

VEGETABLE KINGDOM.

A cell with its contents is the fundamental element of a plant, and the simplest and lowest plants are the microscopic *unicellular* kinds; that is, those made of a single cell, or a few in a series, as the lower ALGÆ and lowest FUNGI. From these, the grade in species rises through larger Algæ, and other kinds consisting of cellular tissue, as the FUNGI, HEPATICÆ, and MOSSES, to those which contain also vascular tissue, but subordinately to the cellular—as the FERNS, EUISETA, LYCOPODS. The kinds thus far mentioned are *Cryptogams*, or the Flowerless plants.

The remaining plants, or those producing true flowers and seeds, are called *Phænogams*. They consist of cellular tissue and woody fibers; and also, of vascular tissue in the larger part of the species.

PHÆNOGAMS.

Phænogams are divided into two sections, on the basis of the structure of the embryo or seed, and the growth. In the *Exogens*, the embryo consists of two or more parts called cotyledons. Further, as the name *Exogen* implies (it signifying *growth by the outside*), there is, after the first year, with rare exceptions, an annual addition of a layer of woody tissue between the wood and bark. In a section of an *exogenous* stem more than a year old, the wood has, consequently, rings of growth.

In the *Endogens*, the seeds consist of a single cotyledon. Besides, there are no rings of growth, and no separable bark; growth goes forward mainly by the pushing out of buds at the extremity of the stem or of its branches. The structure of the wood is said to be *endogenous*.

1. Exogens.

Exogenous species are of two divisions called *Gymnosperms* and *Angiosperms*.

480.



Cycas circinalis, $\times \frac{1}{10}$.

1. *Gymnosperms*.—In this inferior division of the Exogens, the seeds are naked and there is no stigma. The fruit often consists of a cone made of scales with the seeds beneath the scales. They are called *Gymnosperms* (from the Greek for *naked seed*) in allusion to the naked or uncovered state of the seed. The inferiority to other Phænogams is manifested not only in the simple character of the flower, but also in the wood, which contains no vascular tissue, and this inferiority accords with the fact that they preceded geologically other Phænogams. The inferior division, that of *Cycads*, is now few in species, but formerly included a large part of the common forest trees. The *Cycads* (with the related *Zamiæ*) are peculiar in combining the structure and fructification of the *Gymnosperm* with the habit of a *Palm*, and the method of uncoiling the leaves as they are developed which belongs to *Ferns*. The