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**JOURNAL**  
**OF THE ROYAL STATISTICAL SOCIETY,**

DECEMBER, 1896.

*On some DEVELOPMENTS of STATISTICAL RESEARCH and METHODS*  
*during RECENT YEARS.*

*The INAUGURAL ADDRESS of JOHN BIDDULPH MARTIN, ESQ., M.A.,*  
*PRESIDENT of the ROYAL STATISTICAL SOCIETY. Session 1896-97.*  
*DELIVERED 17th November, 1896.*

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I.—*Introductory.*

THE Royal Statistical Society has conferred on me the honour of succeeding, as the thirty-third occupant of this chair, to the dignity of the Presidential office. The honour and dignity of presiding over a Society such as this, which has in successive years deservedly obtained an ever-increasing measure of public consideration, will be freely acknowledged not only by the Fellows of the Society, but also by those who, though not within its ranks, are interested in the studies which we pursue. This dignity is associated with an equal measure of responsibility. It is my privilege to address a Society which has been presided over in the past by statesmen whose names are in the first rank of those who have been associated with the conduct of public affairs, such as the first Earl Russell, who is, and probably always will be, better known as Lord John Russell, the late Earl of Derby, Mr. Goschen, and Mr. Gladstone. The list of your past Presidents includes also

names such as those of Dr. Farr and Sir Robert Giffen, experts whose duties may be said to entitle them to the name of professional statisticians; and your Presidential chair has in turn been occupied by men such as Lord Overstone and William Newmarch, whose lives were passed, as has been my own, in the practical handling of the business affairs of the financial metropolis of the world, and who at the same time have been no less eminent as statisticians and economists than they were as bankers.

But in my own case the responsibilities of assuming the Presidency are increased by the fact that it comes to me after a membership of the Society extending over twenty-two years, during the past sixteen of which I have served with pleasure to myself, and I trust without detriment to the Society, in the dual capacity of Honorary and Foreign Secretary. The knowledge thus acquired of the methods and work of the Society, of its aims and means of attaining them, imparts to me a feeling that if much is conferred on me, much also is required.

To one who has for so long a period of time served you to the best of his ability as a member of your executive, it may be pardoned if the delivery of a Presidential Address does not appear to be the most essential of his functions. To carry out the objects of the Society on the basis laid down at its inception, as widened in scope by experience; to extend still further on legitimate lines its work and influence; to maintain the unbroken harmony which has hitherto prevailed between its officials and the general body of Fellows; these appear to me to be aims no less worthy than the mere egotistical ambition to lay before you an address that shall deserve to take its place among, or if possible outrival, those to which you have listened in the past.

More than one of my predecessors has devoted a portion at least of his address to the year's work of our Society, and especially to a notice of those whose loss the Society has had from time to time to deplore. I may be excused if I take a wider survey, and pass in review the names of those who, in the period during which I have been associated with the Society, have dropped out of the ranks. We have lost, since 1874, no less than twelve of our ex-presidents—

1878. Earl Russell (1859-61).	1885. Dr. William A. Guy, F.R.S. (1873-75).
1880. Lord Hampton (1861-63).	„ Lord Houghton (1865-67).
1882. William Newmarch, F.R.S. (1869-71).	„ Earl of Shaftesbury, K.G. (1843-45).
„ Earl of Harrowby, K.G. (1840-42, 1849-51, 1855-57).	1891. Dr. T. Graham Balfour, F.R.S. (1888-90).
1883. Dr. William Farr, F.R.S. (1871-73).	1892. Sir James Caird, K.C.B., F.R.S. (1880-82).
„ Lord Overstone (1851-53).	1893. Earl of Derby, K.G. (1857-59).

The list of Honorary Fellows who during the same period have been taken from us, comprises the following names familiar to all who are conversant with statistical and economic study:—

1874. Adolphe Quetelet.	1891. A. Beaujon.
1876. Louis F. M. R. Wolowski.	„ A. Vesselovsky.
1878. Professor Bruno Hildebrand.	1892. Dr. Charles Keleti.
1879. Michel Chevalier.	1895. Henry H. Hayter, C.M.G.
1881. Joseph Garnier.	1896. J. B. Léon Say.
1883. P. F. Le Play.	„ Professor Luigi Cosca.
1885. Dr. Edward Jarvis, U.S.A.	„ Dr. Karl Becker.
1888. Prof. F. X. Neumann-Spallart.	

The death roll of ordinary Fellows is more formidable still. I extract from it the following list:—

1875. R. Dudley Baxter.	1888. Frederick Purdy.
1877. Walter Bagehot.	1890. Sir Edwin Chadwick, K.C.B.
1879. Sir Rowland Hill.	„ Hon. J. J. Knox, U.S.A.
1881. Ernest Seyd.	1894. Dr. Robert Lawson.
1882. W. Stanley Jevons.	„ John Walter.
„ George Warde Norman.	1895. Hyde Clarke.
1885. Cornelius Walford.	„ Henry D. Pochin.
1886. Robert H. Patterson.	1896. Frederick B. Garnett.
1887. Lionel L. Cohen, M.P.	„ Rowland Hamilton.
1888. Professor Leone Levi.	

With almost all of these, either as your Honorary Secretary or otherwise, I was myself brought into immediate and in some cases close relationship. Such losses as those here recorded are heavy, they might almost appear to be irreparable. But it is true that in our Society, as elsewhere, no man is indispensable, and if we have to deplore losses such as those enumerated above, we may the more congratulate ourselves that our ranks have been filled up, and the places of the missing occupied by not unworthy successors.

If new workers have come forward to take the place of those who have passed away, new work and more ample fields of inquiry have, with the lapse of time, been provided ready to their hand. It is impossible on this occasion not to refer briefly to a period of time more than twice as long in its duration as that of my own individual connexion with our Society. Public attention is at this present time directed to the unprecedented length of the period to which our Sovereign's reign has been prolonged. Comparisons have been made, and contrasts have been drawn in many quarters between the economic and social conditions at present existing, and those which obtained in 1837. The establishment of our Society in 1834 was slightly antecedent in date to the accession of Her Majesty the Queen to the throne. For present purposes it may be said that our existence has been of equal duration with that of the present reign. Both have been coincident with a development of science, and of the application of

science to the purposes of practical life, without parallel in the history of mankind. The recognition of the scientific laws which govern the development of steam, has led during the past sixty years to its employment for the practical purposes of locomotion by land and water to an extent which, at the beginning of that period, would have been held to be altogether chimerical. The case has been the same with electricity, whose possibilities are as yet by no means exhausted. Sixty years ago the statistics of railways and of steam tonnage were practically non-existent. From their various aspects they now furnish no small amount of matter to the contributors of our papers, and to the contents of our *Journal*. It is sufficient to mention on this point the name of Mr. John Glover, the worthy recipient of our recently founded Guy Medal, who has laid before us, at decennial intervals, the statistics of the tonnage of our mercantile marine during a period of forty years. The future may be for us no less fertile in supplying materials for statistical inquiry than has been the past. When we look back at the manner in which prophecies as to the limitations of steam locomotion have been falsified, it would be rash to deny the possibility that sixty years hence electrical locomotion by land and water may not be at least as important a topic for the consideration of those who by that time will have succeeded us. It may be that the problems of aerial navigation will then have been more or less completely solved. It is possible that in the art of cycling, which we usually consider merely as a pastime or a fashionable craze, we have already with us the development of an invention which is already exercising a marked economic influence, the statistics of which it may even now be worth while to observe. In matters such as these it is for the statistician to keep a watchful eye on the march of events, to discriminate between the trivial phenomenon and the inception of an economic movement, and by a careful tabulation of the "primary statistical quantity," to present essential facts in a well digested form for the consideration of the economist.

A very cursory perusal of the addresses which have been delivered by my predecessors in office, is sufficient to show how wide a field of selection is open to your President in the choice of a subject. The circumstances of my connexion with our Society have led me to the conclusion that I shall be justified if I devote a part at least of the time at my disposal to a sketch of the marked impetus that has been observable in the collection and study of statistics, both at home and abroad, whether by the direct action of the State, by private initiative, or by way of academic training, during the last twenty or five and twenty years. I cannot sufficiently express my thanks to those Honorary Fellows

of our Society, and to many of the Members of the International Statistical Institute, as well as to others to whom I addressed myself, for the readiness with which they have responded to my queries. I cannot even quote as amply as I could wish the expressions of individual opinion on the aims, scope, and tendency of the statistical method as made the subject of academic teaching.

Fully sensible that I have dealt very imperfectly with the material which has thus been placed at my disposal, I proceed to review the development of statistical methods that has been observable at home and abroad:—

- (1) On the initiative of the State,
- (2) Through the efforts of private Societies, and
- (3) Owing to the increased attention that has been given in recent years to Statistical training by educational bodies.

## II.

### *The Development of Statistical Research under the direction of the State.<sup>1</sup>*

#### *Austria.*

Since 1867, when the relationships between Austria and Hungary were settled on their present basis, the control of official statistics has been vested as regards Austria in the Central Statistical Commission, whose president is Dr. von Inama-Sternegg, Professor von Juraschek being vice-president. The Commission is responsible to the Minister of Public Instruction. The investigations as carried out by the commission are submitted in draft to a permanent committee consisting of representatives of every ministerial department, as well as some professors of political economy.

From 1872 onwards the Ministry of Commerce has compiled statistics of foreign trade, posts and telegraphs, railways, etc., while since 1873 there has been established in the Ministry of Agriculture a special statistical department, which deals with the statistics of agriculture and of mines. More recently, in 1892 and 1893, the Ministry of Finance has published valuable statistics relating to the currency question from data compiled by Dr Grüber. A Bill for establishing a Labour Department in the Board of Trade has not yet passed into law, but the statistical department of the Board of Trade is already collecting statistics dealing with strikes and labour lock-outs.

The censuses of 1869, 1880 and 1890 were taken under the provisions of the Census Law of 1869. Formerly each parish

<sup>1</sup> Cf. "Le 25<sup>e</sup> Anniversaire de la Société de Statistique de Paris, 1860-85." Paris, 1886.

furnished its census returns to its district, while the district as a whole handed in the collective totals to the Central Commission. But since 1890 the census papers themselves have been delivered to the Central Commission for more scientific treatment. The tabulation is performed by the Hollerith electrical apparatus, which it will be remembered was explained to this Society by the Hon. R. P. Porter, U.S.A., and Dr. Hollerith in December, 1894.

Administrative statistics relating to crime, hygiene, sanitation, &c., have received increasing attention from the Central Statistical Commission. Formularies and instructions are issued to school boards, medical officers, law courts, etc., and with a view to popularising the results of these investigations, since 1883 they have been presented to the public in the periodical '*Oesterreichische Statistik*,' and since 1889 in the '*Statistical Year Book*.' The Austrian Board of Trade has, since 1891, published in the monthly organ of the Board the statistics of foreign trade, and also in the '*Statistische Monatschrift*.' Values are established by a permanent commission of values in trade, composed of officials and business men, though it may be questioned whether this method is trustworthy, and whether the British method of valuation is not preferable, as being more independent of government control.

The Chambers of Commerce have, since 1880, supplied industrial statistics to the statistical department of the Board of Trade. The returns are based as regards the number of traders on the taxation lists, which are collected by the Chambers of Commerce as self-governing bodies; as concerns the extent of production, on returns furnished by the great producing establishments at the request of the Chambers of Commerce—an inquiry in which the Chambers of Commerce have the assistance of the Civil Service magistrates. It is proposed to supersede these statistical returns in 1897, or perhaps in 1900, by investigations based on an industrial census of all producers.

Agricultural statistics are furnished to the Department of Agriculture by agricultural societies, who take local estimates of the harvest, together with the average cost of production and average prices of the principal products. Mining statistics are supplied to the department by the owners of collieries, etc. The Agricultural Department issues a special year book. Its operations have not been marked by any noteworthy changes.

