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Transactions of the Statistical Society of London (1837)

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Summary. The *Transactions of the Statistical Society of London* (1837) appeared before the journal of the Royal Statistical Society began publication and represents the substantial statistical work that had been undertaken in the early years of the existence of the Society. The contents of this publication are summarized here against the historical background of the time.

Keywords: Journal; *Proceedings*; Statistical Society of London; *Transactions*

1. Introduction

An account is given elsewhere (Rosenbaum, 2001) of the discovery of early publications of the Royal Statistical Society before its journal was begun in 1838. The most considerable contribution was the *Transactions*, published in 1837, which also expanded on extracts from the earlier *Proceedings*. It was the year which saw the beginning of the Victorian era with the accession of the young Queen. And, with consequences that could not be foreseen, Darwin started his notebooks on variations in the animal and plant kingdoms: he had read Lyell's *Principles of Geology* on the voyage of the Beagle, and combining this with Malthus's (who was a Fellow of the Statistical Society) *Principle of Population* would put forward natural selection as the key to the origin of species.

Only one volume of the *Transactions* appeared, as volume I, number 1, but it was a substantial document. Six articles in this volume are summarized in this paper against the background of contemporary history, and with an eye to later events, making statistical comparisons where possible.

2. Articles in the *Transactions of the Statistical Society of London*

2.1. 'Observations on the collection of statistical knowledge', by William Jacob FRS

The article by William Jacob surveys the scope for acquiring statistical knowledge of the state of the nation. Apart from financial data, little statistical information had so far been collected, though the population census (from 1801) had been a great step forward, settling the question whether numbers were increasing or declining. Other subjects could be investigated through a separate department of the Board of Trade to examine and diffuse the information produced through the efforts of Parliamentary committees. (A new statistical branch had indeed been set up in 1833, just before a version of the article was read at a meeting of the Society in 1834 (in part 1 of the *Proceeedings*). G. R. Porter (1792–1852) who was head of the branch was a member of the Society's first Council and its Treasurer from 1841.)

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Examples are given of the information that was obtainable from public departments, e.g. the Stamp Office whose returns could show the increase in personal wealth by a calculation based on the probate duty (which is still in use); at a rough estimate, if an average duty of $2\frac{1}{2}\%$ yields £900 000, and deaths are 1 in 54 of the population, the wealth of the nation comes to about £2000 million. Further detail should be provided of the distribution as between sizes of estate.

Then the Tax Office could classify houses by the number of windows (the tax on which was not repealed until 1851), and rents, indicating for instance—if the lowest categories increase more rapidly—that relative poverty is increasing. Other taxes noted are the horse tax, the men-servants tax, the tax on carriages and that on dogs.

Besides making a financial profit, the Post Office provided services such as the supply of newspapers and Parliamentary papers post free and a 2-d post in the London area. The cost of conveying letters should be categorized according to whether they were carried by coach, by one-horse vehicles or even on horseback.

2.1.1. Excise Office and Customs

Since the tax on beer was no longer levied, the duty on malt could give an estimate of consumption. Other commodities on which duty was paid included paper, glass, sweets and bricks. Tobacco had such a heavy duty as to result in contraband traffic, imperfectly repressed by the officers of the revenue. The upper classes used it in the form of segars and snuff of foreign manufacture, in contrast with common tobacco and English snuff.

The quantity of candles made may have been affected by the increasing prevalence of lamps and the use of gas for lighting (by 1834 London had 600 miles of gas-mains and over the next 25 years there were nearly 1000 gas-works round the country); duty was paid on both wax and tallow candles. In contrast, leather had been freed from tax.

Wine, foreign spirits and tea were dutiable as imports and therefore came under Customs which covered commodities such as cotton and silk. But most British manufacturing was based on domestic products, such as coal, iron and other metals, earthenware, salt (the tax on which had been repealed a few years earlier) and house building, and agricultural production of which they were ignorant.

Beyond the revenue-producing activities of the Government there were those resulting merely in expenditure, such as maintaining the navy, the army, the courts of law and the police. Accounts were annually laid before Parliament, but details on crimes, insolvency, poor-rates and so on in each county were lacking. Such inquiries, and others that had been suggested, would lead to an accurate knowledge of the state of the nation.

