

REVIEWS

Population Studies.

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Population Studies, a quarterly journal of demography, edited by Prof. D. V. Glass, is issued by the Population Investigation Committee of the London School of Economics and Political Science. All actuaries will have welcomed the appearance of this journal, which is designed both to spread a wider knowledge of demographic matters among statisticians and social scientists and at the same time to afford a medium for the publication of original research in the field of population mathematics. No one can seriously doubt that in their pursuit of both these objectives Prof. Glass and his associates are performing a valuable task.

So far three volumes—comprising twelve quarterly numbers—have been issued, together with a supplement published under the auspices of U.N.E.S.C.O. and devoted to a symposium on the cultural assimilation of immigrants. The subjects discussed in these volumes cover a wide range of interests, and it is heartening to note the emphasis placed on the social and humanistic side of demographic studies. The fundamental *raison d'être* of demography lies in the translation of its results into the sphere of social policy. It is not enough for the demographer to calculate indices of reproductivity or fertility. He must also examine the effects produced upon the culture of a community by variations in reproductive pattern and age structure. In short the demographer, if he is to know his job properly, must be also a humanist.

One feels that these desiderata were in the minds of the editor and his advisers when they framed the policy for *Population Studies*. While due place has been given to such theoretical studies as Karmel's analysis of the inconsistencies between the male and female net reproduction rates, most of the articles published have an appeal directed well beyond the inner circle of specialists. They range from family allowances to the heredity of intelligence and from child welfare services to the economic concept of an optimum population. A particularly welcome feature is the international character of the contributions. Although we commonly tend to be preoccupied with the demographic situation in our own country, population problems can only be effectively studied on a world basis. In the three years since its first appearance, *Population Studies* has published articles on France, Belgium, Germany, Norway, Sweden, Canada, the United States, Brazil, British Guiana, New Zealand, Japan, China, Israel, Cyprus, Libya, East Africa, Southern Rhodesia and Sierra Leone. As a result, the British reader has ample opportunity of learning something of the types of problem which present themselves in environments very different from his own.

In a comprehensive review it is impossible to notice individually more than a few of the total number of contributions. The importance of the relation between intelligence and family size received an early recognition in *Population Studies* by the publication in Vol. 1, no. 2, of valuable articles by Blackburn and Burt. These two authorities represent different points of view on a question which is clearly of urgent social interest; and it is to be hoped that further research will be undertaken on a sufficiently large scale to resolve the conflict of opinion and

to justify greater confidence in the statistical evidence. Even if negative correlation between intelligence and family size be granted, the correct inference to be drawn is far from certain. Are the less intelligent people within each social group more prolific than their more gifted fellow citizens? Or, alternatively, does the existence of a large family force down the standard of living and deprive the children of opportunities for self-expression and the development of personality which are available in smaller families? To these questions no one as yet knows the answer. Yet an answer is essential before appropriate measures can be recommended to counteract any harmful results which differential fertility of this kind may have upon the mean level of national intelligence.

Another study in differential fertility, by Hopkin and Hajnal, is an analysis of births by father's occupation, which appears in Vol. 1, nos. 2 and 3. These authors obtain some interesting results, but wisely conclude that 'far more care than is usual needs to be exercised in measuring "differential fertility"'. Not least among their problems is mobility among occupational classes and the consequent difficulty of estimating a complete reproductive pattern for any homogeneous group.

Actuaries will naturally turn with most interest to articles on mortality. In an article in Vol. 1, no. 3, Buckatzsch examines the shortcomings of multiple regression analysis in estimating the influence of social conditions on mortality rates and suggests that some method of factor analysis might prove more fruitful. He does not develop this suggestion; but no actuary reading his comments on the application of the multiple regression method will be surprised that yet one more attempt to isolate the complex and closely interrelated factors governing mortality rates has broken down. In Vol. 1, no. 4, Peller contributes a comprehensive survey entitled *Mortality, Past and Future*, which summarizes for the benefit of the non-specialist reader many of the familiar features in the history of mortality improvement during recent centuries. Cancer mortality is discussed at some length, and Peller believes that it may be substantially reduced by improvements in the human environment. In the same volume, Derksen analyses the variance between mortality rates experienced in successive years into random and non-random elements. He considers that the non-random elements are appreciable; e.g. they must include the effect of any long-term trend that may exist. As an outcome of his arguments he concludes that the best estimate for q_x in an investigation which extends over several years is the unweighted mean of the values emerging in individual years rather than the customary over-all ratio of the total deaths to the total exposed to risk. However, he finds that in practice the difference between the two estimates is negligible.

A paper of some actuarial interest is Wolfbein's in Vol. III, no. 3, entitled *The Length of Working Life*. This contains a table which gives both death and retirement rates for the United States labour force. From these it is possible to calculate an 'expectation of working life' for use in workmen's compensation cases. As Wolfbein himself indicates, the next step is to construct similar tables for specific occupational groups. Before this can be done, however, there must be more research into the factor of mobility between one occupation and another—a requirement which has already been noted in connexion with the work of Hopkin and Hajnal on differential fertility.

Population forecasts have a perennial interest, and an article in Vol. III, no. 4, by Shryock on *Forecasts of Population in the United States* encounters all the customary stumbling-blocks. It reviews the work done by the U.S. Bureau of the Census in co-operation with the Scripps Foundation, and frankly admits that

forecasts made five years ago have fallen wide of the mark. The following passage is not without a certain unconscious irony:

During the course of the work it appeared desirable to compute an additional set of forecasts using a million more births for the first post-war quinquennium than were used with the new 'high fertility' assumption. Even so, by the time the report had been printed, this 'super-high' assumption was already well below the current level.

It is of peculiar interest to note that eight different forecasts, made at various times during the past thirty years, of the United States population in 1950 all fell short of the actual figure, the deficiency varying from 1.1 % for a forecast published at the beginning of 1949 to 6.5 % for one published in 1937.

