animals. In other places I have attempted to show the need of definite recognition of the fact that the transmission of characters is quite distinct from expression.[1]

The spread of a character through a group by transmission does not appear to have any relation to the frequency with which the character comes into visible expression. In their ability to spread through species recessive characters have a distinct advantage over dominant characters. In the presence of an adverse selection a recessive or latent character could continue to spread, even in spite of the elimination of all the individuals in which the character came into expression, whereas a dominant character would be destroyed as soon as its representatives were exterminated.

It is also known that the potency, or power of a character to come into expression, is subject to pronounced changes, even among different individuals of the same stock. Thus one of Professor Davenport's tailless fowls produced only tailed chicks, though the Mendelian reckoning called for large percentages of tailless birds. And yet the tailless character reappeared in Mendelian proportions in the progeny of a son of the same bird.[2]

Thus the biological probabilities regarding brachydactyly are altogether different from the mathematical calculations based on the Mendelian assumption that parental characters are *transmitted* by only half of the germ-cells. The biological indication is that brachydactyly is *transmitted to all the descendants* of a brachydactylous ancestor, and is likely to regain expression, or even to become prepotent, in any generation, near or remote.

O. F. Cook

Washington,
July 16, 1908

[1] "Transmission Inheritance distinct from Expression Inheritance," Science, N. S., XXV., 911. "Mendelism and Other Methods of Descent," *Proc. Wash. Academy of Sciences*, IX., 189. "Heredity Related to Memory and Instinct," *Monist*, XVIII., 263.

[2] "Altogether, out of 200 offspring of this tailless cock, where I expected 90 per cent. tailless birds, I got not one. On the other hand, using some of the same hens with another cock (the son of No. 117), from 50 offspring, where I expected 25 tailless, I got 24 tailless. In No. 117, although tailless, the tailed tendency strongly dominates over taillessness, so that not in the first nor in the second hybrid generation does taillessness appear, and of the Mendelian segregation in the second hybrid generation there is no trace! On the other hand, another cock reveals typical Mendelian phenomena." See Davenport, C. B., 1907. "Heredity and Mendel's Law," *Proc. Washington Academy of Sciences*, IX., 184.

SCIENTIFIC BOOKS

A Text-Book of the Principles of Animal Histology. By Ulric Dahlgren, Assistant Professor of Biology in Princeton University, and William A. Kepner, Adjunct Professor of Biology in the University of Virginia. Pp. xiii + 515. Price, $3.75. New York, Macmillan Company. 1908.

This book is so unlike the usual text-books of human and mammalian histology that it will seem like an entirely new subject to most readers. It comes as a welcome relief from the multitude of text-books which differ from one another only in the order and arrangement of the subjects treated. For many years the comparative method has been recognized as the "saving salt," as Michael Foster expressed it, of anatomy and embryology, but strange to say, few works have attempted to deal with histology from the comparative point of view, and this subject has been adequately treated only in the case of man and of a few mammals. If we except the early pioneer work of Leydig and the incompleted work of Fol, the only works which deal specifically and adequately with the subject of comparative histology are the large manual of Camillo Schneider and this volume by Dahlgren and Kepner, and the present work is, I believe, the first attempt which has been made in English to put histology upon a comparative basis.

The purpose of the authors is clearly stated in the preface to be

> To produce a work that covers the general field of histology, and is not restricted in the main to human and mammalian forms. It is intended to be a work that teaches general principles and

teaches histology as a pure science and for its own sake. It is believed that it will serve as a broad foundation for future studies of morphology and embryology as well as for the medical studies.

The book admirably fulfills the purpose thus outlined. The field which it covers is greater than that of any other existing work on this subject; every phylum in the animal kingdom is drawn upon for illustrative material and in a few cases plant cells and tissues are also considered. A glance at the 470 excellent figures, most of them original, which illustrate the book shows from what a wide field the material has been drawn and how extensive the researches have been upon which this work is based.

Such wealth of illustrative material would inevitably lead to confusion were it not for the fact that general principles rather than specific structures are everywhere kept in the foreground. These principles are in the main the general physiological properties common to all organisms. The authors have shown that even histology may be best treated from the standpoint of the living, functioning organism. After seven introductory chapters dealing with protoplasm, the cell, multicellular organization viewed from the phylogenetic and from the ontogenetic standpoints, mitosis and amitosis, epithelium and glands, connecting, supporting and filling tissues, there are taken up in order, tissues for the production of motion, electricity, light and heat; tissues connected with circulation, sensation, pigmentation, alimentation, ductless glands, tissues concerned with respiration, gas secretion, excretion, protection, reproduction, accessory reproductive tissues and tissues for the nourishment of the young. This summarizes briefly and in a very general way the purpose, method and extent of the work and it must be apparent at once that within the proper limits of such a review as this it is impossible to deal critically with each of these sections of the book. Comment must be limited to the general features of the work rather than to specific details.

