species or genus, is one of the few living giants in the extensive group of mammals (Primates) to which he belongs, (2) that man's physical structure, both skeletal and visceral, has numerous well-known and much-discussed peculiarities that, like his gigantism, show him to be far advanced in the period of "phylogeronty" or racial old age, while (3), in his mental constitution man unites the dominating type of social behavior that is common to most anthropoid primates (well described by Yerkes and his associates) with such a unique genius for "implementing" it as to make the combination a totally new phenomenon in animal evolution. This combination may well prove to be, in the end, as racially lethal as the huge size and great bodily specialization of titanotheres, proboscidians and dinosaurs appears to have been in the past.

Though the idea of racial death as the normal end of every evolutionary line is not a new one, it is seldom given the place it deserves in the discussion of man's future. Professor Blackwelder alludes to it (p. 365), but Professor Goodale is silent on the subject. As an exception to this rule I may quote from an article entitled "A Palaeontologist Looks at Life," by Professor Herbert Leader Hawkins:

> . . . The conclusion seems inevitable that simplicity is safe and complexity is dangerous. But if the main tendency of evolution is toward specialization then evolution leads inevitably to extinction. The rates of progress may vary, but the destination is the same. . . . And yet there is nothing strange in the contention . . . are we not aware that we [as individuals] are living in the constant anticipation of death sooner or later?[1]

GERRIT S. MILLER, JR.

WASHINGTON, D. C.

THE LAW OF URBAN CONCENTRATION

ON page 19 of the July 4th issue of SCIENCE, E. L. Thorndike, in reviewing G. K. Zipf's book on "National Unity and Disunity," referring to his discovery of the law of urban concentration, remarks, "This discovery may rank with Quetelet's discovery that the statures of men are distributed in accordance with the so-called normal probability curve."

This discovery is neither new, nor perhaps quite as striking as Professor Thorndike seems to indicate. That the size of cities and their rank when plotted on doubly logarithmic paper form essentially a straight line, seems to be first indicated by F. Auerbach, and was shown to apply to the cities of the United States in my book, "Elements of Physical Biology," 1925, pages 306–307. That a relation of this sort is not uncommon is a well-known fact, the outstanding example perhaps being Pareto's law of the frequency distribution of incomes. Another example is Williss's "Theory of Age and Area," as applied to the frequency of biological genera and species (see *loc. cit.*, pages 311, *et seq.*). Still another example is the Frequency Distribution of Scientific Productivity, as shown by me in the *Journal* of the Washington Academy of Sciences, 1926, Vol. 16, page 317. From this last source, I may quote the following sentence (page 323): "Frequency distributions of this general type have a wide range of applicability to a variety of phenomena, and the mere form of such a distribution throws little or no light on the underlying physical relations." This type of frequency distribution is, in fact, Pearson's type XI, a special case of type VI.

ALFRED J. LOTKA

METROPOLITAN LIFE INSURANCE COMPANY

DR. LOTKA is right in giving to Auerbach the credit that I gave to Zipf; and I apologize for my ignorance of Lotka's discussions of curves which use ranks and are based on the extreme value of the series. Very likely he is right also in regarding them as relatively unimportant cases of curves of extreme skew, but I still hope that they will be more than that.

E. L. THORNDIKE

SCIENTIFIC BOOKS

ENDOCRINOLOGY

Endocrinology. The Glands and Their Functions. By R. G. HOSKINS, M.D. 388 pp. New York: W. W. Norton and Co. 1941. $4.00.

AMONG the many notable advances in the field of the biological sciences in the last fifty years none has been more spectacular than that relating to the endocrine glands. Unfortunately, much that has been written concerning these organs reflects more the enthusiasm of the investigator than it contributes to the advancement of knowledge, and this has been particularly true in the field of clinical endocrinology.

While the remarkable effects of small quantities of certain hormones upon bodily function are a continued source of wonder, a full appreciation of their action is not gained unless the function of the endocrine glands is projected against the operation of the organism as a whole. Until it was clearly recognized that the endocrine glands operate as an integrated system, largely controlled by the anterior pituitary, there was a tendency to believe that they possessed an autonomy of action that set each individual member apart from the others. Even more deplorable was the undue emphasis placed on the hormone as an entity without recognizing that the tissue or tissues upon which it acts

[1] *Proc. Cottswold Naturalist's Field Club*, vol. 33, pt. 3, p. 223, 1929, December, 1930.