Many of the articles relating to non-European countries are concerned with enumeration problems. For a country like China with a vast population and little administrative machinery, sampling methods inevitably come to the fore. In an illuminating contribution to Vol. III, no. 2, You Poh Seng discusses difficulties which would have to be overcome before a sample survey of the Chinese population could hope to be accepted by any responsible statistician. Among the more intractable obstacles is the inherent conviction in the Chinese mind that any government interviewer is necessarily prompted by 'evil' intentions. A comparable difficulty is remarked upon by Shaul and Mybergh in an article in Vol. III, no. 3 describing provisional results of a sample survey in Southern Rhodesia. These authors observe that according to African etiquette a person questioned must give the reply which he believes will cause most pleasure to his interrogator. A not dissimilar tendency has, in fact, been noted by investigators conducting public opinion surveys in this country and they have devised trick questions to overcome it. As a result it is essential that field workers engaged on sampling surveys should be carefully trained for the job. For sampling the 1.6 million Africans in Southern Rhodesia this was not a prohibitive requirement. But China's 450 millions present a more formidable problem, and much water must flow down the Yangtse valley before reliable census data for China can become available.

The special number entitled *Cultural Assimilation of Immigrants*, which was published under the auspices of U.N.E.S.C.O., contains a series of articles whose nature is sociological rather than demographic. The statistical material available for this kind of study is not extensive, and the authors of the various contributions have frequently to fall back on generalizations and informed opinions. Occasionally a lack of agreement is in evidence. Thus Savorgnan, in an article on matrimonial selection, regards intermarriage as a powerful factor aiding assimilation; whereas Isaac, writing of post-1945 Germany, thinks that intermarriage 'might merely increase mobility between the two groups without narrowing the rift between them'. Perhaps the most valuable outcome of all these studies is that they have reviewed the available sources of data and have indicated the lines along which future research might develop. There can be little doubt about the importance which this branch of demography would assume if ever attempts were made to grapple with the world's population problems by large-scale transfers from over-populated to under-populated areas.

The overriding impression created by the thirteen issues of *Population Studies* covered by this review is one of a vast field of research awaiting investigation. In almost every branch of demography there is a conspicuous lack of data from which valid inferences might be derived in accordance with the approved canons of

scientific method. An immense amount of work remains to be done before our knowledge of the world's population problems is adequate to the needs of policy and administration. But in charting the outlines of the territory which future investigators may hope to explore, *Population Studies* is undertaking pioneer work of signal importance.

R. D. C.

Sickness in the Population of England and Wales in 1944-1947. By PERCY STOCKS, C.M.G., M.D., F.R.C.P.

[General Register Office—Studies on Medical and Population Subjects,
No. 2. Pp. iv + 51. H.M. Stationery Office, 1949. 1s.]

SOURCES of information about the causes and even of the amount of sickness among the population of England and Wales as a whole are meagre and insufficient. We know a great deal about causes of death because their registration is required by law and failure is punishable; we know how many people who have symptoms of certain recognizable infectious diseases consult their doctors, because social security demands that these contagions should also be notifiable; but no one is compelled to notify a headache or biliousness, or a cold, or even a gastric ulcer. To fill the gap—and the gap must be filled if the Health Service is to be planned and its efficacy tested—improvised attempts have had to be made. In this new field the General Register Office has been commendably adventurous and this Report describes the first fruits of its labours in the analysis of the data obtained from the monthly survey of sickness carried out by the Social Survey, and the data obtained from certifications of certain scheduled diseases for the purpose of entitlement to special food allowances, and also in the integration of the analysis with notifications of infectious disease.

Before sickness can be measured it must be defined, and Dr Stocks with characteristic thoroughness proceeds first to define his terms and to suggest a standard terminology; in itself this is a valuable contribution to a subject where language 'is neither precise nor uniform'. When, for example, is a person ill? When he is conscious of disability or symptoms? Is he ill during the period of incubation of an infectious disease or while an unsuspected cancer is developing without any outward signs? Dr Stocks suggests that the population can be divided into the following groups.

- (i) Healthy, i.e., free from defect.
- (ii) Healthy, apart from a congenital defect producing no appreciable disability.
- (iii) Carrying scars or deformities left by past illness or injury which no longer cause appreciable disability.
- (iv) Affected by latent or early disease not yet causing the subject to suffer either symptoms of illness or the appreciable restriction of activities which would be imposed by its discovery.
- (v) Ill (sick) (i.e., one who is suffering from or aware of the existence of a condition classified in the International Statistical Classification of Diseases, Injuries and Causes of Death, 1948).

Dr Stocks goes on to differentiate between new, recurrent and continued illnesses, minor ailments and injuries. Some of his terms for statistical measures will take some getting used to. He calls 'the number of illnesses present in a specified or average day per stated number of population' the 'point prevalence rate'. 'Proportion sick' cannot be used here because one person may have

more than one illness, but where *persons* only are concerned 'proportion sick' seems preferable to 'point sickness rate' which Stocks suggests. 'The number of persons who became ill during the period, per stated number of the population' is called (after Pliny) the aegrescence rate. This will sound strange to actuaries for some time to come but the difficulty is to find a term which will not be confused with 'inception rate'—which is to be used of illnesses as distinct from persons. Perhaps 'accession rate' might be suggested by way of referring to the number of those who joined the ranks of the sick; but many plausible suggestions could be made and someone of the stature of Dr Stocks has to make a choice; *aeger* (a note certifying that a student is ill) may be more familiar in medical and scholastic than in actuarial circles.

Dr Stocks provides a most valuable review of the incidence of infectious disease in the two sexes and at different ages. One small point of criticism may be found. He argues that since 46.4% of boys were notified for measles before age 15 in 1944-47, whereas 72.5% of boys entering English boarding schools in 1930-34 were said to have had measles, the discrepancy indicates under-notification of measles. 1930-34 is a long while ago, however, and the incidence of measles may have fallen; furthermore, the memories of public school boys' parents are not necessarily to be relied upon for estimates of incidence. Dr Stocks compares the notification rate at ages over 15 (2 per 100,000) with the inception rate of 4 per 100,000 in adults as shown by the Sickness Survey; but since the latter rate is based on only three new illnesses in the numerator the sampling error must be relatively large and it hardly seems justifiable to calculate a rate at all.

Interesting features emerge from the notification statistics. Scarlet fever shows a male excess in infancy changing to a female excess at school ages which disappears at ages 15 to 25 but reappears at ages over 25. Measles shows a slight female excess in the first year of life, no appreciable sex difference between ages 1 and 10 years and a female excess thereafter. Whooping cough shows an increasing rate of female to male notification rates as age advances. For poliomyelitis there is a male excess. These differences have yet to be explained.