2.2. 'On the increase of wealth and expenditure', by Colonel Sykes FRS (Vice-President)

The title of the second article goes on 'in the various classes of society, as indicated by returns made to the Tax-Office, Savings' Banks, etc.'. The general background was that of a population in Great Britain growing at a rate of 1.4% per annum over the first four decades of the 19th century and an urban population growing very fast indeed owing to the influx from the countryside. At the same time the Industrial Revolution, roughly 1760–1830, resulted in economic growth—the benefits of which, however, did not extend to all. For a while Britain retained a lead among the nations of the world though inevitably others caught up and competed successfully.

Although he believed that no-one could fail to draw the same conclusions from the facts as he did, Sykes would act in the spirit of the established principles of the Society by abstaining

absolutely from all comment beyond showing their interconnections. The classes of society with which he was concerned were the gentry, the trading and manufacturing bodies, and the depositors in savings' banks, supposed to consist principally of small shopkeepers, domestic and farm servants, etc.

2.2.1. Riding-horses

Riding-horses etc. numbered 183 000 in 1832. (Numbers will generally be rounded in this paper.) Sykes infers from a comparison with carriages that an increase in the number of horses since 1820 was for the saddle, and that they were kept mainly for pleasure. The number of racehorses had increased by half to nearly 1000, each valued at £150; other horses varied in cost from £20 to £60. In 1820 the number of working horses was not far short of a million; by 1832 a reduced duty was paid on 124 000 horses, and 646 000 were exempted as being exclusively used in agriculture. (In all monetary statements it must be borne in mind that prices have gone up perhaps by a factor of 60.)

2.2.2. Private carriages

The number of four-wheeled carriages for private use was almost 25 000 in 1832, an increase of 7500 since 1820. Considering that the cost of supporting each carriage, including horses, servants, liveries, duty and wear and tear, was about £250 a year, the *increase* in annual expenditure amounted to £1.87 million for the luxury of indulging in carriage exercise.

2.2.3. Duty

Duty was payable on 226 000 male servants (the term had a wider use at the time) in 1832, though the following year duty was repealed on about half the number who were travellers, clerks, bookkeepers, shopmen, porters, etc.; there remained 105 000 gentlemen's servants who could be considered as adjuncts of luxury. The average expense in wages, liveries and keep was estimated to be £70 per annum.

Duty was paid on 338 000 dogs in 1832, an increase of 26 000 since 1820. Of these 216 000 were domestic dogs, whereas greyhounds numbered 16 000 and other sporting dogs 106 000. The cost of a dog is put at £1 a year, plus duty of $\frac{1}{2}$ guinea. With regard to fox-hunting, there had been an increase of 'only' five packs of hounds in the 12 years. Although the number of packs is not stated, we can calculate from the total duty paid, assuming that the rate had not changed, that there were 77 packs in 1832 each paying a duty of £36. (In 1961 there were over 200 packs in Great Britain and 30 in Northern Ireland.)

As final items of luxury or amusements Sykes quotes a falling-off in stamp duty on playing-cards, and a smaller increase for dice. As for hair-powder, the use of it was diminishing, but the duty was still paid, at 4%, on an expenditure of £275 000.

Articles that were not absolutely necessary, though hardly the height of luxury, included tea, coffee, sugar, etc.

2.2.4. Tea and coffee

The quantity of tea drunk had risen to about 30 million lb per annum and by 1835 was over 36 million lb, the excise duty amounting to about 2 s per pound of tea valued at 4 s a pound. Though coffee was somewhat less extensively drunk, its use had increased yet more rapidly since 1820, to 20 million lb (compared with 30 million lb for tea).

2.2.5. Sugar

Taking the census years, the population (including Ireland) of 21.2 million in 1821 consumed an average of 16.2 lb of sugar, and in 1831 the population of 24.3 million consumed an average of 17.4 lb (the consumption nowadays is very much greater: compare the sugar supplied per head in 1976, i.e. 100.5 lb).