Social statistics have no uniform organisation. Some special work, such as a report on agricultural wages in 1895, has been done by the Central Statistical Commission. The Statistical Department of the Board of Trade has issued statistics of strikes

and lock-outs since 1894, chiefly based on the reports of factory inspectors. In addition to this, local Chambers of Commerce have done independent work. The Chamber of Reichenberg issued in 1891, "Labour Statistics of North Bohemia," and the Brünn Chamber of Commerce put forth the statistics of the working men of the engineering industry of Brünn, compiled by Dr. Stephan Bauer. The Brünn Chamber of Commerce also issued in 1894 a work on the local labour guilds. This inquiry was in 1895 extended to the whole of Austria, and published by the Statistical Department of the Board of Trade.

From 1883 onwards the greater part of the statistical work has been published in the "Statistische Monatschrift."

#### *Belgium.*

The administrative organisation of the Statistical Bureau remains, as always, under the direction of the Minister of the Interior and Public Instruction. The other ministerial departments have each of them special statistical bureaux.

There is one special statistical organisation, founded in 1894, which deserves independent notice: this is the Labour Bureau, which is placed under the administration of the Ministry of Industry and Labour. The publication of official statistics up to 1885 are set forth in the proceedings of the Twenty-fifth Anniversary of the foundation of the Statistical Society of Paris, in a paper contributed by Monsieur Leemans and Dr. Nicolai, in which the publications of the Belgian Statistical Bureau are enumerated.

#### *Denmark.*

In Denmark the State Statistical Bureau has been reorganised by the law of 16th December, 1895.<sup>2</sup>

The municipality of Copenhagen has its own statistical bureau. The publication of the statistics of commerce commenced to appear in 1876, although the organisation of the bureau only dates from 1st July, 1883. The bureau consists of a director, a sub-director and subordinates.

#### *France.*

The "Bureau de la Statistique générale de la France," which now forms one of the bureaux of the Ministry of Commerce, established in 1872 a new series of official statistics called the "Statistique annuelle," which has continued up to the present time. The same Bureau also published in 1873 a "Statistical Summary of the principal Industries of the Country," and in

<sup>2</sup> "Bulletin de l'Institut International de Statistique," tome xiii, deuxième livraison, pp. 312 and 313.



1878 began the "Annuaire statistique de la France," which contained the statistics published or prepared by the various government departments. Since 1871 the "Bulletin Consulaire" has been published, the text of which is furnished by the foreign minister, and completes the "Annales du Commerce extérieur."

The Ministry of Public Works publishes statistics of railways, tramways, and roads (routes). In 1882 it published a return of the "Circulation sur les routes nationales," and maps and diagrams illustrative of the mineral industries. In 1874 was instituted a "Service d'Economie générale," which was incorporated in 1878 with the "Direction des Cartes, Plans et Archives" et de la Statistique graphique." This office issued the "Bulletin du Ministère des Travaux Publics," recently discontinued, and the "Albums de Statistique graphique," which are still continued by the Ministry of Public Works, though the "Direction des Cartes, &c.," has been suppressed.

The Ministry of Finance, under M. Léon Say, created in 1877 a "Bureau de Statistique et de Legislation comparée," and also a "Bulletin Mensuel de Statistique et de Legislation comparée." It also publishes every year numerous important works concerning the finances, budgets, foreign commerce, and shipping. In 1883 the Ministry of Finance published an important inquiry on the valuation of revenue derived from land ("Evaluation du revenu foncier") with a statistical atlas, and in 1884 an equally important inquiry on the "Share of taxation which ought to be contributed by Landed Property" ("Cotes de contenance de la propriété foncière"). In 1887-88 was held an inquiry as to the valuation of house property.

The Ministry of Public Instruction publishes a quinquennial "Statistique détaillée de l'enseignement primaire" starting from 1878, and a tabulated summary every year.

The Ministry of the Interior was formerly charged with the quinquennial censuses, as well as vital statistics, local taxation, etc., but in 1891 the "Office du Travail" was founded as one of the bureaux of the Ministry of Commerce, and this office published the results of the census of 1891. It also publishes a monthly bulletin dealing with wages, hours of labour, strikes, etc.

The Ministry of Agriculture undertook in 1882 to publish a "Bulletin Mensuel," and decennial statistics of agriculture have been issued from 1852 to 1882, those for 1892 being not yet published. In 1880 the service of the statistics of the city of Paris was reorganised under Dr. J. Bertillon, and in 1882 appeared the first "Annuaire statistique de la Ville de Paris," in addition to the weekly and monthly bulletins. In 1886 was started the publication of the causes of deaths in the towns of France.

Several towns (Reims, Nancy, Lyon, Bordeaux, etc.) publish annual statistical abstracts.

On the 6th November, 1885, a convention of the States composing the Latin League was held, at which the French Government undertook to collect the statistics relating to the production, coinage, and consumption of the precious metals. A further conference was held in October, 1893, and as the result of the deliberations of the League, the International Statistical Institute, at its meeting at Berne in 1895, unanimously adopted a resolution to the effect that the French Government should place the Department of the Mint in a position to publish periodically the statistics of the production of the precious metals, their international movement, and their consumption in the shape of coin or otherwise in various States.

The Government has taken action in the direction indicated by the above resolution, and the first report of the Master of the Paris Mint, our colleague Monsieur de Foville, to the Minister of Finance, has recently been published. It is intended that this valuable publication, which is drawn up on the lines of the reports of our Deputy-Master of the Mint, shall henceforth be annual.

In 1886 was also founded the "Conseil Supérieur de Statistique," to exercise a general supervision over all official statistics published; it was modelled on the "Commission centrale de Statistique" of Belgium (see *Journal of the Royal Statistical Society*, December, 1882, p. 606).

#### *Germany.*

A fairly detailed review of the development of the organisation of official statistics of the various States and municipalities is given in the work of Herr Mischler—"Handbuch der Verwaltungstatistik," Stuttgart, 1892.

#### *Germany (Prussia).*

The development of official statistics in Prussia is recorded in the "Journal of the Royal Prussian Statistical Bureau," as well as in the "Preussische Statistik;" and a paper on the elaboration of the card system in Prussia during the past twenty-five years was contributed by Dr. Blenck to the proceedings of the International Congress of Hygiene and Demography, Budapest, 1894.

Many large cities, namely, Berlin (1865), Frankfort (1865), Altona (1871), Breslau (1873), Görlitz (1878), Cologne (1883), Magdeburg (1885), Königsberg (1893), Hanover and Dortmund (1894) have formed their own statistical bureaux, and there are similar statistical bureaux in Munich, Dresden, Leipzig, Chemnitz, Strassburg, Mannheim and Stuttgart. In the Hanse towns of

Hamburg, Bremen, and Lübeck the municipal as well as the national statistical departments are in charge of a single bureau.

*Italy.*

In Italy the statistical service is centralised by the union of the different statistical departments in the single department of the General Direction of Statistics, and also by the method adopted in adjusting original returns in a central bureau. The General Direction of Statistics is attached to the Ministry of Agriculture and Commerce, but for the purposes of statistical inquiry it is at the service of other administrative departments. Unity of method, which is indispensable in the conduct of its work, is assured, not only because of the uniformity of the executive bureau, but also by means of a superior council. This council is composed of eight *ex officio* members, including chiefs of departments and the Director-General of Statistics (Signor Commendatore Luigi Bodio), a delegate of each ministry, excepting that of agriculture and commerce, and eighteen members appointed by the crown. The sovereign also names the president of the council. The executive committee, under the presidency of the Director-General, prepares resolutions for submission to the council, and sees that they are duly carried into effect. Statistics of civil and criminal law are also compiled by one of the bureaus of the General Direction of Statistics under the instructions of a special commission appointed by the Minister for Justice. Of this committee the Director-General is an *ex officio* member. In a general way it may be said that the general direction is responsible for the preparation and publication of all official statistics, except—

(1.) Agricultural statistics, woods and forests, and live stock, which are published by the Agricultural Department.

(2.) The monthly position of credit and provident societies, which are published by their own special direction, included in the Ministry of Agriculture and Commerce.

(3.) Statistics of foreign commerce and shipping, together with statistics of tobacco and alcohol and other industries, which are subject to the official surveillance of the excise. These are published by the Receiver-General of Customs attached to the Ministry of Finance.

(4.) Statistics of railways, which are made by the Department of Public Works.

(5.) The statistics of posts and telegraphs, post office savings banks, and telephones, which are published by the Ministry of Posts and Telegraphs.

(6.) The accounts of the financial department of the State as

regards taxes, public debt, etc., which are compiled by the Ministry of Finance.

(7.) Statistics of recruiting in the army, which are published by the War Department.

The scope and method of work prescribed to the general direction of statistics is laid down in the decree of the 9th January, 1887.

For ten years the adjusting of statistical matter has been so far centralised that the original tables for the whole of the kingdom are examined in the central bureau. For instance, mortality returns are based on a separate schedule in the case of every death duly attested, in which is set forth the name, sex, and age of the deceased, &c., as well as the nature of the last illness or cause of death. These returns are sent once in three months by the communes to the General Direction of Statistics through the intermediary of the prefectures. A similar method is adopted in the case of criminal statistics.

The mechanical appliances in use are Thomas's arithmometer, and for the last two years Hollerith's electrical tabulating machine.

#### *Netherlands.*

The Special Bureau of Statistics at the Ministry of the Interior came into existence in 1849, at first under the direction of Dr. von Baumhauer, and afterwards of Dr. G. de Bosch Kemper. It was abolished in 1878, and its work was transferred to the various government departments concerned.

In 1891-92 the Government, on the proposition of Dr. Tak van Poortvliet, Minister of the Interior, founded the Central Statistical Commission.

The Commission, whose office is at the Hague, is composed of thirty members, assisted by a secretary, Dr. Verriijn Stuart, the chief of his bureau. Its operations are recorded from time to time in the official gazette, and it issues an annual report in the shape of a year book, one for Holland and one for the colonies; it also continues the publication of the "Statistical Year Book" on the lines adopted by the Statistical Society, by whom it was first issued. A bulletin, however, has been added, which appears twice a year, and in which monthly statistics are given, whether obtained from official or non-official sources. It also undertakes independent statistical researches, and directs the work of all government bodies in statistical matters. Besides the researches undertaken on its own initiative, the Commission has opened a series under the title "Contributions to the Statistics of the Netherlands." The three volumes of this series which have already appeared deal with the statistics of trades unions, with

the consumption of certain commodities of first necessity and of relative luxury during the period 1852-91, and with the wages of labourers employed on public works.

The foregoing sketch would not be complete without mentioning that two years ago a municipal bureau of statistics was inaugurated for Amsterdam, under the direction of Dr. A. Falkenburg, which is fairly successful.

At the seventh census on 31st of December, 1889, separate individual returns were made for the first time, and from these returns the numbers and other details of professions were obtained, the results of which were published in twelve volumes in 1893-95. This system has also just been applied to penal statistics, reorganised at the beginning of the present year, which are under the control of the Ministry of Justice.

#### *Norway.*

The Norwegian Statistical Bureau was included in the Home Office until the year 1876, when it was reorganised and made a special independent institution, but remained under the control of the same department. Its work embraces statistics of all kinds except a few special branches, namely, railways, post offices and telegraphs, statistics of diseases, public education, national finance, prisons, and recruiting.

During the period 1875-96 judicial and criminal statistics, and statistics of savings banks, poor relief, probate, bankruptcies, and the electorate have been transferred from one or other branch of special administration to the central bureau, which has also during the last few years commenced to investigate and publish statistics of labour and wages.

Previous to 1875 the counting up of statistical data in the most important branches of information, such as census returns and the movement of population, was founded on individual returns.

The method of individual tickets or cards has been successively extended as much as possible during the period in question to all branches of statistics, and since 1895 the Hollerith electrical machine has been introduced. The representative method mentioned by Dr. A. N. Kiær, in his paper presented to the meeting of the International Statistical Institute at Berne in 1895, has also been introduced.

