

Memoir of the late John Finlaison, Esq., Actuary of the National Debt, Government Calculator, and President of the Institute of Actuaries.

FEW objects can be found more worthy of attention than the life of a man who has spent year after year in an unremitting and successful struggle against the ever-varying difficulties of new sciences; and who, not content with treading the beaten paths, has always sought to take a place among the pioneers of knowledge, neither deterred by the labour, nor dismayed by the risk of failure.

Mr. John Finlaison, late President of the Institute of Actuaries and Government Actuary, was eminently a man of this description. Born at Thurso, in Caithness, August, 1783, he lost his father when only seven years old. His innate energy of disposition, however, aided by the careful tutelage of his mother, procured for him that education for which Scotland affords such facilities; and he showed a keen taste for classical literature, and attained considerable local reputation as a poet. At this time his great mathematical talent was suspected by no one, least of all by himself, who regarded such studies with dislike; but the highly logical bent of his mind was shown in a faculty for systematizing, which he displayed to great advantage as factor to Sir Benjamin Dunbar, of Hempriggs, afterwards Lord Duffus, whose whole estates, with

those of Lord Caithness, were entrusted to his management at the age of 19.

The ability which he thus early displayed induced these kind friends to recommend that he should study for the Scottish bar. He accordingly went to Edinburgh, and qualified himself for that profession; but having visited London in 1804, on business, he became attached to the daughter of the Rev. James Glenn, and receiving from the then Secretary at War, the Hon. Mr. Dundas, afterwards second Lord Melville, the offer of an appointment under the Board of Naval Revision, which enabled him to marry at once, he was induced to relinquish the legal profession and enter the Government service in July, 1805, when Mr. Pitt was Prime Minister. He was shortly afterwards promoted to be first clerk to the Commission, and filled that office till the Board closed its labours in August, 1808. For some time previously he had also acted as secretary to a committee of the Board, represented by one of its members, Admiral Sir William Domett; and in that capacity, although but twenty-three years of age, he framed the eleventh and twelfth reports of the Commission—since laid before Parliament—and was the sole author of the important system therein recommended for the reform of the victualling departments. The accounts of this branch of the service had, for a century past, been so loose, imperfect, and complex, as to amount to a mere nullity; and, moreover, were seldom less than eighteen months in arrear. The effect of the new system was to produce them before the Board in London, simple, perfect, checked and audited, in *three weeks*. And this was accomplished not only without increased labour, but with a reduction of the establishment, which effected an enormous annual saving to the country. A memorial from the officers at Deptford stated, that, in the year when Mr. Finlaison's system first came into operation (the year 1809), the consequent saving from their yard alone was upwards of £60,000. Had the same system been established in the dockyards, many millions of the public money might have been saved.

On the dissolution of the Commission for the Revision of the Navy, the members of the Board expressed their great satisfaction with the ability evinced by Mr. Finlaison; and, in a letter to Mr. Wellesley Pole, then Secretary, they warmly recommended him to the notice of the Lords of the Admiralty, who were at that time much in need of the services of an able accountant. By the special advice of Sir William Domett, Mr. Finlaison was employed by Mr. Wellesley Pole to consider the state of the records and despatches

of the Admiralty ; and, if possible, to devise some remedy for the inextricable confusion into which they had fallen.

Ever since the Restoration the records had accumulated without any means of reference, except from the accidental recollection of individuals ; hence the production of the entire correspondence upon any one subject was almost impossible. Papers upon the most recent events, even when described and known to be in the office, could with very great difficulty be discovered. In 1805, Lord Barham had appointed an eminent barrister, Mr. Morthland, at a salary of £800 per annum, with two assistant clerks, to devise some remedy for the increasing evil ; but, after eighteen months' trial, he completely failed, being deterred by the magnitude and difficulty of the object in view.