2.2.6. Tobacco and snuff

The amount of tobacco and snuff averaged about 20 million lb annually, again much less per head than it was to become. The Tobacco Manufacturers' Standing Committee published the sales figures in Table 1 showing the growth over time, in particular the increasing dependence on cigarettes (Todd, 1959).

The figures per head are for the whole population but per adult, in 1958 for instance, the sales were 11.9 lb, and for men alone 14.3 lb. The *number* of cigarettes smoked per week was 130 among men and 79 among women. (The standard conversion factor is 1 kg per thousand cigarettes.) (The *Annual Abstract of Statistics* now gives the quantities of cigarettes and so on, but for 1976 the weight was 230 million lb (Central Statistical Office, 1977).)

2.2.7. Spirits and other drink and soap

Sykes's cloak of impartiality slipped slightly over the 'frightful' increase in the consumption of spirits to 22 million gallons annually (produced in the UK) 'contemporaneously' with reduced duties. 8 million gallons were imported. The 6 million gallons of wine imported, though it represented a rise, was much less than it used to be in the 1790s. Beer and ale consumption had varied little, at about 8 million barrels annually, until 1831 when the excise duty ceased. However, there is an indication from the duty on malt that more beer and ale were being drunk.

To complete the survey of 'comforts', Sykes notes that the annual consumption of soap had risen to over 154 million lb from a level of around 100 million lb in 1820–1826. Here again, the *per capita* contrast with today—or rather yesterday, given the increased substitution of detergents—gives cause for reflection. Despite the difficulty of making comparisons over a long period the averages in Table 2 are at least indicative.

Table 1. Sales figures for tobacco

Population (millions)	*Year*	*Total sales (million lb)*	*lb per head*	*Sales of cigarettes (million lb)*	*lb per head for cigarettes*
27.4	1870	53.5	2.0		
31.0	1880	63.5	2.0		
34.3	1890	72.0	2.1	0.3	0.0
38.2	1900	91.7	2.4	11.3	0.3
42.1	1910	98.3	2.3	36.1	0.9
44.0	1920	153.2	3.5	80.3	1.8
46.0	1930	160.8	3.5	107.0	2.3
(48?)	1940	203.1	4.2	161.1	3.4
50.2	1950	221.5	4.4	181.7	3.6
52.7	1958	260.8	4.9	225.1	4.3

Table 2. Consumption of soap and detergents

Year	*Soap (lb per head)*	*Detergents (lb per head)*
1820–1826	4.5	
1832	6.3	
1956	20.1	
1972	9.5	23.9

2.2.8. Trading and manufacturing

Sykes begins with *cotton and wool*: in the former case an annual import of around 300 million lb, and still rising owing to imports from America, whereas Indian cotton had remained stationary since 1820; in the case of wool, imports amounted to 38 million lb, exports 5 million lb and home consumption 39 million lb. In contrast with a doubling per head in wool consumption at the present day, the amounts of raw cotton imports are very much lower than before (having experienced an enormous growth in the 19th century and up to the First World War). 163 000 tons of *iron* were exported in 1833, almost twice as much as in 1820, the average price being taken as £8 per ton 'which is less than the truth'.

Sykes's section on shipping is against the background of the Comet steamer plying on the Clyde in 1812 and the Royal William in 1833 going from Canada to England, which led on to wooden-hulled paddle steamers crossing the Atlantic such as the Great Western, of 1778 tons burthen, in 1837. Not until 1843 was the Great Britain put into service, iron hulled and driven by a screw propeller. Meanwhile coastal services by steamboat had developed and short sea journeys made to the continent. The Duke of Wellington made a Channel crossing in 1822 in the new steam-packet and wrote of a 'tremulous motion occasioned by the wheels which is very unpleasant'. The UK had 20 000 ships in 1834, with a tonnage of 2.3 million tons, i.e. 115 tons on average, and including the colonies 25 000 ships of 2.7 million tons, i.e. 108 tons on average, manned by 168 000 sailors, averaging between six and seven a ship. The total of British and foreign ships entering the Port of London was 5000 of 0.95 million tons, thus of considerably greater burthen.