#### *Roumania.*

In 1872 the kingdom of Roumania did not exist; since that time it has come into existence, under circumstances which, on the present occasion, it is unnecessary to trace.

It is satisfactory to find that this young country has already

made considerable progress in the organisation and development of its statistical department. This has been organised by the ministers of the public domains, commerce and industry, and placed under the charge of Monsieur Crupenski. At the same time the Minister for Education has organised a well equipped statistical department, which has already issued very valuable statistical returns dealing with the attendance of children at school, judicial statistics, and especially the statistics of suicide.

The Bertillon system of anthropometry as applied to the detection of criminals has also received special attention, and has had very satisfactory results. It is proposed to extend the system of Bertillonage beyond the criminal classes, and to make use of it in connection with the recruiting service for the army as well as for the police, domestic servants, and drivers of hired vehicles. It is already in use for the identification of corpses otherwise unknown.

#### *Russia.*

The activity of the Russian Central Statistical Committee, founded in 1802, is well known. The constitution of this department, which has always been under the control of the Ministry of the Interior, has been brought up to date by the publication of an "Aperçu Bibliographique" in 1895. Next in importance to the Central Committee must be placed the Department of Agricultural Statistics, attached to the Ministry of Agriculture and Public Lands. Since 1881 the sphere of its operations has been enlarged so as to include the statistics of rural industry, compiled by the assistance of voluntary co-operation. The department further issues publications on various matters connected with rural industry and technical agriculture.

Statistical bureaux are attached to the greater number of the departments of the Ministry of Finance, the most notable being that which deals with customs and foreign trade. In this department the system of registration has in matters of detail been brought closely in line with that in use in Germany. Another very important statistical bureau is the one established in 1873 in connection with the Ministry of Roads and Communications. Its publications deal with the statistics of transport by road and rail, as well as by river and canal. The statistics of crime, prisons, etc., similarly emanate from a statistical bureau of the Ministry of Justice.

The collection of local statistics has had its origin during the last five and twenty years, during which it has attained considerable development. Twenty-five provinces now possess statistical departments, whose special object is to study the economic condition

of the peasants, and to a certain extent that of the private landowners. By 1893 collection was made of the statistics of each *zemstwo*, the necessary statistics in the case of the peasants being collected by means of a house to house visitation. The same system was applied to the landowners in one hundred and twenty-three districts. In addition to this many *zemstvos* have a statistical department on the lines of that of the Ministry of Agriculture.

Considerable progress has also been made in the matter of municipal statistics. St. Petersburg, Moscow, Warsaw, Odessa, and some other cities possess statistical bureaux in connection with the municipal department. These bureaux more than once have undertaken a census of the population. The last census of St. Petersburg took place in 1890, Moscow in 1892, and Odessa in 1893. In addition these bureaux publish statistics as to the movement of the population and other phases of social life.

#### *Spain.*

In 1856 a State statistical bureau was first established in Spain, under the title of "Comision de Estadistica general del "Reino." In 1861 its title was changed to "Junta general de "Estadistica." Its duties were to collect the general statistics of the kingdom, and to bring special statistical subjects into line for the purposes of comparison with similar investigations of foreign countries. Finally, on the 27th April, 1877, it assumed its present form, under the title of "Direccion general del Instituto Geografico "y Estadistico."

The Institute of Geography and Statistics is divided into three branches—Land Survey, Topography, and Statistics. Any lack of private initiative in organising special statistical societies has been made good by the publication of special statistics by the various administrative departments, whose labours have been subjected to the service of statistical science.

Account must, however, be taken of the fact that during the period under consideration statistical works of real value have been published in Spain, notably those comprised in the publications of the Geographical and Statistical Institute above mentioned. All these statistical works have, with very few exceptions, been published since 1874.

#### *Sweden.*

As a rule the branches of official statistics in Sweden, which have been in existence for twenty-two years, still furnish their information on the same general lines. Since 1874, however, a new method in relation to agricultural statistics has been partly

employed, so that immediately after the harvest a report can be presented on its results, although the figures are approximate only. Moreover, the agricultural statistics, as furnished by the agricultural societies since 1865, are now more exact, owing to the local researches which are made each year in the smallest districts of the country.

As to the developments and improvements in statistical methods, both as regards the extent of information and elaboration and publication, the following points may be noted :—

The statistics of population in each commune have been issued annually since 1886, instead of triennially as in earlier years.

Since 1875 statistics of emigration have been completed by information on immigration.

In the census return of 1890 (part iii), the mortality and survival tables have been given separately for urban and rural districts. Death-rates had already been presented in 1880 showing social condition.

For several years past in the census returns a calculation has been made of the distribution of the population according to age. Since 1891, the "Journal of the Central Bureau of Statistics" has contained similar calculations on the distribution of the population both according to age and social condition.

Since 1895 deaths and marriages are distinguished by the year of birth as well as by the age of the persons. In the figures on the distribution of population according to profession in the general census, distinction is made between the number of women (since 1880) and the number of children (since 1890) in each group of professions.

In the shape of an appendix to the population statistics of 1876, there was published a yearly *résumé* of the population since 1748.

After the reorganisation in 1892 of the College of Commerce, which publishes the statistics of mines, factories, trades, commerce, and navigation, a special section of statistics was instituted, and the above named branches of official statistics underwent remarkable changes and developments : those of mines and factories were essentially extended and better arranged ; the prices of merchandise in foreign trade were thoroughly reviewed, and the commerce of Sweden with each foreign country treated more in detail. Statistics in regard to labour have become much more complete, and the Diet of the present year has voted a sum for further improvements and more prompt publication.

Since the year 1883 the statistics of telegraphs also include information as to telephones.

In the quinquennial reports of the *préfets* the following new subjects may be mentioned :—



Statistics of investments belonging to Swedish joint stock companies.

Investments owned by subjects of foreign powers.

Funded investments held by trustees and pious or religious foundations of every kind.

Moreover, the statistics of insurance are now given in much greater detail. Since 1887 these statistics have been published annually by the Ministry of the Interior.

The great series of materials for the official statistics of Sweden (*Bidrag till Sveriges Officiella Statistik*) has been increased by the insertion of new subjects, namely :—

Annual statistics of secondary instruction (1876-77) and all primary education (1892).

Statistics of lands farmed by the State for the years 1883-87.

Annual statistics of public relief and the finances of the communes since 1874.

Statistics of the manufacture and sale of alcoholic liquors, and of the cultivation of the sugar-beet since 1873-74.

Statistics of salaries and pensions in the public administration from 1882 to 1891, which deal with the whole administrative department of the State and of the Diet.

Statistics of postal savings banks, published since 1884, and also statistics of other savings banks whose figures were originally published in quinquennial reports of the local *préfets*, and for the years 1860-92 were given annually in the "Journal of the Central Statistical Bureau" formed in 1893.

Special statistical research has been made into the qualifications for the political and communal franchise.

Mention may be made of the following official statistics, although they do not appear in the materials for official statistics in Sweden :—

Monthly reports of foreign commerce.

Annual statistics of registered mutual sick-benefit societies.

Annual reports on the inspection of labour.

The "Statistical Journal," published annually since 1871, embraces an *annuaire* or *résumé* of official statistics in Sweden, and since 1895 a *résumé* of the principal statistical facts in various countries.

Valuable statistical inquiries have been conducted by more than one royal commission specially appointed. The commission appointed in 1884 in order to submit a project for old-age pensions for the working classes, presented a mass of social statistics of the greatest value under the following heads :—

Accidents in, and duration of, work.

Warming and ventilation of workshops.

#### Measures of precaution adopted in factories.

Pension funds for inferior civil and municipal officials, as well as for non-commissioned officers of the army and navy, registration offices and pension bureaux in connection with the mercantile marine, individuals entirely dependent on public assistance, mutual offices providing for sickness or death, distribution according to age and social condition of the working classes, and mortality according to occupation.

#### *Switzerland.*

In dealing with the statistics of Switzerland it must always be borne in mind that Switzerland, like the United States, is a confederation of sovereign States. In legal procedure, police, public instruction, public worship, public works, industry, agriculture, finance, poor relief, etc., etc., each canton takes its own line, and the tendency is as a rule extremely conservative. The federal authority, therefore, only exercises control over those departments which have been placed in its hands under the federal constitution, such as civil status, customs, posts, telegraphs and telephones, the army, and, in part, civil justice.

Social questions that come under the discussion of the general assembly of the confederation as well as of the separate cantons, require for their solution information which statistics only can give, and which is demanded on all sides. Thus the Federal Statistical Bureau was called upon to undertake during the years 1888-91 the statistics of accidents, with the object of elaborating a scheme for insurance against accidents. This question of insurance against accidents was the reason why the census of the confederation, which should have taken place in 1890, was anticipated by two years. The next census has been fixed for 1900, and it is quite possible that after 1900 the decennial will give way to one taken quinquennially. To take another instance, in the matter of public instruction, the confederation possesses only one polytechnic school, situated at Zurich, all other educational establishments are under the direction of the cantons. At the same time the confederation encourages the publication of a statistical annual, which brings together all statistics available under the head of public instruction.

The receipts of the confederation are limited to the property tax, customs, posts and telegraphs, explosives, the half of the military tax paid by those who on the score of health are exempted from service, the mint, a tax on bank notes, and other receipts. The expenses of the confederation are limited to the services imposed upon it by the constitution.

Considerable subventions are granted to the various cantons

for public services or for works of general utility. In order to obviate as far as possible the inconveniences which thus arose, some of the official statisticians in 1889 conceived the idea of holding annual conferences of the officials who, either by federal or cantonal authority were specially entrusted with statistical work. The object of these conferences, which have done much valuable work, was to arrive at the best system of drawing up in the various cantons uniform statistical tables, so that the returns might be capable of comparison. These conferences are now held annually in different cantons, in conjunction with the annual meeting of the Swiss Statistical Society, and the necessity and advantages of sound statistical work have been thus effectually brought home to the public. Under these conditions not only has the Swiss Statistical Society observed an increase both in the number of its members as well as of its sections, but in addition certain of the cantons have established their own statistical societies. Thus after the meeting at Lugano in 1892, a statistical society was founded in the canton of Ticino, and a similar society was formed at Geneva; again, a meeting at Zurich in 1894 led to the foundation of a statistical society at St. Gall, while in the following year, as a consequence of the meeting of the International Statistical Institute at Berne, a cantonal bureau of statistics was also founded at St. Gall. It is probable that some of the adjacent cantons will come to terms with the government of St. Gall in order to make common use of its bureau for certain inquiries in statistical work.

Very shortly after the meeting of the International Statistical Institute above mentioned, the canton of Fribourg also organised a statistical bureau for the special investigation of agricultural statistics. The canton of Geneva followed this example.

There are at the present time in existence the following federal bureaux:—

(1.) The bureau of statistics, attached to the department of the Interior.

(2.) The bureau of commercial statistics (customs), attached to the department of Finance.

(3.) The bureau of railway statistics.

The other departments of the federal administration have at least one official charged specially with the statistical work which appears in its annual reports. The cantonal bureaux are those of Zurich, Berne, Argovie, Vaud, Fribourg, St. Gall, and Geneva. In all the other cantons there is an official whose duties consist in the compilation of annual statistical returns. In addition to these the municipality of Zurich has a statistical bureau, and in the city of Berne a similar bureau is in course of formation. The canton of Bâle (city) has under consideration at the present time the

establishment of an analogous department. The federal bureau occupies itself specially with the periodical census of the population as well as of live stock. It also takes note of the statistics of the movement of the population. Before 1889 its publications were very few and of little general interest; since that date it has laid itself out to popularise the statistics of the movements of the population, and its publications have accordingly increased in bulk and in attractiveness.

