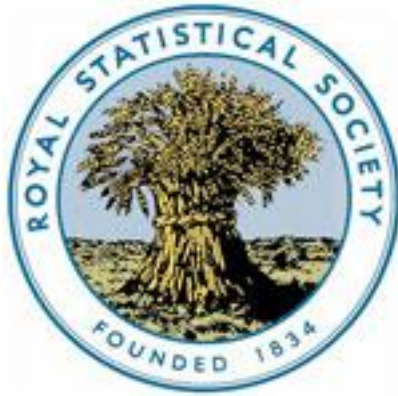


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JOURNAL
OF THE ROYAL STATISTICAL SOCIETY,
DECEMBER, 1889.

*The OPENING ADDRESS of DR. T. GRAHAM BALFOUR, F.R.S., &c ,
Honorary Physician to Her Majesty the Queen, PRESIDENT of the
ROYAL STATISTICAL SOCIETY. Session 1889-90. DELIVERED 19th
November, 1889.*

AT the opening of this, the Fifty-Sixth Session of the Society, it is pleasing to be able to congratulate you on its continued prosperity. The number of members who joined during the last session was 97, while the loss from all causes was 75. We have to lament an unusually heavy death roll, having lost 24 Ordinary Fellows since the opening of the last session—of whom no less than ten had joined in the current decade—and one Honorary Fellow. Of those in that list who took an active part in the work of the Society, the senior was Mr. T. R. Edmonds, who was elected in 1836, and served on the council in 1838 and 1839. He read two papers in 1837 on the mortality of England and Sweden, which were published in the *Proceedings*, and a paper on the "Statistics of Health," at the meeting of the International Congress in London in 1860. Lord Addington, then Mr. J. G. Hubbard, was elected in 1853, and was a member of council in 1855; he was the author of several pamphlets on Currency and Income Tax, but did not contribute anything to the *Journal* of the Society. Mr. W. L. Sargant was elected a Fellow in 1860. He served on the council in 1867, and contributed six papers to the *Journal*, four of which had been read at the meetings of the Society. He was the author of several works on educational and economical subjects. Mr. Robert Baxter joined the Society in 1876, and was elected a member of council in the same year. He read a paper on the currency laws, which will be found in the 39th volume of the *Journal*. Mr. W. Westgarth joined also in 1876. He was the author of several works on the Colony of Victoria, to which he emigrated in 1840, and where he resided for many years; his last volume, entitled "Half a Century "of Australian Progress, a Personal Retrospect," gives an account of a visit made by him to the colony last year, and published only a

few months before his death. He read several papers at the meetings of the British Association, on subjects connected with capital, and one in 1864 on the Statistics of Crime in Australia, which has been published in our *Journal*. I am informed, by a good authority on the subject, that his works on Australia are thoroughly reliable. He was one of the founders and the first Chairman of the Chamber of Commerce of Melbourne. Mr. Richard Valpy received an appointment in the Board of Trade in 1841, on the reorganisation of the statistical department under Mr. Porter. In 1842 he was elected a Fellow of this Society, and served on the Council during eight years between 1854 and 1876. He was sent as a delegate from the British Government to four of the International Statistical Congresses held abroad, those at Brussels, Paris, Berlin, and the Hague, and took an active part in that which was held in London in 1860. Mr. Valpy, after having been for some years chief of the statistical and commercial department, and comptroller of the corn returns at the Board of Trade, retired in 1876 from the public service. He did not subsequently attend the meetings or take an active part in the work of the Society, chiefly, I believe, on account of his sight and hearing having become impaired, the former not improbably a result of his unintermitting work; but I know that to the last he continued to take an interest in our prosperity. Twelve papers by Mr. Valpy have been published in the Society's *Journal*, several of which had been prepared for, and read at, the meetings of the British Association for the Advancement of Science, in addition to which six communications by him appear in the reports of several of the statistical congresses, four of which, as already stated, he attended in an official capacity. Mr. Valpy was a most valuable public servant, one of those men who discharge their duties with zeal, intelligence, and perseverance, but the value of whose work, owing to their unassuming character and absence of self assertion, is too often overlooked by the higher authorities, and as a result left unacknowledged and unrewarded.