Legacy duty affords an index of disposable wealth (as noted by Jacob in the first paper) and in 1834 amounted to £1.2 million. The rate of duty supposed here was 4%, so the estates on which it was levied must have amounted to around £31 million. The inheritance tax is now at 40%.

The increase in trade and manufactures is reflected in the tax returns, showing that the numbers of shopmen, warehousemen, porters and cellarmen had risen from 34 000 in 1820 to 50 000 in 1832. Clerks, bookkeepers and office-keepers rose from 31 000 to 44 000 in the same period.

Table 3 shows a complete table for 1832, before duties were repealed.

Increasing trade entails more travelling: the numbers of public stagecoaches almost doubled in a decade to over 3000 in 1831. There was also a rise in the number of post-chaises and other carriages for hire, and in hackney coaches (and a consequent slight falling off in posthorse duty). All in all, steamboats and railways had not noticeably affected the employment of horses.

One of the new railways had claimed its first passenger death when William Huskisson, President of the Board of Trade from 1823 to 1827, and leader of the House of Commons 1827–1828, was killed at the opening of the Liverpool—Manchester railway in 1830, struck

Table 3. Numbers of tradesmen

Travellers etc.	2600
Clerks etc.	44100
Stewards, bailiffs etc.	10100
Shopmen etc.	50200
Waiters	4200
Stagecoachmen etc.	2700
Coachmen let to hire	1300
	115200

down by George Stephenson's prize winning Rocket. But, as all statisticians know, kicks to death by a horse (von Bortkiewicz, 1898) were not uncommon.

2.2.9. Housing, savings banks and pauperism

The number of *houses* in Great Britain on which tax was paid in 1832 was 443 000 and at least another 162 000 were no longer taxed; the average value of a house is put at £340. Even supposing the second figure to have been considerably augmented in the 7 years since the tax was repealed, there must presumably have been housing exempt from tax altogether, or severe overcrowding, to accommodate a population numbering 16.5 million. There were certainly patches of very rapid growth and severe overcrowding in London's St Giles rookery (a word coined in 1829): 27 houses in 1841 accommodated 855 people (an average of 24); by 1847 they housed 1095 (average 40).

Sykes then turns his attention to the *savings' banks* to see whether increasing wealth 'is shared by people a few steps down in the social scale' and concludes that even in Ireland 'unaccustomed as we are to hear of any amelioration' in that quarter there had been a steady increase in depositors and deposits.

He finally turns to the 'less flattering side of the picture' in the continued pauperism reflected in the poor-rates. The Royal Commission on the Poor Laws was set up in 1832 with the purpose of solving the problem of pauperism (seen as distinct from poverty). Its report (in 1834) which led to the Poor Law Amendment Act of 1834 was based on questionnaires sent out to 15 000 parishes of which 10% responded; it led swiftly to the Act. Two members of the Commission who drafted the report were Edwin Chadwick and Nassau Senior, both followers of Bentham; the Chairman was Charles Blomfield, Bishop of London, and all were Fellows of the Statistical Society. The consequences of the Act, in particular the separation of families, though relaxed in 1842, were held in detestation by those affected and by the humanitarians (Longmate, 1974).

Jeremy Bentham (1748–1832) whose embalmed body is preserved at University College London, subscribed to the principle of utility—not exactly the economists' notion of utility—and made a suggestion for a 'felicific calculus' that should include the duration, certainty and intensity of an act. Each factor was to be weighted according to its pleasurable or painful effect and a judgment made. When a number of people was involved Benthamites took the view that *laissez-faire* was to be supported when the *majority* stood to benefit, but public provision was necessary, e.g. in sanitation and streetlighting.

Opponents claimed that no allowance was made for humane impulses such as compassion or generosity. One firm opponent was Charles Dickens whose opposition to 'blue books'

(Government reports) is made manifest in *Hard Times* accompanied by Gradgrind's statistical clock measuring every implacable second.