Dr Stocks concludes from all his comparisons that notification is complete only for poliomyelitis, cerebro-spinal fever, diphtheria and scarlet fever. Probably nine-tenths of respiratory tuberculosis is notified. The position for other diseases is less satisfactory and for dysentery, in particular, notification is assumed to be only fractional.

The Social Survey each month asks a sample of 3000 persons to diagnose their own illnesses in the previous month and to recall duration and severity. Error is minimized by skilled questioning and careful construction of the sample, but some element of approximation remains of which Dr Stocks gives a frank account. In the matter of diagnosis Dr Stocks takes refuge behind the agreement between Sickness Survey rates and those deduced independently from food allowance statistics for diabetes, tuberculosis and thyrotoxicosis. Surely it is just for such conditions that error would not occur because self-diagnosis would not be attempted. No one would say that he is suffering from thyrotoxicosis without having borrowed the word from his medical practitioner (and consultation is much more certain where food allowances are concerned). However, the errors may be more or less constant from month to month, and the figures do provide *faute de mieux* a national index of incapacity of relative if not of absolute significance.

About one in eight persons developed a cold during an average month; the average was 1.4 colds per person in a whole year. Only 3 in every 1000 admitted

to developing a boil, a surprisingly low rate. The inception rate per 100,000 for diabetes was 10, for gastric or duodenal ulcer 121.

Days of incapacity per head in the year from October 1946 to September 1947, averaged 12.9 for men and 11.7 for women. Men up to age 45 experienced about 10 days per head, increasing to 17 at ages 55 to 65 and 18 at ages over 75. The figures for incapacity at ages under 65 are not really comparable between the sexes, because females include a large proportion who do not go out to work, for whom incapacity here means confinement to the house by the illness, and their incapacity rates are naturally lighter because of being less completely recorded. For most men under age 65, however, it means inability to work. After age 65 the rates are comparable. Women recorded only 8 or 9 days at ages 25 to 45, but the average then increased very rapidly with age and exceeded that for men after age 65.

The number of medical consultations in the year averaged about 4 per head for each sex up to age 45, and increased to 6 per head at ages 55 to 65, and to over 7 at advanced ages; at all adult ages the average was about 5 visits annually for each sex.

These are examples from the Sickness Survey figures and with all necessary reservations it must be agreed that

this first set of estimates of prevalence of a long list of diseases may, subject to proper regard for sampling errors and special circumstances such as absence of psychotics and of people with such conditions as cancer in special hospitals and institutions, provide a much needed guide to disease frequency.

Statistics of food priorities covered active tuberculosis, gastric and duodenal ulcers, dyspepsia due to other causes, diabetes mellitus, and thyrotoxicosis. Assuming that the stringency of rationing was such as to cause every sufferer to seek his priority allowances, these statistics should provide measures of incidence. On this basis, the number of diabetics in England and Wales between 1945 and 1947 was fairly stable at about 230 per 100,000 of the population. The incidence of active tuberculosis suggested by food records in 1947 was about 280 per 100,000 (excluding patients in hospitals or sanatoria).

The report is a stimulating document. It goes some way towards filling lacunae in medical statistics. It provides a stock-taking of the present piecemeal efforts to gather measures of morbidity. The author makes the most of the available information and shortcomings are not due to lack of statistical effort but to inadequate resources; they are a challenge to the country which produced the finest organization for the analysis of causes of death, that it should match this achievement with adequate means for the recording of causes of illness, fatal and non-fatal. The present methods, those described by Dr Stocks, and others, such as the analysis of hospital medical records or of National Insurance certificates, all have elements of bias or selection; their common meeting ground is in the surgery of the family doctor. It is to the records of the general practitioner, perhaps, that we should look for a base upon which to integrate all other measures.

B. B.

Probability and the Weighing of Evidence. By I. J. GOOD, M.A., Ph.D.

[Pp. viii + 119. Charles Griffin and Co. Ltd., London, 1950. 16s.]

IN recent years dualisms in probability have been common, but there is now some reaction. This is good for progress because an unnecessary dualism cannot fail in due course to be inhibitory. This is not to deny the great progress that has

resulted from more than one of these dualisms and in particular from the imperialism of the frequency idea. Nevertheless, the essential element of the degree of belief and the limitations of the notion of objectivity cannot be denied even by a sophisticated appeal to logical positivism. The actuary has never been captured by any one of these doctrines. He has always realized that an objective 'life', while certainly being a unit in some national statistics, might at one and the same time be an industrial policyholder as well as an ordinary policyholder, a select life and an ultimate life, a member of a pension fund and of a friendly society, and otherwise have a great many different 'probabilities of dying'. Whether the life is successively allocated to or selected from various 'populations' or whether degrees of belief are fixed relevant to successive pieces of evidence has not seemed to be very important. The actuary has known that he must work in abstractions, fix his basic probabilities for his different problems and, on the basis of certain rules, work out other probabilities and functions of probabilities.

Dr Good's theory is a formal expression of the long-established practice of the actuary. It is, of course, much more than this. It is a synthesis of probability theories into which the current theories can be fitted as special cases. It is frankly based on degrees of belief and embraces Jeffreys's theory of degrees of *rational* belief for those who can accept that certain beliefs are rational.

Dr Good rejects dualism. The apparent dualism of probability is, he says (p. vi), due 'to the use of different kinds of propositions rather than to different kinds of probability'. This may be compared with Prof. M. G. Kendall's recent remark (*J.R.S.S.*, Series B, Vol. xi, p. 144) in the discussion on Prof. G. A. Barnard's paper on *Statistical Inference*. He said, with reference to Prof. Barnard's probability example of the Russell paradox of types (*loc. cit.* p. 135), that 'he did not think that this was a reason for believing in different kinds of probability; it was only a reason for believing that there were probabilities about different kinds of aggregate'. Dr Good (p. 41) discusses various ways of avoiding the logical difficulties that might arise from allowing propositions which refer to probabilities to be the subjects of other probabilities and admits that a 'theory of types' might be required. Actually he shows that the difficulty can be avoided for 'chances' (i.e. probabilities that are independent of further experiments) which it is usually possible to express in non-probability language. Otherwise, he excludes propositions referring to probabilities, or rather he throws them into his 'body of beliefs' (p. 20, para. (vi)).