During the period which has elapsed since our last meeting here, an important statistical reunion has taken place in Paris—the second meeting of the International Statistical Institute. It may be in the recollection of many of you, that on the occasion of the celebration of the jubilee of this Society, measures were taken to found an International Society, limited in number, and consisting, as far as possible, of men of all nations who had specially directed their attention to the method of statistical inquiry, and were recognised as experts in its application. It was felt by those who had studied the subject, that there was a marked need of some medium of intercommunication between the statisticians widely scattered over the world, with a view to obtain a greater amount of

uniformity in the mode of collecting numerical data on the various subjects open to investigation, and thereby secure the very desirable means of accurate comparison of the results in all the different countries. This had previously been to some extent effected by the various statistical congresses held at intervals between 1853, when the first met at Brussels, and the last in 1876, at Budapest; but owing in some degree to their unwieldy size, and also perhaps to the semi-official position they had attained, which rendered it difficult on the part of the Governments of some of the countries to decline carrying out the measures recommended by them, even when it would have been inexpedient or injurious to adopt them, these congresses had become unsuited to the purpose for which they were in the first instance intended. They had, in fact, developed into charming social international reunions, but had lost their quality of counsellors on the means of accurate statistical investigation. For these and other reasons they were discontinued, and it was believed that the desired results might be more surely and satisfactorily obtained by a smaller body of practical experts—a limited hive of working bees. Chiefly to our esteemed president, Sir Rawson Rawson, and the lamented M. Neumann Spallart, the consummation of this idea, in the formation of the International Statistical Institute, is due. In 1887 the Institute held its first meeting at Rome, when a considerable amount of preliminary work was done, and committees were formed to prepare reports and gather information on various subjects which had been brought before the meeting. It was decided on that occasion that the second meeting should be held in Paris this year, as the great exhibition would be sure to form an additional attraction to the members to attend. The reunion accordingly took place on the 2nd September, and lasted four days. And here I may be permitted to express the thanks of the members for the kind, the liberal, and efficient assistance afforded by the French Government. Although the Institute had no official status, it was granted the use of rooms in the Ministry of Commerce, and received much valuable aid in the form of secretarial work and printing. It appears to me to be one of the great advantages of this new organisation, that while it has enrolled among its members a large number of distinguished men, holding high positions under their respective Governments and municipalities, it has no official connection with, or dependence upon, any of the Governments. It is therefore free to exercise an independent judgment on the various subjects brought under its consideration; and although its recommendations may lose somewhat of the weight attaching to official prestige, it is free from the restraint which is an inevitable consequence of such connection. At the recent meeting of the Institute there was a larger attendance

of members from England than from any other country, France of course excepted. Your Society was well represented by two past Presidents, Sir Rawson Rawson and Mr. Giffen, one of your Vice-Presidents, Dr. Mouat, your three Honorary Secretaries, Mr. J. B. Martin, Mr. Bateman, and Major Craigie, and your President. The meetings were presided over by Sir Rawson Rawson, assisted by M. Levasseur, Vice-President, Signor Bodio, the Secretary and Mr. J. B. Martin, the Treasurer. The Congress was opened by an address from M. Parmentier, as representing M. Tirard, the President of the Council of the French Republic, who was unavoidably prevented attending, in which he gave a cordial welcome to the members, and expressed the warm interest felt by the Government in the labours of the Institute. Sir Rawson Rawson then delivered the opening address, in which he enumerated briefly the principal statistical works which had been published in each country since the meeting at Rome in 1887, and referred feelingly to the losses which the Institute had sustained by the death of some of its most eminent members, and notably of Professors Neumann Spallart and Leone Levi. At the afternoon meeting M. Juglar read a sketch of the new edition of his work on commercial crises in France, England, Germany, and the United States, in which he has continued his researches on the subject up to the latest date. This was followed by a report by Mr. Bateman, on the work of the Labour Bureau of the Board of Trade, giving the substance of the information published, or in course of publication, respecting the condition of the working classes. M. Denis gave similar information regarding the workmen in Belgium, with a special reference to their wages and food. Major Craigie then brought up the report of the committee on landed property and agricultural holdings; and M. Gimel read an interesting communication on the division of landed property in France before and after 1793. In both these subjects, as in most others before the Congress, the advantage of discussing the bases of statistical investigation so as to render possible an accurate comparison of the results obtained in the various countries, is very apparent. Questions of labour and prices are no longer confined to one country, but a constant comparison is being made of the rewards obtained by labour in this country with those of the Continent or the United States, and comparisons made on insufficient data or misleading bases are worth less than nothing. In like manner there is a constant discussion of the productive results arrived at by large and small holdings in agriculture. Here also there is much doubtful ground to be cleared before accurate bases for the comparison of different countries can be obtained. In connection with the discussion of labour and economical questions, the tables and diagrams of

prices and transactions in Mr. Juglar's book, to which we have already referred, are most interesting and valuable.

The morning meeting on the 3rd was chiefly occupied with the reading and discussion of the reports of committees appointed at Rome, that on prices and the index number by Messrs. J. B. Martin and Inglis Palgrave, and that on improving the basis of trade statistics in different countries, and thereby securing a greater uniformity in them, by Mr. Bateman. M. Kiaer (Norway) brought up the very technical and difficult question of tonnage measurement, and a committee was appointed to consider it, a better method, surely, than attempting to settle the best system by discussion of the whole Congress. The President then read the report of the Committee on the Classification of Statistical Bibliography. At the afternoon meeting M. Fournier de Flaix communicated a paper on the statistics of the religions of the world, in which he attempted to prove too much from the very unsatisfactory data available on the subject. M. Levasseur then read a report on the methods and results of the statistics of primary education, and obtained the appointment of a committee to consider the best system of collecting these in a form suitable for comparison. M. Levasseur, at a subsequent meeting, presented his "*Petit Atlas Général*," by which he has endeavoured to introduce into the course of instruction in the schools some of the results of statistics.

