tition of symbols and their names, explanations of tables both in the text and at the tables themselves, in addition to isolation and review of concepts and formulas, are other important procedures used by the author to insure understanding and retention.

The 12 chapters of the book include the usual topics in descriptive and inferential statistics at the elementary level: frequency distributions, central tendency, variability, percentiles, regression, correlation, hypothesis testing, and t tests. In addition, one-way and two-way analyses of variance are covered in two chapters; nonparametric techniques in a long, 41-page chapter; and further topics in probability in the final chapter. Almost twice as many pages are devoted to the last six chapters, which deal with statistical inference, as to the first six chapters on descriptive statistics. Chapters 7 and 8 on hypothesis testing are particularly well written.

Exercises are placed at the end of a section—another useful pedagogical device—rather than waiting until the end of the chapter. However, the student must turn to an appendix to confirm his answers. Also at the back of the book are the customary statistical tables, a glossary of symbols, and an index. The book is attractively packaged in a blue and white cover. In sum, this newcomer should be a respected competitor on the elementary statistics book market, and one that this reviewer is happy to recommend.

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Daniel N. Robinson (Ed.) *Heredity and Achievement.* New York: Oxford University Press, 1970. Pp. X + 441. $4.95 (paperback).

This is a collection of readings intended for an introductory course in behavioral genetics, with emphasis on the especially important issues of intelligence, and of racial differences in intelligence. Since it provides an informative introduction covering concepts in genetics, a course built around this book would not require any previous exposure on the part of students to genetics. The two readings by geneticists Hirsch and Dobzhansky, placed late in the book, are also rich in didactic material, and might well be read first along with the introduction. It would be wise for the psychologist instructor, however, to know a bit more population genetics than the book provides, and for the geneticist instructor to know much more about the race-intelligence controversy, statistics, and psychological measurement.

The initial selections are studies which illustrate the genetics of maze-learning ability, spontaneous activity, avoidance conditioning, and memory in rats or mice. For establishing the basic point of there being a genetic basis for behavior, these papers are

invaluable, if sometimes tiresome with minute experimental detail. These are followed by Gordon Allport, discussing traits, and David Rosenthal on familial concordance by sex for schizophrenia—a long paper so packed with close argument that it will be difficult for most students to follow. This section closes with a paper addressed to its theme, the inheritance of personality, by Gottesman. This is a clean, straightforward piece, although its indexes of heritability may now be somewhat dated. Jensen (1967) has presented a revised formula for heritability and has pointed out that unless corrections for attenuation are used, estimates of heritability are too low. According to Jensen, there also appear to be some peculiarities associated with heritability estimates of personality variables.

In a later section, Beach's call for cross-species comparative research, like an earlier one by Verplanck, focuses attention on profound differences in animal behavior that must be rooted in genetics, and Scott's discussion of critical periods, such as in imprinting, presents many examples of acute genotype-environment interaction of a highly special sort. (Oddly enough, the editor fails to point this out, although he makes frequent mention of such interactions in other contexts.) Unfortunately, the critical periods model needs to be scrutinized carefully before its limited applicability to common differences in intellectual performance is apparent, and neither the article itself—which ends on a seductive note about the possibility of "learning 'not to learn' "—nor the editor provides this.

A major part of the book deals with race and intelligence, both directly and indirectly. The editor distinguishes two camps (p. 3), going back almost thirty years to Boring's terms, the "nativistic" and the "empiricistic." "Environmentalistic" might have been a more neutral term to present to students, who will be unaware of the context of Boring's use of these terms in 1942, and who probably have been socialized to regard "empiricists" as the "good guys." The introduction ridicules lay questions such as, "What fraction of intelligence is determined genetically?" with the help of portentous but cryptic references to gene-environment interaction and gene action (p. 4), instead of training the student to think in terms of heritability of IQ by particular populations in stated environments. Genotype-environment interaction really boils down to a statistical question in calculating heritability, and since available evidence (Jinks and Fulker, 1970; Jensen, 1970a) indicates that this component of the variance in IQ is negligible, it is not the bugaboo that the frequent allusions to it would have us believe. Most likely, these allusions are predicated on interactions that are dramatically apparent but which occur only far outside of the usual range of interest of the environmental variables concerned, for example, when they are lethal to the organism. It is also discouraging to students

to be told, as the editor does, that the nature-nurture problem is a "pseudoquestion," without leading them to think in terms of heritability and components of phenotypic variance. If it were a pseudoquestion, this book would hardly be necessary.

