in the great herbaria, prove the identity of many so-called species. It is only the converse of a mistake often charged, rightly or wrongly, upon the school to which M. Boreau belongs. They are stated to describe species from single specimens; but they may return the compliment by announcing that their opponents combine them upon just as little evidence. For in what does a "series" of individual specimens—one from the Himalaya, another from Siberia, and a third from Europe, with a few more from other countries,—differ from so many single specimens of species? How can the writers know, in these cases, that they are not samples of plants presenting a constancy of character each in its own country? It is as rash to combine as it would be to separate them upon such imperfect evidence.

But we have perhaps occupied too much space with this matter, and run considerably away from the work proposed for consideration. We therefore conclude by recommending all earnest students of European, and especially British botany to obtain the "Flore du Centre de la France."

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY.

April 29, 1858.—J. P. Gassiot, Esq., Vice-President, in the Chair.

"On the Structure and Functions of the Hairs of the Crustacea." By Campbell De Morgan, Esq.

The object of this communication is to determine, by the observation of their anatomical relations, the uses of the hairs and similar appendages to the shell of the Crustacea. The author mentions the observations of those who have of late specially investigated this subject. M. Lavalle noticed the connexion at times of the canals of the hairs with canals penetrating the whole thickness of the shell, and the *occasional* continuity of the matter which filled the hairs with that which exists in the corresponding canal of the shell. M. Hollard says that the canals of the shell which correspond to the hairs, are occupied by membranous investments, which embrace the base of the hairs, and seem to receive an extension of the nutrient system. He suggests that amongst other functions, the hairs may possibly be connected with that of general sensibility. Dr. Häckel in a recent publication has shown that the canals of the shell and hair are lined by a continuation of the outer layer of the soft internal integument, which he calls the chitinogenous layer. He describes minutely the structure of the inner integument, and his account on the whole agrees with that given by Milne-Edwards; but he does not recognize the presence in the canals, of any of the elements of the inner integument except the external cuticular or chitinogenous layer; nor the connexion of these canals with the corium which lies beneath it, and which receives abundantly nerves and vessels.

According to the investigations of the author, it is with this deeper,

vascular and nervous layer that the contents of the hair-canals and of the corresponding canals in the shell are especially connected. This can be readily seen in parts where the shell is thin, as in the foot-jaws for example. In a section made in such a situation, the canals leading to the hairs will be found to be often nearly as large as the bases of the hairs to which they correspond. They are lined by a thick membrane, which invests the cup-shaped cavity in which the hairs are implanted, and becomes so closely connected with the bulb of the hair itself, that it is often dragged out with it when the hair is pulled out. The cells and other elements of the deeper layer of the internal integument fill up the canal and pass on into the hairs.

Where the shell is thick, as in the claw of a lobster, the sheaths which are connected with the hair-bulbs and line the shell-canals can be demonstrated in the manner adopted by Mr. Tomes to show the existence of the dentinal fibres. If a section of a part of the shell or the claw where the hairs are implanted, and which has been previously softened in dilute acid, be torn through, the sheaths will usually be dragged out, and will be seen projecting from the torn edges, their contents often remaining in them. The connexion of the inner integument with these sheaths may be seen in sections of the claw with the integument still adhering to it, when on carefully tearing away the latter, its prolongations into the sheaths will be dragged out. That the hairs have some especial and important connexion with the inner vascular and nervous layer of the integument of the lobster's claw and elsewhere, seems probable from the observations made by the author on the contents of the claw. The terminal moveable piece, the pollex, and the prolongation of the metatarsus which it opposes, the index, do not contain muscular fibre, but are filled entirely by a soft pulpy mass of corium. The nerves of the limb are large, but only some small branches will be found to go to the muscles; the principal nerves pass on and terminate in the pulp which fills the opposing pieces of the claw. The author believes that it is the office of the hairs to establish a communication between the outer surface and this inner, and no doubt highly sensitive pulp, and that this is rendered still further probable by the comparison of the claws on the two sides. In the smaller claw the edges are sharp, and have fine tubercles along their margin; and the hairs are placed in a regular series of short tufts on each side of the tubercles, beyond which they do not project. But on the larger crushing claw, the tubercles are massive, and no hairs are seen projecting above the surface. If, however, a section be made, it will be seen that a communication is established between the inner pulp and the surface by means of an abundant series of canals which terminate in bulbous extremities, sometimes projecting beyond the surface, sometimes lodged in depressions in the shell. This arrangement may be found in other parts; and in the crab's claw, where the tubercles are deficient, these hairless pulp-cavities almost entirely replace the hairs.