The morning meeting of the 4th, after a report by M. Yvernès on the means of rendering uniform the criminal statistics, was chiefly occupied with a memoir by M. Cheysson, on the means of obtaining uniformity in the statistical returns of transport of passengers and goods by the principal means of conveyance in different countries. He showed how much in advance the French are in their returns of the traffic not only of their canals, but also their roads, on which it is counted seven times a-year, and its weight estimated by skilled enumerators. The coasting trade also is classed by distance, so that the 100 tons, say of coal, carried from one port to another 100 miles distant, is rightly set down as of equal importance as regards transport with the 1,000 tons taken 10 miles, the distance between two adjacent ports. At the afternoon meeting papers on the economic condition of Italy, Belgium, and France were read by MM. Bodio, Leemans, and Loua, each of them an authority on the statistics of his own country, and M. Körösi (Austria-Hungary) submitted a proposition relative to the rectification of the computation of the mortality of large towns. The committees on agricultural holdings and trade statistics also held prolonged sittings to discuss and settle the limits of their inquiries.

On the 5th September a valuable and interesting paper on

strikes in France from 1874-85 was read by M. Turquan. A practical paper followed by Dr. J. Bertillon, drawing attention to the various classifications of trades and professions adopted by different countries in taking the census of the populations, and the advantage which would arise from the adoption of an international arrangement, which would permit of an accurate comparison of these classes in different nations and their various subdivisions. Instead of the usual afternoon meeting, the members of the Institute, after a reception at the Hôtel de Ville by Dr. Chautemps, the President of the Municipal Council, assembled at the Palais de Justice, where, through the kindness of M. Bertillon, they had a clear and interesting explanation of the system adopted by the police of Paris for the identification of persons who have been previously convicted (*récidivistes*). This is effected by a combination of anthropometric measurements and photographic portraiture. The anthropometric system consists in taking, recording, and classifying certain measurements. These include the height, the length of the body when seated, the length of the arms extended (*l'envergure*), the length of the head, the breadth of the head above the ears, the length of the forearm (*coudée*), the length of the middle finger and of the little finger, the length of the foot, the length and the breadth of the external ear. Each of these measurements is arranged in three subdivisions, those above the average, under the average, and of the average, and thus classified are deposited in the Office of the Prefecture of Police. Two photographic portraits are also taken, one in profile and the other of the front face slightly turned to the right, and on the back of these are recorded, with the precision of anatomical descriptions, any special marks such as tattooing, cicatrices of cuts, colour of the eyes, or similar aids to identification. When a prisoner who denies any previous conviction is brought to the Prefecture, and all the required measurements have been recorded, a process occupying only about seven minutes in the hands of the skilled staff, by the process of eliminating from each group the two subdivisions which do not agree with his measurements, the cards are quickly reduced to a very small number in which the various measurements correspond with those now taken, and there will probably remain not a dozen out of the 100,000 in the office to be identified by the photograph. A practical example was given of the working of the system by the identification of a man who had been apprehended the previous night on a charge of theft, and who resolutely denied all previous acquaintance with the criminal police. In a very brief space of time—probably not exceeding ten minutes—the whole process of measurement and examination was completed, and the man's photograph produced

from the bureau. He at once admitted his identity as having been convicted under a different name, the use of which, however, he stated he had discontinued for the last two years!

In addition to the measurements, it is necessary also to take into consideration the apparent age of the accused, for, especially with the younger ones, considerable changes occur in the lapse of a few years. The results obtained by this joint process of anthropometry and photography are very remarkable, first as regards the certainty with which habitual criminals may be identified, and secondly, the very short time required for the identification. M. Bertillon has published an account of the working of the *service d'identification* which is well deserving of study by those interested in criminal statistics, and he has added to it several tables drawn up from the documents in his bureau. It must not, however, be forgotten that these tables apply exclusively to Frenchmen, and that although affording interesting data for comparison with other anthropometrical tables, they cannot be adopted as a basis for observations relating to other peoples. The practical benefit derived from this method of identification may, to some extent, be estimated by the fact that in 1888, of 31,849 prisoners examined, 615 were thus discovered to be old offenders (*récidivistes*), passing under new names. Before the introduction of this system there were from 200 to 300 prisoners annually recognised, *after condemnation*, to have been already convicted. In 1888 there were only 14 persons thus detected, and of these 10 had not been previously measured, so that 4 only appeared to have escaped identification on arrest. Exception has been taken to this system of examination as being "painful as well as unsportsmanlike," in fact, destroying one of the chances of a criminal to escape from so much at least of his punishment as might fairly be awarded on the ground of "habit and repute;" but surely it is in the interest of society—at least of the well doing and law abiding portion of it—that the judge should always be in possession of the full facts bearing upon the case and likely to influence him in determining the nature and amount of the punishment. This principle is acted upon in this country at present so far as the identification can be effected by the memory of the various prison officials, which may often fail or even be injuriously wrong, and by photographs, but it would surely be much better to have the aid of a nearly infallible method of identification. The result of the examination should be kept inviolably secret till the magistrate or the jury, as the case may be, has recorded a verdict, and if the prisoner is acquitted, the document should be at once destroyed. In this manner the possibility of an unfair prejudice, while the case is under trial, would be avoided, while in the event of a conviction

