

which this form is due; (b) it enables one to reduce the consideration of any skew curve to that of the normal curve; (c) the simplicity of the application."

A popular discussion of the origin of normal curves follows. The curve, as is well known, is given by the expansion of $(1/2 + 1/2)^n$. Professor Pearson derives his skew curves by studying the expansion of $(p + q)^n$, where $p + q = 1$. Now Professor Kapteyn considers the exponent n as giving the number of causes which enter into the problem of growth, and shows that with a sufficiently large value for n , and natural causes must be looked upon as almost infinite in number, $(p + q)^n$ approximates closely to a normal curve or, quoting Bessel: "Whatever be the effect of the various causes of deviation, as long as they are: (a) very numerous; (b) independent of each other; (c) such that the effect of any one cause is small as compared with the effect of all such causes together, we shall obtain a curve which approximates the nearer to the normal curve the greater n is."

But, though we may assume the effect of certain causes in producing deviations in certain quantities x to be independent of the value of x , this can not be the case with quantities proportional to x^2 , $1/x$, or any non-linear function of x . The resultant curves under these conditions are the skew curves. To obtain these the author supposes that 'on certain quantities x , which at starting are equal, there come to operate certain causes of deviation, the effect of which depends in a given way on the value of x .' Let us imagine certain other quantities depending on the quantities x in the way given by $z = F(x)$.

Then we have

$$\Delta z = F'(x)\Delta x, \text{ or } \Delta x = \frac{\Delta z}{F'(x)},$$

where Δz represents a series of deviations of the quantity z independent of the value of z . Thus the effects of the causes of deviation operating on x are proportional to $1/F'(x)$. Now since, according to assumption, the quantities z are distributed in a normal curve, say

$$y = \frac{h}{\sqrt{\pi}} e^{-h^2(z-M)^2},$$

the quantities x must be distributed along the curve

$$y = \frac{h}{\sqrt{\pi}} F'(x) e^{-h^2(F(x)-M)^2}.$$

This is the frequency curve generated under the influence of causes, the effect of which is proportional to $1/F'(x)$, no limits being placed as to the form of this function.

The author next takes up the case

$$F(x) = (x + \kappa)^q$$

the equation of the curve now being

$$y = \frac{Ahq}{\sqrt{\pi}} (x + \kappa)^{q-1} e^{-h^2[(x + \kappa)^q - M]^2},$$

and derives complete formulæ and tables for the finding of the five constants A , h , M , q , κ for the five possible cases

$$q \geq 0 \text{ and } q = \pm \infty.$$

The solution is left in a rather unsatisfactory state, as we can not find A directly, while it is necessary to know A in order to find the other constants. As A is in most cases unity, he assumes this value for it, and computes the other constants. These having been found, A is readily computed. If A computed $\neq 1$ assumed, try again with some other value for A until a perfect agreement has been obtained. Another weakness of the solution is that only four of the observations of a set are used. These are so chosen that their abscissæ are in arithmetical progression. The author, however, considers this very fact an element of strength.

It can not be denied that Professor Kapteyn gets some very good results and his theory is undoubtedly full of possibilities.

C. C. ENGBERG.

THE UNIVERSITY OF NEBRASKA.

The Mammals of Pennsylvania and New Jersey. A Biographic, Historic, and Descriptive Account of the Furred Animals of Land and Sea, both Living and Extinct, Known to have Existed in these States. By SAMUEL N. RHOADS. Illustrated with plates and a faunal map. Philadelphia, privately published. 1903. Pp. 252.

Mammalogists have been so busy in recent years describing, classifying and getting their

work on a sound systematic basis that few exhaustive studies of the mammals of limited areas have been made. The 'lay ornithologist' thrives throughout the United States. By his enthusiastic local work he has contributed largely to the present high state of knowledge of the birds of the whole country. Interest in mammals, however, has been lamentably slight, except among professional workers connected with museums. Mr. Rhoads's work on the mammals of Pennsylvania and New Jersey is a valuable object lesson for those who refrain from attempting local studies of mammals on the supposition that there are no opportunities for non-professional workers. The book, however, is not primarily non-professional, nor can Mr. Rhoads be called a 'layman,' but the amount of interesting and valuable data he has gathered in a comparatively limited region is very suggestive of what might be accomplished by local students elsewhere.

The book takes the form of a list, with each species fully treated under several subtitles, such as faunal distribution, distribution in Pennsylvania and New Jersey, records, habits and economic status, and description of species. In addition to the recent species and subspecies, which number 96, a list of 95 which occur in the fossil state is given, and also a brief hypothetical list. Introduced exotics are likewise enumerated. The large list of recent forms, which in many cases includes two or more related subspecies, is swelled by 18 species of whales and dolphins found off the coast of New Jersey.

Besides being an accurate list of all the mammals known to occur within the boundaries of Pennsylvania and New Jersey, the work is of importance and interest in its bearing upon the history and habits of many well-known mammals. The accounts of species now extinct in the two states, such as the wapiti, the bison and the beaver, are of especial interest. The notes on habits are entertainingly written and will be found interesting alike to the ordinary reader and to the professional naturalist. The author's own observations, which are stated to have covered a period of eleven years in the region, are freely given, but considerable quoted matter is also included.

