CULTURE METHODS FOR INVERTEBRATES

Culture Methods for Invertebrate Animals, a Compendium prepared Cooperatively by American Zoologists under the Direction of a Committee from Section F of the American Association for the Advancement of Science. PAUL S. GALTSOFF, FRANK E. LUTZ, PAUL S. WELCH and JAMES G. NEEDHAM, *chairman.* Ithaca, xxxi + 590. 1937. Comstock Pub. Co., $2.00.

"THIS book has been prepared as an aid to studies that require living animals in continuous supply." It was compiled by Miss Mary E. Davis, under the direction of the four members of the committee. One hundred and eighty-six collaborators have contributed one or more articles, and information from other sources has been reprinted. The book begins with three general introductory chapters in which certain common methods of collecting and caring for terrestrial and aquatic animals are discussed. The remainder is taken up with articles which are primarily concerned with cultural methods, but often digress into other fields. For example, the brief but excellent section by R. K. Nabours gives stimulating suggestions as to favorable lines of research on grouse locusts; Dr. Libbie H. Hyman not only tells how to keep planarians under laboratory conditions, but also points out how different types may be utilized for various purposes; and J. Speed Rogers gives detailed directions for rearing various types of crane-flies from diverse habitats. Articles are arranged systematically under their respective phyla, beginning with Protozoa and ending with Ascidacea. As would be expected, considerable space is given to protozoans and arthropods.

This work will be useful for those who maintain animals for experimental work or teaching. It covers a wide range and is well organized, with cross references and a complete index. The committee which prepared it is to be congratulated on its good work. Many of the advances in scientific discovery have been made possible by the availability of dependable material for observation and experiment. The publication of culture methods by which animals may be maintained for such procedures is a valuable service.

A. S. PEARSE

SOCIETIES AND MEETINGS

THE TORONTO MEETING OF THE AMERICAN ASSOCIATION OF ANATOMISTS

A VERY successful session of the American Association of Anatomists was held in the brisk atmosphere of Toronto from March 25 to 27. The registered attendance was 303, of whom 281 were from out of town.

The meeting opened with three papers on the lung, treating respectively the factors initiating respiration in the embryo, the mechanical expansion of alveoli by the inhalation of amniotic fluid, and the nature of the ultimate alveolar lining. Nine other papers were read that morning, chosen from the several fields into which anatomy is now subdivided. Thereafter it was generally necessary to hold from three to six simultaneous meetings to cover the lengthy program of 150 papers and 58 demonstrations. At the evening smoker, Dr. G. L. Streeter described, with lantern slides, the International Congress of Anatomists at Milan last September. Eight Americans had attended, and all presented papers. President Livini was pictured in Fascist attire, addressing the congress on the glories of Italian anatomy. Everywhere one heard the Giovanezza and saw the marching squadrons. The congress included a memorable visit to the Carthusian monastery and the ancient university of Pavia.

On the second day in Toronto, multiple sessions continued. By invitation of the president, six members of the association undertook the organization of round-table conferences, dealing with special subjects as follows: "Factors in Sperm Production," P. E. Smith, Columbia University; "Structure of the Teeth," T. Wingate Todd, Western Reserve University; "Embryonic Heart," Bradley M. Patten, University of Michigan; "Present-day Trends of Investigation in the Field of Gross Anatomy," R. J. Terry, Washington University; "The Structure of Neurons and Its Functional Significance," D. M. Rioch, Harvard Medical School; "Blood Capillaries," E. V. Cowdry, Washington University. Attendance at these round-table conferences numbered from 50 to 150. All of them gave rise to a general discussion.

Three of the round tables, and three general sessions besides, occupied the second morning. The afternoon was devoted to motion-picture and other demonstrations. Then came the annual dinner of the association, in the Ball Room of the Royal York Hotel, attended by 199 persons. Led to their places by two bagpipers in Highland dress, who continued to play at intervals, the anatomists dined heartily on roast beef and Yorkshire pudding. A message from His Excellency, the Governor-General of Canada, was read as follows:

> It is with great pleasure that I welcome to Canada the American Association of Anatomists. Your coming is a further example of the fact that science knows no political frontiers. You have my best wishes for the success of your deliberations.
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> TWEEDSMUIR

To which this reply was sent:

The American Association of Anatomists assembled at Toronto is gratified to receive Your Lordship's stimulating message. We would assure Your Excellency that Canadian and other American anatomists form what we call a syncytium.