the advantage to the community arising from the recognition of the offender would be secured. The propriety of destroying the record in case of an acquittal is too obvious to require comment.

The meeting of the 6th September was devoted to the business of nominating committees to investigate various subjects and report to the next meeting of the Institute, which is to be held at Vienna in 1891, and in the re-election unanimously of the office bearers, with the addition of M. J. Lexis, as a vice-president. A cordial invitation from Washington to hold an extraordinary meeting there in 1892, on the occasion of the celebration of the fourth centenary of the discovery of America, was received, but the decision upon it was deferred to the next meeting of the Institute.

I have confined my remarks hitherto to the details of business of the Congress. I should fail grievously did I omit to record also the hospitality and kindness which were extended to us. The members were entertained at one of the exhibition banquets given by M. Tirard, the Premier and Minister of Commerce of the French Republic, and at luncheon at the *Hôtel des Travaux Publics*, by M. Yves Guyot, the Minister of Public Works; and the foreign members were invited to dinner by M. Levasseur, the Vice-President of the Institute. Banquets were also given by the *Société d'Économie Politique*, and the *Statistical Society of Paris*, at which discussions on social and economical subjects followed the gastronomic portion of the entertainment. At the latter of these banquets, the toast of the *Royal Statistical Society of London* was drunk with much enthusiasm. On the day after the conclusion of our meeting, M. Eiffel personally conducted those of the members who were able to attend over the remarkable tower which bears his name, and explained to them various matters connected with its construction.

I may be permitted to express my belief that good work was done at the Congress, and my sincere hope that its labours may, from year to year, tend to promote the realisation of a system of uniformity in the statistical documents of the civilised world.

I am sure it is unnecessary to say to the Fellows of this Society, that much of the success of the meeting was due to the tact, zeal, and courtesy of its excellent President, our past President and Honorary Vice-President, Sir Rawson Rawson.

In concluding this notice of the meeting of the Institute, I must express my thanks to Mr. Bateman for the kind assistance he has given me in preparing it, and especially for having placed at my disposal the notes he took from day to day of the proceedings.

In the earlier years of this Society a system existed of the appointment of committees to conduct investigations on special subjects, and report the results to the Society. I find from the

Proceedings and Journals that between 1836 and 1843 seven reports of such committees were read and discussed at the meetings of the Society, and six were published in the *Journal* without being read. The system was however then discontinued, probably, as stated by Dr. Mouat in his history of the Society, for the double reason: first, "that by attempting too much the committees had accomplished little," and "it was felt and found that a body of earnest inquirers with limited funds, and still more limited leisure at its command, was unable to cope successfully with the vast amount of material which it was necessary to gather together, examine, and analyse." The second reason was that private individuals and public bodies and the State itself instituted and carried out investigations of great interest and value, and took up some portions of the work with means and instruments which no Society could command.

These reasons are no less cogent now than they were five and forty years ago. Statistics have much more official recognition and support, and it is, I think, a characteristic of this country that private enterprise organises and executes many undertakings which elsewhere would be left to a department or bureau. I cannot adduce a better instance of this than the scheme of which the recently published volume of "Life and Labour in East London" by Mr. Charles Booth, one of our Vice-Presidents, is the first instalment. Of all the problems created by the social and economical revolutions of the past hundred years, those involved in the growth and condition of London are perhaps the hardest to solve and the most imperative in their demands for an answer. The air is full of cries of distress and of proposed remedies, but before the one can be adequately relieved, or the other finally accepted, a full knowledge of the circumstances and conditions should be obtained and recorded. To vague clamour and to sentimental generalities the application of figures is an invaluable test, and although the use of them is not new, certainly they have never yet been applied to the poverty and employment of poorer London so comprehensively, so efficiently, or with such judicial impartiality. The working of the London School Board has created a large body of trained official visitors, who are required to register and keep in sight every family living in the smaller houses in their districts and having children of school age. Of this machinery Mr. Booth has availed himself, and has checked his information by every other means in his power, with the aid of charitable workers and of various organisations. No one would, I am sure, be more ready than the author of the scheme himself to admit its shortcomings. Poverty is too complex to be completely described by drawing up a simple table, or explained by adding two and two together, and

its moral elements and its financial elements do not necessarily coincide. But these difficulties only enhance the supreme merit of having converted the project into an accomplished fact; the poverty of London has been narrowly localised, its extent discovered, its intensities gauged and differentiated; a method which had never before been attempted has now been applied to the largest, and therefore least manageable, city in the world. The problem has been stated in black and white, and whatever may, or may not, be done towards its solution, the science of statistics has been rightly and usefully employed in clearing the ground for the labours of other and less exact sciences.

