

SCIENCE.

FRIDAY, NOVEMBER 28, 1884.

COMMENT AND CRITICISM.

THE PRIMARY work of our Hydrographic office is the publication of charts, based on original surveys of distant coasts, by officers of our navy; but at present we take only a small part in this form of maritime exploration. During the past year, only one vessel has been engaged in such surveys. In unpleasant contrast with this, the review of hydrographic reconnoissances and surveys published annually in the English *Nautical magazine*, for example, shows how largely our ship-masters must depend on British charts in their voyages. The coast-survey does admirable work on our own seaboard; but, in addition to this, our government should take its proper share of the general hydrographic study of the world, commensurate with our wealth and maritime interests. New surveys of the northern coast of South America and of parts of the West Indies are urgently required, and their execution would be a well-chosen initial step towards the desired increase of our trade with the Spanish-Americans.

The collection of data for the physical study of the oceans is an important supplementary work of the same office; and by the recent establishment of its branches at six of our ports, intercourse has been greatly increased with ship-masters, from whom a large share of valuable material is obtained. The demand for the pilot chart of the North Atlantic (see *Science*, No. 69) has steadily increased; and some captains have even telegraphed from Europe, at their own expense, certain observations of special interest, made on the voyage across, for publication on it. The distribution of blank meteorological journals to voluntary observers has more than doubled during the past year; and ship-masters have been stimulated to make

immediate report of inaccuracies of charts, and matter of all kinds pertinent to hydrography and cartography.

AMERICANS are often called upon to contribute toward memorial funds which are designed to honor distinguished Europeans. Among recent requests of this sort, we remember the subscriptions which were opened in honor of Berkeley, the early friend of education in this country; Tyndall the reformer; Charles Darwin; and the naturalists Balfour, Barrande, and Müller, — every one of whom is well worthy of high honor from Americans as well as from Europeans. Probably the amount which has been raised for all these commemorations is quite moderate, constituting no adequate expression of American sentiments, and no important part of the entire sum collected. The value of the gift is doubtless in the international or cosmopolitan aspect which it imparts to the memorial. But it is quite possible that each of these tributes has taxed some one in this country to a very considerable extent. Committees have been formed, circulars distributed, small sums collected, and a good deal of correspondence exchanged; and all this with very slight results. We raise the question whether it is worth while to make such efforts? Is the return worth the exertion? The truth is, in our opinion, that what force we can command in the direction of monuments ought to be expended in memorials to be retained in this country. Among secondary educational influences, monuments to great men hold a most important place. They not only honor the departed: they inspire the enthusiasm of youth, they encourage lofty emulations, they lead all classes to think about the men who have contributed to the advancement of our civilization.

We are only at the beginning of the monumental epoch in this country. Having honored

soldiers and statesmen for many decades, the Americans now seem ready to commemorate their literary and scientific heroes. John Harvard and Abraham Pierson, whose real likenesses perished long ago, have risen in bronze upon the greens at Cambridge and New Haven. The statues of Joseph Henry and Benjamin Silliman stand near the scenes of their activity. Examples like these should be imitated throughout the land. Those who have rendered great services to science and education should receive due recognition from those who have profited by their labors. Only let us pray to be spared such commonplace monuments as are to be seen in abundance in London. Let us rather study the memorial statues which have of late years been placed in the cities of Germany, Holland, France, and other continental countries. Better no monuments than those which give positive pain to the beholders, and which will some day be lowered, like the Iron Duke from his lofty arch, when taste and skill are more highly developed.

LETTERS TO THE EDITOR.

The oldest living type of vertebrates.

It is necessary to add a little to the discussion of *Chlamydoselachus* in order to give readers of *Science* a just idea of the case as it now stands. On hearing the evidence presented in my paper at the Philadelphia meeting of the American association, Professor Cope gracefully conceded that he had mistaken the affinities of *Didymodus*, and agreed with me in the conclusions that the two genera belonged to different orders, and that, judging from the teeth alone, the nearest known allies of *Chlamydoselachus* were *Cladodonts* of the subcarboniferous and middle Devonian. The shapes of the bodies of the extinct *Cladodonts* are yet unknown. What has been considered the closest approach to a determination of their skeletal structure is that of Dr. Traquair, based on the resemblance of a single, partly visible, and imperfect tooth of *Ctenacanthus costellatus*. Professor Gill has accepted the doctor's idea, and classified the sharks, fossil and recent, in accordance (*Science*, iii. 346). The lateral curvature near the apex of the tooth is rather against the determination, and the character of the base is not known. The weight of the evidence does not seem to favor the conclusion that *Ctenacanthus* is a *Cladodont*. The tooth resembles that of *Rhina* as much. Until we are tolerably certain in regard to the extinct (the unknown), it is about as well to assume that it in some degree resembled the recent (the known). In a revision of the arrangement of Gill, the *Xenacanthini* should be taken from his *Lipospondyli* to form a new order, the *Cladodonts* removed and placed with the *Selachophichthyoidi*, and the definitions revised in several

cases to accord with structure. The result would appear thus:—

Xenacanthini, *Pleuracanthus*, *Didymodus*, and allies, prototypes of bony fishes.

SELACHIA. GALEI.

1. *Lipospondyli*, including the true *Hybodonts*, but excluding the *Cladodonts*.
2. *Selachophichthyoidi*, including *Chlamydoselachus* and the *Cladodonts*, but excluding *Didymodus*; changing the definition from "vertebral condition unknown, and with teeth having fixed bases," to "vertebrae partially or imperfectly developed, notochord persistent, and teeth with broad backward expanded bases."
3. *Opistharthri*, the *Notidanidae*; changing the expression, "which alone exhibit these peculiarities in the existing fauna," to read, "which share many of their peculiarities with the preceding."
4. *Proarthri*, *Heterodontidae*.
5. *Mesarthri* (*Anarthri* Gill), most sharks; changing the statement, "palato-quadrate apparatus not articulated with the skull," to read, "pterygo-quadrate articulated or connected with the skull in the orbit by the trabecular elbow." The name '*Anarthri*' is manifestly inappropriate, since few of the genera are without the articulation.
6. *Rhinae*, *Rhinidae*; changing the definition so that "with the palato-quadrate apparatus not articulated with the skull" shall read, "with the pterygo-quadrate articulated with the skull in the orbit by the trabecular elbow."

S. GARMAN.

Cambridge, Nov. 17.

Water of crystallization.

The first accompanying illustration (fig. 1) is taken from a photograph of plumes produced by the crystallization of water. In the appendix of Tyndall's work on light will be found an illustration (fig. 2) of the



FIG. 1.

same phenomenon which is explained in the following letter from the late Professor Joseph Henry to Professor Tyndall.

"Accompanying this, I send you a photograph at the request of Prof. S. H. Lockett of the Louisiana state university, of which the following is his explanation:—

"In my drawing-room I kept a wash-basin in which to rinse out the color from my water-color brushes.