Mr. Finlaison undertook the task with great diffidence ; he was young in official affairs, as in years ; a stranger to the nature of the Admiralty correspondence, and unable to obtain from Mr. Wellesley Pole, who well knew the defect of the office, any idea of the way in which it was to be supplied. Under these discouraging circumstances—after a vain but most diligent search, in the public libraries and elsewhere, for any English or foreign system of assorting correspondence at all applicable to the subject—he could only promise that no personal labour should be spared to accomplish Mr. Wellesley Pole's wish. After nine months of incessant application, he produced a magnificent system of digesting and indexing the records and correspondence of the Admiralty, which, after the lapse of more than fifty years, still works with such perfection, that should information or precedent be needed on any subject under discussion, all that has been received concerning it can be immediately known ; or should the name of some individual be called for, all that relates to him may be instantly produced. Under his superintendence, this system so eminently contributed to the dispatch of business, that every letter—although, in time of war, these averaged in number from two to three hundred a day—was answered on the very day of its arrival. The value of such precision and expedition in the conduct of naval affairs can hardly be appreciated by those who have not experienced the want of it. There was not, at that time, any system of official arrangement in any office of state in Europe which could be compared with this invention.

The following account of his work is extracted from a letter written by Mr. Finlaison in 1855, in answer to a request from the Admiralty that he would reconsider the working of his

system, and suggest some improvements which time had made necessary :—

“ Among the manuscripts of Samuel Pepys, at Cambridge, will be found ‘ A Devout Imagination,’ a sketch, in fact, of a return intended to show from time to time the nature and amount of the stores in hand in the several dockyards. This renowned Secretary of the Admiralty showed himself no mean adept in the art of arranging a system on the Linnæan principle, although he had died before the birth of its author. His kingdoms were—timber, the metals, fibril materials, and unctuous matter. His genera were the different kinds of each of those. His sub-genera, the raw and manufactured respectively. These last again were ramified into innumerable species and varieties, until you came to the individual article wanted—perhaps a common brass cock for a spirit cask.

“ When I entered on my task at the Admiralty, I took the grand idea of Mr. Pepys for the basis of my plan. The Admiralty records were tolerably complete since the period of the Restoration; they consisted of letters and reports addressed to the Board, and of copies of letters and orders issued from it. I soon found that these papers were of three descriptions, and that it would be at once unprofitable and hopeless to attempt to digest the whole. There is, first, a vast correspondence relating purely to the interests of individuals; the discharge of impressed men; applications from officers for employment, for leave of absence, for particular information, &c , which I did not think worthy of record, beside subjects intimately connected with the public service. In the second place, a very large proportion even of papers regarding the public service are worthless as soon as answered; they consist merely of official reports and ephemeral details, such as periodical reports, reports of the arrival and sailing of ships, applications for supplies of stores, payment of ships, &c.

“ The remaining portion of the records comprising the public acts of the Board is alone valuable for reference. A digest is made of these only, which form about a third of the whole correspondence; but the papers passed over can always be found, if needed, by means of the index, as will presently be seen.

“ The purpose of any system of reference must be to supersede the use of individual memory—to instantly invest a new Board of Admiralty with the very same facilities for the despatch of business which had previously been at the command of their predecessors. The principle of my method is briefly this :—All information sought for must relate either to a person or a thing. The index, therefore, is an alphabetical list of proper names of persons and ships, in which the history of each name may be traced, though concerned in fifty different things; while the digest is a systematic list of words in which any subject may instantly be brought under review, though fifty persons have taken part in it. It was in the arrangement of this list that I found Mr. Pepys suggestion to be, like the poetry of Homer, a source of inspiration. One hundred and four chapters embraced all capital topics, such as firearms. I divided the chapters into sections as numerous as the different kinds of each of these, and placed in each section all discussions upon one and the same thing. The Minié rifle, for instance, ought to be found in one chapter and section of the digest, unencumbered by discussions on other sorts of gun-barrels or on firearms in general. In the one case a lord hears that something has happened—he knows not *what*

nor *when*—to a particular person or ship; he is instantly informed by means of the index. In the other case, a lord hears there are heavy complaints—he knows not *when* or *from whom*—of bad victuals. But, on reference to the digest, he is at once put in possession of the whole matter.