For the reasons already stated, it may be inexpedient to revert to the system of committees, but there is one special work to which I think this method of co-operation might be advantageously applied to meet a great want, that of a handbook or guide to workers in the various branches of statistics. Of its value in the preparation of a work of a similar character, a noteworthy example is to be found in the "Hints to Travellers, Scientific and General," prepared for the Council of the Royal Geographical Society. Each article in that volume has been treated by one or more experts, and the whole edited by two distinguished Fellows, with the most satisfactory results. Nearly forty years ago the Earl of Harrowby, in a presidential address delivered to this Society, dwelt upon the importance of educating the country at large in the principles of statistics and the proper mode of conducting statistical inquiries, but although since that period the knowledge of the science has greatly extended, as yet we have no good elementary work in which these principles are laid down. Of the need for some such instruction every one who has worked much at the subject must have had abundant experience. Within the last few weeks the following instance has come under my notice. In the Twelfth Report of the Commissioners of Prisons, just issued, a table is given showing the number of cases of insanity in local prisons from 1862 to 1889. The last column of the table is headed "cases of insanity per 1,000 per annum," and these are correctly given. But there is a second series of figures in the same column of which the following account is given in the report: "If the numbers and the proportions are taken for periods of five years since and including 1885, and for corresponding periods of five years before that year, it will be seen that the number of lunatics sent to prison has enormously increased since that year." The figures in the column are I presume, the "proportions" here alluded to. They have not however been obtained from the numbers, but by adding together the ratios of five years—ratios, it may be observed, of unequal quantities—and are supposed to

represent something ; what that really is I am unable to say. The table gives a ratio of 91·5 per 1,000 for the last quinquennium, while if calculated from the figures in the table, it is only 18·15 per 1,000. The error of endeavouring to obtain results from operating with ratios instead of the actual numbers is, I regret to think, very prevalent, and one of which it is often exceedingly difficult to convince those who are unaccustomed to figures, and I have no doubt this must be the experience of many of you. In his work on penological and preventive principles, Mr. Tallack, the Secretary of the Howard Association, remarks : “ As regards the “ statistics of crime and prisons, it may be observed, that the “ measure of imperfection which is more or less inherent in all “ matters pertaining to humanity, is apt to be somewhat specially “ characteristic of this class of figures.” After a notice of some of the difficulties arising from want of uniformity of basis for statistical calculations, he says : “ Hence the whole question of international statistics, especially in regard to [penal matters, must “ be regarded as essentially defective, and of merely elementary “ development from the point of view of mathematical accuracy.” In June next an International Penitentiary Congress will be held at St. Petersburg, at which I think this important point may be fully discussed, and steps taken to remedy, so far as possible, the defects in the system of prison returns. Our Society will, I hope, be represented at the Congress by Dr. Mouat and Mr. J. B. Martin, but it is a matter for regret that our Government have as yet taken no steps to send a delegate to take part in the proceedings, and that the native land of John Howard, the great reformer of prisons, should alone of the European nations fail to take part in the discussion of a question of such importance as that of the best means of diminishing crime by prevention, repression, and reformation.

Another instance of an error, but of a different kind, will be found in the annual report of the Sanitary Commissioner with the Government of India, for 1887. In Section III, the native army, it is stated that “ The total mortality was less, as usual, “ than among European troops” Now the ratio of the total deaths of the native troops amounted to 18·17, or omitting those on active service in Upper Burma, to 15·06 per 1,000, while that of the European army was only 14·11 per 1,000, Upper Burma being also omitted. In none of the last seven years has the ratio been so low in the native as in the European army, except in 1884, when it was 0·34 under it. The erroneous statement referred to has arisen from the Sanitary Commissioner having omitted in his comparison to take cognisance of the deaths which occurred among men absent from their corps on furlough or for other causes.