Here, then, lodged within the densest part of the shell, is a structure richly supplied with nerves, shut off from other parts of the

body, and having communication with the surface only through the medium of canals, which are sometimes continued into short bristles, and sometimes terminate in mere bulbs. As a prehensile organ, the claw needs sensibility, but no force which the animal could exercise could make any impression on the parts within, through its dense tuberculated edges. On the other hand, it is difficult to assign any office to the bristles, and still more to the bulbs, mechanical or otherwise, unless it be that which has been suggested,—that, establishing, as they do, a communication between the external surface and the nervous structure within, they communicate impressions, and are in fact tactile organs.

The author had satisfied himself, before the appearance of Dr. Häckel's paper, that the hairs were connected with the inner layers of the corium, and not with the chitinogenous membrane only; and he had seen indications in the lobster and larger Crustacea of an arrangement of the pulp corresponding to the arrangement of the hairs. In the smaller Crustacea, especially in the shrimps, he found a remarkable confirmation of his views. In the flabelliform processes, and even in the claws in these animals, he found that the structures within the shell were arranged in the form of tubes corresponding to the hairs, through which passed from the deeper parts, fibres which were prolonged into the hair-canals. In the claw the nerve was traced to the inner termination of these tubes. The tubes in some instances merged internally into the general mass of the corium; in others they were truncated. Externally, or towards the margins, they presented open orifices, through which the fibres passed. The fibres, when drawn out from the hair-canals, often presented the plumose or serrated character, according to the form of hair to which they belonged. They could be traced for some distance down the tubes, and at times completely through them, but their deep connexions could not be clearly made out. Several modifications of this arrangement are described and figured. The author believes that the facts brought forward are sufficient to establish that the hairs of the Crustacea are probably organs by which external impressions are communicated to the internal sensitive parts.

May 6, 1858.—The Lord Wrottesley, President, in the Chair.

"On *Chondrosteus*, an extinct genus of Fish allied to the Sturionidæ." By Sir Philip de Malpas Grey Egerton, Bart., F.R.S.

Before the conclusion of his great work on Fossil Fishes, Professor Agassiz recognized in some fragmentary remains found in the lias strata at Lyme Regis, unmistakeable evidence of the existence, at that period of the earth's deposition, of a representative of the still extant family of the Sturgeons. To this extinct fish he assigned the name *Chondrosteus*. The author of the present memoir has been enabled, by the examination of numerous specimens more recently acquired, to describe in some detail the external features of the fish, and the structural peculiarities of those portions of the exo- and endo-skeleton which have been preserved. In the former

respect the fossil differs from the recent sturgeon in having a shorter and deeper trunk, in the greater vertical expanse and wider divergence of the lobes of the caudal fin, in the median position of the dorsal fin, and in the absence of dermal plates on the back, belly, and flanks. Before describing the cranial anatomy, the author points out certain homologies between the head-plates of the recent sturgeon and the epicranial bones of the teleostean fishes, more especially with reference to the parietals, mastoids and frontals ; and explains that these conclusions have resulted from the examination of the inner table of the skull, where the relative position and proportions of the component plates are constant, however much the outer or dermal layer may vary.

The remainder of the memoir is devoted to detailed descriptions of such parts as are preserved in the several specimens ; and the author concludes by stating as the result of his investigations, that Professor Agassiz was right in referring the liassic fish to the Sturionidæ ; that in some respects it evidenced a transitional form between the latter family and the more typical ganoids ; that its food was similar to that of the existing members of the family, but that it was procured in a tranquil sea, rather than in the tumultuous waters frequented by sturgeons of the present time.

ZOOLOGICAL SOCIETY.

February 9, 1858.—Dr. Gray, F.R.S., V.P., in the Chair.

On a New Genus of Mytilidæ, and on some Distorted Forms which occur among Bivalve Shells. By Dr. J. E. Gray, F.R.S., V.P.Z.S.

We have for several years had some specimens of large *Mytilidæ* in the Museum Collection which I have always regarded as the types of a distinct genus, but have deferred from time to time their publication, as I was informed that Dr. Dunker and others were engaged on a monograph of the family. Dr. Dunker having described the species without forming it into a group, I have therefore brought it before the Society, and at the same time make some observations on a peculiarity which the species presents.

Stavelia, n. g.

Shell inequivalve, inequilateral, subtrigonal ; umbo anterior ; the front of the ventral edge sinuous, the flatter valve with a broad expanded lobe on the front of the ventral margin, the more convex one with a deep sinuosity to fit the lobe of the other valve. Anterior adductor scar distinct, oblong ; posterior roundish ; submarginal scar parallel to the edge of the shell, entire. Hinge toothless. Ligament and cartilage linear, marginal, rather short.

Periostraca laminate, with elongated flat linear or tapering processes.

This genus differs from *Mytilus* in the inequality of the valve and