It is this 'body of beliefs' that is the important distinguishing feature of Dr Good's theory. It is a kind of generalization of the classical specification of the 'equally-likely cases'. The abstract axiomatic theory, built up by Dr Good with such clarity and precision, recognizes that every application of probability theory involves an abstraction and an idealization. This is true of games of chance as well as of actuarial work. We always start with some assumed probabilities. They may be strongly based in logical or statistical fact or they may be mere guesses—estimates or 'guesstimates'. They do not need to live up to the word 'rational' in the sense of Jeffreys's degrees of rational belief, but if they lead to contradictions, they are then regarded by Dr Good as 'unreasonable' and they must, rationally, be replaced by others with happier conclusions.

Before developing his theory, Dr Good devotes the twelve pages of chapter 1 to a preliminary discussion of the probability idea, to the purpose of a theory and to a brilliant summary and classification of existing theories. This summary is alone worth the money! The second chapter of six pages contains a discussion of the axioms to be adopted and for this discussion the 'equally-likely' theory is

invoked. The whole theory is set out in chapter 3 with eighteen theorems, a number of corollaries, some examples and an alternative set of axioms, each set being implied by the other. This chapter contains twelve pages only! The basic symbol is $P_B(E|H)$ which is read as 'the probability of E given H (and assuming B)' and, as Dr Good says, it is 'otherwise undefined'. The symbol B represents a 'body of beliefs' which (p. 32) 'consists of a set of inequalities and equalities between probabilities'. It is through the specification of B that the application of the theory arises. The simplest example is the 'equally-likely' assumption in coin-tossing. The essential need to specify a B has long been recognized in examples of geometrical probability, but the implied specification whenever the words 'at random' or 'random variable' are used has tended to be glossed over by advocates of the frequency theory. Only if the assumed B is relevant to some practical problem are the deduced probabilities and other propositions relevant. This is common ground for actuaries. Only if the 1924-29 rates of mortality are relevant can the net premiums, annuity values and other 'expected' values be relevant.

Dr Good seems to require that the assumption of B must always be an 'honest' assumption, i.e. what 'you' really believe (p. 35), although he admits approximations and simplifications. This seems to be a quite unnecessary restriction and to contradict Rule (ix) on p. 32. Similarly, the reviewer would prefer the weaker form of the fourth axiom given on p. 49 as this further extends the scope of the theory. Otherwise, an element of dualism remains. What this means is that certainty and impossibility are confined to logical implications that are *known* to be such, e.g. the millionth figure of π may be a 7, but as this is assumed not to be *known* to be a logical implication of the definition of π , the probability can be taken as $\frac{1}{10}$, unless and until there is known evidence in favour of or against this particular digit. This distinguishes logical implications from known implications in much the same way as empirical facts are distinguished from known facts and seems to be required by Dr Good's refusal (p. 15) to discuss 'the insoluble problem of "determinism" versus "indeterminism"' and by his dictum that 'the very notion of probability depends on an assumption of partial ignorance'.

In the fourth chapter a set of 'rules' is given for interpreting the mathematical P -symbols of the abstract theory in terms of 'reasonable beliefs', and some 'suggestions' are made and discussed regarding the formation of suitable bodies of beliefs in practical applications. The use of the principles of insufficient or cogent reason is thus a matter of application rather than theory. Dr Good does no more than mention invariant rules.

The fifth chapter shows how the usual mathematical superstructure can be erected on the theory, and the stage is set for the discussion of the subject indicated in the second half of the title of the book—'the weighing of evidence'. If any actuary expects to obtain any help in connexion with various professional problems involving the weighing of evidence, such as judging investment prospects or life assurance underwriting, he will be gravely disappointed. Although Dr Good recognizes the importance of the 'profit and loss' test in the practical application of probability—he almost advocates betting so that 'probability judgments can be sharpened'—his contribution to this subject is theoretical and disappointing. His extensive use of Bayes's theorem is welcome. It is, of course, inevitable in view of the preliminary theory, and the ratio of likelihoods as the major instrument, apart from 'purpose' or 'utility', for judging between two hypotheses is a natural consequence. But the fact that likelihoods and posterior probabilities build up as products is used to develop a technique

based on the logarithms of the odds ($\text{odds} = p/(1-p)$) in much the same way as in Barnard's recent paper (*loc. cit.*). This predilection for addition rather than multiplication is a strange phenomenon. The idea that 'weights of evidence' can be added together may in fact be misleading to the practitioner who often has pieces of evidence which are correlated and whose weights should therefore not just be added together. A simple actuarial example is the effect on the probability of death of a family history of consumption combined with (a) low weight or (b) excessive weight. Dr Good is, of course, aware of this kind of limitation of his technique, but he dismisses it in one line (p. 67).

It is sometimes held that probability theory is like any other mathematical model used in science to represent a body of empirical facts. For example, after a general discussion on these lines, Cramér (p. 148 of *Mathematical Methods of Statistics*) says 'we now proceed to work out a theory designed to serve as a mathematical model of phenomena showing statistical regularity'. In his preface, Dr Good says that 'the analogy with other scientific theories should not be pressed too far, since probability is a part of reasoning and is therefore more fundamental than most theories'. It is precisely this important fact that explains why the frequency idea is so inadequate for so many who are not mathematical statisticians.

W. P.

MacGillivray on Insurance Law. By E. J. MACGILLIVRAY, LL.B., and DENIS BROWNE, M.A.

[3rd edition, pp. xcvi + 1541 + index, 1947.]

First Supplement. By E. J. MACGILLIVRAY, LL.B.

[Pp. v + 68, 1949.]

[Both published by Sweet and Maxwell Ltd., London. Complete £7. 17s. 6d. net.]

MacGillivray on Insurance Law is not merely a classic; on this subject it is *the* classic. Accordingly, the appearance of a third edition is an event of more than ordinary importance to the insurance world.