This is no new error in army statistics, for I remember that when the report of the Royal Commission of 1857, on the sanitary condition of the army, was presented to Parliament, Captain Annesley, the member for Cavan, and an officer of the Scots Fusilier Guards, took exception to the statement in it of the death-rate of the Guards as 19.5 per 1,000. He moved in the House, an address for a report by the Medical Officers of the Guards, which, he stated, showed the correct ratio to be little more than half that amount, and General Codrington, who for many years commanded one of the regiments, stated that "the returns of mortality from the medical officers of the Guards for the fifteen years, showed an average of only about 15 per 1,000, while the return in the report showed twenty or twenty-one." This return was granted, with some slight modification in the form, and when laid on the table of the House it showed the deaths to have been 20 per 1,000, or higher than stated by the Commission. The original error on the part of the medical officers was the omission of men who had died on sick furlough, and the later discrepancy from their having included the deaths of some invalids from the battalions then in Canada, which ought to have been excluded from the death roll of the battalions serving at home.

It is right to state that the returns in the appendix to the Indian report show the number of deaths of men absent from their corps, and also afford the means of making the necessary correction of the strength, but one result of the mode in which the ratios are given in the report, is that, in the volume of "Statistical Abstracts" presented annually to Parliament, the death-rate of native troops is invariably mis-stated, being merely that of the men present with their corps. There is, however, one important defect in the Indian returns, the *causes* of death of the men absent from their corps are in no instance given, and as they amount to one-fourth of the whole, this must materially affect any deductions as to the relative influence of different classes of diseases upon the death-rate. There should be no difficulty in obtaining the necessary information on this point, and I trust the subject will receive the consideration of the Indian military authorities. I may observe that this defect existed, though in a less degree, in the earlier medical returns of the troops at home, but was easily rectified when attention was called to it.

Such instances as these, occurring in important official documents, may, I think, be taken as proofs of the need for some instruction being given in the principles which must be observed in statistical inquiries to ensure accuracy and render them of practical value.

There is probably no science which has made more rapid

progress during the last thirty years, or been more thoroughly popularised, than sanitary science. The legislative provision for the notification of cases of infectious disease, for their removal from crowded dwellings and isolation in hospitals or other establishments suitable for their treatment; the introduction of sanitary supervision in the erection of buildings; in the removal of excreta; in the supply of wholesome water, its distribution, and its protection from contamination, are all evidences of the awakening of a large class of the people to the importance of those questions which relate to public health. The results which have been obtained in the knowledge of the causes of epidemic diseases, such as diphtheria, scarlatina, enteric fever, &c., and the means by which their propagation may be restrained, and in the reduction in the death-rates of the general population, and still more of various special classes, which has followed the adoption of restrictive measures, are highly satisfactory evidence of the value of such inquiries and of the application of sanitary science to the affairs of daily life. But in the satisfaction which has been expressed at these results, it seems to me that one important factor in the work has been greatly overlooked, that while pæans have been sung in honour of sanitary science, little or nothing has been said of the services rendered by statistics in the investigations into the causes of the epidemics and the extent of their ravages; and yet it is upon the information so acquired that the labours of the sanitary reformers have been based, and it is by statistics that the success and value of the sanitary work is measured; they in fact act the part of a mariner's compass to the sanitarian. For statistics we claim the credit of being the solid foundation on which the fabric of public sanitation has been established, by which the success or failure of the various works undertaken have been measured, and the results brought from the hazy atmosphere of conjecture into the clear light of certainty. I have been induced to touch upon this question because so much credit has been claimed—and justly claimed—for the important services performed as regards the public health, while the labours of those who have contributed largely to these results have been practically ignored, and the means of acquiring correct data on which to found sanitary legislation and sanitary works have been lost sight of, or at least left without acknowledgment. That this is no imaginary picture, that the credit due to the early labourer is oft times claimed by those who, coming late into the field, have reaped the honour attaching to the results of the work of those who have gone before, is unfortunately too true. We have a remarkable instance of it in army sanitation. So late as 1883 Mr. (now Sir Edwin) Chadwick stated at a meeting of the Sanitary Institute: "There has been a continual neglect of

