

## MISCELLANEOUS.

*Cases of Monstrosities becoming the starting-point of New Races in Plants.* By C. NAUDIN.

THE discussion lately raised by MM. C. Dareste and A. Sanson upon the question whether monstrosities, in the animal kingdom, can become the origin of peculiar races, recalls to my memory some teratological facts which appear to me to show that this is the case in plants. Perhaps, however, in the first place, we ought to come to an understanding as to the sense to be attached to the word *monstrosity*; and to avoid all confusion I shall say that I employ it in the sense which is habitually given to it in botany, that of a notable deviation from typical or reputed typical forms. There is, in fact, a distinction to be made between cases of monstrosity incompatible with the faculty of reproduction by generation in the individuals affected by it, and those in which the alteration of form is not such as necessarily to imply the loss of this faculty. It is to the latter only that I wish to refer here, as they alone are in question.

Well attested facts place it beyond a doubt, in my opinion, that considerable anomalies which, by general consent, are classed among the teratological facts of the vegetable kingdom are faithfully transmitted from generation to generation, and become the salient characters of new races. Horticulture would furnish a great number of these if the trouble had been taken to collect them and subject them to the check of experiment; but I can cite only a few, because they alone, as far as I know, have been examined scientifically; and, moreover, they suffice to establish the principle of the transmission of anomalies by sexual reproduction through an indefinite series of generations.

The first fact of this kind will be borrowed from Professor Göppert of Breslau. This was a poppy (*Papaver officinale*) which presented the curious anomaly of the transformation of a part of its stamens into carpels, from which resulted as it were a crown of secondary capsules round the normal central capsule, the development of which was nevertheless complete. One thing to be noted is that many of these small additional capsules, as well as the normal capsule, contained perfect seeds capable of reproducing the plant. In 1849, M. Göppert, having learnt that a whole field of these monstrous poppies existed a few miles from Breslau, sowed in the following year a considerable quantity of seeds taken designedly from the normal capsules; and nearly all the plants which sprang from this sowing reproduced the monstrosity of the previous generation, although not all in the same degree. I do not dwell upon this first fact, because its observation was not, so far as I know, carried any further, and it may be thought that the number of generations is not sufficient to justify our concluding from it the stability of the anomaly indicated.

The same doubt does not exist with regard to the following facts. Cultivators of ferns know that these plants are very subject to vary, and that some of them, even in the wild state, present true mon-



strosities in the conformation of their fronds, which by that means acquire very singular figures. These monstrosities are sought for by the fanciers of these plants, because they consider them an improvement; and they were for a long time rare and bore a high price in horticultural commerce. Now-a-days they are produced in as great abundance as can be desired, by simply sowing the spores, on condition that these spores are taken from the altered parts of the fructifying frond. Where the frond remains in the normal state, the spores only give origin to normal plants; but those of the monstrous portions of the same fronds reproduce with certainty plants affected with the same kind of alteration. This mode of propagation has been in use for several years; and the fact of the transmission of monstrosities by sowing, in the Ferns, has never yet been invalidated by experiment.

Very considerable anomalies, which may be classed among teratological facts with as much reason as in the two preceding instances, may be observed in the three species of alimentary gourds—plants subjected to cultivation from time immemorial, and which have never been found in the wild state. These anomalies are peculiar in this respect, that they characterize very well-marked and persistent races, are preserved notwithstanding changes of place and climate, and even partially resist crossing with other races of the same species. The date of their origin is unknown, nor do we know under what influences they were formed; but the species being here entirely reduced to a state of domesticity, it is very probable that some of these races, if not all, were actually produced by cultivation. Such, among others, is a race of the common gourd (*Cucurbita pepo*), in which the tendrils are all converted into a kind of branches which give origin to leaves, flowers, and often to fruits; such are also, in the same species, those numerous races with deformed, warty, and oddly coloured fruits, which are preserved by sowings, always in a similar condition, so long as intercrossings do not step in to modify them. A still more remarkable example is that of a small race of pumpkin (*C. maxima*) which we have received from China and observed for several years at the Museum. Resembling the type of the species in the organs of vegetation, it differs therefrom singularly in the ovary and the fruit, which have become almost entirely free, the tube of the calyx being reduced into a sort of plateau serving to support the carpels. Nevertheless the complete adhesion of the ovary to the tube of the calyx, in which it is deeply immersed, is given by all authors as one of the essential characters of the family *Cucurbitaceæ*. From this example we see how great may be the extent of the variations and also what a degree of fixity these variations may acquire when once they are produced.

