Book reviews

Statistics in Small Doses. By W. M. Castle. (Pp. 216; £2-00) Edinburgh: Churchill Livingstone. 1972.

It was a good idea to write this book, and some parts of it, for example the introduction to chapter 10 and the discussion of degrees of freedom, is first class. Unfortunately, it is marred by bad proof-reading, the careless use of English, and some statistical mistakes.

If the book is to be used by someone working on his own it is particularly necessary that there shall be no misprints to confuse him (7.26, 8.7, 10.21, 11.19, 12.50 need correcting) and that the questions and remarks should be intelligible (what are we to make of 10.60, or of the statement in 11.47 that 'Clothes vary in precision'?). However, it is in the use of statistical terminology that he is most likely to be muddled; for example, a random sample is not unbiased and precise, it gives unbiased estimates of the mean to which a measure of precision can be attached. This is made clear in the summary of chapter 11 but not in 10.47, 11.32, and 11.57. The expressions in 14.47 and 14.51 give points, not intervals, they are the 95% confidence limits. The statement that p represents an amount of evidence, in 15.21, is very questionable indeed.

The statistical treatment is usually all right except for the chapter on correlation. Some misinformation is implied about the normal distribution – in chapter 7 the range seems to be treated as having no connection with the variance, and the ranges suggested in 7.33 and 7.40 are improbably large. It should be mentioned that data near an absolute zero, such as reaction times, will not as a rule follow a normal distribution. It should also be noted that the sort of confidence intervals described in chapter 14 can be used only in circumstances where one would use a two-tailed test. More emphasis should be given to the fact that, if a one-tailed chi-squared test is used, the data must be checked to see that they agree in direction with the predicted result. It would be desirable to say more about the nature of an 'identical' control group (see 11.52).

The worst difficulties occur in chapter 8. Why should the word 'association' mean more to the naive reader than 'correlation'? What is the point of talking about quadrants when there is no information about how to draw the axes? It is very difficult to compare two scatter diagrams by eye if either the variances are different or the number of points is not approximately the same. Will the reader understand this, especially after doing

8.19? This chapter undoubtedly needs rewriting.

As it stands, this book would be useful as a course book for medical students if the course were taught by a competent statistician. It would be worth improving it so that it could be used as a programmed text by individuals wishing to learn on their own.

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Radiation Protection Instrumentation and Its Application. ICRU Report 20. (Pp. $V + 60$; \$3.50.) ICRU Publications, P.O. Box 30165, Washington, D.C. 20014, U.S.A. 1971.

In a series of publications, the International Commission on Radiological Protection (ICRP) has issued recommendations concerning radiological safety for the guidance of all types of users of ionizing radiations and radioactive materials. In the past, in the field of radiological protection, the International Commission on Radiation Units and Measurements (ICRU) has concerned itself primarily with the theoretical aspects of dosage units for protection purposes rather than with the practical problems of measurements in this field. The present ICRU report, however, has been prepared to give practical guidance on appropriate instrumentation for radiological protection measurements and on the correct interpretation of the results of such measurements.

The Report comprises four main sections concerned respectively with basic protection dosimetry concepts, instrument characteristics, choice and use of instruments, and instrument calibrations. There are also two appendices dealing with available information on thermal neutron instruments and dose-equivalent instruments, and seven pages listing over 200 references. The first section summarizes the definitions of the relevant Quantities and Units already defined in detail in ICRU Report 11 (1968) and also introduces two new quantities, 'Absorbed Dose Index' and 'Dose Equivalent Index', which will be discussed in more detail in ICRU Report 19 which is in the press. It then proceeds to deal briefly, for X or Gamma Radiation, Neutrons, and Charged Particle Radiations, with the principles of protection measurements, the interpretation of instrument readings, and their desirable accuracy.

In the second section of the Report, the main characteristics of ionization chamber instruments, gas pro-