“sanitary experience in the army down to the present time.” But in making that statement he seems to have entirely ignored the work of the Army Medical Department for the preceding sixty-five years. On the termination of the Peninsular War Dr. McGrigor, who had been the principal medical officer of the British forces under the Duke of Wellington, was appointed Director-General of the Army Medical Department. With that remarkable prevision which characterised his official career, he established, and by degrees improved, a series of returns in which were recorded the chief data relating to the health of the troops in the various British possessions, and the circumstances, local and general, by which it was likely to be affected in each. In this manner all special outbreaks of disease were brought to his notice, and many improvements were introduced which seemed desirable to increase the efficiency of the troops. But no general scheme of inquiry into the condition of the army as a whole, or even into that of large sections of it, was adopted, owing, I believe, to the difficulty of obtaining an adequate office establishment to work out what then appeared to the financial authorities to be a merely scientific professional investigation. In 1835, however, in connection with an inquiry into colonial expenditure, some information was required with regard to the expense incurred in replacing soldiers who died or were invalided. The Secretary at War, Lord Howick (the present venerable Earl Grey), fortunately entrusted the inquiry to Dr. Henry Marshall, Deputy Inspector of Hospitals, with whom, for this purpose, Lieutenant Tulloch, 45th Regiment, was associated. While engaged in this work Dr. Marshall became aware of the amount of valuable information contained in the accumulated medical returns of the preceding twenty years, and obtained Lord Howick's authority to extend the inquiry to a more general investigation of the health of the troops at home and in all the colonies. In the following year, upon the retirement of Dr. Marshall on account of his health, I was nominated by Sir James McGrigor to carry on the work with Lieutenant Tulloch. In 1838 we presented a report upon the West Indies; in 1839, upon the sickness, mortality and invaliding of the troops in the United Kingdom, Mediterranean, and British America; in 1840, upon those in Western Africa, the Cape of Good Hope, St. Helena, and Mauritius; and in 1841, upon those in Ceylon, the Tenasserim Provinces, and the Burmese empire. With each of these volumes we drew up a *précis* of the measures which appeared to us necessary, or likely to improve the health of the troops. Although it was not deemed advisable by the authorities to publish these recommendations in our reports, many of them were carried into effect, with marked benefit to the soldiers, but others were neglected or put off till a

more convenient season on account of the expense which they would have involved. On the completion of the first volume, we prepared a form of sanitary report to be forwarded annually to the Secretary at War, through the military authorities, by the principal medical officer on each foreign station. In this manner some of the defects in the original medical returns were remedied, especially as regarded the strength of the troops, the number daily sick in hospital, and the omission of deaths which occurred out of hospital. The principal medical officer was also required to report how far, in his opinion, the sickness and mortality had been affected by 1, the duty and employment of the troops; 2, the barrack and hospital accommodation; 3, the duty; 4, crime and punishment; 5, intemperance. In 1848 a second series of the reports on the health of the army was commenced by Sir A. Tulloch and myself, comprising the ten years in continuation of the first series, and in 1853 the first volume, including the United Kingdom, Mediterranean, and British America, was published. The outbreak of the Crimean War put an end to our labours in this direction.

I am not aware of any previous work in which the important question of the health of bodies of troops on a large scale has been attempted to be investigated by the numerical method, but the example thus set was soon followed. In 1840 the first volume of *Statistical Reports on the Health of the Navy* was published; in 1842 that of the *Army of the United States*, and in the same year a general topographical and statistical account of each of the *Military Divisions of the Madras Presidency*. In 1847, Lieutenant-Colonel Sykes read to this Society a report on the "Vital Statistics of the East India Company's Army in India, European, and Native," which he had drawn up from data supplied to him from official sources in India. The French Government, impressed with the importance of the results obtained by the statistical method of investigation, applied it in 1847 to the study of the sanitary condition of the army horses, and commenced a valuable series of annual reports on that subject. For political reasons the system was not extended to the investigation of the health of the men of the army till 1864. Our Government, on the other hand, did not apply it to the horses, or if they did, at least did not publish any results till 1882, when the first of a series of annual reports by Dr. Fleming, the able head of the veterinary department, appeared. In 1876 a report on the *Sanitary Statistics of the Italian Army*, and in 1880, a *Statistical Health Report of the Royal Prussian Army*, and the XIIIth (Royal Würtemberg) Army Corps, were published by their respective Governments.

On the reorganisation of our Army Medical Service, in accordance with the recommendation of Sidney Herbert's Com-

mission, statistical and sanitary branches were established at the head-quarters of the Department, and since 1859 annual reports by the Heads of these branches have been presented to Parliament and published. It is difficult therefore to understand how Sir Edwin Chadwick could have brought such a serious charge of "continual neglect" against the medical officers. The history of Army vital statistics, which I have just given you, shows that, so far from their being laggards, they have for upwards of half-a-century been well to the front in quickly, steadily, but unobtrusively carrying on a great statistical and sanitary work. A remark made by Lord Panmure in the House of Lords, while defending the War Department against some unfavourable comments which had been made on it, applies very forcibly to the sanitary work of the medical officers: "Because all has been done unostentatiously, the public have taken no notice of it, and are quite in ignorance of the vast improvements which have taken place in the condition of the soldier."¹

I feel that some apology may be necessary for the prominence I have given to a work in which I was for many years personally concerned. I should not have done so had I not felt it to be my duty to clear my old brother officers from an unfounded charge preferred by so highly esteemed an authority on sanitary questions.