The director of the statistical bureau, acting in concert with the chief of the sanitary bureau, has endeavoured to obtain from the medical profession returns, as accurate and circumstantial as possible, as to the causes of death. The federal law requires a medical certificate of death and an indication of the cause of death. This declaration must be handed by the doctor to the family of the deceased, and it often happened that the true cause of death was not indicated, but that some cause less painful to the relatives was substituted. Again, in certain cantons, as in Geneva, the doctors took refuge behind the veil of professional secrecy and refused to state the cause of death. The registrar had, therefore, to be content with the declaration of the official verification of death which satisfied the schedule, and left the cause of death to be declared by the relations. It happened also that the doctor in attendance gave as the cause of death a secondary complaint, as, for instance, pneumonia, when this disease was the consequence of measles, or nephritis, when the primary cause was scarlatina. In order to obviate these inconveniences, the Statistical Bureau, in accord with the medical profession, instituted a new certificate of death. As soon as a death is declared to the civil authorities, the officer fills up the first part of the new schedule, and sends it with an envelope to the doctor who has signed the open declaration. The doctor, after having assured himself of the identity of the individual, tears off the counterfoil which bears the name of the deceased, and has only to answer questions in the second part of the schedule, that is to say, to indicate primary and secondary, or immediate cause of death, as well as all information useful for statistical purposes. Having done this he returns the card to the registrar, who is not at liberty to open the envelope, but must satisfy himself that the card is therein contained. Later on the sealed envelopes are sent to the officials of the Statistical Bureau, by whom they are sorted and arranged. In this way medical confidence is safeguarded and exact returns are obtained. In this manner the series of the death returns have attained a high degree of accuracy, since they are based on confidential information given by doctors who are only actuated by the interests of medical and sanitary science. This method is one worthy of special attention.

The efficiency of the Statistical Bureau is further increased by the courtesy of the administrators of hospitals and asylums and institutions of various kinds, who furnish returns regularly. In this way it has been found possible to publish a first record of the statistics of the mentally afflicted and institutions for the insane. In the matter of penal statistics the case is the same: they are furnished by monthly returns giving the names of those who are in custody in the various prisons of Switzerland. The statistics of fires have also at the instance of the statisticians at their meeting at Neuchatel been undertaken by the bureau, and a report is now in the press.

As regards the method employed in statistical research, may be mentioned the introduction of nominative returns in place of the system of lists in preparing a census of the population. The new system offers the advantage of greater exactitude in collecting the returns, and permits the insertion of a larger number of questions. For some years it has been the habit to take as the basis of calculation the ordinary resident population instead of the actual population, and as regards the death-rate the death is attributed to the place of domicile of the deceased. This was an absolute necessity in the matter of the chief cities of the greater number of the cantons, whose hospitals took in the sick not only of the canton itself, but also of neighbouring cantons, and it was not rational to charge the death of the sick who came from beyond the frontier, to the locality where by chance the cantonal hospital was placed. Formerly this distinction was not drawn, and so it happened that the death-rate of the principal cities was relatively very high, and conclusions were drawn adverse to the salubrity of the large towns. In great cities like London, which comprises more inhabitants than the whole of Switzerland, the death of non-residents is of no great moment on the death-rate; but it is quite otherwise in the small towns of Switzerland. This is the reason why deaths are set down to the usual domicile of the deceased. The practice is the same as regards births. Great pains are taken to obtain exact information as to age, civil condition, profession, birthplace, etc., of each individual, and moreover when the cause of death is not sufficiently set forth on the new schedule, a letter is addressed to the official registrar in charge of the case asking for further details.

It is much the same with other works which the bureau has been called upon to take up, such as the medical and educational examination of recruits, divorces, etc.; and now the bureau is able to group in its publications the results of five or ten years, in order to have, as far as the conditions of the Swiss confederation permit, sufficiently large totals and figures that are reasonably comparable.

Of the numerous publications of the Statistical Bureau the principal is the "Statistical Annual," whose first volume appeared in 1891; the sixth is now in the press.

*Great Britain.*

To enumerate the many subjects which have, during the last twenty-two years, furnished matter for Government inquiry whether by means of departmental, parliamentary, or mixed commissions, would not only be unwarrantably voluminous, but would also be superfluous, and at the same time tedious to my audience. In every department the Government has shown activity in availing itself of the statistical method in dealing with the matters which it has made the subject of inquiry. I may, however, refer to a few subjects which various departments have investigated, with the result that action of an enduring character has followed.

The want of official returns of agricultural production in Great Britain, which was brought under the notice of our Society in 1883, has been remedied. In the Board of Agriculture itself is to be recognised the formation of a new Government Department under an Act of 1889 (52 and 53 Vict., cap. 30), which recites as one of its special objects the collection and preparation of statistics relating to agriculture. Several additional matters are now dealt with statistically in this office, and its publications include returns as to the price of cattle by live weight—a new class of statistics obtained under a special provision of 54 and 55 Vict., cap. 70.

The Home Office has applied itself to the more complete collection of valuable statistics respecting mines, and the inspection of factories, civil law and judicial statistics, a special statistical branch having been organised.

The Board of Inland Revenue is applying statistical analysis to the returns made to it for the purposes of the death duties, the classification of various descriptions of property, real and personal, promising to be thus made more complete than hitherto.

The Board of Trade has organised the Labour Department and the statistics of labour. This matter was one which, in 1885, as a result of the meeting of the Industrial Remuneration Conference in London (*Journal*, 1885, pp. 121 and 340), received the attention of our Society. In April of that year, as the outcome of this conference, the Society addressed a letter to the Board of Trade urging the importance of an accurate collection of the statistics of labour. In connexion with these matters I may mention the establishment of the "Journal of the Board of Trade."

The Foreign Office has, during the period under review, undertaken the publication at shorter intervals of reports made by our consuls abroad. I need hardly say that in view of the competition

in trade affairs to which we are subjected by foreign nations, the consular reports are of extreme importance to our commercial community, and that they are not yet, in popular opinion, held to have attained ideal perfection.

The Local Government Board has devoted considerable attention to the more careful and complete analysis of returns of local taxation, the previous absence of reliable information on this subject having been on more than one occasion a matter of comment at the meetings of our Society.

### III.

#### *The Development of Statistical Research by private Societies.*

##### *Austria.*

There are in Austria no statistical societies properly so called, but the Austrian Society of Economists has from time to time done good work in this direction.

##### *Denmark.*

The National Society of Political Economy was founded on 12th November, 1872, having for its object the discussion of questions relating to political economy and statistics. An account of the discussion and the results of the meetings is given in the "Nationalökonomisk Tidskrift," which also contains original articles on economics and statistics.

##### *France.*

No new Statistical Societies have been founded in France, but the Journal of the Statistical Society of Paris shows that our friends there are carrying on their work with undiminished and even increased energy. It will be remembered that simultaneously with the celebration of our Jubilee, the Paris Society commemorated the twenty-fifth anniversary of its foundation, and the occasion was marked by the issue of a special volume.

##### *Germany.*

"The Allgemeines Statistisches Archiv," founded in 1890, is the only non-official periodical in Germany which deals exclusively with statistics.

##### *Germany (Prussia).*

With the exception of the Geographical and Statistical Society in Frankfort-on-Main, there is no statistical society in Prussia. This society, assisted by a municipal grant in aid, has published a record of its own labours, as well as of the municipal statistical department, covering the period from 1858-90. Since 1892 this

work has been continued by the Statistical Bureau. Similar publications have been issued at Breslau and Magdeburg. Especial attention has been given in Berlin to the condition of its population, with special reference to the condition of buildings and dwellings. Special attention has also been given to the monthly and weekly movements of the population, together with vital statistics, more especially as affected by meteorological conditions.

#### *Hungary.*

In Hungary there are no statistical societies, nor any unofficial organisation for the collection of statistics, but there is a single Politico-Economic Society, of which Herr Louis Lang is the president. This society embraces a statistical section.

#### *Italy.*

There is not in existence any purely statistical society, but it is needless to say that numerous works on statistics have been published in Italy, whose bibliography will be found in the pages of the Bulletin of the International Statistical Institute.

#### *Netherlands.*

Much of the progress of statistics in this country is due to the exertions of the late Professor G. de Bosch Kemper, who, in 1849, after the extension of the franchise, published the first number of a statistical year-book, entitled "Annuaire Politique et Economique." As the work became too vast to be dealt with by one person, he invited the co-operation of others, and this led to the formation, about the year 1859, of a Statistical Society. Dr. N. G. Pierson, Professor of Political Economy and Statistics at Amsterdam, became president of the Society, and at his instigation the municipal authorities made the departments of political economy and statistics distinct — the statistical department being placed under the direction of the late Dr. A. Beaujon. In 1878 the Government Bureau of Statistics was dissolved, and in order to avoid the serious consequences of this measure for those interested in statistics, the Statistical Society considered it their duty to redouble their activity. Side by side with the "Annuaire Politique et Economique" mentioned above, the society resolved to issue a statistical year book, and for this purpose obtained a subsidy from the government. The first volume, as well as that of 1881, was edited by Dr. de Bruijn Kops, then president of the society. The society also founded at Amsterdam in 1884, at the instigation of Dr. Pierson, and with a view to more effective co-operation with the city government, a Statistical Institute, under the direction of the late Dr. Beaujon,



professor at the Municipal University of Amsterdam, who was succeeded in the post by Dr. C. A. Verrijn Stuart. The works of the institute were published under the title of "Bijdragen van het Statistisch Instituut" from 1885 to 1892. But the Statistical Society and its Institute, believing that a private institution was not sufficient for the work, continued to urge on the government the necessity for a central office for the kingdom, and their efforts were at last crowned with success in 1891, when the Institute was superseded by the Central Statistical Commission. Thereafter the parent Statistical Society became a society of political economy and statistics, whose meetings are annual, but it has not ceased its work of publication.

#### *Norway.*

There is not in Norway any exclusively statistical society, but in 1893 a society was founded at Christiania for the study of political economy, which also gives attention to statistical questions.

As regards statistical publications proper, it is sufficient to mention that since 1st January, 1885, the date of the commencement of the third series, 244 different volumes of official statistics have been published.

#### *Russia.*

The Imperial Geographical Society of St. Petersburg, the Imperial Economical Society, and the Juridical Society at Moscow, embrace special statistical sections. The Geographical Society has been specially persistent on the necessity of a general census of the empire, which has been officially fixed for 1897. The Juridical Society at Moscow has paid special attention to the local statistics of the zemstvos, and its observations have been comprised in two volumes published by the society.

#### *Spain.*

No special statistical societies have been founded in Spain during the period under review, and although weekly and monthly reviews devoted to statistical research have been published, their existence has been but ephemeral.

#### *Switzerland.*

The attention bestowed by educational bodies on statistical training has fostered a taste for this kind of investigation in different classes of society, and numerous independent associations, industrial, commercial, agricultural and philanthropic, undertake, each in their own department, statistical work. At the National Swiss Exhibition, which took place this year at Geneva, there was a group

devoted to social economics, and the greater part of the exhibitors had represented their operations by the graphic method. A special catalogue of this group indicates the practical tendency of this exhibition under all heads—a tendency which does not exclude the scientific or theoretical point of view which is essential to scientific training. Evidence in this direction is moreover furnished by the “*Journal de Statistique Suisse*,” the organ of the Swiss Statistical Society, now numbering 470 members, scattered throughout the various cantons, and devoted to all branches of social inquiry.

Since the publication of Monsieur Kummer’s historical account of the development of the statistics of Switzerland, her statesmen and the public have shown themselves to be well disposed towards the work undertaken in this direction.

The meeting of the International Statistical Institute at Berne in 1895 exercised a very favourable influence on public opinion, and while fully appreciating the papers then read, special importance was attached to the public lectures delivered on that occasion by Monsieur Levasseur and Herr von Mayr.

#### *United Kingdom.*

I must not pass over without brief notice the operations of our friends of the Manchester Statistical Society, and of the Statistical and Social Inquiry Society of Ireland.

