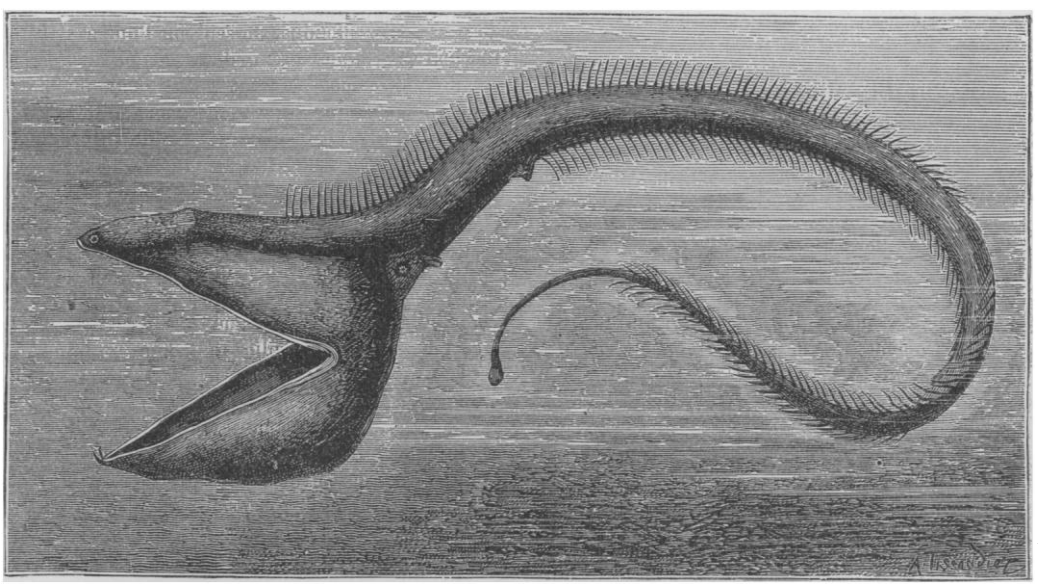
THE ICHTHYOLOGICAL PECULIARITIES OF THE BASSALIAN FAUNA.[1]

The author recalled the fact that he had recently proposed the name 'Bassalian realm' for the collective deep-sea faunas. At indefinite distances below the surface, deepest in the tropics, we find strange forms of animal life, which differ not only specifically and generically from those of the superincumbent water, as well as from those of the cold extremes of the globe, but often represent quite distinct families. Those forms which live at moderate depths (existing, as they do, in cold water) are related to, or even belong to, the polar faunas; but, as we go still deeper, we find various other assemblages of animals. Those of the lowest horizons are often wonderfully modified; and the deep-sea explorations of recent years have brought to light many very peculiar forms. Not the least remarkable of the several animal types, and in some respects the most remarkable, are the fishes. The only extended summary of our knowledge of the fishes of the deep sea has been given by Dr. Günther, in his 'Introduction to the study of fishes' (pp. 296–311). According to Dr. Günther, "before the voyage of H. M. S. Challenger, scarcely thirty deep-sea fishes were known. This number is now much increased by the discovery of many new species and genera; but, *singularly, no new types of families were discovered:* nothing but what might have been expected from our previous knowledge of this group of fishes" (p. 304). Dr. Günther evidently forgot that he had himself proposed to distinguish a peculiar family (Bathythrissidae) for a deep-sea fish obtained by the Challenger; and his generalization otherwise will not bear the test of confronting with the facts known even to him, much less those now known. In fact, the deep-sea fauna is surprisingly rich in peculiar forms of fishes; and no less than twenty-eight families are either confined entirely to the deep sea, or represented elsewhere by mere stragglers. Three new family types were obtained during the past year. Further, two orders, the Lyomeri and the Carencheli, are only known from deep-sea representatives. The families that have been already distinguished for the deep-loving fishes are twenty-eight in number.[2] Several of these have been



