. Central cavity small and roundish. Jatropha Manihot, Carolinea princeps, Batatas edulis.
19. Central cavity large and star-like. Colchicum.
20 Component granules quite hollow, cup shaped. Anathorum Ivaraneusæ.
B. Granules more numerous.
21. Granules in irregular groups of 2 to 12. Arum maculation.
22. A large number (30) loosely rolled together. Bernhardia dichotoma (stem), &c.

2.—*Smaller granules arranged around a central one.*
23. Sagus Rumphii (pith) &c.

It has been pointed out by Cruger that the ferns present a clouded, indistinctly laminated, irregular form of starch-granule; all the Cyperaceæ, a compressed granule, with a large hollow nucleus, &c., but although peculiarities thus pervade certain families, exceptions exist, "the Arodeæ exhibiting every variety of form except the compressed," while even in the same plant various forms pass into one another, rendering it impossible to tell to which category the plant belongs.

Gum is one of the forms through which vegetable matter passes in being applied to the purposes of plant life; it exists in the cell sap, and is often exuded from the surface of trees.

Sugar in like manner, occurs in solution in the cell sap, and, both in the form of "cane" and "grape sugar," is an important substance in economic botany. The sugar cane, beet, carrots, parsnip and sugar maple, yield the former, while the latter is obtained from the juice of many fruits.

In addition to the above substances, (starch, gum, sugar) consisting of carbon, oxygen, and hydrogen, which are convertible into each other, and are important products as regards the growth and nourishment of plants, there are others which contain also nitrogen, hence they are called azotised; they are essential in the process of vegetation.

Oily, fatty and resinous matters are often contained in the cells of plants, as well as in inter-cellular cavities, and organs of secretion. Thus, a section of the rind of orange shows the oil-receptacles in the form of large cavities, and in many plants, such as Rubiaceæ, we have special glands for the secretion of various substances. The turpentine canals in the bark of pines are merely inter-cellular cavities whose real structure and development are not well known. Wax is in some cases an important vegetable product. We have also crystals in cells, those of an acicular form being composed of phosphate of lime, while crystals of oxalate of lime in an octohedral form occur in cacti and other plants.

Parenchyma cells (of which the leaves, &c., of plants are mostly formed) being usually quite colourless in their membrane, whence comes the green colour of plants? it is due to the prevalence, *in* the cells, of minute green granules (usually of a globular form); these are termed Chlorophyll, and are shown in considerable numbers in the cells of Cladophora and other confervoid growths. It is a fatty or wax-like substance, and is often associated with starch, and sometimes indeed invests granules of that substance. The changes which it undergoes according to its state of oxidition, give rise to the varied autumnal tints of leaves. Flowers owe their colour to colouring matters which exist in some in the form of definite globules, and in others diffused in the cell sap.

All plants, however complicated their after structure, originate from a single cell. From this cell is evolved by the process of cell-development, all the future structure of the plant, its cells and vessels, and matter produced in and by them. We trace all the phenomena of plant life back to the elementary cell, the basis of all vital action. The farmer, the forester, and the gardener, must all view the vegetable cell as the workshop in which the products of their labour are prepared. It is the cell which absorbs from surrounding soil and air the lifeless materials out of which the plant structure is reared; it is the cell which elaborates these materials, converts them into organic form, and endows them with life; it is the cell which stores up those substances required for the plant's future nutrition, and which it is the purpose of Agriculture to turn to the supply of man's wants; it is the cell which is the storehouse of those substances, while the structures of this tiny storehouse itself are available for the like purpose. Cells and cell-contents form the choicest fruits of the orchard, and the gayest hues of flowers, while a modification of them constitutes timber. The whole phenomena of vegetation are performed in and by the cell; every question in physiology, reverts to this elementary body as the basis and parent of the whole structure. The plant begins as a cell; its whole phenomena are the development of cell by cell from this original cell, and the secondary phenomena of which these cells are capable; and even those plants which are most gigantic in dimensions, and most elaborate in anatomical structure consist only of a mass of simple cells and of cells more or less compounded in the form of those elongated tissues which botanists call vessels. In the study of the plant's life, therefore, the cell must be viewed as the theatre of our observations; in it are enacted all the stages of its life. The physiological conditions of the cell are those of the plant also.

It is desirable to keep in view, however, that the applications of Botany to Agriculture are not limited to its physiological department—a view which has been propounded by Schleiden, who, in discussing the relations of this science to Agriculture and Pharmacy, states that "in all these cases it is the physiology of plants which is alone of use (!) A knowledge of the systematic arrangements of plants is only of importance to the botanist, for all others, it is a pastime, if not a waste of time." The application of Sytematic Botany to Agriculture and Pharmacy are rather more productive in England than they appear to be in the romantic valley of Jena!

Communications.

CHEDDAR SYSTEM OF CHEESE MAKING.

To Professor Lawson, Editor of the Journal of Agriculture.

SIR,—Having read with interest in some of the previous numbers of your Journal, several articles on the manufacture of cheese, wherein you gave an account of the Dunlop and Annapolis system of making, and being desirous of bringing under the notice of your readers the Cheddar mode of manufacture, I will, if you allow me through the medium of your columns, give a detailed account of the process, as written by a practical man in Ayrshire, Scotland, who has several large dairies where cheese are made in conformity to the following rules, which he has printed and hung up on the walls of the cheese rooms as a guide, and which must be carried out to the letter by his dairymaids.

Immediately after the morning milking, the evening and morning milk are put together into the tub. The temperature of the whole is brought to 80°, by heating a small quantity of the evening milk. After the rennet is added, an hour is requisite for coagulation and the curd is partially broken and allowed to subside a few minutes in order that a small quantity of whey may be drawn off to be heated. The whey is put into a tin vessel and placed in a tin boiler to be heated in hot water.

The curd is then most carefully and