Since the enforcement of the Poor Law Act had to be at the local level, the Municipal Corporations Act was brought in, in 1835. As part of the administrative apparatus for various enactments the compulsory registration of births, marriages and deaths began in 1836, with a specific intention of regulating Althorp's (who was a Fellow of the Statistical Society) Factory Act (in 1833) (the credit for which is due really to Lord Ashley, later Earl of Shaftesbury). This was the first *effective* such Act, though only a beginning, applying a 12-hour limit to the working day for young people, but only in textile factories: from age 9 to 13 years the limit was 8 hours a day, and they had to receive 2 hours of education; no children under 9 years of age could any longer be employed. Obviously the registration of births provided the means in due course of proving a child's age.

2.2.10. Crime and police forces

Sykes follows his remarks on pauperism with a comment on the disproportionate increase in crime: 1 in 866 of the population had been committed for trial in 1821; in 1835 it was 1 in 631 (levels varied from 1 in 274 in Bristol to 1 in 8289 in Merioneth).

It was a restive society, but property crime was probably the motive for Robert Peel's bringing in the Metropolitan Police Act (in 1829), followed somewhat laggardly by Police Acts in the Counties (in 1839, but not obligatory until 1856). At first there was resentment by many especially at having to pay the extra rates. But they succeeded in their main purpose, and Governments could also cope with disturbances without calling in the military.

2.2.11. Politics

All else depended on political reform, the mainspring being the Great Reform Act of 1832: the electorate was increased by 70% to 1 in 7 adult males—it would not include agricultural labourers or most industrial workers and the ballot was not secret, but rotten boroughs (where numbers had dwindled) ceased to exist and it was at least a beginning. Women still had no vote; in counties, where previously freeholders worth 40 s could vote, this right was extended to copyholders and leaseholders, and in boroughs, where in the main freemen of the city, or local ratepayers or 'potwallopers' (those with a fireplace to boil a pot on) previously had the vote, it was now extended to £10 householders.

Earl Grey's cabinet (November 1830) had the support of Whigs, Tories, Canningites and Radicals: there was no two-party system yet. The Whigs thought that the Government should represent the people, by which they meant, in Althorp's phrase, 'the respectable middle classes', such as merchants and professionals. In the south and the rural areas the Bill would have this effect; in the north and the Midlands it took in the skilled workers. After a series of crises and a general election the Bill was passed and became law. The last hurdle had been the recalcitrance of the House of Lords, overcome only when the King was persuaded to threaten the creation of enough peerages to ensure its passage, a device destined to be repeated in 1911 when the Parliament Bill came before the House.

2.2.12. Conclusion

Sykes closes the account with, as he sees it, the last discouraging feature, the increased consumption of spirits: ignoring children under 10 years, who may be supposed not to touch spirits, the average consumption annually had risen from a gallon per head over the period 1820–1826, to a gallon and a half over 1827–1833.

2.3. 'Statistical documents respecting France', published by the French Minister of Commerce, 1835: 'Analysis', by T. R. Preston, Assistant Secretary to the Statistical Society of London

The analysis presented by Mr Preston is in effect—apart from an introduction relating to French plans for producing national statistics—a set of tables condensed from the original publication. Preston's tables are themselves so extensive that only a selection of a few facts that took my attention will be given here; comparisons will be made, where appropriate, with Colonel Sykes's analysis of the UK statistics.

The *population* of France according to the census of 1831 was 32.6 million, greater by a third than that of the UK, and the number of houses, and other habitations subject to taxation, was 6.6 million. Of almost 1 million births, 7% were illegitimate, and $3\frac{1}{2}$% were foundlings. In the course of a decade six out of every 10 foundlings died, either in hospitals or out at nurse. (There is a reference to Quetelet's *Sur l'Homme* as a source of information on this subject.)

Exports to Great Britain at 102 million Fr were three times as great as *imports*, whereas exports to the USA, worth 90 million Fr, were more nearly balanced by imports at 73 million Fr.

French *ships* at the end of 1833 were three-quarters of the British in number, with less than half the average displacement; the most numerous category was the 70% of ships under 30 tons. The French *colonies* had numbers of coffee and sugar plantations, the labour being provided largely by a slave population of about 294 000 in 1831.

It may be of interest to note that a public lottery existed, which was shortly to be discontinued. Since 1798 the sums staked averaged 55 million Fr annually with 40 million Fr distributed in prizes. The annual net profit of the Treasury became a loss in 1814 which was attributed to the invasion of France by the forces of the coalition: Austria, Prussia and Russia from the east and Wellington's peninsular army in the south.

