these soils as the Bureau of Chemistry obtained by five hours' extraction with dilute acid of 40 degrees centigrade.

This correction will be made in the third edition of Illinois Circular No. 72. Analytical chemists will recognize how little force there is in this single just criticism in its application to the principles under discussion.

To illustrate his difficulty in finding suitable material for criticism, Doctor Cameron says:

> It is not at all clear why the phosphorus as determined in the two investigations should be compared on the basis of an acre surface with a depth of seven inches, for it is inconceivable that any one at this day, and in view of the well-known work of Darwin and others, would suppose that the same identical seven inches of soil would remain at the surface for any considerable period of time.

This criticism is neither pertinent nor consistent. First, it may safely be assumed that neither earthworms nor crawfish were active in these particular samples of soil during the interval between the two investigations, hence the criticism has no bearing on the point. Second, all results and comparisons reported in Bulletin 22 of the Bureau of Soils are based upon soil samples taken to certain depths; hence the critic is inconsistent. Reports of soil investigations which are written for the benefit of agriculture and agricultural people are best given on the acre basis, because this is the basis used in measuring crop yields, in applying manure, fertilizers, etc. The classic agricultural investigations of Lawes and Gilbert are practically all reported on the acre basis. Seven inches is a common depth for good plowing and this method of reporting results is in accord with the methods* adopted by the Association of Official Agricultural Chemists for collecting soil samples, which recognize that there are differences between soils and subsoils, whereas the arbitrary method of soil sampling, 0–12 inches, 12–24 inches, and 24–36 inches, in depth, as used by the Bureau of Soils (see pages 23–33 of Bulletin 22) commonly mixes surface soil and subsoil in one of the samples.

* U. S. Department of Agriculture, Bureau of Chemistry, Bulletin 67, p. 152.

While it is true that, in the early publication of his paper, Doctor Hilgard anticipated the proceedings of the Association of American Agricultural Colleges and Experiment Stations and of the censorship of the Bureau of Soils over the publication of those proceedings, it is also true that his arguments are unanswerable, as are, likewise, those of Director Hall of the Rothamsted Experiment Station, whose criticism of Bulletin 22 appeared in *Nature* last November, although it is entirely ignored by Cameron.

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SPECIAL ARTICLES.

ON A LEPTOCEPHALUS OF THE CONGER EEL.*

DURING late July, 1900, the first eel eggs taken outside of Italian waters were secured by the Fish Commission schooner *Grampus* on the surface of the Gulf Stream off Newport. The development of these eggs was described in the Bulletin of the U. S. Fish Commission for 1901.

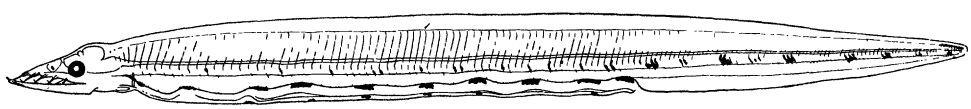
The largest larva reared measured about 11 mm. in length. The larvæ were characterized by the projecting lower jaw, the arrangement of the spots and the number of protovertebræ. Since writing the account which appeared in the bulletin the larvæ have been mounted on slides and a more satisfactory count of the protovertebræ made possible. There is still some doubt about the number of caudal protovertebræ. The count as near as it is possible to get it is $64+86$, $64+91$, $66+89$, $67+82$, $67+89$, $68+81$ and $70+86$ in seven larvæ.

On July 31, 1902, the *Grampus* collected a *Leptocephalus* 65 miles south of No Mans Land. It has a total length of 21 mm. and is undoubtedly the same species reared at Woods Hole in August, 1900. It agrees with the 1900 specimens in the projecting lower jaw, the general plan of the coloration, and has approximately the same number of protovertebræ. The protovertebræ are definitely 73 for the abdominal portion of the

* Contributions from the Zoological Laboratory of Indiana University, No. 54.

body and 82 or 83 for the caudal portion. The total number is, therefore, approximately equal to the total number found in the previous larvæ.

The coloration differs from that of the smaller larvæ in that additional spots have developed along the alimentary canal and along the sides. There are ten spots along the alimentary canal from the gill-openings to the anus. Most of these are duplicated



above and below, the upper one being the larger. There are seven or eight spots along the tail, not counting the color at the tip, which is apparently much as in the younger larvæ. There is a marked spot near the tip of the lower jaw and another on the upper jaw. There are in addition to these spots, which had representatives in the younger larvæ, a number along the sides over the notochord. In the anterior part of the body, the abdominal portion, these spots consist largely of a single chromatophore between two protovertebræ. Their arrangement on one side is as follows: No. 1 between the seventeenth and eighteenth protovertebræ; No. 2 between 28 and 29; No. 3 between 35 and 36; No. 4 between 39 and 40; No. 5 between 45 and 46; No. 6 between 51 and 52; No. 7 between 55 and 56; No. 8 between 61 and 62; No. 9 between 70 and 71. Those of the other side have a slightly different arrangement.

The spots on the tail have migrated up from the lower margin of the body so that they form a continuous series with those of the middle of the sides instead of with those of the alimentary canal. The last one of the caudal spots is, however, still located at the lower margin. Below it on the margin of the fin fold is a small spot, and there is a black stripe along the upper margin of the body at the base of the dorsal membrane, from a little in front of the last caudal spot to the end of the tail.

The size of this specimen indicates that it is about a month older than those previously described. The breeding season of this eel would, therefore, extend from about the middle of June to the end of July.

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ION ACTION.

It has long been the view of the writers that the term ion action in the sense that it has been used in pharmacology and physiology, is not justifiable and throws no light on the nature of salt action. It seems to have been accepted by many physiologists that the differences observed in the action of a series of analogous salts possessing, for instance, a common anion are to be attributed to a specific action of the cations upon the tissue. Such a conclusion seems to be unwarranted. Recent work on the catalytic decomposition of hydrogen peroxide offers a good example to illustrate our views. In a recent number of the *American Journal of Physiology* there appeared an article by Neilson and Brown* entitled 'The Effect of Ions on the Decomposition of Hydrogen Peroxide by Platinum Black.' After a study of the effect of a series of sodium salts and also a series of chlorides on the rate of the catalytic decomposition these authors conclude: 'In the catalytic decomposition of hydrogen peroxide by platinum black the cation, in general, has an inhibiting or depressing effect, and the anion has an accelerating effect.' We have recently shown† that the inhibitory action of certain salts on the catalytic decomposition of hydrogen peroxide by various metals is due to the formation of a thin insoluble film over the surface of the metal by the action of the salt on the metal. Thus it was shown that the catalysis by a given metal is inhibited by those salts whose constituent acid yields an insoluble salt with the catalyzer. Thus the catalysis by silver is inhibited by soluble chlorides, brom-

* *Amer. Jour. of Physiol.*, Vol. X., p. 225, 1904.

† *Amer. Chem. Jour.*, Vol. XXIX., p. 397, 1903.