In estimating the sanitary work of the Army medical officers, it must not be forgotten that they had no power to carry out any of their recommendations, however urgent the need might be. They could but recommend; the adoption of the proposed measures depended first upon the approval of the military authorities, and secondly on the sanction of the Treasury to incur the necessary expenditure. The last was by no means easily obtained during the period to which I have referred, as the importance of sanitary measures was much under-estimated, and public opinion had not been sufficiently educated to be brought to bear upon the Government on such questions. In the Army estimates for the present year a sum of 10,000*l.* has been taken for the improvement of the Royal Barracks, Dublin. Had a recommendation been made for such an expenditure in those days, it would have been treated as a flight of fancy, and the hope of its realisation as a dream of Utopia. Many of the suggested sanitary works were shelved with the stereotyped answer that they would be considered with the next year's estimates, a date which often—to judge by the results—seems to have been synonymous with the *mañana* of the Spaniard, or the Greek kalends. In 1858 Colonel Knox stated in the House of Commons, that "he himself had every session called the attention of the House to the unsatisfactory state of

¹ "Hansard," March, 1858.

“ the barrack accommodation in the metropolis, but hitherto without avail;” and Colonel Pennant said, “ that the expenditure necessary for the substitution of new barracks was then objected to on the plea that it was proposed to build gorgeous palaces for the troops.”

In my inaugural address last year, I called attention to the possible risk of loss from the fraudulent personation of post office annuitants, and the necessity for some check in the way of identification, to prevent, or, if they existed, to detect such cases. I also referred to certain returns in the report of the Postmaster-General, as, in the absence of detailed information respecting the means of identification, strengthening the case for a careful and searching inquiry into the subject. I forwarded a copy of the address to the Postmaster-General, the Right Honourable Cecil Raikes, who referred the question involved to the Receiver- and Accountant-General for inquiry and report. Through the courtesy of Mr. Raikes, I was favoured with a copy of the report, from which I think it only an act of justice to the department to quote the following extract: “ As regards the annuitants paid through the Post Office, special inquiries are made periodically to ascertain that the persons receiving the annuities are the persons entitled to them, and under the arrangement for paying annuities through the Savings Bank Deposit Accounts, the signature for each payment is compared by an experienced officer with a known signature of the annuitant, and a further check is applied by the paying officer. Further, a system of check is maintained by the preparation of special returns for the quinquennial valuations required by Statute, at which time any excessive duration of an annuity would necessarily be detected.” These arrangements appear to be well adapted to the purpose, but I would still suggest the advantage of an additional check in the form of a yearly, or possibly a quinquennial, return of the mortality by ages. This could be prepared without much additional labour or expense, from the special returns necessary for the quinquennial valuation required by Statute. A publication of the results would tend materially to strengthen the public confidence in that Department of the Post Office, and to make known its value as a means of securing a stated income after attaining any specified age, or of making provision for the survivors when the bread earner is taken away. With regard to the results shown by the returns to which I had referred as possibly connected with fraudulent personation, Mr. Cardin, the Receiver- and Accountant-General, points out that they are a consequence of “ Mr. Fawcett's Act of 1882, which increased the maximum amount for which an annuity could be granted from 50*l.* to 100*l.*, and decreased the minimum amount

“ for which an insurance policy could be issued from 20*l.* to 5*l.* “ It is obvious that the effect of such legislation would be to produce just the result pointed out by Dr. Balfour.” It may be in the recollection of the Fellows that I specially guarded myself by pointing out that it was impossible, in the absence of details, to draw any definite conclusion from the figures which I had quoted. Now that these details have been furnished, it appears to me to give additional point to the subject I had just before been discussing—the necessity for ascertaining the *cæteris paribus* before instituting a comparison of the results for two different periods. With reference to the Army pensioners who are now paid by means of Post Office Army Money Orders, Mr. Cardin states that the War Office Committee, of which he was a member, in view of the danger of personation, arranged special forms of certificate of identity, and reported that, “ It is not proposed to dispense with the “ ordinary personal inspection by the officer of each pensioner, &c., “ once a-year; and it is suggested that the most convenient time “ for such inspection will be that now fixed for the medical “ examination of the Army Reserve.” But the recent financial regulations issued from the War Office respecting the payment, seem to involve the impossibility of such personal inspection, as “ the pensioners will, without reference to their place of abode, be “ paid by ” certain paymasters detailed in the circular. So far as the pensioners from infantry regiments are concerned, the identification may be effected by the paymasters of regimental districts, but as regards the other branches of the service this would be impossible, unless there are regulations which have not been promulgated requiring a personal inspection of them by some officer of the district in which they reside. Under any circumstances, however, it would be an additional security, at least against any extensive fraudulent personation, such as was practised under the old Chelsea arrangements, if tables of mortality by ages were periodically prepared and published. It appears to me that such a document should be established for all persons drawing pay on the non-effective lists of the various branches of the public service. Much has been said lately in Parliament on the subject of the steady progressive increase of the non-effective estimates, it seems very desirable that every available measure should be adopted to prevent fraudulent personation. I place very little confidence in the security afforded by declarations and similar documents, unless conjoined with some system of personal identification, and such check as may be derived from a periodical statistical examination of the results as shown in the death-rate at the different ages.
