THE OCCURRENCE OF TAURIN IN INVERTEBRATE MUSCLE.

A RECENTLY published paper by Agnes Kelly* on the occurrence of taurin in *Pecten opercularis* and *Mytilus edulis,* leads me to announce a similar observation on the occurrence of taurin among the muscle-extractives of *Sycotypus canaliculatus* and *Fulgur carica,* the zinc-bearing gastropods of Long Island Sound.†

Taurin has been described as a constituent of invertebrate muscle since 1845, when Karsten isolated a crystalline body from the watery extracts of certain molluscs, and identified it with the taurin separated from bile. Since that time the list has been largely extended by Krukenberg and others, until it includes the following molluscs: *Doriopsis, Turbo, Cassidaria, Mytilus, Ostræa, Pinna, Arca, Spondylus, Pectunculus, Pecten, Murex, Octopus, Loligo* and *Sepia.*

In a physiological-chemical study of various molluscs, which has been in progress in this laboratory for some time, under the direction of Dr. Mendel, taurin was separated in its characteristic crystal form, which, together with its sulphur content and chemical reactions, left no doubt in regard to its identity. This was further established by an analysis, which gave the following results:

	N.	S.
Calculated for $NH_2.CH_2.CH_2.SO_3H$	11.22%	25.62%
Found	11.37%	25.89%

Taurin has also been obtained from the muscles of *Haliotis,* the 'abalone' of the Pacific coast, by Professors L. B. Mendel and M. E. Jaffa, and likewise identified by analysis.

The finding of taurin—amido-ethyl-sulphonic acid—among the products of muscle katabolism in invertebrates is of particular physiological interest in view of the close relationship which has recently been shown to exist between taurin, cystin and the proteids.‡

The apparent association of taurin and glycocoll—amido-acetic acid—in molluscs, recalls the related occurrence of derivatives of these compounds in higher organisms.

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* Agnes Kelly, 'Hofmeister's Beiträge zur chemischen Physiologie,' V., p. 377, 1904.

† Cf. SCIENCE, Vol. XIX., No. 474, January 29, 1904.

‡ Friedmann, 'Ergebnisse der Physiologie,' 1902–3, I., 1, and II., 1.

THE PTERIDOSPERMAPHYTA.

SUCH is the name that I would propose to give to those plants, long extinct though they may all be, having the general character of Pteridophyta, but bearing seeds as in the Spermatophyta.* Such forms are now rapidly coming to light and are too well known to botanists to require enumeration. The name Cycadofilices which has been applied to them seems objectionable in several respects. While most of them do partake of the nature of both cycads and ferns, it is not certain that all do so, and additional ones may not entirely justify this designation. It is probable that they may, if some already known do not now, show affinities with the Pinales as well as with the Cycadales, and it is not at all improbable either that calamarian forms will be found with true seed vessels. A name is needed that shall express the broader fact that the ancient Pteridophytes occasionally developed so far in their reproductive system that they take on the characters of Spermatophytes. The term Pteridospermaphyta expresses this truth. It is somewhat long, but not longer than a number of the terms used in current systems of classification for which there are far less cogent reasons. It has the further advantage of denoting the true order or direction of development, and not the inverted order denoted by the term Cycadofilices.

The Pteridospermaphyta constitute a *phylum* coordinate with the Pteridophyta and Spermatophyta. They mark the progress of plant development from the standpoint of the reproductive organs. It is true that they bridge over a great chasm hitherto supposed to be impassable, but this is what we ought to expect as the knowledge of nature increases.

* This term is shortened by some writers to Spermaphyta.

Just as the discovery of the exogenous structure in many Carboniferous Pteridophytes (*Calamites, Stigmaria, Sigillaria,* even *Lepidodendron*) overthrew the old Lindleyan classification into endogens and exogens, which was supposed to be fundamental, so the discovery of the Pteridospermaphyta causes the later classification into spore-bearing and seed-bearing plants, which was confidently believed to constitute a durable substitute, to break down, and we are in the presence of the important truth that in both their internal structure and their floral structure the early types of vegetation advanced during Paleozoic time to a position not essentially different from that of the more developed types of the present day.

LESTER F. WARD.

INFLUENCE OF BORIC ACID AND BORAX ON DIGESTION AND HEALTH.

BULLETIN No. 84 of the Bureau of Chemistry, now in press, is the first of a series of monographs from that bureau embodying investigations made in accordance with the following authority contained in the act of Congress making appropriations for the Department of Agriculture, to wit: "To enable the Secretary of Agriculture to investigate the character of food preservatives, coloring matters, and other substances added to foods, to determine their relation to digestion and health, and to establish the principles which should guide their use."

These investigations were commenced in the autumn of 1902 under the direction of Dr. H. W. Wiley. Previous to their beginning a careful study of similar work done in this and other countries was undertaken and some of the laboratories where this work had been carried on, notably the laboratory of the Imperial Board of Health of Germany, at Charlottenburg, were visited and the method of experiments investigated. The plan finally decided upon was to secure the voluntary services of a number of young men who would undertake to try the effect of the added substances upon their digestion and health, to make the necessary observations, and to submit themselves to the rigid analytical control which such a series of investigations required.

The number finally selected for experiment was 12, as this was found to be about the maximum number which could be cared for with the analytical and culinary facilities afforded by the Bureau of Chemistry. A kitchen and a dining room were fitted up in the basement of the bureau and in December, 1902, the actual experimental work began and it continued, in the case of boric acid and borax, until July 1, 1903. The work was so divided that no one of the young men under observation was required to submit himself to the rigid control necessary to the conduct of the work more than one half of the time. The men selected were taken partly from the force of the Bureau of Chemistry and the rest from other Divisions and Bureaus of the Department of Agriculture. Each one was required to subscribe to a pledge to obey all the rules and regulations prescribed, and to abstain from all food and drink during the period of observation save that which was given him in the course of the experiment. Careful medical inspection of each of the members of the experimental class was secured, both directly and by collaboration with the Public Health and Marine Hospital Service. The details of the work, both analytical and medical, are found in full in the bulletin above mentioned which is now in press. Some of the conclusions are as follows:

When boric acid or borax equivalent thereto, in small quantities not exceeding a half gram per day, is given in the food no notable effects are immediately produced. If, however, these small doses be continued for a long while, as for instance in one case 50 days, there are occasional periods of loss of appetite, bad feeling, fulness in the head, and distress in the stomach. These symptoms, however, are not developed in every person within the time covered by the experiment, for some are far more sensitive to the action of these bodies in small quantities than others.

When boric acid, or borax in equivalent quantities, is given in larger and increasing doses there is a tendency to the somewhat rapid development in a more accentuated form of the symptoms above described. The most common symptom developed is a persistent