It seems inevitable in notices of this work that some comment should be made on its bulk, tempered at the same time with references to its comprehensiveness. It is undeniably bulky, in fact inconveniently so, but it would indeed be a pity if this fact, coupled with its general appearance of the typical practitioner's work of reference, were to deter the student of insurance law from dipping deeply into its pages. It may have been designed originally for use by practitioners, but it has reached a wider public in the many actuaries, insurance executives and officials to whom, by reason of his reputation, the original author stands in the capacity of guide, philosopher and friend. A considerable knowledge of insurance law is now commonly required of those called upon to fill the higher executive posts in the insurance business, and this book offers both the means of acquiring such knowledge and, since it is in future to be kept up to date by cumulative supplements, the opportunity to refresh it as occasion requires. As in the previous edition, Prof. Denis Browne has collaborated with the original author and the whole work has been completely revised in the light of the Assurance Companies Act, 1946, and other legislative changes which have occurred since the last edition was published in 1937.

In an authoritative work of this kind the authors have no doubt felt it necessary to make full use of the decisions of the superior American and Dominion Courts, but the layman may well wonder how he is affected by these decisions and to what extent he should allow himself to be influenced by the trend of opinion which they appear to indicate. Quite apart from these considerations, there is the practical difficulty that the actual reports of these cases will not usually be available for reference by the general reader, should they be required.

A notable feature of this book, and one for which readers, both professional and lay, will be grateful, is the authors' readiness to offer the fullest possible discussion of doubtful points of law followed by what must be accounted in text-book writers an unusual readiness to express their opinion on the way in which the difficulty might be resolved. When there are inconsistent authorities, such guidance as the authors offer is particularly to be appreciated, but it may be wondered whether there is not too much of this very good thing. An example is to be found in pp. 598-608, where the questions arising out of disclosures made to insurance agents but not passed on to their offices are discussed. The long-standing conflict between what may conveniently be termed the *Bawden* and the *Biggar* lines of cases is generally conceded to have ended with the decision in *Newsholme v. Road Transport and General Insurance Co. Ltd.* (1929) 2 K.B. 356, and the authors have no hesitation in stigmatizing *Bawden's* case as unreliable. Why then should they go on to say that it is explicable only on the grounds that the insured was illiterate and that in the circumstances the agent owed a special duty to the company to disclose the facts which he must have gathered by inspection? If the decision is explicable to any extent, can it in fact be said to be unreliable as an authority, and if, on the other hand, it has still some authority, what proposition does it support? In a book generally remarkable for courageous opinions a more forthright condemnation of such an appalling decision would not have been out of place.

A mere practitioner, even one pre-occupied with insurance law, ventures on a note of criticism of such a work as this with some trepidation—but even Homer nods! He notes, therefore, that on p. 282 the facts and the decision in *Tidswell v. Ankerstein* are still mis-stated. An executor *qua* executor has no insurable interest in the life of his testator, and if the reference to this decision were corrected to correspond with the facts the authors might find it unnecessary to disapprove of it, though admittedly the case has little, if any, importance today. On p. 286, where reference is made to funeral expenses in relation to insurable interest, the statement that 'this legal liability on the parent (to bear the funeral expenses of his child) creates a good insurable interest in the life of a child to the extent of reasonable funeral expenses' is supported by an American decision. If this is intended to be a statement of the law of England it would indeed have curious consequences in the industrial assurance world, since a policy on the life of a child in whom the assured has an insurable interest is excepted from the provisions of the Industrial Assurance and Friendly Societies Acts. In connexion with this matter it is noticed that in the Appendix in the main volume the authors include s. 14 of the Poor Law Act, 1930. The first supplement issued in 1949 should, therefore, have contained some reference to the repeal of the former Poor Law code and its replacement by the National Assistance Act, 1948, as a result of which consequential changes in the text should now be made on pp. 290 and 924.

The Industrial Assurance and Friendly Societies Act, 1948, has been added to the Appendix by means of the Supplement, which also contains the changes

in the main text necessitated by this and other recent statutes and orders. Some errors occur on pp. 20 and 21 of the Supplement where the authors appear to have overlooked the provisions of the 1948 Act for non-aggregation where a relevant policy was taken out by a person other than the claimant.

Certain changes in style and format have been made in this edition. Opinions on such matters may differ but, with the exception of the index facilities which appear to have been rather drastically cut, the changes seem to the reviewer to be all to the good.

P. J. DUFFY

The Law of Insurance. By SIDNEY PRESTON and RAOUL P. COLINVAUX, Barristers at Law.

[Pp. xxxiii + 425 + index. Sweet and Maxwell Ltd., London, 1949. 45s. net.]

THE eighth and last edition of Porter's *Law of Insurance* appeared in 1933 and those familiar with that well-known work will be gratified to know that the publishers have been able to arrange for its reincarnation under the present title. They explain in their foreword that the late Mr Sidney Preston, having undertaken the preparation of a new edition of *Porter* after retiring from service with one of the largest insurance offices, eventually produced an enormously detailed manuscript which must have involved a considerable expansion of *Porter* if, as they say, every proposition was supported by quotations from reported cases. Mr Preston died before he could prepare his work for the press and to Mr Colinvaux has fallen the task of completing his colleague's work by producing a book which, though in the style and tradition of *Porter*, can fairly be claimed to be a new work.

Mr Colinvaux says that the book has been designed to meet the needs of legal practitioners, students and those engaged in the insurance business. In the reviewer's opinion it is much more likely to accomplish the last two objects than the first, and to say this is not in any way to detract from the obvious merits of the work. Since the spacious days of *Porter*, as practitioners know only too well, insurance law has increasingly become a specialist subject or rather a series of such subjects each requiring more exhaustive treatment than the author could fairly be expected to give to it within the compass of such a work as this dealing with all branches of insurance law except marine. But if Mr Colinvaux had sought to meet only the requirements of the large number of students of insurance law in the various professional bodies from whom something more than an elementary knowledge of various branches of this subject is now required, he would indeed have done something worth while. He can rest assured that he has at least done that, for the book is attractively written and reasonable both in size and price. It can be confidently recommended also to those engaged in the business of insurance as a book in which a real effort has been made to explain a technical subject in simple terms.

