from the fullness of his acquaintance with the writings and doings of all the continental phytotomists, and also with the authority of an experienced original investigator. And, so far as we know, it comprises much the best *resumé* of vegetable anatomy and development now extant in the English language, at once succinct, clear, trustworthy, and well brought up to the present state of the science. Perhaps the succeeding chapters, on the Physiology of Plants generally, the Physiology of Vegetation, and on Reproduction, are equally commendable in their way; but we have as yet barely glanced over the pages. We like the following definition, and the ensuing paragraph upon the *rôle* of vitality in plants.

"The physiology of plants is that department of botany in which we investigate the phenomena of the *life* of plants, manifested in a series of changes taking place in the diverse parts of which each plant is composed."—p. 475.

"The physiological phenomena which indicate vitality are always of more or less complex nature, and admit of being analyzed into a number of factors, of which a large proportion are found to be purely physical or chemical. A very considerable part of the changes which accompany the process of organization are the results of the action of physical and chemical forces, [and] capable of being explained up to a certain point, by the known laws of those forces. But in every case, after referring all the chemical and physical phenomena to their respective places, there remains a residual phenomenon to be accounted for, which is precisely the most important of all,—namely, that in living organic structures . . . . the laws of inorganic matter are subdued under a higher influence, and caused to undergo modifications never occurring except in the presence of living matter; while—most important of all—the peculiar compounds of matter thus produced are not only made to assume forms, according to definite laws, totally unlike any forms of mineral matter, but [to] constitute bodies manifesting a continued interchange of material with the surrounding media, which, instead of resulting in decomposition, as in mineral bodies, effects a reproduction and increase of the already existing [organized] matter."—p. 542.

In the paragraph on the longevity of trees (p. 549), we find renewed occasion to notice the longevity of unfounded statements, copied from one book into another long after the error has been pointed out. Here again the *Adansonia* of Senegal and the *Wellingtonia* or *Sequoia* of California figure as trees "whose age, deduced from the rings of growth of the stems would amount to upwards of 3000 years." There is really no evidence to prove that the famous Baobabs described by Adanson are of such an age, and as to the *Wellingtonia* in question, an actual counting of the rings has shown that the tree was not half so old as it was vaguely computed to be.

The chapter on Reproduction appears to be excellent, as indeed we should expect. The geographical and geological part is necessarily very briefly treated. A. G.

2. *Naudin's Researches into the Specific Characters and the Varieties of the Genus Cucurbita*, are published in the 6th volume (4th series) of the *Annales des Sciences Naturelles*, and are of no small interest, being founded upon a very conscientious investigation of nearly all the known

forms, collected for the purpose, and cultivated under the author's eye at the *Jardin des Plantes*. These forms our author reduces to six species, and the alimentary sorts in cultivation, to three, viz. *Cucurbita maxima*, *C. Pepo*, and *C. moschata*. The remaining three species are *C. melanosperma* of Braun, newly introduced from Eastern Asia, and the two perennial and tuberous-rooted species, *C. perennis* and *C. digitata*, Gray, natives of our southwestern borders, the fruits of which are not esculent. Indeed the pumpkins and squashes cultivated in Northern Europe and with us, as now understood, belong to only two species, since the third, *C. moschata* hardly comes to perfection north of the Mediterranean region. Of these *C. maxima* is made to include *C. Melopepo;* and *C. Pepo*, comprising our pumpkins and a large part of our squashes, is made to include *C. ovifera*, *aurantia*, *verrucosa*, &c., and the species are defined by botanical characters, which apparently may be relied upon. The varieties of *C. maxima* fall into two main groups, characterized by their fruits, viz., the *Turbans*, having *crowned fruits*, that is, the summit projecting beyond the adnate calyx-tube, a peculiarity found in no other species, and the *crownless* sorts, in which this peculiarity is not manifest. The innumerable varieties of *C. Pepo* are arranged in seven groups, according to the configuration of their fruits.

M. Naudin has not undertaken to discuss the questions respecting the birth-place of these plants. He remarks that *C. maxima* and *C. moschata* have been known in European gardens scarcely above two centuries; but that *C. Pepo* was perhaps known to the Greeks and the Romans in the time of Pliny.

The younger DeCandolle, in his discussion of the history and origin of the principal cultivated plants, which form a most interesting chapter of his *Géographie Botanique*, although he is unable to assign them to any country as their home, confidently (perhaps too confidently) refers all the squashes and pumpkins to the Old World; but not to India, because they have no Sanscrit name. He will not believe that any of them came from America, and appears to think little of the current statements that squashes or pumpkins were in cultivation by our aborigines before the European settlement of the country. On the other hand, our lamented Dr. Harris, —who, during the later years of his life, assiduously studied this question, and who was very cautious in drawing conclusions,—had become satisfied that the North American Indians as far north even as to Canada, cultivated squashes and pumpkins, one or both, along with their maize, before the whites were established here. We are unable at this moment to refer to his manuscripts, or to what he had too imperfectly published upon this subject. But we well remember his laying much stress upon the narrative of Champlain; and with good reason, as it appears to us on turning casually to the pages of *Les Voyages du Sieur de Champlain .... ou Journal tres-fidèle des Observations faites et Decouvertes de la Nouvelle France*, &c. &c., edition of Jean Berjon, Paris, 1613, 4to.: also *Voyages et decouvertes faites en la Nouvelle France depuis l'année 1615, jusques à la fin de l'année* 1618,—second edition, published by Collet, in 1627, small 12mo,—to which volumes we desire to direct M. DeCandolle's attention. In Champlain's narrative of his own voyage along the coast of what is now the State of Maine, in the year 1604, and the two voyages

of Le Sieur de Mons along the coast of New England in 1605 and 1606, *Citrouilles* and *Courges* are repeatedly mentioned, along with maize (*Bled d'Inde*) and beans: e. g.

