The pedunculated lateral-line organs of Gastrostomus.

The recent discovery of a form of deep-sea fishes closely allied to the Eurypharynx described by M. Vaillant, by the U. S. fish-commission steamer Albatross, has afforded excellent opportunities for a more thorough examination of the external characters presented by the skin of these forms. This species of eurypharyngoid fishes, — the one studied by Professor Theodore Gill and myself, and named by us Gastrostomus Bairdii, — upon closer examination of the region of the lateral line, discloses features which appear to be somewhat remarkable, if not unique, amongst organs of the kind hitherto known.

The lateral line is in its usual position, and begins just behind the head. There is no mucous canal covering the end-organs; but these are isolated in groups of from two to five, standing on the skin in an oblique row at the hind margin of each muscular somite. The groups consist, in fact, of from two to five stalked organs, as shown in fig. 1 in the cut. The stalks are not pigmented at all, except at the tips, where they support a discoidal cup-shaped organ, which is more or less completely pigmented internally. In some instances these end-organs are very distinctly cup-shaped; in others that form is less clearly apparent. The base from which the stalks arise is not so deeply pigmented as the surrounding skin, which is very densely loaded with pigment, and very black. The pigment on the basal disks is, in fact, arranged in a slightly reticular manner: the pigmented layer is continuous with the outer clear sheaths of the stalks; and the medullary portion of the stalk can be seen in some cases to consist mainly of nerve-fibrils, which pass outwards to the cup-like organs at the tip. In a few cases there appears to be a clear space in the centre of the cup-like end-organ, as shown in fig. 2, surrounded by a dense circle of pigmented tissue.

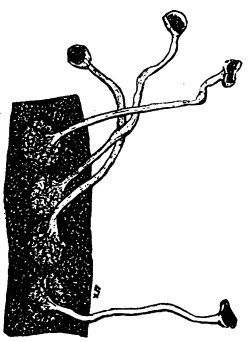

FIG. 1.

The function of these side-organs of Gastrostomus is apparently tactile, or may serve a special purpose at the great depth in which this fish lives. They remind one very forcibly of the rows of comb-like end-organs which have recently been described by F. Leydig on the head of the cave-fish (Amblyopsis spelaeus DeK.); but in this case the stalks are not so robust, and are much more slender, and relatively longer. It may even be that these lateral bands of side-organs of Gastrostomus are phosphorescent at their tips, like the side-organs of scopelids, steroptychids, etc. The lateral bands made up of short oblique rows of these organs, as the fish moves through the water at a depth of five to fifteen hundred fathoms, may possibly become luminous.

Fig. 2.

That they are also sensory in function there can be no doubt, being found in the usual position of the lateral line, as in common fishes, and, like it, probably innervated from the vagus. The stalks are fully a sixteenth of an inch long, and are apparent on the side when the fish is immersed in alcohol or water, and project outwards quite freely, so as to be visible along the sides when the fish is viewed from above. These naked side-organs remind one also somewhat of the naked nerve-hills on the sides of the body of young fishes, such as those of Gadus and Gambusia. In the former the stiff sensory hairs of the nerve-hills project immediately from the surface of the hill into the surrounding water, but in no embryo fishes am I aware that the side-organs are ever pedunculated. In fact, the side-organs of Gastrostomus Bairdii, like the whole of the rest of the organization of the animal, particularly its skull and branchial apparatus, present an extreme phase of specialization.

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RETROSPECT AND PROSPECT.

WITH the present number *Science* enters upon the second year of its existence. The time is an appropriate one, while extending a cordial greeting to its readers, to call their attention to its work and its purposes. That a journal of popular science, with the varied and informal contents appropriate to a weekly publication, would, if judiciously conducted, prove a welcome addition to the list of American periodicals, has long been felt by those most interested in scientific progress; but, when the numberless difficulties in the way of success had to be considered in detail, they were found to be numerous and perplexing. The general scope of the journal was the only feature about which little doubt could be felt. Two quite distinct yet inseparable objects of existence presented themselves: one was to keep the readers of the journal informed of the progress of science in all its branches; the other, to give expression to the well-matured views of scientific men upon all public questions connected with the increase of knowledge, and thus to become, so far as possible, an organ of public opinion upon scientific affairs.