The defect of the book, in the reviewer's opinion, is that it attempts too much in the space available. For example, in the section dealing with Life Assurance (there unfamiliarly called Life Insurance) it might well have been wiser to omit the references to Industrial Assurance on the grounds that it was governed by separate statutes which would require more detailed treatment than could there be given, rather than to encumber the text with continual references to the various statutes, which, as many readers of this *Journal* will recognize, are necessarily

inaccurate because they are incomplete. The author would thereby have avoided the wholly unnecessary discussion on p. 304 under the marginal note 'Funeral Expenses', in the course of which it is said on the authority of *R. v. Stewart* (1840) 12 Ad & E.R. 773 that 'since every householder in whose house a dead body lies is bound by common law to inter the body decently according to Christian rites, it would seem to follow that he has an insurable interest *pro tanto* in the lives of those living with him'. If this proposition, and its corollary as stated, were true some interesting, if hitherto unexplored, fields would be opened to industrial offices. It seems, however, to have been overlooked that *R. v. Stewart* was decided before the passing of the Poor Law Amendment Act, 1844. In *R. v. Vann* (1851) 2 Den. 325, which is not mentioned, Lord Campbell C.J. was not prepared to go beyond the statement that a father, *if he had the means* (the italics are not mine), was bound to provide for the burial of his deceased child. It is difficult to see how such an obligation could give rise to an insurable interest, but however that may be, the point has lost whatever importance it may once have had, for s. 50 of the National Assistance Act, 1948, casts upon local authorities the duty of disposing of the bodies of persons dying in their area for whom no other suitable arrangements are being or have been made and the expense so incurred can only be recovered from the persons who, under the Act, are liable to maintain the deceased.

Apart from what might be called its inherent defects the book is a workmanlike production. The usual Tables of Statutes and Cases (from which the American and Dominion decisions might without loss be omitted) are provided and there is an adequate index.

P. J. D.

Demographic Yearbook, 1948.

[Pp. 596. United Nations, Lake Success, New York, 1949. £2. 10s.]

SINCE the war of 1914-18 there have been compiled a number of different works of reference containing international population data, one of the best known of which was the *Statistical Yearbook* of the League of Nations. On the whole these were not fully comprehensive, nor were they concerned solely with demographic statistics; in recent years their appearances became rather intermittent.

The publication of two yearbooks by the United Nations is therefore very welcome. The *Statistical Yearbook* for 1948 may be regarded as the successor of the corresponding League of Nations volume and contains a similarly limited amount of population data. The new *Demographic Yearbook* represents, however, a great advance in presentation and scope over previous compilations. Extensive tabulations cover more countries than before and give more details over a wider range of subjects.

Special questionnaires were issued to national statistical offices all over the world and an interesting table is given showing the degree to which satisfactory replies were received on various important topics. The percentage of world population covered varies from 100, for number of inhabitants, to the region of 50, for age, sex, marital condition, occupation and mortality, and to as low as 20 or less, for more sophisticated information such as migration details and reproduction rates.

The number of subjects upon which some data are set out is so large that it is much easier to speak of omissions than inclusions. Because of competing claims for space by more pressing matters a few topics are not dealt with in this

first volume although the information has been collected. These include births by sex and legitimacy, deaths by cause, divorces and general morbidity. No doubt these gaps will be filled in due course.

As is well known, differences of social custom and in methods of collection and definition of data render international demographic comparisons very hazardous. It is therefore especially useful to have the illuminating introduction and commentaries as well as the footnotes, bibliography and maps. P. R. C.

Die Veränderliche Sterblichkeit (Variations in Mortality). By DR WOLFGANG SACHS.

[Schriftenreihe der Länderausschüsse der Versicherungswirtschaft in der Französischen Besatzungszone. I. Pp. 60. Baden-Baden: J. C. B. Mohr (Paul Siebeck), Tübingen, 1949.]

THE author's principal theme is the effect of catastrophes on mortality, and the resulting problems with which a life office may be confronted. He points out that we have virtually no knowledge of the average mortality of assured lives over a period which includes years of war and other catastrophes and that if premiums are calculated from mortality tables based on a period of normal years, abnormal risks must be allowed for by increasing the tabular premiums or by modifying the policy conditions. This latter alternative is far from satisfactory. In the case of war risks it is difficult to define a war death or to measure the extra mortality due to war, because modern warfare has many indirect effects on the mortality of civilians, e.g. by drawing women into the factories, by blackout accidents, by nutritional changes, or by causing a lack of adequate medical facilities. Furthermore, offices are by no means free to formulate their own policy in these matters, for public opinion and the attitude of the government have a powerful influence.

Dr Sachs illustrates these difficulties by describing the experience of life offices in Germany under National Socialism.

In the 1920's almost all German life policies provided full cover for those assured at the outbreak of a war, and the intention was to finance the strain by utilizing first any war risk reserves, then 'bonus reserves' formed from undistributed profits earmarked for policyholders, and finally, if necessary, a levy on all insured persons.

At the outbreak of war in 1939 a decree required offices to cover war risks up to RM. 100,000 for individual policyholders, new assurances up to this amount being subject to a single extra premium of 2% of the first RM. 3000 assured and 3% of the balance.

A few days later the life assurance control board, which had almost completely escaped penetration by the Nazis, received its first Nazi president and was transformed from an expert supervisory authority to a political command post. New uniform war-risk conditions were decreed which applied to new and old assurances. Every office had to cover war risks up to RM. 100,000, and single extra premiums were to be paid on new contracts as follows:

First	RM. 500 assured	Nil
Next	RM. 4,500 assured	1 %
Next	RM. 15,000 assured	1.5 %
Next	RM. 20,000 assured	2 %
Balance		3 %

Two defects in the new regulations were immediately apparent. First the rapid increase of the war-risk extra with sum assured caused people to take out a number of smaller policies with several companies. The reason for the imposition of extras on a scale increasing with size of sum assured was social, but its effect in practice was to dispense generosity with other people's money. The author thinks that as larger policies tend to be effected by older lives exposed on the average to a lower degree of war risk, the trend of the extras should have been in the opposite direction, and even a flat extra would have favoured the smaller sums assured. Secondly the allocation of bonus reserves to cover the strain of war deaths was virtually abandoned, and the curious situation arose of the offices declaring further bonuses and finding new and exceptional sources of revenue open to them.

Failure to provide for investment losses resulting from the war was a further significant defect of the new regulations. However, this was understandable because the fiction was maintained that only a German victory was conceivable, and her defeated enemies would pay for war damage. This idea was the basis of the regulations published at the outbreak of the war which provided that those called-up could maintain their assurances in force by the payment of a 'risk premium' which amounted in general to one-quarter of the tabular premium. There was no mention of the subsequent payment of the outstanding three-quarters, with the result that the public were encouraged in the belief that the soldiers themselves would not pay the arrears.