One of the fundamental ideas which are set forth in the first chapter and which runs through the whole book is that the cell can produce only substances and that dynamic products, such as heat, light, electricity and motion are the results of the chemical activities of the substances which the protoplasm has formed by its own "vital" activity. The substances thus formed usually appear as granules and are known respectively as "thermochondria," "photochondria," "electrochondria" and "myochondria." Even in the case of other forms of energy which can not be certainly referred to any of the four types named, the authors are apparently inclined to follow this same idea, and accordingly the granules of the nerve cells are called "neurochondria." The treatment accorded these types of energy and their production by animal tissues is particularly striking and valuable. Other histologies deal with the tissues concerned with the production of motion, but no other text-book deals so fully and satisfactorily with the production by animals of heat, light and electricity. In the treatment of practically every topic touched upon in the book the broadening influence of the comparative method is shown, and most of the illustrative material figured and described is new. Indeed, the work as a whole is much more than a text-book, for it contains a large amount of original observation here published for the first time. This applies to every chapter, but particularly to those which deal with the production of light and electricity, and with the sense organs. However, owing to the fact that investigators' names are rarely mentioned it is difficult for one not thoroughly acquainted with the subject to distinguish between the author's researches and those of others.

In the opinion of the writer the most serious criticism of the work for use as a text-book is that it "falls between two stools"; it can be used advantageously only by advanced students who have had a pretty thorough training in zoology, while much of the material described is quite inaccessible to average classes. This makes the book valuable as a reference work and for use with advanced students, but for this purpose it should be more detailed in character and should include a more extensive bibliography

with references to the principal literature. No general bibliography is given, on the ground that it would necessarily discourage rather than stimulate the student, but the writer has found in reading the book that a larger number of references to special papers and to general works would have been helpful and desirable. The references given are not always definite nor exact.

Now and again throughout the book a kind of teleology appears, which in the present state of biological science it is best to avoid, although it is often difficult to do so; *e. g.*, on page 102, it is said that "muscle must be developed wherever needed," again, on page 142, "heat production is stimulated by its need," etc.

The terms employed are sometimes open to criticism; thus on page 174 "perception" is given as a function of the nerve cell where only irritability or sensitivity is meant; sometimes the style and grammar used are not above suspicion, and in places the malevolence of the printer's "devil" is manifest, as on page 233, where a discovery of the brothers Sarasin is attributed to the Saracens.

However, in view of the many excellences of the work it seems almost ungenerous to call attention to these minor defects; they are slips which we may expect to see corrected in future editions of the book.

When one considers the narrow, technical training which students in histology usually receive, whether they be medical students or not, one can not but wish that a course similar to that outlined in this book might be given in every college and university.

E. G. Conklin

Anthropological Publications of the American Museum of Natural History for 1907–1908

The anthropological publications of the American Museum of Natural History, during 1907 and 1908, comprise Volume I., and Part I. of Volume II., beginning a new series entitled *Anthropological Papers of the American Museum of Natural History;* the closing sections of Volumes XV., XVIII. and XVIII. of the Museum *Bulletin;* and the last part of Volume III. of the Museum *Memoirs:* eleven papers with an aggregate of 1,099 pages, 82 plates and 373 text figures. Formerly minor anthropological papers were published in the annual Bulletin, primarily designed for biological publications. By the segregation of these papers and their issue under a distinct title the Museum has made a change for the better.

Volume I. of the Anthropological Papers opens with Mr. Charles W. Mead's "Technique of some South American Featherwork" (pp. 1–18, pls. I.–IV., 14 figs.). In two distinct sections, the author describes the feather-technique of the ancient Peruvians and of the modern natives of South America. The most striking difference between the two is found in the mode of attaching feathers: the Peruvians employing knots while the modern Indians substitute a loop or simple turn about the shaft.

In Part II. (pp. 19–54, pls. V.–VII., 26 figs.) Dr. Clark Wissler discusses, "Some Protective Designs of the Dakota." The shields or shield-covers of the Dakota were formerly painted with designs, derived from supernatural experiences which imparted to them supernatural efficacy. On modern shields, the thunder, lightning and spider symbols play an important part; but there is evidence for the greater prominence in the old days of simple circular designs representing the heavenly bodies. The designs on supposedly bullet-proof shirts, worn in the ghost-dance, are characterized by a tendency to represent animals, such as turtles, believed to be proof against missiles. While the use of these garments is modern, the author insists on the aboriginal character of protective designs, long antedating, as they do, the outbreak of 1890. In his conclusion the author explains the animistic basis on which interpretations of designs rest, notes the psychologically interesting predominance of animal motives, and mentions the coalescence of apparently incongruous power-symbols as representations of the same natural forces.

Parts III. (pp. 55–139) and IV. (pp. 141–282, pls. VIII.–XIII., 44 figs.) embody Dr. A. L. Kroeber's fairly representative collection