way responsible for the alleged one-sided state of biological education.

While Mr. MacMillan's enthusiasm is in a good cause, he has allowed it to run away with his discretion. Without sufficient reflection or inquiry, he has, unintentionally, I am sure, given an entirely wrong impression of the character of work done in several institutions; this is done under a very sensational title and in a style of questionable taste. As it is desirable that this impression should not spread, and as the arrangement of courses in Columbia is cited by Mr. MacMillan as a leading example of the manner in which botany is subordinated to zoölogy, let us see what the Columbia courses are, as announced in the circular of the faculty of pure science:—

17 *Courses in Botany*, in A. Department of Botany.	1. Elementary Botany. 2. Elementary Botany. 3. General Botany. 4. Vegetable Anatomy. Cells and Tissues. 5. Morphology and Determination of Flowering Plants. 6. Economic Botany. 7. Cryptogamic Botany. 8. Advanced Vegetable Anatomy. 9. Natural Orders of Flowering Plants. 10. Advanced Cryptogamic Botany. 11. Comparative Study of Tissue of Twelve Species. 12. Comparative Study of Plants from a Certain Area. 13. Critical Study of a Genus.
in B. Department of Geology.	1. Palæobotany. 2. Study of Flora of Certain Geological Horizons.
3 *Courses in Physiology*, in Department of Physiology.	1. General Physiology. Lower Animal Types. 2. Human Physiology. Man and Lower Animals 3. Laboratory Physiology.

There are altogether eleven courses in zoölogy under the Department of Biology, two of which, namely, "Elementary Biology" and "Cellular Biology" are taught in part from plants.

It does not appear that botany is ignored in this programme of biological courses of study in this institution. The fact that the botanical courses are not arranged under the Biological Department is a mere technicality of administration, which raises no confusion in the minds of students, any more than does the separation of the Department of Physiology, which is equally cognate to biology. The separation of these three departments is simply owing to the fact that botany and physiology were already well established when the trustees decided to found a distinct department in which biology would be taught especially as illustrated in animal types.

HENRY F. OSBORN.

Columbia College, New York, April 13.

Cedar Waxwings,

Mr. Edwin M. Hasbrouck's "Presumably new fact relative to the Cedar Waxwings (Amp. Ced.)" in the issue of the 17th ult., is a very interesting discovery. The observations from which his conclusions were obtained, are familiar to modern ornithology, while his inductions are assuredly new to me. Whether they are accepted or not, his views of the importance of carefully studying the *first* plumages of birds will scarcely fail of universal acceptance. I have no criticisms, but wish to add an observation concerning the wax tips of the secondaries and retrices of the species which I am inclined to think will favor his conclusions.

I have made the ultimate anatomical structure of feathers a special study for many years, during which I have given those of the period before the first moulting special consideration, and have met with some extremely interesting things.

I have never been so fortunate as to meet with a wax tip while the young bird was still in the nest, but have occasionally seen them in very fresh subjects, or as early as the 25th of July. The development of the appendage, after it has commenced to appear, is very rapid indeed, resembling the process of the growth of the new antlers of a buck. I cannot yet state definitely the length of time, but from three to five days ordinarily, and doubtless sometimes a little more. In a work devoted to the Birds of Minnesota, I have made some references to my familiarity with the species, to which I might add many more notes, since that went out of my hands, that are even more in point, but suffice to say, the red wax is secreted in the ciliohamular portion of the barbules of the terminal barbs of the feather.

The rapidity of the development of the appendage is such that occasionally it results in doubling the whole series of barbs with their barbules, back upon the rachis of the feather, and reveals the fact that the horny material constituting the wax-like mass is filled from the tip, shaftward, as if in fact, as in appearance, it consists of genuine red sealing-wax, which has become so thickened or condensed as to cease flowing before quite reaching the point of union of the barb with the delicate, overladen rachis The naked portion of those barbs becomes an easy object of observation under low powers of the microscope, and under supremely good light and a higher magnification, the reflected portions of the barb with its barbules, and even the barbicels, may be seen resting upon the unreflected portion of the barbs and rachis. That there is some special condition very temporarily involved, that produces these decorations, there can be no doubt. I have never yet succeeded in seeing a wax-tip on a waxwing reared in captivity, excellent as has been my opportunity. Who next has something new about the Cedar Waxwing?

P. L. HATCH.

An Appeal to Naturalists.

MAY I appeal through your valued columns for the coöperation of the naturalists of the country? The following letter from Professor Kölliker of Würzburg is the occasion of my appeal:—

WÜRZBURG, April 4, 1893.

MY DEAR PROFESSOR MINOT:

May I ask you if you could procure for me some rare American forms of fishes and amphibians, preserved in Müller's fluid, so as to be investigated microscopically after Golgi's and Weigert's method? Larger animals should be cut transversely, so that the fluid can enter the spinal canal and act upon the spinal marrow. At the same time the head or body should be opened and the brain acted upon.

The list of my wishes is very large, but I shall be very glad, if I get only some of the animals mentioned. It includes, among the amphibia and reptiles, Amphiuma, Siren, Menobranchus, Menopoma, full-grown and larval, young alligators and tortoises; among the fishes, Lepidostens, Amia, Spatularia, Scaphyrhynchus, full-grown and also very young. . . . I am working just now at the microscopic anatomy of the nervous system, and have begun to extend my investigations to the comparative part also. Unfortunately, specimens in spirit only are worth very little, and the only good methods are those of Golgi and Weigert. But even Golgi's is only useful on embryos and young animals, and you know that both these methods demand a previous preservation in Müller's fluid.

Believe me, etc.,

A. KÖLLIKER.

In view of Professor Kölliker's distinguished services to science, covering a period of over fifty years, and of his undiminished activity in research, every one must feel a wish to promote any investigation Professor Kölliker undertakes. In order to secure the material for which Professor Kölliker asks, I seek for contributions from my American colleagues. I request that all specimens may be sent to me at the Harvard Medical School, so as to be in my hands by May 30. All material thus obtained can be packed and forwarded to Professor Kölliker, together with the list of contributors.

The specimens should be kept in the Müller's fluid until they reach Würzburg. In order to secure a good result with the fluid, it must be used in large quantities, and should be changed every day for the first week, and twice during the second week. Müller's fluid will not penetrate hard tissues, such as bone, for more than a quarter of an inch, and soft tissues for more than three-