Up to the commencement of the war with Russia the extra premiums covered the relatively small war claims almost exactly and it was widely believed that on the whole the regulations were adequate. This impression had a dangerous effect and after the French campaign there was pressure from a National Socialist group in the life assurance control board to dispense with war extras. This was resisted, but the concession had to be made that if the war ended in the first policy-year part of the extra premium proportionate to the unexpired months must be returned to the policyholder. The group systematically encouraged the assurance of lives subject to the greatest war risk, e.g. in the 'Frontsoldatenversicherung', a group assurance for firms' employees who had been called up, written by a company belonging to the German Labour Front (the compulsory nazified Trade Union). Naturally canvassing was assisted by political pressure, and whilst no appreciable war claims were expected the promoters hoped for a substantial future surplus from withdrawals. Within a few months, however, this type of assurance was forbidden by an order from Hitler himself, but this was not taken too seriously in the circles of Dr Ley, the Leader of the German Labour Front, and there still remained a large volume of 'Frontsoldatenversicherung' business in force. Although not following this example the other offices were by no means unaffected by these unsound developments. Between the conclusion of the French campaign and the war with Russia many policies, mostly with abnormally high sums assured, were issued on the lives of members of the forces, and those responsible were not unaware of the fact that many of the assurances they were granting were prompted by speculation, since the war extra was ridiculously small in relation to the risk to which, for example, Luftwaffe pilots or U-Boat crews were subjected. However, offices were afraid to offer any resistance, because the S.S. had already intervened in one office which was avoiding proposals on the lives of conscripts.

Sums assured payable under war claims were also greater than the average because the social class which traditionally supplies the greater part of the

reserve officers, who suffer abnormally high casualties at the outset of a war, carry in general more life assurance than other classes, and because the practice in industrial assurance of quoting fixed premiums with varying sums assured tends to produce higher death benefits on young lives subject to a higher degree of war risk.

As a result of the war in the East, claims increased abruptly and two Societies found themselves in difficulties over war risks. These were the Labour Front Company referred to above, and the War Ministry Life Assurance Society which compelled every officer on the active list to assure his life. For a while it seemed as if war claims would be pooled to the detriment of the other offices, but the danger passed and the two undertakings in question received large subsidies from the Labour Front and the State.

From September 1942 the single extra premiums were to be roughly doubled and existing assurances surcharged with an annual additional premium of 0.3 %, or a corresponding reduction in benefits was to be imposed; but this plan did not last long. Offices were chary of fixed annual extras which might subsequently produce surpluses and so resuscitate the pooling idea, and any scheme which implied a prolongation of the war met with political resistance. Eventually, instead of an annual 0.3 % a single extra of 0.6 % was prescribed in July 1943 in respect of all existing assurances. At the same time it was decreed that all offices must transfer half of their gross surplus, before allowing for war deaths, to a war reserve. Although war claims were, in fact, met from the latter, the decree penalized offices which by sound methods had produced reasonable surpluses and favoured the two undertakings described above.

Dr Sachs does not describe the eventual outcome or the steps taken to meet the situation, but he criticizes, on the grounds of principle, the treatment of war risks in Germany.

The remaining sections of his essay deal with mortality variations and extra risks on more general lines, and he suggests methods of treatment which life offices might adopt.

Finally, the arguments developed are illustrated by a series of graphs and tables including some interesting data relating to the war deaths experience of the 'Victoria am Rhein' Insurance Company. The latter showed that, for the years 1943-45, an average of 1 % per annum of all policies in force resulted in war death claims.

J. R. D.

Principles of Medical Statistics. By A. BRADFORD HILL, D.Sc., Ph.D.

[Fifth edition. Pp. ix+282. The Lancet Ltd., 1950. 10s. 6d.]

THE fourth edition of this introduction to statistics (reviewed in *J.I.A.* Vol. LXXIV, p. 164) was published in 1948 and reprinted in 1949. That a fifth edition is so soon required is a proof of its excellence. The main addition lies in the inclusion of twenty-five arithmetical exercises.

The Population of Ireland 1750-1845. By K. H. CONNELL.

[Pp. xi and 293. Clarendon Press, Oxford, 1950. 18s.]

SOME understanding of the past is essential to the discussion of population problems so that they may be viewed in perspective. There was an immense

acceleration in the rate of growth of many countries during the late eighteenth and early nineteenth centuries. The rapid growth of population is the background to modern history until recent times and a study of the forces at work can illuminate the social and political scene. The period chosen by the author, 1750-1845, is a crucial one and a book which gathers together all the evidence for one country in that period is to be welcomed. The author was the holder of a Leverhulme Research Studentship in the London School of Economics.

The author reviews the various estimates—guesses—of the population of Ireland before the first census in 1821. He concludes that the population amounted to about three millions in the 1720's, four millions in the 1780's, and four and three-quarter millions in 1791. These figures may be compared with the totals enumerated at the censuses:

Year	Census population ooo's
1821	6802
1831	7767
1841	8175

It seems that there was an increase of about one-third in the sixty years before 1780 compared with an increase of about 100% in the sixty years after 1780. This percentage, in fact, understates the effect of the natural increase of the excess of births over deaths because there was considerable emigration from Ireland in the later part of the period; the author thinks that about one and three-quarter millions emigrated in the sixty-five years up to 1845. The figures indicate that the rate of natural increase of the population of Ireland during this period probably outstripped the contemporary rate of increase in Great Britain though the actual rate of increase would have been about the same for both countries. The famine, and the subsequent emigration, brought the increase in Ireland to an abrupt end. The comparable population at the 1851 Census was 6,552,000.

It is commonly stated that the increase in the population of Great Britain was probably due more to a decrease in mortality than to an increase in fertility. The author's thesis is that the increase in Ireland was due much more to an increase in fertility than to any likely decrease in mortality.

There is abundant evidence that round about the end of the eighteenth century it was the custom for the Irish to marry at young ages, though it is less clear whether that was then a new tendency or a continuance of an earlier social pattern. The statistical evidence is of a later date but the following table (Table 14, p. 39) illustrates the difference in the age pattern in Ireland as compared with England.