#### *The Manchester Statistical Society.*

This Society claims precedence on the score of seniority. It was founded in 1833 by Dr. Kay (afterwards Sir James P. Kay-Shuttleworth), Messrs. S. and W. R. Greg, W. Langton, John Kennedy, Henry Newbery, and Mr. (afterwards Sir Benjamin) Heywood, its first president. The number of members on the books at the end of the first session was no more than 28; its last report, for 1895-96, shows a total muster-roll of 201—a number which exhibits a considerable increase over the totals of the last few years, but which does not yet satisfy the aspirations of the council. The Society, organised on the same lines as our own, can show many eminent names, including the late Professor Stanley Jevons, Professor Bonamy Price, William Langton, and others, among its Fellows and contributors to its “*Transactions*.” The papers read at the periodical meetings, while covering wider ground than those to which our Society is accustomed, are in many cases extremely interesting records of local sociological problems as illustrated from time to time by the statistical method. A *résumé* of the history of the Society will be found in an address delivered in 1875 by the president, Mr. Thomas Read Wilkinson.

Unfortunately the records of the Society during the earlier years of its existence are incomplete, but since 1853 its operations have been continuously recorded in an annual volume of "Transactions," whose contents testify to the unremitting activity of our friends in the north.

*The Statistical Society of Ireland.*

The full name of this Society, which we usually style the Dublin Statistical Society, is "The Statistical and Social Inquiry Society of Ireland." It was founded in 1847, through the initiative of Archbishop Whately and Dr. Hancock, then Professor of Political Economy in the University of Dublin. As is imported by the style of the Society, it is not limited to inquiries under the numerical method, but its scope also embraces politico-economic questions, including various sociological problems, such as the Land Question. Unfortunately, in the case of Ireland, during recent years, in the treatment of such questions political views have been apt to outweigh in the balance economic theories. It has proved impossible to discuss all the subjects which come within the purview of the Society without introducing a measure of party feeling, which has not operated advantageously to the Society, and the number of members has, to a certain extent, suffered in consequence. It will be the unanimous wish of all of us that the future may have in store more settled times for the sister island, and that increasing prosperity in Ireland may be accompanied by an augmentation of strength and efficiency in her Statistical Society.

*Royal Statistical Society.*

It is impossible for me to deal with the annals of our Society during the first eleven years of my connection with it, without travelling over ground already thoroughly explored. Our earlier history was very opportunely placed on record by our esteemed ex-President, Dr. Mouat,<sup>3</sup> at our Jubilee Meeting in 1885. Nevertheless, at the risk of repetition, I may mention the foundation in 1873 of the Howard Medal; and in 1882 of the Newmarch Memorial Prize Essay (100*l.*) offered by the late Mr. H. D. Pochin, and awarded to Mr. William Watt of Aberdeen (*Journal*, 1885, p. 441). In 1883 was established the Newmarch Memorial Fund, the investment of which has sufficed for an endowment of 60*l.* per annum. This endowment has been placed in the hands of the Trustees of University College, London, with the object of

<sup>3</sup> "History of the Statistical Society of London." By Frederick J. Mouat, M.D., Jubilee volume, 1885, pp. 14—71.

providing for an annual course of lectures to be delivered by the Newmarch lecturer. The first Newmarch lecturer was Professor H. S. Foxwell, and the appointment is now held by Mr. A. L. Bowley. In 1892 was founded the Guy Medal, to be awarded to the contributor of the best paper of the year, or in recognition of special and extraordinary services to statistical science. Under the former clause, the Guy Medal has been awarded to Mr. A. Sauerbeck, Mr. John Glover, and Mr. A. L. Bowley; under the latter, to Mr. Charles Booth and Sir Robert Giffen.

The outcome of our Jubilee Meeting in 1885, to whose proceedings Dr. Mouat contributed his historical sketch of our Society, was the foundation of the International Statistical Institute, to which I have already more than once referred. The establishment of the Institute has, in my opinion, been of great value to the Society, since we have been brought into more direct relations with many of the most eminent statisticians in all parts of the world. The meetings of the Institute have given opportunities to many of us of becoming personally acquainted with men who would otherwise have continued to be known to us by their works and their reputation only. It is unnecessary to say that among the members of the International Statistical Institute will be found many who, either as honorary or ordinary Fellows, belong to our Society. The annual bulletin of the Institute contains many papers worthy of the distinguished authors by whom they are contributed. The Institute has throughout sought to enlarge its sphere of influence by appointing committees for the purpose of investigating the comparability of statistical methods as adopted in various countries, and with a view, if possible, of bringing them into harmony. It is to be regretted that, on the whole, the results achieved by these committees have been but slight. The reason is not far to seek; the members of the committees, in some cases themselves government officials, in others absorbed in academic work or engaged in business affairs, but in all cases men whose time is already sufficiently engrossed, have little leisure for the labour involved in the work necessary for adequate inquiry into the subject matter under investigation by the committee of which they are members. Further, the lines on which government departments are conducted are not easily altered, and to make a change is under no circumstances an operation that is easily effected. It is to be hoped that as time goes on, and as the advantage of bringing into harmony the statistics of various countries is recognised, the good work done by committees of the Institute may yet bear good fruit.

Our own Society has not failed to bring its views under the notice of Her Majesty's government in cases where statistical

inquiry had shown that alterations in existing departmental methods were desirable. This has been specially the case in matters connected with vital statistics, and the taking of the periodical census of the United Kingdom. In 1888 memorials were presented by the Society to the Chancellor of the Exchequer and to the President of the Local Government Board, calling attention to matters connected with the census to be taken in 1891. The memorial based on the report of the census committee of the Society specially urged the taking of a quinquennial census under an Act to be passed with that object, and the appointment of a separate census branch in the General Register Office for England and Wales. As a result of these memorials a departmental committee was appointed to consider the whole subject. In 1894 a similar memorial was addressed to our ex-President, Mr. Shaw Lefevre, then President of the Local Government Board, and a deputation of the Society waited on Mr. Shaw Lefevre in order to urge their views. In July, 1895, prior to the taking of the quinquennial census of London under the Equalisation of Rates Act on the 29th March, 1896, a sub-committee was appointed to confer with the Local Government and Taxation Committee of the London County Council on the inquiries to be scheduled in the census return, but in the result the particulars of age and birth-place, to the inclusion of which the Society had attached great importance, did not find favour with the committee of the London County Council.

Among matters more particularly of private interest may be mentioned the publication in 1888 of Part IV of the General Index to our *Journal*, and in 1895 of the Subject-Index to our *Journal* for the years 1865-94. Lastly, I may mention our change of style in 1887, when, under a royal charter, we prefixed the word Royal to the name by which our Society had up to that date been known.

It only remains for me to say that the number of Fellows on our books on the 31st December annually, reached its high-water mark of 1,063 in 1890. There is no doubt that the extreme financial depression which followed the crisis of November, 1890, is in a great measure responsible for a certain falling off in our numbers. We are not the only sufferers in this respect. It is to be hoped that with returning prosperity we may see a corresponding growth in the number of our Fellows. I do not myself believe that there is any diminution in the interest taken in the pursuit of statistics, and it will be a gratification to me if, at the end of my tenure of office, the number of our Fellows shall have been reinforced to an extent that shall have effaced all our recent losses.

## IV.

*The Development of Statistical Training by Educational Bodies.**Austria.*

The Seminary of Statistics was established in 1889 by Dr. von Inama-Sternegg, for the enlistment of young men in the service of statistical work. Among those whose studies have taken their direction under these auspices are Professor Mischler of the University of Gratz, Dr. Rauchberg, Dr. Ferdinand Schmid, and Dr. Stephan Bauer. There are in Vienna two professors of statistics, namely, Dr. von Inama-Sternegg and Professor Isidor Singer. Since the death of Dr. Brachelli his chair has been vacant. The statistical chair at the High School of Agriculture has also been vacant since the death of Professor Hans E. Sax. At the University of Prague there is no special chair of statistics, one or both professors of economics embrace statistics in the course of their lectures. Professor Rontemann Harburg teaches statistics at the University of Czernowitz, as does Professor V. John at Innsbruck. There are thus in Austria five ordinary professors of statistics, one extraordinary, three *privat-docenten*, and one *supplent*.

*Belgium.*

Professorial chairs have been founded in each of the State universities of Ghent and Liège. They are attached to the *Faculté de droit*. There is also a course of statistical training at the free university of Louvain. The curriculum of the military school also embraces the study of statistics. Mention may also be made of the foundation of a statistical prize, through the generosity of a former director of the General Statistical Bureau, Monsieur Heuschling, who bequeathed a capital of 25,000 frs. for the endowment out of its accumulated interest of a quinquennial prize to be awarded by the government.

*Denmark.*

During the period under review a new professorial chair has been founded at the University, to which Professor Harald Westergaard was elected on 8th May, 1886. The principal object in view in creating this professorship was to teach the theory of statistics, and the works of Professor Westergaard on the subject, which particularly deal with the mathematical aspects of statistics, are made the basis of instruction. In addition the course of teaching embraces the statistics of the country as given in the

exhaustive work, "Statistics of Denmark," by Professors Falbe-Hansen and Scharling (six volumes).

The statistical laboratory of the University was opened on 1st September, 1892. For students preparing for examination in political economy and statistics, the course is obligatory. Professor Westergaard has been placed at the head of the laboratory, while the direction has been confided to three professors of political economy. Attached to the laboratory is a library of works on political economy and statistics for the use of students, and the laboratory also collects on its own account statistical materials applicable to special inquiries.

Outside the University, statistics are also taught at the Military School, the higher commercial schools known as the Schools of Brock, and other commercial academies, but in these cases the instruction is restricted to the statistics of the country.

#### *Finland.*

Since 1886 the science and theory of statistics have been taught in the University of Helsingfors by a qualified professor of the subject.

#### *France.*

Two public chairs of superior education at Paris are partly devoted to statistics.

(1.) At the Collège de France the chair of geography, history, and economic statistics, where the professor (previous to 1885) lectured on French demography and the productive power of the European States and other countries of the world.

(2.) At the Conservatoire des Arts et Métiers the chair of industrial and statistical economics (*économie industrielle et statistique*), a course of lectures on administration and industrial statistics being first given in 1854.

In addition to the above, at the Government *École des Ponts et Chaussées* a course of lectures on statistics was given by M. Cheysson in 1881, dealing with methods of statistical research and graphic statistics.

The *École libre des Sciences politiques* instituted in 1884-85 a course entitled "Statistics and Treaties of Commerce," of which the first part dealt with the general methods of statistics and French population statistics compared with those of other countries.

The *École d'Anthropologie*, for several years previous to 1885, had a course of demography, replaced in 1885 by a course of geography and medical statistics.

The *Facultés de Droit* of Paris, Bordeaux, &c., twenty towns in

all, have courses on political economy, and at Paris and Bordeaux there are now courses on statistics.

In 1889-0 the Statistical Society of Paris held conferences on statistics and economic geography, under the auspices of the Minister of War, for army officers.

*Germany.*

The teaching of statistics in the universities is little developed, and nowhere constitutes a special and independent branch of university studies. Herr Meitzen and Böckh at Berlin, Herr von Mayr at Strassburg, Herr Bergmann at Tübingen, and Herr Hasse at Leipzig, deliver courses of statistical lectures, but do not hold any permanent professorship. There are also some professors of political economy, as Herr Bücher at Leipzig, Herr Laspeyres at Giessen, and Dr. Lexis at Göttingen, who devote a small portion of their ordinary curriculum to the study of statistics as an auxiliary subject.

*Germany (Prussia).*

In a work written for the World's Exposition at Chicago in 1892, Dr. Lexis has furnished a summary of the statistical instruction given in German universities. The universities of Berlin and Halle each possess three professors of political economy and financial science, Bonn, Breslau, Göttingen, Greifswald, Kiel, Königsberg, and Marburg having two each. There is also in Berlin a professorial chair of statistics, as also a chair of political science; the last named, however, chiefly delivers statistical lectures, which are also included in the politico-economic professorships in Halle. Statistics are also taught as an adjunct of political science in the Prussian high schools, excepting Bonn, Königsberg, and Marburg; the course there is neither very thorough nor systematic in all its branches. Statistical instruction is also given in the training colleges attached to the universities of Berlin, Halle, and Breslau, the study in the first two being pursued with special vigour. Statistical training is also given in the college connected with the Royal Prussian Statistical Bureau, in which every year a number of higher officials are trained for statistical service under government.