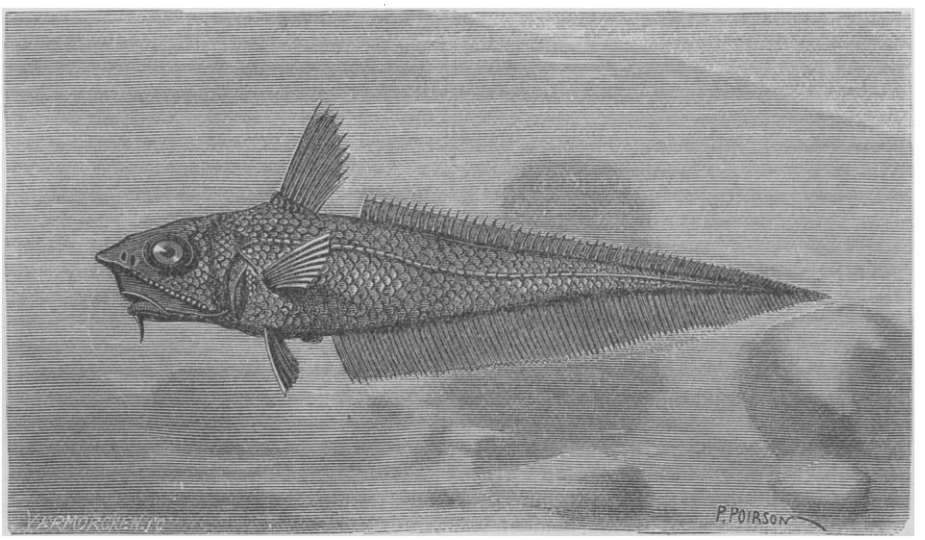
EURYPHARYNX PELECANOIDES.

[1] Abstract of a paper by Dr. Theodore Gill, read to the National academy of sciences, April 17, 1884.

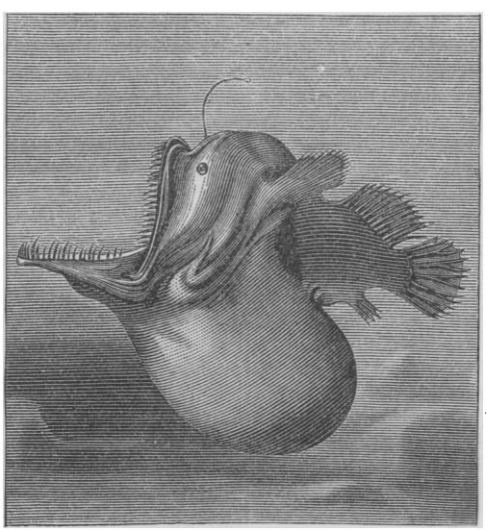
[The investigations carried on in connection with the French exploring-vessel Le Travailleur appear to confirm, as well as supplement, the results heretofore attained. Some of the new species have already been illustrated, and we here introduce figures of representatives of three of the most characteristic of the deep-sea types. These are Eurypharynx pelecanoides (the type of the family Eurypharyngidae and order Lyomeri), Macrurus australis (a form of the widely distributed and rich family Macruridae), and Melanocetus Johnsoni (a representative of the deep-sea pediculate family of Ceratiidae). Additional figures will be found in another article in this number. — Ed.]

[2] Saccopharyngidae, Eurypharyngidae, Synaphobranchidae, Simenchelyidae, Nemichthyidae, Derichthyidae, Notacanthidae, Ipnopidae, Chauliodontidae, Stomiatidae, Paralepididae, Alepi-

greatly increased of late. Probably other families require to be differentiated for certain peculiar forms; and, of course, numerous families, known from littoral fishes, have deep-sea representatives. It is obvious, then, that we have, in such an aggregate, a combination of forms very different from any of the superficial faunas we have heretofore considered. We will be justified, therefore, in recognizing for them a special realm, which has been called 'Bassalia' or the 'Bassalian realm.' But caution is timely that it seems to be rather a heterogeneous one, and may hereafter require restriction. The data now available are insufficient, however, for differentiating what are, doubtless, the several constituents or regions of this realm.



MACRURUS AUSTRALIS.



MELANOCETUS JOHNSONI.

Dr. Günther has even expressed the opinion, that (Introduction, p. 304), "as far as the observations go at present, no distinct bathymetrical regions which would be characterized by peculiar forms can be defined," and that, "if the vertical range of deep-sea fishes is actually as it appears from the Challenger lists, then there is no more distinct vertical than horizontal distribution of deep-sea fishes" (*op. cit.*, p. 305). There are reasons for believing that these generalizations are at least exaggerated; but it may be well to await the collection of more material, and the collation of more extensive data, before reversing them. Four factors must determine the bathymetrical distribution of fishes: (1) temperature, (2) the decrease and final absence of light, (3) the concomitant paucity or absence of vegetation, and (4) the pressure of the water. The relative importance of these several factors still remains to be studied, and their results discriminated. The absence of vegetable life confines the animal life to car-

sauridae, Alepocephalidae, Bathylagidae, Halosauridae, Bathythrissidae, Regalecidae, Trachypteridae, Lophotidae, Chiasmodontidae, Stephanoberycidae, Berycidae, Grammicolepidae, Polymixiidae, Lycodidae, Brotulidae, Macruridae, and Ceratiidae.

nivorous forms; and many of the fishes are pre-eminent for formidable armature, and some for extraordinary modifications for obtaining food.

SMITH SOUND, AND ITS EXPLORATION.

