STATISTICS of course descends historically from State arithmetic, and there is a good deal of truth in the assertion that in the type of society in which it first developed liberty and individuality were not the most prominent features. It has been used—and indeed still is—to enable rulers to discover how far they can with safety go in picking the pockets of their subjects or in conscripting them for war. It lends itself to misuse in the fields of propaganda and advertising. When we read that “nine out of ten film stars use X toilet soap” it is possible that this statement may be quite true but, if so, it is probably equally true that the ten in question were carefully selected to justify the slogan. In modern politics both sides will try to bolster up their cases by the use of carefully selected data in the hope that the electorate will be bludgeoned into accepting their arguments by the confident statement that “figures cannot lie”, forgetting the equally true axiom that “you cannot prevent liars from figuring”. The cynic will sum up their efforts in the old tag “there are lies, damned lies and statistics”.

But, of course, it does not end there. When a private practitioner deals with his private practice he will usually know his patients individually—certainly in country districts this will be so—but the public health medical official is not in this category. He deals primarily not with individual cases at all, but with categories of persons. He will be concerned with the methods of identifying tuberculosis cases as early as possible, the proportion of the population which has been immunised against diphtheria, particularly among the children, the comparison of various methods of immunisation and of their effects, the adequacy of the provision of hospital or nursing services and other problems which relate to “man in the mass”. Certainly he should not become “dehumanised”, but if he is to be effective at his job he must get into the way of looking at his problems as those of large groups of persons rather than as those of individual distinct cases, each of which differs in some way from all the others. The human mind is finite and it is only by precluding from factors which do not influence a problem that we can deal with it at all. Consequently, whether he likes it or not the medical man in public health has to become “statistics-minded” in his approach to his work.

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Anybody who has to deal with problems of groups of individuals must endeavour to quantify them, if only by counting the numbers of individuals with specific characteristics. If once he takes this step he is in the field of statistics and there is no going back. If he is to avoid egregious errors he must make himself familiar at least with the rudiments of what, despite all the hard things that have been said about it, is a science, one which has of recent years developed rapidly and has found applications in many fields of which medicine is only one.

Statistical methods are necessary for dealing with large numbers of individuals and bringing some order into the problems of social life. They have, in addition, another special field of application which is of great importance to medical science. I refer to the use of the concepts of probability in relation to experimental work. In many laboratory sciences the experimental conditions can be brought into very exact control. Where this is so they can be readily duplicated and the results verified very accurately. If this were true universally then the use of statistical methods for dealing with experimental results would be unnecessary. In fact, however, there are many fields of science in which the effects under investigation tend to be masked by fluctuations outside the experimenter's control. Large uncontrollable variations in the basic material are common in technological experiments and, in particular, in many types of work in the biological sciences. In clinical and in much laboratory medicine they are almost inevitable. For this reason I believe very firmly that all medical students should early in their course receive a training in the way of thinking which is needed to deal with the results of such types of experiments. This is true of those who will do clinical experimentation as well as of those who may be engaged in public health work, but it is also true of the average non-specialist who will, or should, read the ordinary professional journals. Nowadays he will scarcely find in such journals of any standing a single article which presents the results of planned experiments and which does not employ the concepts of statistics and probability at some stage, if only in the final summary which may say something like “the t-test shows that the improvement due to the proposed treatment is significant at the 1 per cent. level”.

You will probably say that here is the specialist riding his hobby horse, that the medical curriculum is already very much overloaded and that if a medical man wants advice on the interpretation of statistics, he can get it. That is all true, but in fact nowadays in many fields of medicine if one is to do work of any value statistical methods are probably of more value than even, say, something basic like Anatomy. You do not have to be statistical specialists—I am not suggesting that. You do not even have to be statistical technicians, but what you must have is a comprehension of the science of statistics, of the meaning of probabilistic arguments and of the way the tools of the science can and should be used.

Naturally, in treating a subject like this I have to make a selection of the topics which I shall mention. I am not going to deal at all with ordinary Vital Statistics—birth, death and fertility rates, standardisation, life tables, reproduction rates, and the like. I propose to speak of two topics, viz., (i) planned comparative experiments and (ii) surveys.