The fact of which I have still to speak is quite recent, and has already been brought under the notice of the Academy by Dr. Godron, Professor of Botany at Nancy (*Comptes Rendus*, 1866, i. p. 379). I refer to it here because my own observations confirm it in all points, and especially because it shows us very clearly how a new race may originate from an anomaly. In 1861, Dr. Godron



found in a sowing of *Datura tatula*, a species with very spinous fruits, a single individual of which the capsule was perfectly smooth and unarmed. The seeds taken from this capsule furnished, in 1862, a lot of plants, all of which faithfully reproduced the individual from which they were derived. From these seeds sprang a third generation similarly unarmed; and I have myself observed at the Museum, in 1865 and 1866, the fourth and fifth generations of this new race, in all nearly one hundred individuals, none of which manifested the least tendency to resume the characters of the spinous type of the species. When crossed with the latter by M. Godron himself, the unarmed race furnished hybrids, which in the succeeding generation reverted to the spinous and unarmed forms; in other words, they behaved like true hybrids endowed with fertility. From this fact M. Godron proceeds to refer to a single specific type *Datura stramonium*, *D. lævis* (Bertoloni, not Linnæus), and *D. tatula*, three very constant forms which had previously been regarded as good species. By adding to these the *D. tatula inermis*, discovered by him, and to a certain extent originated under his eyes, we have four distinct forms, issuing by variation from a single type, and with regard to which we should not well know how to say what they wanted of being true species.

Here a point presents itself to which I call the particular attention of those who believe in the mutability of specific forms, and ascribe the origin of existing species to simple modifications of more ancient ones. They assume (at least most of them do so) that these modifications have been effected with excessive slowness, and by insensible transitions—for example, that it required several thousands of generations to transform one species into another congeneric species. We do not know what may have taken place in this long lapse of ages; but experiments and observation teach us that in the present day slight or profound anomalies, alterations of what we, perhaps arbitrarily, call *specific types*,—in a word, monstrosities, whether they be transitory and purely individual, or give rise to new durable races uniform in an unlimited number of individuals, are produced suddenly, and without there ever having been transition forms between them and the normal form. A new race originates perfectly formed, and the first individual which represents it is at once such as it will show in the succeeding generations if circumstances allow it to be preserved. New modifications may be added to the first and subdivide the primary race into secondary races, but they are produced with the same suddenness as the first. I do not here set myself up as the defender of the doctrine of evolution; I only say that the biological phenomena of the period in which we live by no means justify the hypothesis of an insensible degradation of ancient forms and the necessity of millions of years for changing the physiognomy of species. To judge from what we know, these transformations, if they have taken place, may have been effected in a lapse of time incomparably shorter than has been supposed. It may be, indeed, that there are these alternations in the life of nature—that periods of immobility,



real or apparent, are succeeded by other periods of rapid transformation, during which what was previously only exceptional and abnormal becomes the regular state of matters. And, finally, we must not forget that to us time is only the succession of phenomena, and that, whether these phenomena appear to us to succeed one another slowly or precipitately, the result remains the same as regards the doctrine of evolution. In either case the principle of the continuity of things is in no degree affected.—*Comptes Rendus*, May 13, 1867, pp. 929–933.

*The Theory of the Skeleton.*

*To the Editors of the Annals and Magazine of Natural History.*

GENTLEMEN,—I do not imagine that readers of this Magazine will have forgotten Mr. Herbert Spencer's claim to date his views on the skeleton from 1858. I wrote to you not to dispute that, or to impugn Mr. Spencer's claim to be a great discoverer, but to vindicate my own claim to have honestly and independently thought out, from anatomical and physiological data, the theory of the skeleton which I had the honour to submit to your readers. I did not attempt to claim any credit, believing the pursuit of truth inconsistent with the pursuit of fame, and that fame is not honour when awarded at a man's measure of his deserts, but only when spontaneously conferred by his fellow thinkers. If the germ of the view published in my paper prove, as it may prove in its present or some other form, an addition to the philosophical groundwork of anatomy, Mr. Spencer may be sure that he will receive a full share of honour, if his claim is well founded; but till then, all haggling over priorities is waste of good time, which neither of us ought to be able or asked to spare from original work.

I have done myself the pleasure to read the review of Prof. Owen's theory of the skeleton, printed in the 'British and Foreign Medical and Chirurgical Review' (new ser. vol. xxii.), of which Mr. Spencer avows himself the author. And after much logical criticism, in which Prof. Owen's views are roughly handled, the review concludes with a page or two, much less logical, in which Mr. Spencer claims to have stated his discovery. So far as I can judge, the important passages in this statement are these:—

"The entire teaching of comparative osteology implies that differences in the conditions of the respective vertebræ necessitate differences in their structures."

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"It is impossible to deny that if differences in the mechanical functions of the vertebræ involve differences in their forms, then community in their mechanical functions must involve community in their forms."

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"..... have a community of function, it follows necessarily that they will have a certain general resemblance."





Naudin, Charles. 1867. "Cases of monstrosities becoming the starting-point of new races in plants." *The Annals and magazine of natural history; zoology, botany, and geology* 20, 141–144.

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