"It would be highly unlikely that very significant differences would exist among races in regard to those characteristics which are vital to survival—for example, 'intelligence,'" the editor states (p. 13), and he quotes geneticsts Fuller and Thompson in support, who said, ". . . it is likely that natural selection tends to oppose the establishment of major heritable behavior differences between races." But who decides what size difference is "very significant" or "major?" One standard deviation in IQ may be trivial on the scale of nature, although of considerable consequence on the scale of human affairs. In these same passages (p. 13), the editor advances some extremely dubious assertions in an attempt to account for phenotypic racial differences—almost as though they were nongenetic—brought about by selection pressure, and ends by suggesting that "the translocation of these racial genotypes to cultures calling for very different forms of intellectual expression could place the racial minority at something of a disadvantage. However . . . the relocated race would contain genotypes whose norm of reaction surely *allowed* adaptation to the new requirements, even if it *preferred* some slightly different form of expression." This appears to be simply yet another a priori attempt to define any genetic differences that might be established as unimportant, instead of talking about their actual possible magnitude. The use made of "norm of reaction" in this connection strikes me as wishful, as does the vague reference to the adaptable genotypes, without consideration of their relative frequency.

It seems to be the prevailing impression that any geneticist is automatically better qualified—as though some kind of Guardian of DNA—than any social scientist to discuss these issues, although some cultural anthropologists claim that *they* are the ultimate authorities (Diamond, 1962). Accordingly, the editor attempts to trump Jensen by playing the geneticist Hirsch, who has "provided a one-paragraph qualification of the facts and views" of Jensen (p. 222). In this paragraph, Hirsch instructs Jensen, with the help of numerous exclamation points and sarcastic asides, not only about genetics, but also about defining race, heritability, and intelligence, and about the education of the disadvantaged as well. Those personally acquainted with Jensen's careful and thoughtful consideration of all of these issues will recognize the injustice being done here, not just to the scientist, but to science itself.

Robinson follows this with a serious misstatement of fact (p. 223). He says that 25 per cent of the black population exceeds the mean IQ of the white population, whereas the correct value has been given by Shuey (1966, pp. 501–502) as 11 per cent. He trifles

with the problem posed by some northern blacks scoring higher in IQ than some southern whites by ignoring the possibility of selective migration and archly asking whether "genotype changes with latitude?" Treating a supposed association between school expenditures and child's IQ in the same manner, and ignoring the association between SES and IQ as a potential source of spuriousness, as well as the failure of the Coleman Report to find important relations between school variables and pupil achievement, he asks, "Does genotype vary with educational expenditures?" The answer to both questions, of course, is quite possibly, yes. In my opinion, the purpose of an introductory text should be to discuss such issues, not to pose polemical questions left unanswered. A bit further on (p. 223), Robinson reports that monozygotic twins, "reared in very different environments, will reveal *average* IQ differences of fourteen points." However, he omits to state that the very same test showed an average difference of nine points for monozygotic twins reared *together* (Gottesman, 1968), and so only about five points of the fourteen could be attributed to the difference in environments between families. Since a comprehensive review of all studies of IQ differences between identical twins reared apart shows that the grand average difference is only 6.6 points (Jensen, 1970a), the large difference of nine points reported by Gottesman even for identical twins reared *together* suggests, as we might expect, that the IQ test in question (Raven's Mill Hill Vocabulary Scale) was less reliable than the Stanford-Binet or Wechsler-Bellevue, which have been used in other such studies. When Jensen (1970a) pooled the IQ's from the Mill Hill with those from another short IQ test given at the same time, thereby enhancing the reliability of the final IQ, the average difference for these twins reared apart became 6.72, which is quite comparable to values observed in the other major studies of such twins, using longer tests (Jensen, 1970a). In evaluating the average difference in IQ between monozygotic twins reared apart, furthermore, it is always necessary to take into account the component due to measurement error, as reflected in average differences between two testings of the *same individual* with alternate forms; these differences average 4.68 for the Stanford-Binet (Jensen, 1970a). One should also give attention to evidence, reviewed by Jensen (1969a, 1970a), that IQ differences between monozygotic twins seem to be associated with prenatal and other biological influences, rather than with the *social* environment. When all of these considerations are taken into account, Robinson's use of the fourteen point difference is seen to be exceedingly misleading. Yet, this is exactly the kind of "fact" that will stick in students' minds.