*Hungary.*

At the University of Budapest there is a school of statistics under the direction of Professor Bela Földes. Dr. Joseph Körösi, as lecturer (docent) at the University, gives practical lectures on Demology.

Statistical education in Hungary dates back to the year 1777,



when Maria Theresa was Regent. By the so-called "Ratio Educationis" edict law, academies with philosophical and juridical courses were established in Hungary, and statistics were made an obligatory subject in the curriculum. Freedom of teaching was unknown; the works of Achenwall and Cattero were prescribed for statistical education.

Separate chairs for statistics have been established at both the universities—Budapest, 1795, and Klausenburg since the foundation of the university in 1872. At the Polytechnic of Budapest lectures were confined to trade statistics till the year 1872, when a separate chair for statistics was founded, which existed till 1885, but was then transformed into a chair for administrative and civil law. Statistics as an independent subject have been from that date only lectured upon in the two universities and in the ten existing law academies, which latter are comparable with the French "Faculté de droit."

Alexander Konek was professor of statistics in the university of Budapest from the year 1854 till his death in 1882. He represented the standpoint of Achenwall in all his works, although he treats fully in several of his writings on the moral statistical course. His great work, "Statistics of the Austro-Hungarian Monarchy," certainly contains a most rich and valuable collection of figures, but is purely descriptive. This book exercised a dominating influence on statistical education in Hungary, as statistics is an obligatory test subject of the political state examination, and as at the time of Konek, this examination was necessary for every juridical profession.

Through the establishment of the Hungarian Imperial Statistical Office in 1867, and the Statistical Bureau of Budapest in 1868, the new statistical tendency gained ground by means of the most valuable scientific accomplishments of Keleti and Körösi. In the academic years 1868-69 and 1869-70 lectures on theoretical and administrative statistics were delivered in the Budapest University by Doctors Keleti, Konek, and some of the higher state officials. Since then, however, they have not been repeated. After the death of the zealous and meritorious Professor Alexander Konek, Ludwig Lang was appointed regular public professor, and Adolbertus Földes special professor of statistics at the Budapest University. Földes, however, passed over later to the professorship of political economy, and thus at the present time statistics in the University of Budapest is represented by Lang and the private lecturer, Peter Dobranszky. Keleti and Körösi also for several terms delivered private lectures.

Gabriel Nabji has been statistical professor at the University of Klausenburg since its foundation.

Lectures on statistics are delivered in the law academies.

Dr. Moritz Piszatory was professor of statistics for seventeen years at the Pressburg Academy, until his appointment in 1891 as professor of political economy at the University of Klausenburg.

#### *Italy.*

In several universities there have been founded schools for the practice of statistical work. These schools are directed by their own professors.

The teaching of statistics is obligatory, and has a special chair in all the universities of the kingdom as well as in the three Superior Schools of Commerce of Genoa, Venice, and Bari, and in the School of Social Science at Florence. Statistics are also an obligatory subject in all the technical institutes of special secondary training, where they are taught by the professors of political economy.

#### *Netherlands.*

The law of 1876 concerning superior education maintained the course of instruction in statistics already existing at all the universities, and instituted a new degree of *Doctor der Staats Wissenschaften*, the theory of statistics being one of the subjects necessary for obtaining this degree. There is, however, no longer anywhere a separate chair for this branch of science—the professorship of political economy and statistics at Amsterdam having been again united on the resignation of Dr. Pierson.

#### *Norway.*

In 1887 a second professorial chair of political economy and statistics was created for the University of Christiania. Before this time there had been but one, it being obligatory on the professor occupying the chair to deliver a course of lectures. The older chair is still maintained equally with the new one, which is specially consecrated to political economy and statistics.

A similar chair was founded in 1875 at the Commercial Institute at Christiania, which came into existence in that year.

#### *Russia.*

The compulsory teaching of statistics was introduced into the *faculté de droit* of all the universities, in addition to several special upper schools, such as military, law, and agricultural colleges. At the University of St. Petersburg there is an independent professorship of statistics, while in the other universities statistics are attached to the chair of political economy.

*Spain.*

By royal decree of the 28th April, 1850, the teaching of statistics was made obligatory in the curriculum of philosophy in the Spanish universities. In the syllabus of studies approved by the law of the 17th July, 1857, the teaching of statistics was assigned to the *Faculté de droit*.

*Sweden.*

At the University of Lund the study of statistical science has been taken up warmly during the last few years, and a statistical school has been established there.

*Switzerland.*

The science of statistics is taught in all the Swiss universities, Zurich, Berne, Basle, Geneva, Lausanne, and Fribourg, and at the Academy of Neuchâtel.

It is taught by the ordinary professors of political economy and social science, but it also happens that the associate professors give also a special course of lectures. In the universities the professors of political economy have organised a weekly meeting in which their class deal with subjects of practical interest marked out by the professor, which give rise to debate. Statistics are also a compulsory subject in examinations for the degree of doctor of philosophical science (section of moral and political science). Not a few of the candidates for this degree choose for their essay subjects which require statistical work, and address themselves to the statistical bureau for the necessary information.

*United Kingdom.*

The progress of statistical teaching in our own country has hardly kept on a level with that which has been recorded above as having taken place abroad. I may however mention, in addition to the endowment of the Newmarch Memorial Fund already noticed, the course of lectures on statistics annually delivered at the London School of Economics and Political Science.

## V.

*The Development of Theoretical and Scientific Statistical Methods.  
Expressions of Individual Opinion.*

My foreign correspondents, in reply to my request, have furnished me with several interesting communications as to the statistical methods specially in favour in their own country, particularly as regarded from the scientific and theoretical point of view. I proceed to state briefly the more salient points.

*France.*

M. Emile Levasseur is of opinion that statistics should be regarded as an indispensable instrument in the study of social sciences, and it is in this spirit that he employs it in his course of instruction at the Collège de France, the Conservatoire des Arts et Métiers, and the École Libre des Sciences Politiques.

*Germany.*

As to the general tendencies in the domain of purely scientific statistics, Dr. W. Lexis notices the development of an exact theory of the death-rate, commenced in 1868 by Dr. Knapp and Becker, and the application of the theory of probabilities, and of the stability of the statistical series to the grouping of the statistical observations—a study with which Dr. Lexis has been occupied since 1876, and which has been pursued in England with considerable success by Edgeworth, Pearson, Yule, and others.

*Germany (Prussia).*

The tendency of academic teaching in Prussia has, in the opinion of Dr. Bienck, as its main object the inculcation of a careful and conscientious enumeration of statistical data together with the elimination of all possible sources of error, so as to present for scientific treatment foundations of the utmost possible stability—a condition naturally antecedent to, and inseparable from, scientific statistical research. For the present the purely scientific and theoretical use of the rich harvest gathered by the Statistical Bureau is left in the hands of the professors and tutors of the universities and of individual scholars.

*Hungary.*

As regards the tendency of the teaching of statistics, Dr. Körösi expresses the personal opinion that statistics are but a numerical method, applicable to a series of widely differing sciences, such, for example, as political economy, all natural sciences even to æsthetics, psychology and ethics (moral statistics, &c.). It is impossible to affirm that all these heterogeneous data can furnish the material of a homogeneous science. Applied statistics, therefore, as professionally taught, which at bottom is only the statistical method of Achenwall-Schlötzer, is in itself but a conglomeration of most heterogeneous ideas belonging to demography, political economy, finance, &c.

Dr. Körösi is far from denying the utility, and consequently the practical necessity, of such a course of teaching, and the great importance of statistical bureaux. These may be likened to social

observatories, occupied in the collection of all facts accessible to observation by the numerical method; but he denies that these facts can be regarded as constituting of themselves a single and distinct science. Nevertheless, thanks to this fertile numerical method (statistics), there has been discovered in the domain of anthropology a series of new scientific ideas, such as natality, mortality, and the laws of population. These furnish material for a science which is in itself independent, which occupies itself with the physical phenomena of society just as another series of sciences (*e.g.*, moral statistics, "Völkerpsychologie") treats of mental qualities; while another group of sciences such as physics, anatomy, anthropometry, &c., deals with problems relating to the individual. It is the sum total of these ideas relative to the psychic qualities of the community which may be regarded as scientific statistics, and which may pass under the name of demology and demography.

To sum up—

- (1.) Statistics in general are merely a numerical method.
- (2.) The ideas developed by this method are too heterogeneous to form a homogeneous science.
- (3.) Between the ideas discovered by the aid of this method those which relate to demology form altogether a new science absolutely independent and thoroughly distinct from others.
- (4.) This science of demology thus comes to represent the science of statistics, which is not to be confounded with the statistical method or with statistics as taught in the university, which is identical with the statistics of Achenwall-Schlötzer. The latter is merely an auxiliary training which enters into the region of political science, while demology is an independent science belonging to the domain of anthropology. Consequently it will be better to refer the teaching of demology to the faculty of natural sciences, while political statistics would rightfully remain under the control of the political and judicial chairs.

It is satisfactory to Dr. Körösi to find that since the time, twenty years ago, when he developed the above views at the Congress of Demology at Geneva, and later on in the "Allgemeines Statistisches Archiv" of Dr. von Mayr, the science of demology has been purged of elements of impurity, as may be seen on reference to the classification of materials in the catalogue of the Italian Statistical Bureau. Signor Bodio prunes away the matter lying outside the domain of statistics. In Hungary the general con-

census of opinion inclines towards the original point of view, and it is held that statistics may claim all social phenomena that can be expressed in figures, and that the point of view as above stated reduces statistics to a lower level. Finally, it may be conceded that a small substratum of science is worth more than a confused mass of ideas *de omnibus rebus et quibusdam aliis*.

#### *Netherlands.*

The replies which I have received from the Netherlands show that statistics have greatly advanced in that country, the advance consisting in the elaboration of details of all kinds, more especially in regard to agriculture. The progress, however, has been gradual, and has chiefly consisted in applying better methods rather than by any new departures. It is, however, unfortunately the case that the study of statistics is not yet popular in Holland; nevertheless the utility, not to say indispensability, of statistics as the foundation for the study of political economy is being more and more recognised by economists, and the people generally begin to feel and appreciate the value of statistical research. One fact to be noticed is that statistics find determined supporters among the working classes. The suggestion in favour of the establishment of a central office of statistics was introduced in parliament by a socialist member. This party is also represented on the Central Commission.

#### *Norway.*

Dr. A. N. Kiaer states that the tendency of the statistical method in Norway has been to concern itself more with persons than with things. Formerly attention was altogether given up to the statistics of production, the movement of commerce and navigation, &c. Being now convinced that the economic and social condition of men is the most important branch of statistics, Norway is endeavouring to effect a development in the humanitarian side of statistics, without losing sight of the material branch of the science.

#### *Russia.*

Several important works on the theory of statistics have been published in Russia, among which may be mentioned the works of MM. Nebinge, J. E. Janson, A. T. Tschouprof, Fedorovitch, and A. F. Fortunatof.

#### *Spain.*

The Director General of the Institute of Geography and Statistics writes that in his opinion there has been, on the part

of writers of statistics as well as in the statistical works published by his Department, a marked tendency to favour the analytical method, as being more scientific than the arithmetical and mathematical. Nevertheless, as the last mentioned processes are more simple than the first, the inductive method continues to be employed in the majority of practical cases.

