Book Reviews

Human behavior and the principle of least effort: An introduction to human ecology. George Kingsley Zipf. Cambridge, Mass.: Addison-Wesley, 1949. Pp. xi + 573. (Illustrated.) $6.50.

This is one of the most ambitious books ever written. Its expressed purpose is "to establish the Principle of Least Effort as the primary principle that governs our entire individual and collective behavior of all sorts"; there is an allusion to Hamilton's Principle of Least Action in mechanics. Even more ambitious would be the reviewer who would presume to offer a final appraisal now of the full degree of the book's success. Unquestionably a large part of it will withstand the test of time and will grow in influence, whether or not Least Effort becomes generally accepted as a fundamental coordinating principle of human behavior.

In an age of academic superspecialization, work like this is altogether different and refreshing. It cuts across departmental and divisional boundaries as nothing else has for a century. Language, vocabularies, the ego, sex, schizophrenia, theory of art, human geography, the structure and relations of cities, the incomes and social status of individuals, prestige symbols, and cultural vogues—these are some of the subjects treated with a continuous attempt at closely knit reasoning, modeled in large measure on the reasoning of physical science and at a great many points tested against a wealth of systematic quantitative observations. The extensive recapitulation and bibliography of these alone would make the book a very valuable contribution to empiric social science.

Zipf, unlike most contributors to social studies, is fully aware of the usefulness of empirical mathematical regularities as a stage between observation and theory. Many of the interesting ones cited are his own work or his students'; evidently he possesses the enthusiasm which stimulates volunteers to undertake a long and tiresome count for the sake of establishing some empirical formula which of necessity at that stage completely lacks "meaning."

Social statisticians have expended a huge and commendable amount of labor and funds in gathering data, while relatively few investigators have tried to condense these shelves of statistics into roughly approximate empirical rules. Tables or graphs which compare computed with observed quantities are all too rare in the social field. A principal reason seems to be that social scientists are not trained in such work, nor are they readily able to make use of its results. This is because they are accustomed to looking for "meanings" intelligible in ordinary human terms and related to general ideas previously advanced.

As one example of detailed data presented (pp. 23–24), the novel *Ulysses,* according to the studies of Hanley and Joos, has 260,430 running words and 29,899 different words. When the latter are listed in the decreasing order of the frequency of their occurrence in the novel, the product of the rank of a word by its frequency roughly approximates 29,000 in every case, throughout the series of 29,899 different words. Of course those at the tail end of the list are used only once apiece, so that the last product is exactly 29,899. To the conventional student of language this empirical rule, rank times frequency equals a constant, is "meaningless" and uninteresting.

To an investigator with George Kingsley Zipf's insight and originality this regularity, which he finds repeated again and again in other widely varying data, is surprising and exciting and offers a key to major principles of human activity. He applies it with aid of the concept of "tools-which-must-match-their-jobs."

Wisely, or not, the author here and there indulges in satire: some of his remarks about the "Pied Piper morality" (pp. 478 f.) are an instance. Galileo was a satirist too; and, while that got him into deeper troubles, perhaps logic needs satire to enliven it when new thoughts are being advanced in the public market.

There are readers who will regret the slow pace of some of the pages, while others will be grateful for the consequent easy steps in the reasoning. It would not be difficult for a commission of experts to comb through this book and suggest minor improvements. It was E. U. Condon, not "E. V. Condon," (p. 546) who made an early suggestion of the rank-times-frequency rule for a vocabulary. Again, (p. 386) Ravenstein's study of migration (1885) is quoted as the pioneer notion of the existence of the formula, population divided by distance. However, Ravenstein did not suspect, as a much earlier writer did, that this formula had general application to the relations of people with people. Henry C. Carey, of Philadelphia, in 1859 gave what he called the "molecular gravitation" of people for people, and the activities resulting from their association, leading roles in his three-volume *Principles of social science.* Although his treatment was wholly verbal, it parallels this and other physical formulas mentioned by Zipf.

No reviewer can be a competent substitute for a commission of experts in "economics, sociology, cultural anthropology, psychology—both general and Freudian—linguistics, and semantics," which are relevant fields listed by the author. But the present reviewer is sure he can detect in this book the definitive beginning of a new, less confined, and more humanly productive era in research.

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