Book Reviews

Human genetics. Vols. I and II. Reginald Ruggles Gates. New York: Macmillan, 1946. Vol. I: Pp. xvi + 742; Vol. II: Pp. vi + 743–1518. (Illustrated.) $15.00 per set.

Prior to the publication of these two volumes there existed no truly comprehensive reference work dealing with the subject of human inheritance. Except for the genetics of the human eye, skin, blood groups, twinning, and a few other topics, where more extensive summaries are available, *Human genetics* provides the most complete compilation now available on many aspects of human heredity.

The first four chapters cover a general ground: "Introduction," "General Principles of Heredity in Man," "Human Cytology," and "Linkage." The remainder deal with abnormalities of the various organ systems, with normal or anthropological variations, and with special topics, such as allergy, cancer, constitution and disease susceptibility, mental defect, syndromes, metabolic errors, normal mental differences, etc.

In considering the merits of Dr. Gates's work, one must keep in mind some of the peculiarities of the study with which he is concerned.

There is, first, the enormity of the subject. Man is an extremely variable species, and this variability has been recorded in a medical and biological literature of gigantic proportions. An illustration may be of interest. In his chapter on abnormalities of the eye, the author summarizes the literature on approximately 100 hereditary anomalies. One of these (Marfan's syndrome) is associated with skeletal changes and is described in another chapter, where references are made to 25 papers. A recent review article on this syndrome cites 192 publications.

The literature is not only large but elusive, for human heredity has remained largely an incidental study, and titles of medical papers frequently give no clue to their genetic contents. The extensive bibliography therefore makes this a most useful work, and this feature has been well done. The lists of references apportioned to the 31 chapters cover 243 pages and provide complete title and page citations. There is also a very full index of 90 pages.

Since most medical texts contain rather meager references to heredity, the chapters on pathological inheritance will doubtless prove of greater value than the others. Here the medical specialist may find convenient summaries on the genetics of such everyday problems as hypertension, dental caries, breech presentation, or susceptibility to poliomyelitis, or equally, of such oddities as the Marcus-Gunn phenomenon, auricular appendages, or Pelger's leucocyte anomaly.

For the most part, the text consists of an unbroken series of abstracts of papers and citations of pedigrees. Wherever possible, the author calls attention to problems of genetic physiology, and he incorporates a valuable feature in the frequent reviews of certain hereditary abnormalities in animals which resemble those of man. However, the inadequacies of the data bearing on many problems in human genetics have tempted the author to speculate quite freely on modes of inheritance, linkage relationships, rates of selection, mutation, etc. The following excerpts occur in the chapter on albinism.

"Complete albinism appears to be found in all races, perhaps represented by the same gene. But the frequency of this gene varies greatly, from perhaps 7 per 1000 in the San Blas Indians of Darien to 5 per 1000 in the Hopi Indians, 1 per 10,000 in Norway, 1 in 29,000 in Italy and 1 in 100,000 in France and Russia. This may depend on differences in the mutation frequency, but as to the causes of such differences there is no evidence at the present time. That they exist must, however, have some evolutionary significance. It supports the general view (Gates, 1936) that differences in mutation rates arise within a species or group of related species. . . . There may be a greater frequency of albinism in very fair families but albinos also arise from parents with dark brown or black hair. Possibly blond hair is genetically linked with the gene for albinism. . . . From these and other records it is clear that albinos of the colored races generally have more iris pigment than albinos of the white race. They are probably recessive in inheritance, but in the light of Zimmermann's records some of them might be dominant. They are by no means a uniform group but probably a series of alleles, some of them illustrating how the white race arose from colored ancestors."

In the figures cited, the incidence of albinism is incorrectly described as the frequency of the recessive gene, while the remainder of the passage reveals a mixture of uncritical review and surmise, which characterizes many sections of the text. By repeatedly offering genetic linkage as an explanation for genetic correlations of all kinds, the author perpetuates a widespread misconception that these two terms are synonymous. His chapter on linkage contains no clear explanation of autosomal linkage or examples of its statistical detection, but there is appended a list of 48 "probable or possible" autosomal linkages, which in most cases are based on statements similar to the above.

There is, indeed, a conspicuous dearth of quantitative reasoning and statistical method throughout, a lack which seems particularly unfortunate in any treatise on human heredity. For such a work is likely to be consulted by many who are unfamiliar with the usual requirements of statistical analysis in genetics, let alone the more complicated procedures which are made necessary by the peculiarities of human data.

Human genetics is, thus, a descriptive account of a science which is still largely in the descriptive phase of its development. The chief value of these two volumes lies in their comprehensive treatment of a vast and little-summarized literature. They encourage the student to think about problems in cytology, physiology, and population genetics, but in the last-mentioned field, they provide him with no better guide than that of conjecture.

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