nounced electromotive activity of acetylcholine. No other substance in such diminutive concentrations is known to produce perceptible electromotive effects on second-class conductors.

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THE DETERMINATION OF THIAMIN BY THE YEAST FERMENTATION METHOD

A RECENT note in SCIENCE by H. H. Bunzell[1] described experiments on yeast fermentation in which only an 8 per cent. stimulation of fermentation rate was caused by thiamin, whereas a 106 per cent. stimulation was produced by an extract of wheat germ. Observations such as these naturally cast doubt upon the reliability of the yeast fermentation method for the determination of thiamin.[2,3] In view of the widespread use of the latter method it was considered desirable to show how Bunzell's experiments differ from the published procedure.[3]

His description of the fermentation medium mentions a "nutrient" solution. This term does not occur in our paper,[3] and thus there is no way of knowing exactly what his "nutrient" solution contained. However, on the basis of our experience with fermentation it is probable that his "nutrient" solution *did not contain ammonium ions* as required by the published procedure.[3]

Without ammonia in the medium thiamin causes a very slight stimulation and, conversely, without thiamin ammonia causes only a slight stimulation. The combination of the two in maximum amounts, however, causes a 100 per cent. increase in fermentation rate. This circumstance might explain Bunzell's results with the wheat germ extract since it has been shown[4] that various amino acids, etc., have an effect equivalent to ammonium ions.

Bunzell's difficulties recall the experience of Smythe,[5] who, observing a remarkable stimulation of fermentation due to an extract of bull testicle, finally isolated ammonium chloride as the active factor. Smythe made the additional mistake of obtaining his yeast from the small cakes sold in grocery stores. Such yeast is too rich in thiamin to show any stimulation of fermentation when thiamin is added to the medium.

[1] H. H. Bunzell, SCIENCE, 93: 238, 1941.
[2] A. S. Schultz, Lawrence Atkin and C. N. Frey, *Jour. Am. Chem. Soc.*, 59: 2457, 1937.
[3] Lawrence Atkin, A. S. Schultz and C. N. Frey, *Jour. Biol. Chem.*, 129: 471, 1939.
[4] A. S. Schultz, L. Atkin and C. N. Frey, *Cereal Chem.*, 16: 648, 1939.
[5] C. V. Smythe, *Enzymologia*, 6: 9, 1939.

If the published procedure for the determination of thiamin[3] is followed with ordinary attention to detail, a satisfactory determination of the thiamin content of wheat germ will be obtained.

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CONTROL OF RED SPIDER (TETRANYCHUS TELARIUS) BY PHTHALIC GLYCERYL ALKYD RESIN

THE common red spider (*Tetranychus telarius* L.), commonly found on greenhouse-grown plants and on many field crops, is extremely difficult to control. The ineffectiveness of many insecticides which have been recommended for control of red spiders may be ascribed to their lack of ovicidal action. Furthermore, chemicals which possess ovicidal properties are often injurious to cultivated plants, especially those grown in greenhouses.

In the course of an investigation, totally unrelated to the problem of red spider control, the writers observed that when a 2 per cent. phthalic glyceryl alkyd resin in water was applied to plants heavily infested with red spiders, the latter quickly disappeared. Microscopic examination of infested leaves showed large numbers of dead red spiders in all stages of development and masses of spiders' ova which had turned yellow and become shriveled after five days. Further examination of the ovicidal properties of phthalic glyceryl alkyd resin showed that it possesses a remarkable insecticidal efficiency. No injury was observed on plants tested experimentally under greenhouse and field conditions. Concentrations less than 2 per cent. (but not less than 1 per cent.) were effective on adults but not on ova; above 2 per cent. the margins of the leaves were burned.

The following plants were sprayed with beneficial results and without injury to the leaves: alfalfa (*Medicago sativa* L.), almond (*Prunus communis* Fritsch. and *P. nana* Stokes), apple (*Pyrus malus* L.), apricot (*Prunus armeniaca* L. and *P. mume* Sieb. & Zucc.), begonia (*Begonia octapetala* L'Her., *B. tuberhybrida* Voss., *B. semperflorens* Link and Otto, *B. haageana* Wats., and *B. rex* Putz.), *Coleus blumei* Benth., florists cyclamen (*Cyclamen indicum* L.), *Gardenia veitchii* Bailey, *Pelargonium sp.*, grape (*Vitis vinifera* L.), *Hydrangea hortensis* Smith, India rubber plant (*Ficus elastica* Roxb.), ivy (*Hedera helix* L.), poinsettia (*Euphorbia pulcherrima* Willd.), plum (*Prunus americana* Marsh), rose (*Rosa sp.*), snapdragon (*Antirrhinum majus* L.), strawberry (*Fra-*

garia sp.), and tomato (*Lycopersicum esculentum* Mill. var. *vulgare* Bailey).