Age of women at marriage in Ireland from 1830 to 1840 and in England in 1847

Ireland			England and Wales		
Age of wife	Number married	Percentage of total	Age of wife	Number married	Percentage of total
-17	16,914	3.1	-20	2,749	11.3
17-20	136,398	25.0	20-24	12,334	50.9
21-25	209,758	38.4	25-29	5,104	21.1
26-30	98,405	18.0	30-34	1,873	7.7
31-35	34,812	6.4	35-39	906	3.7
36-40	14,752	2.7	40-44	603	2.5
41-45	6,122	1.1			

The figures in this table call for some explanation since, for example, the number of marriages tabulated for England and Wales in 1847 is less than the average of the eleven years 1830-40 in Ireland! There were 135,845 marriages registered in England in 1847 and the author's statistics appear to relate to those 24,220 marriages for which the ages of the spouses were precisely stated (*Tenth Annual Report of the Registrar-General*, 1852, p. 30). The Irish statistics seem to relate to a much higher proportion of the total marriages; and the average of the eleven years conceals a movement—which the author records—towards later marriage during those years.

The author stresses the increased fertility that could be expected from early marriage, but he does not appear to recognize the important effect of a decrease in the length of a generation, that is to say the mean period that elapses between the births of the parents and the births of their children. Since early marriage would lead to the earlier building up of the family, the generation would re-produce itself after a shorter period: any increase would be 'compounded' more frequently.

Statistics were collected in Ireland at the 1841 Census which showed the number of children born before 6 June 1841 to couples married in or since 1830, classified according to the ages of the parents at marriage. From those data the author computed the fertility of marriages of ten years duration in 1841 (Table 7, p. 31); and he has added comparative figures for marriages of ten years duration in 1911 in England and Wales, computed from the data of the Fertility Census, 1911. The scope of these statistics is not clear—whether they relate to all marriages in 1831 or only to those still subsisting in 1841 at the end of the ten-year period. Nor is it clear whether the figures for England and Wales are strictly comparable.

During the seventeenth and eighteenth centuries the tendency had been to put down more and more land to grass but the increase in population in the period under review was accompanied by a change in agriculture, from grazing to tillage, which is of great interest. It seems to be a clear example of a Malthusian relationship between the size of the population and the means of subsistence.

The statistics of imports and exports of grain (p. 268) show clearly how Ireland changed in the 1770's from being an importer to an exporter of grain. Pasture does not require much labour but arable both requires more men to work it and provides more food for their subsistence. The main obstacle to early marriage would have been the difficulty of acquiring a new settlement while the land was under pasture. That obstacle was removed by the change to tillage because the same number of people could be supported on less land: when a child grew up and married the settlement could be subdivided and a new family established on part of the holding.

Arable was encouraged by the Irish Parliament in a series of Acts which culminated in Foster's Corn Law of 1784. That Act provided that when the price of wheat, for example, was below 30s. per barrel (20 stone of wheat) there should be a bounty on exports and a duty on imports: conversely, when the price exceeded 30s. there was to be no bounty and only a nominal duty on imports. During the French wars prices rose to a level which needed no bounty to stimulate the process of change. After the war, between 1815 and the famine, falling prices of grain put a brake on the process of change by making pasture once again relatively profitable, but so conservative is human nature that dependence on tillage does not seem to have ended until the famine.

The climate and soil of Ireland were suited to the cultivation of the potato, which was introduced into Ireland at the end of the sixteenth century, possibly by Raleigh. The crop was prolific and needed little storage. It could be grown on bogland, unsuitable for other crops or for pasture. There is some doubt how soon the potato came to be the staple food of Ireland. The author discusses the evidence and comes to a different conclusion from that of Dr R. N. Salaman in *The influence of the potato on the course of Irish history*. He has no doubt, however, that the potato had become a staple food by the end of the eighteenth century, though regional differences should not be overlooked. He thinks (p. 15) that, at this time, a typical diet of an Irishman consisted of about 10 lb. potatoes a day, with milk and such supplement of meat, fish and eggs as might be available locally. The diet was monotonous but seems to have been nutritionally adequate. Table 21 gives the scientific data in respect of a diet of 10 lb. of potatoes and one pint of milk; for example, the equivalent in calories is given as 3852 compared with 3000 recommended and a lower standard in Britain in recent years.

The potato crop needs only a small area of land and the economy of Ireland, based upon the potato, put no brake upon the size of families so long as holdings could be subdivided or waste land reclaimed. The needs of the peasant were so simple—a rough cabin of sods or mud with a roof of turf laid on branches, little furniture and outside a small potato patch. Children were an asset through their labour until they were married, and when married they could be easily provided for by settling them on small parcels of land. There is much literary but no statistical evidence of the rate at which the fragmentation proceeded. By the time of the 1841 Census, of all holdings above 1 acre 44.8% did not exceed 5 acres in extent, and 81.4% did not exceed 15 acres. There was a natural limit to such a movement; in spite of the efforts of reformers the tragedy was played out till the curtain was rung down by the famine. In this and in other sections of the book there is a political bias, especially against landlords, which jars the reader of a scientific treatise. The historian is concerned to uncover the facts and to set them in the contemporary scene. The wisdom gained by the perspective of later events is denied to the protagonists at the time. Could any human action have saved the Irish from themselves?

The later chapters on mortality seem both less substantial and less satisfactory in treatment. The material is thin but it may be doubted whether the author has made the best use of it.

The author has brought together a number of inquiries which throw light on the demographic problem. For one at least, however, he does not seem to have proved his thesis, though it may be a likely hypothesis. The trend of population, in so far as it depends upon legitimate fertility, is influenced by five factors:

- (i) the probabilities of an infant surviving to the reproductive ages;
- (ii) the proportions marrying;
- (iii) the distribution of sizes of family;
- (iv) the distribution of children by age of mother;
- (v) the years of life after the reproductive ages have been passed.

While the author shows that (ii), (iii) and (iv) were all favourable to high fertility in Ireland in the late eighteenth century he does not prove that the pattern had changed from earlier years—though such a change may well have taken place. The author merely mentions (i) and does not appear to recognize its importance.

The fact is that the population more than doubled itself within a span of less than three generations. This seems to require that each generation of births should have been at least double the generation that preceded it, unless some contribution from lighter mortality is assumed. To the reviewer, the startling acceleration in the rate of increase demands, by way of explanation, a substantial contribution from all the relevant factors.

M.E.O.