In pursuing the latter object the path of duty was too plain to require discussion. The journal must be the organ of no individual, clique, or party, but must, while preserving entire impartiality, give plain and fearless expression to its convictions upon any question in which the interests of science at large were involved. How far it has fulfilled this requirement is a question to be decided by its readers and patrons, without argument from ourselves.

The question of the contents of the journal in detail was a far more intricate one. Shall its articles be designed exclusively for the specialist, or shall the results it makes known be popularized by the omission of all purely technical nomenclature? Shall they be long and elaborate, or short at the risk of incompleteness? Shall they be strictly and purely scien-

tific, or shall the speculative, sentimental, and poetic sides of things be allowed to appear? Shall its chronicles of progress consist of the briefest possible memoranda of all important current researches, each duly labelled for reference, or shall a selection be so made that each account shall be prepared with a statement of the origin, place, and object of the research, with a view of making its true significance known? In the case of scientific articles, where shall we draw the line between what belongs to this journal and what to those intended for the publication of original researches? These are merely a few of the more important questions which the projectors were obliged to meet, and which they have endeavored to decide in the way best fitted to give general satisfaction. The result is seen to a certain extent in the present number; but some aspects of the subject may be profitably considered from a broader field of view.

The difficulty arising from the technical nature of scientific researches admits of being partially resolved, so far at least as the general principle is concerned, by a very obvious consideration. Science must be almost as much popularized, to be made accessible to all scientific readers, as to be readable by the educated public who were never in a laboratory. A new formula in thermodynamics is as incomprehensible to a botanist as to a member of Congress. The average physicist knows as little about a brachiopod as the average merchant. What the most modest well-read clergyman may fairly think he knows about Darwinism far exceeds all that the common run of chemists really do know. The obvious conclusion is, that, should we seek to make discussions of current scientific researches accessible to all scientific readers, we cannot avoid being somewhat popular in style.

On the other hand, if the journal should present to its readers only that class of reading-matter which they get for nothing in the daily papers, its very existence would be a superfluity. To justify the publication of any periodical devoted to a specialty, it must present its readers with a kind of matter which they cannot find in the public prints.

The term 'popular science' is often made to include a class of discussions quite different from the presentation of scientific truths in common language. Science at the present day is the ideal of democracy. Its work and its honors, from the highest to the lowest, are thrown open, without restriction, to all men. There is no authority which can say to the humblest worker, "I know this, and you do not: I am therefore above your criticism, and you must accept my statements without essaying to inquire into the validity of their foundation or the soundness of their application." There is no tribunal in the scientific world which has the power to proclaim what is and what is not proved; what problems are and what are not solved. To one who has never considered this state of things, the first impression felt is, that it must imply universal anarchy; that in a community where every one has equal authority — that is, no authority at all — there can be no such thing as permanent and widely received opinions. But the very opposite is the truth. A system which requires every doctrine to stand on its own merits, and to maintain itself only by being proof against every assault, is the very one under which truth stands the best chance of showing its permanency. A long-established scientific doctrine stands like the Matterhorn, not through being protected from assault, but by being able to resist the storms of ages.

Now, there is in every civilized country a class of writers who avail themselves of this principle of equality to discuss subjects of which they have no accurate knowledge, to propound new theories, and to attack old ones. A voluminous literature thus arises which is the work of the lay element in the scientific community, and which is therefore sometimes called popular science. Such productions must stand on their merits as much as the propositions of the professional scientific man, and are entitled to consideration only according to their merit. The policy of *Science* is to admit nothing to its pages which does not belong to the domain of knowledge, excluding with especial care speculations upon subjects like the nebular hypothesis in which many active minds are so fond of indulging.

After a careful consideration of the form in which the results of current researches should be presented, it has been decided to substitute for the weekly summary heretofore presented brief discussions of current work which shall be of more interest to the general reader. To combine brevity with perspicuity in such cases is often a very difficult problem, in which the golden mean affords the only solution.

The form in which *Science* is now presented has been to a large extent the result of careful inquiry among its accessible friends and patrons. Manifestly, the plan in view cannot be developed in a single number; but we hope that a few weeks will show our purpose to make *Science* of greater value than heretofore to our widening circle of readers.