"Nous y vismes force *citrouilles, courges* & petum, qu'ils cultiuet aussi. . . . Pour les febues elles cõmẽçoiẽt à entrer en fleur, cõme faysoyẽt les courges et citrouilles."—p. 68.

"Ceux que nous auions enuoyes deuers eux, nous apporterent des petites citrouilles de la grosseur du poing, que nous mangeasmes en sallade comme coucombres, qui sont tresbonnes."—p. 77.

See also pp. 83, 115, 116. Of course it does not follow that these esculents were natives of New England, any more than maize: but both may probably have been carried northward together. Whatever their origin, our Indians were found cultivating them together at this early date as well as in later times. According to Nuttall the Indians along the whole Upper Missouri half a century ago were cultivating *Cucurbita verrucosa*. This common squash is, according to Naudin, a variety of *C. Pepo*, as also is *C. aurantia* (the *C. Texana* vel *ovifera*, Gray, Pl. Lindh.) which has every appearance of being indigenous in the western part of Texas, on the Rio Colorado and its upper tributaries. At least, this is the opinion of Mr. Lindheimer and of Mr. Charles Wright, two good judges. The latter personally informs us that, from the stations and localities in which alone it is met with, he could not suspect it to be other than an indigenous plant.

That the later Greeks and Romans possessed the bottle gourd or *Lagenaria*, and also some kind of summer squash, seems pretty clear; but we see no decisive reason for the opinion that they had any form of *Cucurbita Pepo*, as that species is now understood. According to DeCandolle, the earliest figures referable to this species are, one of *C. ovifera* by Lobel in 1576, and one of *C. verrucosa* by Dalechamp in 1587, namely, about a century after the discovery of America, and long after maize had become well known in the south of Europe: and we have seen that some forms probably of this very species (undoubtedly originating in a warmer region) had by this time found their way in this country nearly as far north as the climate will permit of their cultivation. So that there appears to be about the same evidence for the American origin of *some* squashes and of pumpkins that there is for the American origin of maize.

A remaining argument brought by DeCandolle against this view may also be turned the other way, namely, that no certain species of the genus is known as indigenous to America. He has equally allowed that none is known to be indigenous to the Old World. Now of the six species recognized by Naudin, two only are known in their natural wild state, and these are our southwestern species with perennial roots, viz., *C. perennis* and *C. digitata;* to which we add that *C. Pepo* itself (i. e. *C. ovifera* or *aurantia*) grows wild in the same district with *C. perennis*, and has the same appearance of being indigenous there. We leave the subject with these incidental remarks, as we did not intend here to investigate this question, and will briefly allude to another subject, upon which Naudin's investigations have thrown new light.

It is generally thought that the cultivated *Cucurbitaceæ*, and especially that the species of *Cucurbita*, cross-breed with extreme facility. Accord-

ing to Naudin this is true of the *races* only *inter se*. A good illustration of the immediate and great variation from this cause in the fruit of *C. Pepo* is given in Naudin's third plate, where fifteen different forms of the fruit are figured, taken from as many individual plants raised from seeds of one fruit, which had grown in the vicinity of other varieties. It is by no means certain, however, that all these forms originated from direct crossing. But the species themselves strangely refuse to hybridize. Naudin carefully experimented with the five species in cultivation at the *Jardin des Plantes* (viz., all known, except *C. digitata*): and out of seventy distinct trials all but five were utterly ineffectual. In five instances the fruit set, indeed, but in none of these was a single seed containing the vestige of an embryo produced! What are we to think, then, of the universal belief that squashes are spoiled by pumpkins grown in their vicinity, or pumpkins by squashes; and even melons (which are of a different genus) by squashes? The fact of some such influence seems to be well authenticated. Dr. Darlington, one of the most trustworthy of observers, speaks of it from his own knowledge, thus:—"When growing in the vicinity of squashes the fruit [of the pumpkin] is liable to be converted into a kind of hybrid, of little or no value. I have had a crop of pumpkins totally spoiled by that cause, the fruit becoming very hard and warty, unfit for the table and unsafe to give to cattle."—(*Fl. Cestr.*, ed. 2, p. 555.)

Now that this is not the effect of hybridation is clear from the fact that the result appears in the fruit of the season, not in that of the next year, viz., in a generation originated by the crossing. A clue is perhaps furnished by Naudin's observations, that the ovary is apt to set and even develop into a fruit in consequence of the application of the pollen of another species, although, as the result proves, none of the ovules are fertilized. And he hazards the conjecture that the pollen may exert a specific influence first upon the ovary, inciting its farther development, and then upon the ovules. To test this conjecture he was to examine the action, if any there be, of the pollen of *Cucurbita* upon the ovary of melons. The past summer,—which has been as unusually warm in Western Europe as it has been cool in this country,—must have favored such researches in Paris; and we may expect soon to hear of the result. Improbable as such an influence seems to be, it is hardly more so than the now authenticated fact that the graft of a variegated variety of a shrub or tree will slowly infect the stock, so that the variegation will at length break out in the foliage of the natural branches;—an old observation, which, according to the Gardener's Chronicle, has recently been verified in several instances. A. G.

## IV. MISCELLANEOUS SCIENTIFIC INTELLIGENCE.

1. *Studies in Organic Morphology;* an Abstract of Lectures delivered before the Pottsville Scientific Association in 1855 and 1856, containing historical notes of this branch of science, together with original formulæ and constructions of curved lines, designed to assist in the imitation of organic forms; by JOHN WARREN. 58 pp. 8vo. Philadelphia, 1857.