Unfortunately, Jensen is not represented in this book. There are, however, excellent readings by Burt, and by Erlenmeyer-Kimling

and Jarvik, on heritability of IQ, which in combination with geneticist Hirsch's statement in his article that separate breeding populations are "almost certain to differ" in relative frequencies of different alleles in their gene pools, could set thoughtful students thinking despite the editor's distractions. The 1960 review of psychological studies of race differences, by Dreger and Miller, is also included. Like their later work, it bends over backwards not to draw any conclusions, and suffers consequently from a nomological shallowness. A selection by Wesman on the definition of intelligence defines it as "the summation of the learning experiences of the individual," thereby receiving the editor's endorsement. Nothing is said about intelligence as the *capacity* to learn or, in Jensen's work (1969a), as abstract reasoning ability. Wesman's definition seems to suggest that we can teach individuals all to be very intelligent, although IQ test performance has proven remarkably resistant to coaching, and the school performance of low IQ children has been equally hard to boost on a permanent basis.

Many readers will be irritated by the number of times that intelligence is placed in quotation marks, or referred to as *"it,"* in various places. This adds nothing but mystification. Most will also find Hirsch's attack on the mean, and concern with other parameters such as skewness and variance, to be equally excessive, even for the purpose of discrediting "typological" thinking. The mean, after all, is the statistic that best summarizes all of the observations in the distributions in question, and one-way ANOVA is known to be quite robust for slight differences in variance.

A teacher of behavioral genetics will be able to use this book if he supplements it with other readings so as to balance the picture and remain current. I say this with ambivalence, because it would mean giving wider circulation to Hirsch's article, in which he put words in the mouth of the psychologist Garrett that are sufficiently removed from what Garrett actually said to constitute an act that is at least mildly vicious. Suggested supplementary reading would include "must" papers by Jensen (1967, 1969a, 1969b, 1969c, 1970a, 1970b, 1971), and papers by De Lemos (1969) and Garron (1970), the latter two dealing for a change with nonverbal and quantitative abilities. Students should also be exposed to the work of Lesser, Fifer and Clark (1965), which shows cognitive profiles unique to different ethnic groups, but constant across SES. Palmer (1970) and Lane, and Albee and Doll (1970) have shown some environmental differences that do not make a difference in IQ, including having a schizophrenic parent. Some policy considerations are treated well in Jensen (1970c, 1970d), and Bereiter (1970), and moral issues are sensibly discussed in Bressler (1968), Brues (1964), Ingle (1970), and Scriven (1970). Important topics related to the validity of ability tests for disadvantaged groups are

covered in Stanley (1971) and Sattler (1970). A collection of reading from a different perspective appears in Kuttner (1967), and if one wishes a really sweeping overview by an outstanding geneticist, there is Darlington's (1969) book. Finally, for those who would like to give students a whiff of diatribe, there is Alfert (1969a, 1969b), followed by Jensen's replies (1969d, 1969e).

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Joseph A. Steger (Ed.). *Readings in Statistics for the Behavioral Sciences.* New York: Holt, Rinehart and Winston, 1971. Pp. ix + 406. $5.95 (paperback).

This book of readings contains thirty-three articles divided into five chapters. The editor's stated purpose for the book is ". . . to supplement the basic courses in statistical methods and research design, or other undergraduate or first level graduate courses" (p. v). The designated audience is ". . . those who are not statisticians but who use statistics as tools in their field of study" (p. v).

Chapter one, entitled "Measurement and Statistics," is concerned with scales of measurement. A presentation by Stevens (1951) of his four scales of measurement is placed first, followed