An unidentified species of a very minute, white mite occurring on ivy and China asters (*Callistephus chinensis* Nees) and a begonia mite (probably *Avrosia translucens* Nietner) were also successfully controlled by a single application of 2 per cent. solution of phthalic glyceryl alkyd resin.

Since these experiments for the control of red spiders were performed also in commercial greenhouses and in the field, it seems highly probable that this chemical may find a wide application. Additional advantages which it possesses include no disagreeable odor, lack of spray residue on the leaves, its high degree of spreading capacity and only one application is necessary for killing the adults and the ova.

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A BIRD LIST

IN SCIENCE, for July 18, you refer to a bird list, made by Roger Peterson and myself (not my brother, Dr. Frederick H.) at the Fairchild Connecticut Gardens, on May 18, as a "bird census."

To my mind, it was in no sense a census, but simply a more or less superficial list of the species of birds noted during the course of a morning's walk through the area. The word "census" has been widely misused in this way in the past, and it would seem highly desirable to arrive at some general agreement as to what constitutes a "bird census."

If we adhere strictly to the dictionary definition of the word "census," a true bird census of a 127½-acre tract, swarming with migrants on the move, in addition to the resident species, would be almost impossible to take on a May morning. In view of the increasing need in ecological work for real censuses of the numbers and kinds of wild animals occurring on sample areas—it would seem wise to call any record, which does not represent a conscientious effort to record every single individual bird in the area at the time, a "bird count" or "bird list."

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SCIENTIFIC BOOKS

ZOOLOGY

A Text Book of Zoology. By the late T. JEFFERY PARKER, D.Sc., F.R.S., and the late WILLIAM A. HASWELL, M.A., D.Sc., F.R.S. Sixth Edition, in two volumes, Volume II revised by C. Forster-Cooper, M.A., Sc.D., F.R.S. xxiii + 758 pp.; 1–656 figs. 8vo. London: Macmillan and Co., Limited.

THIS famous text-book of zoology was originally a descriptive reference work of monumental character; it stemmed from the heroic period of T. H. Huxley, W. K. Parker and W. H. Flower but was not completed and published until 1898. Although both the volumes emphasized the factual side of development and morphology, the first volume, on the invertebrates, contained far more and better treatment of major phylogenetic problems than the second, which was for the most part merely an orderly record of bare facts with a minimum of inference. But these facts were so conveniently set forth that the rising demand has kept the work going through six editions.

In the first five editions some new details were added, but few radical changes were made and there was scant notice of the huge expansion of knowledge that had meanwhile taken place in the fields of vertebrate paleontology and general morphology. At last, however, the time came when it was realized that Parker and Haswell, Volume II, was in great need of modernization, and this formidable undertaking was then fortunately entrusted to C. Forster-Cooper, M.A., Sc.D., F.R.S., late director of the University Museum of Zoology at Cambridge and for some years director of the British Museum (Natural History).

The theme of the volume is the "Phylum Chordata," treated strictly from a taxonomic-anatomical viewpoint. In order to compress this enormous subject into practicable limits, the reviser has ignored many such significant techniques as the mathematical treatment of growth and form and the illimitable fields of genetics, physiology and the like; albeit that in many universities these are considered to be the central themes of modern zoology. But these subjects are already well represented by excellent contemporary text-books; whereas Parker and Haswell, Volume II, while still without a peer in its own territory, was getting to be so far behind the times that it might have been abandoned entirely in favor of a wholly new work. Thanks to the reviser and his collaborators, however, the old book has now been thoroughly rejuvenated or, more accurately, revised and enlarged. In its handsome new format we might even liken it to some stately building to which new extensions have been added but in such a way as to increase the usefulness of the parts and enhance the general effect of the whole.

The old text aimed to describe accurately the resemblances and differences between the innumerable products of vertebrate evolution; it but rarely referred to the changes in anatomical structure whereby one type has been transformed into another. The result