This is taken largely from correspondence with old residents of various parts of the region. The reliability of such sources is of course doubtful, but the notes are evidently given for what they are worth. In one case, after a quotation of several pages, the fact is brought out that the narrator 'was in the habit of making a good story of his exploits.' Nevertheless, such information is valuable, and this method almost the only one for obtaining an idea of conditions no longer existing. As far as possible, primitive conditions have been contrasted with those of the present, with particular reference to the influences of settlement and deforestation upon the existence and distribution of the native mammals. When these processes have progressed still further, the value of this work in carefully setting forth present conditions will doubtless be appreciated by future students. Distribution is usually stated in terms of life zones. A religious correspondence of the ranges of the mammals with the zones is implied throughout. Indeed, some subspecies are included solely because the zone they are supposed to inhabit is known to extend within the boundaries of the region. The extent to which such distributions are theoretical is not emphasized. In this connection there appears to have been an opportunity for a suggestive outline of desirable confirmatory work for the future.

The nomenclature and technical treatment throughout are according to the most recent knowledge and standards. In several instances names in common use by others are slightly changed, but it is to the author's credit that the reasons for so doing are always stated, even if they merely amount to personal opinion. In one case, to which my attention has been called, a name has been wrongly applied, that of a domestic animal, the so-called Belgian hare, which should be designated as *Lepus cuniculus*, not *Lepus europæus*. Questions of doubtful relationships are discussed in some cases, and in this connection occasional disparaging allusions to 'the hair splitters' occur, as if to lead the unsuspecting reader to the belief that the author abhors such.

The book is illustrated with nine full-page plates, chiefly photographs of specimens. A double-page colored map of the life zones of the two states is also given. Since this is the most detailed zonal map of the region yet published, and since it differs in some respects from previous inclusive maps of smaller scale, it is regrettable that more space was not devoted to discussion of life zones and especially to the boundaries as indicated on this new map. It is also unfortunate that the colors are not those which from repeated use on other maps have become associated with the several zones. As a piece of book-making, the work is not all that might be desired. The paper is rather poor and errors in typography are not infrequent. Minor shortcomings, however, may easily be overlooked in such a good and useful book. It is a thorough exposition of the knowledge, past and present, of the mammals of the two states, and may be safely ranked among our most important works on the mammals of eastern North America.

WILFRED H. OSGOOD.

SCIENTIFIC JOURNALS AND ARTICLES.

THE last number of *The Journal of Infectious Diseases* contains the following articles:

ALICE HAMILTON: 'The Toxic Action of Scarlatinal and Pneumonic Sera on Paramœcia.'

C. P. CLARK and F. H. BATMAN: 'Pneumococcal Bronchiolitis (Capillary Bronchitis).'

E. H. RUEDIGER: 'Improved Technic of Agglutination Test in Typhoid Fever—The Use of Formalinized Cultures.'

ROGER G. PERKINS: 'Bacillus Mucosus Capulatus: A Study of the Group and an Attempt at Classification of the Varieties Described.'

MARY C. LINCOLN: 'Agglutination in the Group of Fluorescent Bacteria.'

EDWARD C. ROSENOW: 'Studies in Pneumonia and Pneumococcus Infections.'

JOSEPH LOUIS BAER: 'Epidemic Gonorrheal Vulvo-Vaginitis in Young Girls.'

EARLE B. PHELPS: 'A Critical Study of the Methods in Current Use for the Determination of Free and Albuminoid Ammonia in Sewage.'

WM. ROYAL STOKES: 'A Simple Test for Routine Detection of Colon Bacillus in Drinking Water.'

GEORGE A. JOHNSON: 'Isolation of Bacillus Coli

Communis from the Alimentary Tract of Fish and the Significance Thereof.'

CHARLES HARRINGTON: 'Sodium Sulphite: A Dangerous Food-Preservative.'

STEPHEN DE M. GAGE and GEORGE O. ADAMS: 'Studies of Media for the Quantitative Estimation of Bacteria in Water and Sewage.'

ANNOUNCEMENT has been made of the initial numbers of a series of *Bulletins* on pathology from the laboratory of the Medical Department of the University of California, Berkeley, under the editorship of Dr. Alonzo E. Taylor, head of the Department of Pathology and director of the Hearst Laboratory in San Francisco.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the section was held on February 29 at the American Museum of Natural History in conjunction with the American Ethnological Society. The program was as follows:

Ethnological Survey of the Pueblos of New Mexico and Arizona, during the Summer of 1903: MR. GEORGE H. PEPPER.

Mr. Pepper first went to Española, and from there visited the pueblos of Santa Clara, San Ildefonso, Pojoaque, Nambe and Tesuque. One of the ceremonial dances at the pueblo of Santa Clara was witnessed. San Juan, Picoris and Tesuque next received attention. After this work was completed the Hopi region was visited, the time selected being the occasion of the Antelope and Snake dances at Walpi. In the pueblos of Hano, Sichomavi and Walpi, special attention was devoted to the work of the Hopi potters, particularly Nampayo of Hano, who is the only one living that has made a careful study of the old pigments and clays.

On the second mesa the pueblos of Mashongnavi and Shungopavi were visited, and the Snake Dance at Mashongnavi observed. Oraibi, the seventh of the Hopi pueblos, situated fifteen miles to the west of the second mesa, came next. During the stay in this pueblo the wonderful Flute ceremony was enacted. From the Hopi region the route taken