The expenses of various Ministries are tabled, revealing that the *Ministry of Justice* paid the salaries of cardinals, bishops and other clergy. The *Ministry of Public Instruction* spent 3 million Fr on science and literature, while the *Ministry of the Interior* spent a further 2 million Fr on theatres and the fine arts. The *Ministry of Commerce* spent like sums on maritime fisheries (3 million Fr) and the breeding of horses (2 million Fr). Under *Foreign Affairs* there was an almost invariable subvention of 0.7 million Fr on its secret expenses budget, while the *Ministry of the Interior* spent 2 million Fr rising to 4 million Fr in 1832, soon after the 1830 revolution had placed Louis Philippe on the throne, the same summer that saw William IV succeed his brother George IV to the English throne. In 1832, also, the succour to refugee foreigners reached 4.2 million Fr. But the major expenditure in that year was 48.5 million Fr on bridges, highways and mines.

A subsection of one table shows 'alienations' from 1805 to 1815, including 29 000 Fr for Marshal Berthier, the army's Chief of Staff, and varying amounts to Ney, Soult and other marshals and generals. Louis Napoleon received 500 000 Fr and Prince Borghèse, second husband of the Emperor's sister Pauline, 300 000 Fr, an equal amount going to the Duchy of Guastalla, of which she was Duchess.

2.4. 'Statistics of epidemic cholera', by Sir David Barry, MD

Sir David Barry was a member of the Central Board of Health, set up by the Government in 1831 because of the imminent threat of cholera. The Central Board sent in returns, based on reports from the local boards (of which there were over 1200), of the number of new cases, deaths etc. Unfortunately the statistical returns that were supposed to be sent in at the end of

an outbreak were deficient since, once the immediate dangers had passed in any particular district, the local authorities and doctors became indifferent to the history of their own local epidemic. Thus certain details such as the class of people attacked are based on rather few returns in the final analysis.

The first case of Asiatic or spasmodic cholera—a keelman, who died—was reported from Sunderland in October 1831 though some cases may have occurred as early as August. The first local board of health was set up in Sunderland in November 1831. The disease then began to spread, first to Newcastle-upon-Tyne: Table 4 is a summary of the reports on the epidemic, outside London; some whole counties remained free from the disease, as well as much of Scotland and Wales.

No total is shown for the number of districts since clearly a district might be experiencing an epidemic on more than one date. The peak of the epidemic was in August. Three-quarters of the new cases as well as the deaths occurred between July and October. The mortality rate was 37.1%.

In London there was a parallel situation, though there was an intermission in May, and a close look suggests an earlier peak in March as well as July–August (Table 5). The mortality rate in London was 47.9%, which was significantly greater than in the rest of the country taken as a whole.

The returns sent in by the local boards at the end of their particular 'visitation' related to a population of only 840 666 (this deficiency was discussed earlier). Of these 10 918 were attacked and 4152 died. Clearly only a fraction were reported in this way, giving the extra details that were asked for (Table 6). Such as they are, the results showed that males and females were equally susceptible and that one child suffered an attack to four adults, with the same proportion dying. A quarter were treated in hospitals, rather less than half of them dying there, compared with a third of those treated at home.

This catastrophic event had come about as a consequence of the large increase in population, especially in the towns, where the sanitation, the water supply and sewage disposal were woefully inadequate. Following a proposal by the Bishop of London in the

Table 4. Reports on the cholera outbreak outside London

Date	*Number of districts*	*New cases*	*Deaths*
November 1831	2	319	91
December 1831	13	697	282
January 1832	20	2149	614
February 1832	23	2332	627
March 1832	29	1589	685
April 1832	41	1890	975
May 1832	48	1575	678
June 1832	63	3274	1183
July 1832	78	9135	3454
August 1832	120	20912	7635
September 1832	147	14269	4794
October 1832	96	8578	3698
November 1832	39	2139	789
December 1832	10	325	138
		69183	25649