A MORE opportune moment could not have been selected by Dr. Bessels for publishing[1] a condensation of the literature relating to Smith Sound. Added to the interest which arctic narrative has always possessed, is the concern felt for Lieut. Greely and his party, and the hopes and fears awakened by the departure of the expedition for his relief. Many persons will therefore be glad to learn something of the region, which, with all its terrors and hardships, has been sufficiently attractive to again and again induce men to risk life and limb in the attempt to penetrate its mysteries. For that class of readers, Dr. Bessels' paper was, possibly, originally designed. But in relating the history of the more recent expeditions, especially those carried on under the auspices of the signal-office, the author has been so severe in his criticisms and reflections, that his production, while possessing the faults, has likewise the interest, of a polemic. Paragraphs like the following will certainly not fail in attracting attention for want of severity. "This plan, termed the Howgate plan, was devoid of all sound originality. The valuable parts of it are based on the work of Hayes and Weyprecht; the rest, emanating from the brain of Lieut. Henry W. Howgate, bears testimony that the originator of the '*Howgate plan*' was not familiar with even the rudiments of arctic exploration" (p. 414). "Lady Franklin Bay should have been the last place chosen as a permanent or temporary station" (p. 416). "That this plan [Howgate or Signal-service plan] would lead to disaster was pointed out by myself and others at an early date; but the judgment of the chief signal-officer in arctic matters was considered supreme, and upon him rests the responsibility of its failure. Several names connected with the signal-office will not easily be forgotten in arctic history" (p. 418). "The Proteus is now at the bottom of the sea; and all the arguments I could offer would not be able to raise her, or to relieve the ice-bound party in Lady Franklin Bay. The person responsible for the disaster is the chief signal-officer" (p. 435). "The preceding paragraph embodies the substance of his (Garlington's) instructions, as given and signed by W. B. Hazen, Brig. and Bvt. Maj. Gen'l, chief signal-officer, U. S. A." (p. 431). "It clearly shows that those who wrote Garlington's orders were utterly ignorant of the nature and character of the country to be traversed" (p. 436).

Other quotations might be made, which would show that the signal-service is not alone censured. The explorations of Sir John Ross and Hayes, and the conduct of Buddington, are all criticised more or less severely. Ross and Hayes are dead, and can make no reply; Buddington, according to Bessels, is not proficient in the art of writing, and we can expect nothing from him. But Gen. Hazen has a pen, which he has at times used with considerable effect; and it is possible that he may see fit to raise the low temperature of the present controversy to a height not at all in accordance with the normal of arctic literature.

But, on the whole, the strictures upon the signal-service expeditions appear to be just and proper. The folly of intrusting the organization and details of an arctic exploring-party to a board composed of persons without special experience, has been forcibly brought to notice by the failure of both relief expeditions; and possibly it will be made more prominent when we know more of Lieut. Greely's situation and experiences. That such a board should advise many unwise things, and propose schemes and plans more or less impracticable, was in the nature of things. But that success should be expected from nautical expeditions to the polar seas, which were commanded by persons not only without arctic experience, but ignorant of the art of navigation and the management of ships, seems incredible. Certainly Greely's party, as well as those undertaking his relief, should have had the benefit of the best arctic and nautical experience, assistance, and advice. That they did not have it is evidently the fault of the originators of the Lady Franklin Bay plan, and the devisers of the details of its execution.

But, while careful to point out the errors in origination and execution of the signal-service expeditions, Dr. Bessels appears to entirely overlook the fact that the Polaris expedition, of which he was a member, was so constituted as to invite, if not insure, failure. Hall, its commander, though of great arctic experience, was entirely ignorant of ships, their management, navigation, and capabilities. He was also entirely an uncultivated man, and little fitted to observe or study phenomena in their scientific aspects. His sole qualification for the direction of a polar expedition was his enthusiasm and interest in arctic exploration. To supply his deficiencies, the Polaris party was peculiarly organized. The care and management of the ship were in the hands of Buddington. The scientific corps was under the direction of Dr. Bessels. Hall was to supply the steam necessary to run this rather complicated machinery. Naturally, from such an organization, continual controversy was to be expected; and controversy, under the circumstances, would necessarily seriously affect the success of the undertaking. But the instructions issued by the Navy department provided, that, in case of Hall's death, the control of future operations should be shared by Buddington and Bessels; the former being supreme as far as the vessel was concerned, the latter equally supreme in the direction of matters on shore. Such a provision could but tend to a failure in all respects. During Hall's life the possibilities were, that either scientific observations would be sacrificed to the supposed interests of the vessel, or that the real interests and safety of the vessel would be sacrificed to a supposed necessity for

[1] Proceedings of the U. S. naval institute, vol. x., no. 3.