#### VI.—*Statistics, Economics, and Ethics.*

The foregoing cursory review of the development, both at home and abroad, of theoretical and applied statistics, furnishes sufficient evidence of the increased attention which is given to the pursuit which our Society has in view. The controversy as to the exact status of statistics, no less than the status of the kindred studies of political economy and moral philosophy, cannot yet be considered as absolutely closed. Many of us will remember the address by Mr. Goschen to the British Economic Association on "Economics and Ethics." In this address the economic man—"the creature of hypothesis and analysis"—may be said to have been decently buried; and Professor Marshall in his remarks on Mr. Goschen's address, deprecated the view that the deceased was nothing if not utilitarian and purely selfish, attributing his actions to the guidance of his mistress Ethics—much of the drudgery of ethics being delegated by the mistress to this one among other of her servants. This address may be held to be the celebration of the return in unimpaired, or it may be said augmented, vigour of Political Economy from the distant planet to which she had some few years previously been relegated. Nevertheless, a month or two later, in his inaugural address to the Statistical and Economic Section of the British Association at Nottingham, Professor J. S. Nicholson took up the cudgels in defence of the stricter method of economics, and having broken open the sepulchre, exhumed the defunct, and with eminent ability showed that life was not yet extinct in him. The professor warned his hearers that if ethical considerations were allowed to intrude themselves into the practical application of economics to legislation, we ran great risk of undergoing the same experience as did the Arab of the fable, who began by admitting one ear of his camel to the interior of his tent, and ended by finding that the entire beast was inside and that he himself was out. Still more recently my immediate predecessor in this chair, in his address delivered in November, 1894, chose for his subject the relations between morals, economics, and statistics. In the course of his address he held strongly to the view that statistics ought not to be regarded as a special branch of knowledge, but as part of the science of the subject to which they relate; statistics of national wealth and

political economy being not two different sciences but different parts of one science, a position which statistics also held in relation to other departments of inquiry, such as the science of health and jurisprudence.

Lord Farrer pronounced the functions of such a Society as ours to be the collection of materials for political economy and other kindred sciences. It is difficult to bring this view into harmony with that put forth in 1885 by Sir Rawson Rawson, then president of this Society, in the address which he delivered at the opening of our Jubilee Meeting. On that occasion he reviewed the part which has been assigned to statistics since Achenwall, nearly one hundred and fifty years ago, proclaimed it to have as its scope the whole realm of social science. He noticed the definition of statistics by Quetelet, as the representation of a State at a given point of time, and later still, the views of Professor Ingram. in his noteworthy address to the Economic and Statistical Section of the British Association at Dublin in 1878, and also acknowledged the work done for our Society by Mr. Wynnard Hooper, and the conflicting opinions as to the position of statistics held by Dr. von Mayr, Engel, Haushofer, Block and Gabaglio, as compared with those of Dr. V. John, by whom statistics are clearly defined as a science of observation in the service of social science.

The question is one which has not yet received, and will not probably for a long time receive a definite and universally satisfactory answer. It is not easy indeed to be sure that we have a clear conception of the definition of the word science as applicable to our purposes. Seeking guidance from those whose names are most familiar to us statisticians, we find that Mill lays down the dictum that "Art necessarily pre-supposes knowledge; art in any " but its infant state pre-supposes scientific knowledge." On the other hand Dr. Guy maintains that an "art so long as it continues " to be the mere effect of skilful handiwork, remains an art, but " directly it submits itself to the guidance of well ascertained " principles, it may claim to be a science." Sir John Herschel holds that "science is the knowledge of many, orderly and " methodically digested and arranged so as to become attainable " by one." Professor Sedgwick in his Presidential Address to the British Association in 1833, understood science to be "the " consideration of all subjects, whether of a pure or a mixed nature, " capable of being reduced to measurement and calculation."

Within the limits of these definitions there is room for claiming as the *ne plus ultra* of science the registration of immutable laws and the statement of the simplest mathematical formula. From one point of view there can be no experimental science, for there can be no science until a law has been evolved by experiment;



from the other, the objects of this Society can be claimed to rank as scientific, seeing that they are pre-eminently the examination of causes which seem to be accountable for apparent irregularity in the working of social laws, and, in the words of Dr. von Mayr, aim at obtaining "from millions of facts the grand average of 'the world.'"

Enough has been said to justify the sarcastic humour which suggested the dictum that statisticians when they meet together devote half their time to discussing the status and dignity of their pursuit, and its precedence of, or subservience to, economics. It is not on record that the conviction entertained by Professor Bonamy Price that political economy must be considered as a closed science imbued him with that sense of pessimism and inclination to suicide which John Stuart Mill has stated to have been borne in on him by the consideration that the number of combinations of musical notes is finite, and that there consequently would be a time when it would be impossible to compose a new tune. We Fellows of the Royal Statistical Society are not likely to be overwhelmed by the depressing effect of philosophic speculation of this nature. The object which we set forth as being ours is "to collect, "arrange, digest and publish facts illustrating the condition and "prospects of society in its material, social and moral relations; "these facts being for the most part arranged in tabular forms and "in accordance with the principles of the numerical method." In the words of Professor Marshall, "History never repeats itself. "In economic or other social problems no event has ever been an "exact precedent for another. The conditions of life are so "various; every event is the complex result of so many causes, "so closely interwoven that the past can never throw a simple and "direct light on the future." Whether we claim for our studies the position of a science, an art, or a method, whether political economy be or be not the handmaiden of ethics, whether economics be an abstract science or altogether dependent on statistics for the data on which it depends as a foundation whereon to build its laws, the changing conditions of society will always furnish to statistics problems whose solution must be uncertain unless it be based on the evidence not solely of *à priori* reasoning, but also on ascertained facts.

#### VII.—*The Misuse and Abuse of Statistics.*

It will not be denied that the numerical method of statistical inquiry applied to social and economic phenomena is an implement of the highest value and the most delicate temper. It must be the aim of our Society in the future, as it has been in the past, to use this implement in a strictly workmanlike manner. Its use is

not to be acquired in a moment; its misuse is more easy. It is not too much to say that the misuse of the numerical method, that is to say the application of the term statistics to figures either inadequate in themselves or inadequately digested, has reduced in no small measure the popular estimate of the value of true statistics. I speak of the misuse in all good faith through ignorance or inexperience of the statistical method; of the wilful misuse there is nothing to be said; this last form of misuse cannot be discussed, it can but be deplored. It is enough to say that the unintentional misuse of statistics has as its effect no less mischievous results than what I must call their malicious misuse. If I may quote particular concrete instances, it is sufficient, in matters which directly concern the well-being of the community, to point out the widely divergent views which, based as they should be on an accepted statement of facts ascertained by the numerical method, are held either this way or that in the matter of Vaccination, Vivisection, and the Contagious Diseases Acts. It is, then, the function of our Society so to marshal the data presented to us, and so to digest the matter available to us, by a skilful and workmanlike use of the instrument which is ready to our hand, as to eliminate, so far as may be, all elements of doubt in matters of fact, and to establish that basis of agreement without which logic teaches us that argument is impossible.

The path of the statistician who is in quest of the primary statistical quantity is indeed beset with many pitfalls and temptations to error. There must be some here present who well remember the address delivered at our jubilee meeting by our most able and witty colleague, Monsieur Alfred de Foville. Taking as his text "Statistics and its enemies," he began by quoting the saying that one has three kinds of friends, those whom one loves, those whom one does not love, and those whom one hates. There is no doubt that the methods adopted by some so-called statisticians bring them within one or other of these categories. There is the laborious compiler of figures which are of no value when they are obtained. Of this class was the statistician introduced on the French stage, who estimated that in a given year there passed over the Pont Neuf 13,498 widows, in addition to one who was questionable. Again there is the statistician who errs on the point of needless exactitude, and calculates the wheat crop of the year at 3,500,000,000 and a half ears, or who is ready to produce the statistics of population of any country on the face of the earth, and to state in precise terms the number of inhabitants in China or the Sudan, or to give with equal precision the exports and imports and the tonnage statistics of Timbuctoo. A thrust was made at statisticians of this class

when, on the famous occasion of the alleged abduction and forcible baptism of a Jewish boy in Rome, it was said that the population of Italy consisted of thirty millions of inhabitants, *non compris le petit Mortara*. It is through extravagances of this kind that Monsieur Thiers defined statistics as the art of stating in precise terms things which one does not know. The statistician is also not infrequently the victim of faulty returns. The fact that the tabulation of census returns has been known to show a larger number of women between the ages of 30 and 40 than at the previous enumeration there had been between the ages of 20 and 30 is well known. It is a difficulty with which the census department has to grapple in more countries than one. Monsieur de Foville gave us an instance of faulty returns, which came home to me individually with special force in view of my own inquiries in the same direction. He told us how on one occasion the French government called for an enumeration by date of the coins held by some 20,000 departmental offices on a given day. Some of the returns were made showing coins struck in years during which no coinage operations whatever had taken place. Such schedules had clearly been filled up at haphazard, but it was impossible to say whether some of those which escaped detection might not have been fraudulent.

Nor when data have been collected with all possible care can their judicious use be invariably depended on. The man who has a particular point to make, who is anxious to find statistical proof of some theory which he is bent on establishing, is only too prone to select two sets of figures whose curves exhibit a similarity suitable to his purpose, ignoring those which are unsuitable, to accept the *cum hoc* as *propter hoc*, and to claim as cause and effect that which is in reality merely a coincidence. The true statistician, if he would be justified of his pursuit before himself and before others, ought to come under the definition which describes the statistician as the man who can reason as well as count, and must learn to discard the superfluous, the imperfect, and the false.

#### VIII.—*The Graphic Method of Statistical Illustration.*

To help him on his way he has devised many ingenious methods, at one or two of which I permit myself briefly to glance. To discuss adequately any one of them would require more than the space of time which is available on such an occasion as the present.

I cannot but refer in the first place to the graphic method—a method of comparatively modern origin, and one entirely unknown to the earlier volumes of our *Journal*. Its use has now for a considerable time been extremely popular, and, having grown up automatically, it is not surprising that it has assumed an infini-

tive variety of forms, of which one or other is for the most part adopted according to the idiosyncrasy of the compiler of the table. The use of what I may call barometrical columns, the suppression of these columns and the junction of their points by that jagged or serrated line which, in statistical language, is called a curve, the use of circles, squares, or other geometrical figures, and the employment of colours, whose various shades do not invariably carry the same significance—not infrequently of themselves reveal to the practised eye the author of the paper of which they are an accompaniment. It is to be regretted that this liberty in the adoption of one or other method of graphic illustration has been uncontrolled by any agreement for the employment of particular forms in particular fields of statistical inquiry. It is obvious that the closed circle by which a statistical position at some particular point of time is portrayed, is inapplicable to describe a phenomenon under observation during a continuous period. An established convention in the use of the graphic method would be of conspicuous advantage if applied to similar phenomena in different countries. An agreement as to the best method of expressing vital or other statistics of international interest would render graphic tables immediately legible to statisticians of all nationalities, and in one respect at least might serve as a medium for the exchange of ideas more efficient than that elusive Volapuk from which so much advantage has been expected and so little achieved. Some little progress has been made in this direction. The French “Album de Statistique Agricole” has adopted a method which has been copied by the Agricultural Department of the United States; and other instances might be cited where some degree of resemblance has been attained. While then the graphic method is useful for the purposes of popular illustration, and affords a ready means of striking the eye and fixing in the mind some general statement of facts, it is always subject to the danger of proving either too much or too little. The preparation of a graphic table telling the whole truth in some cases involves the introduction of so much matter as to render the entire table obscure, and its extreme plausibility requires that it should be employed with a corresponding amount of discretion and caution. Professor Marshall’s proposition to adopt a statistical atlas consisting of a series of tables each marked with an identical base line on which one or possibly more statistical curves could be drawn so that the economic position of a nation under any two or more aspects could be seen at a glance, may be cited as evidence that the want of uniformity in the graphic method is clearly recognised. While concurring in Professor Marshall’s view that such a method would be of great value as applied to the statistics of our own

country, we shall not withhold our assent to his opinion that its highest use would be for international statistics.