Table 5. Reports on the cholera outbreak in London

Date	*New cases*	*Deaths*
February 1832	130	81
March 1832	1599	834
April 1832	818	426
May 1832	125	70
June 1832	305	180
July 1832	3027	1362
August 1832	2939	1240
September 1832	1347	685
October 1832	700	382
November 1832	27	13
December 1832	3	2
	11020	5275

House of Lords in 1839, Chadwick moved on from the secretaryship of the Poor Law Commission increasingly to public health matters and was responsible for another outstanding report, on the 'Sanitary condition of the labouring population' (in 1842). Comparisons were drawn by the Manchester Statistical Society between Rutland and parts of Manchester, Birmingham, etc. from which it was deduced that fever was a dirt-, not a destitution-, induced disease. Not only cholera but also typhoid from which Prince Albert, the Society's first Patron, was to die in 1861, and tuberculosis the scourge of barrack-rooms, resulted. The aim then was to dispose of noxious odours etc., and to 'scrub and rub' people into good health. This was a dozen years before Snow showed the connection between cholera and the water supply, and fully 40 years before Koch discovered the tubercle bacillus followed a year later by his discovery of the cholera vibrio. Sewage disposal did not have to wait for these discoveries but still took time to organize and for construction to begin. Not until 1859 did Joseph Bazalgette begin work on a sewage system for London—it still exists.

To start it all moving there was a tiny civil service numbering 21 305 (in 1833) compared with 932 000 in France (in 1846): the Home Office numbered 29 officers; the French Ministry of the Interior 200 000.

Barry's paper ends with a discussion of the quarantine regulations which had been eased as a result of studying the statistics. The old system, entailing expensive delays in the landing or sale of cargoes, was based on precautions against the spread of *plague*. The Central Board became convinced that there was no connection between spasmodic cholera and the plague of the Levant and reduced the period of quarantine from 40 days (the accepted period for plague) eventually to 10 days, to the relief of traders. The key consideration was the

Table 6. Classes attacked and died

Class	*Attacked*	*Died*
Personal attendants on the sick	150	58
Washerwomen	65	36
Medical men	30	6
Persons in easy circumstances	442	185

incubation period, which was known to be short in India where the disease was prevalent and was shown to be so in sailings from infected ports in the Baltic. The Board concluded that the longest period was 5 or 6 days. No ship had *ever* arrived from India with the disease on board.

2.4.1. Schooling

One of the four main categories of statistics in the early days of the Society was 'moral and intellectual', the first part including crime (and in an early journal article 'improvident marriages', defined as those of males under 21 years old), and the second part education.

According to the Select Committee on the Education of the Poorer Classes (1837–1838) about 1 in 12 received some sort of daily instruction though only in half of them was it likely to be useful. Dame-schools in villages, charging a small fee, went back to Elizabethan times, and charity-schools, under the Church of England, of which there were 1500 by the end of Anne's reign, were attended by 25 000 (5000 in London) though some estimates put it at 42 000 at some point. Certainly in the first half of the 19th century primary education was in the hands of the churches:

(a) the National Society for the Education of the Poor according to the principles of the Church of England and
(b) the British and Foreign School Society for Dissenters.

These grew from the Sunday schools (7100 of them in 1803, with 89 000 teachers and 845 000 pupils) to, in (a), 3700 day-schools with 346 000 children in 1830 and 17 000 day-schools with 956 000 children in 1851 and, in (b), 1500 day-schools with 225 000 children in 1851.

In 1833 a Government grant of £20 000 (£30 000 from 1839 on condition of allowing school inspections) was paid towards the cost of school building, and renewed annually, but dissent between the Societies prevented much further state support until the Education Act of 1870. The University of London, which received its charter in 1836, opened its doors to nonconformists and secularists.

2.5. 'Connexion between crime and ignorance', by G. R. Porter (Vice-President)

In an essay on the moral statistics of France, by M. Guerry, it was claimed that instruction (education) tended to increase the number of criminal offenders. Porter points out that although it was perfectly true that, in departments of France where instruction was greatest, so also was criminality, this was so only in the particular year examined by M. Guerry.