THE SECRETARY

The Hon. and Rev. Henry John Cody, president of the University of Toronto, led the after-dinner speaking with a most cordial address of welcome, in which he described briefly the organization and character of the University of Toronto, with its 8,000 students. President Cody also called attention to the number of Canadian medical scientists, and particularly to the anatomists trained in Canada who have influenced anatomical work in the United States, mentioning especially Professors Osler and McCrae, Addison, Barker, Bensley, Chambers, Cowdry, Harvey, Macklin and McMurrich.

Dr. J. P. McMurrich, professor emeritus of anatomy in the University of Toronto, sketched biographically two pioneer contributors to anatomy in Canada: Michel Sarrazin (1659–1735), who first described the comparative anatomy of Canadian mammals in communications to the Académie Royale in Paris, and James Douglas (1800–1886), a prominent early teacher of human anatomy and the 'grand old man' of Quebec.

The president of the association, Professor F. T. Lewis, of Harvard University, then delivered the annual presidential address entitled "The Fundamentals of Cell Shape."[1] In advance of publication, he was permitted to announce the finding of Dr. J. W. Marvin, of Columbia University, that compressed lead shot of one size have an average of 14 facets—not 12—so that an accepted distinction between solid and liquid bodies in this respect disappears. With solids, such as a mass of peas, a primary contact with 12 neighbors may be expected, but upon expansion to fill completely all interstices, an average of 14 facets will be established, as indeed might be expected from *a priori* considerations. The lecturer indulged the hope that sometime there may be a symposium, with lively discussion, on the neglected problems of cell shape and statics, "for there are indications" which he seemed to see "of a ripple of interest in that direction."

The final day included five morning programs, valuable throughout. Special mention may be made of the superb moving pictures of capillaries in the frog, reacting to the external stimulus of a needle point by the thickening of individual endothelial cells and the local adhesion of a pair of passing red corpuscles (Zweifach and Chambers, New York University).

Four afternoon papers of greater length preceded adjournment. Professor Boyden, of the University of Minnesota, primarily interested in Talmudic anatomy as a commentary on gall-bladder anomalies, explained the nature of this lore in a comprehensive historical survey. Professor Kappers, of the Institute for Brain Research, Amsterdam, showed in detail the comparative anatomy of the hypothalamic autonomic centers, and Professor Ranson dealt with their functional significance. Finally Professor Bensley presented his penetrating micro-chemical studies of mitochondria, dealing with the distribution of lipids in protoplasm and their relation to its constitution.

Professor Grant, of the University of Toronto, and his associates on the local committee, in cooperation with Professor Corner, of the University of Rochester, the able and experienced secretary of the association, had anticipated every need of such a convention. The first Canadian session of the Anatomists was rewardingly alert.

CORRESPONDENT

SPECIAL ARTICLES

CORTICAL REPRESENTATION OF TACTILE SENSIBILITY AS INDICATED BY CORTICAL POTENTIALS[1]

THE observations reported below were obtained in the course of experiments directed toward a functional analysis of the somesthetic area of the cerebral cortex. It was thought that a study of the slow components of potentials which may be picked up by widely separated electrodes and which presumably result from the summed activity of cortical elements might be of value. First in cats and later in monkeys, it was found that the application of discrete tactile stimuli to a given cutaneous area produces in the cortex of the anesthetized animal well-localized surface positive waves. The potentials are of such magnitude, show such regularity over periods of time and are so decisive in all their characteristics that we have been able to employ them in mapping a cortical representation of the tactile sensibility of the body surface.

The most essential requirements for observing and recording these potentials are: (1) anesthesia of sufficient depth to reduce the Berger waves to minimal frequency and size;[2] (2) the use of mechanically dis-

[1] For summary, see SCIENCE, April 2, 1937, Supplement, p. 10.

[1] From the Department of Physiology, Johns Hopkins University School of Medicine.

[2] It has previously been shown that surface positive activity occurs in the deeply anesthetized cat's cortex