If the graphic method, from the very fact that the inferences to be drawn from it appear to be altogether final and conclusive, requires to be used with discretion, and in many cases, like a contour map, can be appreciated only by a trained eye, its value in the hands of experts is undeniable. There is an increasing tendency to check the merely numerical statistical method by the application to statistical data of the formulæ of higher mathematics. The work in this direction of Mr. Francis Galton and Professors Edgeworth, Marshall, and Nicholson, not to speak of our foreign fellow labourers in the same field, are familiar to all. By more than one of these experts the numerical method has been carried into the field of economics as well as of statistics. It is not for everyone to appreciate the value of this form of exposition. The ordinary man may say that he is not guided in his mercantile operations or in setting the rent of his farms by any statistical curves whose significance is expounded to him in an algebraical formula. Just so, he might doubt the value of a medical prescription couched in the algebraic equivalents of its ingredients. But he will swallow the resultant mixture in faith that it will restore or maintain his bodily vigour. In like manner it is important, nay essential, that observations as to the condition of the body politic should be capable of verification or confirmation by an abstract method on which implicit reliance can be placed.

#### IX.—*Index Numbers.*

There are few subjects of statistical inquiry on which, during recent years, more attention has been bestowed than that of index numbers. It is needless to remind the present assembly that the topic is no new one. The idea that the purchasing power of a certain weight of precious metal might from time to time vary, and that such variation must work to the advantage or disadvantage of one or other party to any contract extending over a protracted period of time, found expression long ago. It is two hundred years since Fleetwood expounded the idea in his "Chronicon Preciosum;" Sir George Evelyn laid it before the Royal Society in 1798. Adam Smith suggested that wheat, the production of which, in his opinion, at all times required the same sacrifice of labour, would furnish the least variable standard of value; in this view he was followed to a great extent by Ricardo. Mr. Joseph Lowe in 1823 proposed to correct any inequalities which lapse of time might import into unexpired contracts, by a "Tabular Standard," based on a weighted arithmetical mean of prices. G. R. Porter and Thomas Tooke followed up the idea,

which was carried on in still more recent times by Professor Jevons and William Newmarch.

Some additional impetus was given to the inquiry by the appointment at the meeting of the British Association in 1886 of a committee consisting of Messrs. Bourne, Edgeworth, Foxwell, Giffen, Marshall, Nicholson, Palgrave, Sidgwick and myself, for the purpose of investigating the best methods of ascertaining and measuring the variations in the value of the monetary standard. In the spring of the next year (1887) the International Statistical Institute at its meeting at Rome appointed a similar committee, consisting of Messrs. Beaujon, de Foville, Giffen, von Inama-Sternegg, Neumann-Spallart, Palgrave, Pantaleoni, and myself, with a similar object. It must be admitted that the difficulties of concerted action are not confined to the field of international politics, and that the "Comité des Prix" of the International Statistical Institute has borne but little tangible fruit. The committee of the British Association showed more activity. It held frequent meetings, and reported annually in 1887-8-9-90. Its reports were accompanied by valuable memoranda by its Secretary, Professor Edgeworth, until in its final report it was able to claim that it had, as far as the theoretical issues raised were concerned, sufficiently dealt with the problem from every point of view. The question as to the inclusion of commodities commonly so called, the exclusion of services rendered, the pros and cons of dealing with wholesale or retail prices respectively, were fully considered. The works of individual members of the committee, as also those of foreign statisticians, such as Professor Newcomb, of the John S. Hopkins University, Dr. Soetbeer, Dr. Walras, and others, furnished matter for the consideration of the respective merits of various standards of value. Professor Nicholson's Capital Standard, the Consumption Standard of Professor Marshall, the Currency Standard of Professor Foxwell, the Standard of Income favoured by the Committee, the Tonnage Standard of Sir Rawson Rawson and Mr. Stephen Bourne, and the analogous system of Sir Robert Giffen, together with the methods of Mr. Sauerbeck, Mr. Palgrave, and the "Economist," were amply discussed. The most suitable method of dealing with the component items of the Standard of Value was also considered, and the merits of the simple Arithmetical Mean, the Weighted Mean, the Geometric Mean of Jevons, and the Median Mean of Professor Edgeworth were weighed in the balance. The final issue of the labours of the committee was a draft proposal for a Government Commission, which should watch and record the fluctuations of prices, and publish at frequent intervals an adjusted Standard of Value. It

was also proposed that it should be made legal for contracting parties to stipulate by mutual agreement that future payments in money might be made on the basis of the officially published Index Number.

It must be added that the committee expressed the view that public opinion was hardly prepared for any such system of sliding scale in contracts extending over a period of time. "A pound's a pound," quoth the heroine of Tom Hood's poem, and popular sentiment inclines towards the same view. I do not recollect that the labours of the committee were increased by correspondence with individuals or bodies anxious to base their leases, or other contracts, on any such standard of value as might ultimately be adopted by the committee. It is not so long ago that Mr. Goschen, in the manner of one who should excuse himself, apologetically introduced to the House of Commons the topic, which he assumed to be new to his audience, of the possible variation in the purchasing power of the sovereign, and gave an elementary lecture on the appreciation of gold. The phrase has since become only too painfully familiar to us all; but it has been monopolised by the monometallists and bimetallicists, and the question of the measure of value, of itself a far more important one, has, for the time, ceased to occupy the attention even of experts.

#### X.—Averages.

The aim of the committee on Index Numbers was to elaborate from a sufficient series of individual averages one grand comprehensive average of the price of commodities from time to time. To lay down accurately an average that shall serve as a point of comparison with subsequent or antecedent averages, is in itself a task of extreme difficulty. The man in the street just returned from Epsom would be quite ready to say confidently that the attendance at the Derby was an average one; the farmer would have no more hesitation in declaring that he had harvested an average crop; but neither of these could readily give the grounds on which their opinion is based. The statistician who wishes to establish an average which shall serve practically as his unit of value or number, is apt to find his task no easy one. The legal maxim, *dolus latet in generalibus*, is well known. It finds its counterpart in the warning of an eminent statistician—"Beware of large figures!" "Beware of averages!" cries another warning voice; it is a voice whose utterance must not lightly be disregarded. The year 1873—a year of inflation, of exaggerated values, of feverish activity, shortly to be followed by the inevitable reaction—has been employed over and over again, and more than once before this Society, until the mention of the

year 1873 has become a terror to all of us. It is in cases like this that the statistician has to justify the definition which I have already quoted, that he is a man who can reason as well as count. It is not to everyone that it is given to apply to facts under observation the methods of *la haute statistique* which such experts as Mr. Francis Galton, Professor Edgeworth, and others have made their own. These methods have claimed the attention of our Society on more than one occasion, as in the case of the papers contributed in 1881 and 1883 by Mr. Wynnard Hooper, and in 1891 by Dr. Venn, and in addition to this I may cite the interesting notes on this subject contributed by Mr. Francis Galton to our Jubilee number. Any deviations from what might be expected to be the normal curve will probably, for the most part, be allowed for without difficulty. The effects on the statistics of births and marriages caused by a sudden outbreak of war or pestilence are pretty generally known, and allowance will be made for such apparent errors without any difficulty. But, to confine myself to this single field of inquiry, there are causes of aberration that lie even deeper. The variations to which I have referred may be compared to the known influence on the orbit of one planet exercised by the attraction on it of another; more subtle causes induce deviations comparable to those exercised by the advent of a comet of hitherto uncalculated orbit. The Franco-German war had the effect that might be expected on the subsequent marriage-rate and birth-rate in both countries, but in France at least more obscure psychological influences produced effects whose full result has only in recent years become apparent. The strain and stress of that disastrous war had, as one of its results, the development of a type ill-balanced in bodily and also in mental health. The names of Ravachol, Henri, Vaillant, and Caserio stand out prominently as extreme instances of this ill-balanced temperament; but it is known to experts in such matters that these are merely extreme types of a class which sprang into existence at that time, and which is sufficiently numerous to have earned for itself the title of *Enfants de l'invasion*. This is perhaps an extreme case. In dealing with his chosen subject the statistician must needs tread warily. It has been said that he should start with a clear idea of the point at which he is aiming. This is no doubt true, but it is needless to say that there is a great difference between this clear perception of the matter which it is sought to elucidate by statistics, and a perception of it to the exclusion of all other points of view, with the result that statistics are wrested to support a pre-conceived theory rather than to prove whether a pre-conceived theory be tenable under the dry light of the statistical method impartially applied.



XI.—*Summary and Conclusion.*

I think that I have sufficiently shown that during the last five and twenty years there has been, both at home and abroad, a very marked development in the collection of statistics, as well as in the providing of suitable machinery to arrange and digest them when collected. There has simultaneously been an advance in the inculcation of the statistical method by educational means. There has also been a decided tendency on the part of private societies to make use of the statistical method either *per se* or as elucidating problems of political economy. It only remains briefly to satisfy ourselves as to the meaning of this movement. The collection of statistics is not merely the gathering together of dry bones, a futile array of figures that have no ultimate significance. We are not concerned to know how many widows cross the Pont Neuf in the course of a year, or how many grey horses can be counted on London Bridge in the course of a day; nor, on the other hand, can we be content to allow the higher statistical method to betray us into algebraic formulæ and terms which are caviare to the general. I am not ashamed to profess that the scope of our inquiries is essentially utilitarian. We avow this in the very first article of our bye-laws, wherein we state that it is our object to collect, arrange, digest, and publish facts illustrating the condition and prospects of society in its material, social, and moral relations. It is unnecessary for us to claim precedence of this or that branch of sociology, or, if I may adopt a word that has hardly yet become acclimatised with us, demography. Papers that have been laid before us on tonnage statistics are not intended to serve for the guidance of shipowners in the matter of ocean freights; others, such as the one read before the Society during the last session by Mr. Price-Williams, on railway charges, or the one contributed in 1883 by Mr. E. Foxwell, on the speed of railway trains, are not intended for the guidance of railway directors in the administration of their duties. The ultimate object of these, and I think I may say of all similar papers that have been read before this Society, has been to illustrate the bearings of some industrial or mechanical development on the producer as well as the consumer. Were it not travelling outside the record, I might supplement this view by a consideration of the objects which really justify the most purely abstract branches of scientific inquiry. The higher branches of mathematics are not a mere tossing to and fro of symbols and formulæ under certain given rules of the game; mathematics lend their aid to astronomy, and without astronomy navigation would be in great measure impossible. Chemistry, geography, biology are not

merely branches of abstract research; their discoveries are seized on immediately by the practical man to the advantage of mankind, and there are few who would propose or acquiesce in the aspiration attributed to the student of abstract science, "Here's to the "next scientific discovery; may it never do any good to anybody." In this Society, at least, that aspiration would meet with no acceptance. We shall more readily acquiesce in the words which I extract from the Presidential Address of our late esteemed colleague Dr. Guy:—

"To prevent men from falling into a state of abject squalid poverty and debasing destitution, and to raise them out of it when they have unhappily sunk into it, is the great work set before all men who have in them any common human feelings of shame for national humiliation, of passion for distress, of respectful pity for the truly poor. To us who are assembled here this evening to renew, so to speak, our profession of a special interest in the condition and prospects of society, this duty of doing battle against destitution will commend itself with irresistible force."

No improvement in the condition of society can be hoped for as long as the essential facts which make it such as it is at any point of time are imperfectly known or inadequately appreciated. It is for us patiently to investigate these essential facts; not to be led astray by incomplete data, or by pre-conceived theories; to keep a true balance, giving proper weight to the many concomitant circumstances and countervailing influences that repel or attract us from the straight path. It is for us fearlessly to follow truth wherever it may lead us, to hand on to our successors the torch of knowledge that has been entrusted to us by those who have gone before, and to maintain in the future the prestige which our Society has deservedly won in the past. In pursuing this object I feel assured that I may thoroughly depend on the co-operation, not alone of the members of your executive staff, to whom I owe a deep debt of gratitude for support given to me in past years, but also of the general body of Fellows, who have honoured me by election to the Presidential chair.

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