Taking the departments at the extreme ends of the scale, in the four departments where there was most instruction there were 72–74% who could read and write, and among the four where there was least there were 12–13%, the percentage for the whole of France being 38%. It so happened that in the year 1831, which was taken by M. Guerry, 232 people were charged with offences in the first group and 187 in the second. But over the 5-year period 1829–1833 the result is quite different, 1831 being the *only* year with the inequality this way round.

Over the 5 years the number of criminals among the departments with the least instruction was nearly 10% greater than in the departments where there was most. Separating those charged for offences against the person, the numbers in the departments with least instruction, as against those with most, were in the ratio of 1.4 to 1, whereas for crimes against property it was 1 to 1. Porter's explanation for the latter equality, i.e. a relatively high figure where there was more instruction, was that in the most favoured departments there was the

Table 7. Breakdown of crime by extent of education

Least instruction (per 100 000)		*Most instruction (per 100 000)*	
Could neither read nor write	Others	Could neither read nor write	Others
15.8	21.9	24.2	12.5

Table 8. Criminal sentences given in 1833

Death	50
Perpetual labour	141
Labour for different periods	802
Solitary confinement	737
Transportation	4
Imprisonment	21
Correctional punishments	2417
Children detained	25
Surveillance	25
	4222

greater temptation to perpetrate property crimes. (Porter neglected to comment that Guerry's claim was in a sense correct, in respect of property crimes—over 70% of all crimes.)

A further breakdown into those who could neither read nor write and others better instructed, over the period 1831–1833 for which there were data, showing the proportion of offenders per 100 000 population, is given in Table 7. Porter supposed that the reason for the greater discrepancy in the second pair of figures was that employment opportunities were fewer if you were illiterate, whereas when most people lacked instruction it was easier to obtain work.

The French Ministry of Justice provided figures of relapsed criminals (*reçidives*) or professional offenders as they were known in Britain. An annual average of 644 could neither read nor write; others numbered 371. Their proportion is exactly the same as the figure quoted earlier for the whole population This was true also for French conscripts, and for all criminals subjected to punishment, who received the sentences given in Table 8 in 1833.

2.6. 'Births and deaths in the Prussian states 1820–34', by M. Hoffman (Director of the Statistical Bureau of Berlin) translated by W. R. Deverell (Assistant Secretary)

The population of Prussia was 11.4 million in 1820–1822 and had risen to 13.3 million in 1832–1834. Males born exceeded females in the ratio 1.06:1. In discussing whether the reduction of this inequality to near equality by the age of puberty is ordained by nature for the sake of monogamy the writer comes close to the argument for divine providence (Arbuthnot, 1710).

The proportions per 10 000 parturitions that resulted in multiple births were as follows: twins, 116; triplets, 1.46; quads, 0.024. Of the twin pairs about two-thirds were of like sex and a third of dissimilar sex. The infant mortality rate was 205 per thousand born who died

within the first year. Two-fifths of all deaths in the population were before the age of 3 years. In giving birth the mother's life was often at risk. Of female deaths between the ages of 14 and 45 years, nearly 1 in 6 died during delivery or in childbed.

We move now to other specific causes of death. In 1831 there were 32 600 deaths from Asiatic cholera, a higher mortality rate than in the 1832 outbreak in Great Britain. Violent deaths in Prussia over the whole 15 years averaged 4600 males and 1400 females annually, including 900 male and 200 female suicides. Deaths from smallpox averaged 6200 in 1832–1834, said to be much diminished as a result of vaccination; the numbers, however, were thought to be unreliable. In the case of other diseases the authorities appear to have abandoned any attempt to obtain accurate information, and large groupings are employed such as 'internal chronic diseases' and 'internal acute diseases', which together with the infirmities of old age make up three-quarters of the total.

One disease, of small proportions but fatal consequences, is hydrophobia which has led to misunderstandings in the statistics because of the confusion between the words *wasserscheu* and *wassersucht* (dropsy). The likely number of deaths was about 45 a year.

3. Conclusion

In conclusion, it is obvious that the beginnings of the Society were closely bound up with the social concerns of the day, and the investigations undertaken, both at home and abroad, were numerical in nature rather than algebraic. Such methods were dominant in the first half of the Society's existence and remain a potent instrument today.

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