“In each of these books the utmost brevity is required. Immediately the letters reached me from the Board—generally the morning after they were received and acted on—I marked each, if of a memorable nature, in pencil, with the number of the chapter and section in the digest to which it belonged, as 51-1; having a sheet containing a plan of the digest as a guide. I also marked any proper name, as well as the signature, with a large cross ×. The letters then passed to the clerk of the index to be stamped, marked and numbered, for the different cabinets in which they were finally to be placed. This done, the clerk, whenever he saw a cross, without reading the letters, entered the name referred to in his index, together with the digest mark, 51-1, which referred to the subject-matter, and the numbers by which the letter itself might be found. It was estimated that in this way he made annually forty thousand entries. From him the letter went to the clerk of the digest, who opened the chapter and section referred to, and wrote therein an exact précis of the letter, and its answer already engrossed upon it by the lord whose department it concerned, together with the numbers referring to its place of deposit. If of an ephemeral nature, the letter was, of course, not marked for, and not entered in, the digest. The letters being indexed and digested, were, by the same two clerks, placed in their respective places. To a third clerk and myself fell the duty of producing any of the papers when wanted, and of compiling for the Board statements or memoirs on any topic whatsoever upon which information or precedent might be desired.

“To give the Board ocular proof, in the shape of an actual model, that there could be no doubt of the success of this plan, I took the whole correspondence of the year 1803, the first year of the war: assisted by one clerk, I made, in three months, an index of every name and ship mentioned therein. With my own hand I made a précis of all the *memorabilia* found in every single letter—and in that year these were not less than twenty-five thousand; placing experimentally in the margin some significant title. Revising these last carefully, generalisation—thus rising from analysis to synthetis—ensued, and my plan was developed and acted upon.

“A second division of clerks was appointed to digest and index, on the same principles, the records of former years since 1792, and thus the chain of naval history is complete from that period to the present time.”

Baron Dupin, a member of the French Institute, gives a clear account of this system, while describing the Admiralty, in his work entitled *Voyages dans la Grande Bretagne*. He recommends it as a model for the use of his Government, which proves that it was highly esteemed in France. Louis XVIII., after his return to France, transmitted to Mr. Finlaison, in 1815, the order of the Fleur-de-lys—a gracious acknowledgment of services rendered him in connection with this subject. The invention was shown to other royal personages by Lord Melville, then First Lord of the Admiralty, who permitted them to carry away plans for the use of their

respective Governments. Among these were the Grand Dukes Constantine and Nicholas, the Archdukes John and Lewis of Austria, and the Grand Duke Michael of Russia, who visited the Admiralty at various times between the years 1816 and 1818; and to each of whom Mr. Finlaison presented an elaborate account of his method, and received testimonials of their satisfaction. He was honoured by the particular notice of the Grand Duke Nicholas, since Emperor of Russia, who sent him an autograph letter of thanks.

To further the efficient working of the system, Mr. Finlaison, at Mr. Wellesley Pole's strong recommendation, was, in 1809, appointed Keeper of the Records. A few months later, a library having been formed, consisting of about 5,000 volumes, he was made librarian, and became thus the general depository of all the information, whether in print or manuscript, in the Admiralty. This necessarily entailed his being general referee for supplying that information to each member of the Board, to the public and private secretaries, and to every clerk in the office. Moreover, he became, in consequence, reporter and précis writer on all difficult and complicated inquiries arising from day to day. This highly confidential and important service—than which nothing can be more arduous—he fulfilled for twelve years. While he occupied this position, many members of the Board availed themselves of his freely-offered services, in matters foreign to his appointed duty and performed out of office hours. The following are a few instances in which his ability was remarkably displayed on important questions.

In 1810, Lord Mulgrave, then First Lord of the Admiralty, was called to account for his naval administration by Lord Melville, under the mask of a question on troop-ships. Lord Mulgrave, who had shown Mr. Finlaison much previous kindness, now requested him to prepare the materials for his defence in both Houses of Parliament. Mr. Finlaison accordingly, after three months of zealous and successful exertion, produced such an amount of information, calculation, and reasoning, as enabled Lord Mulgrave triumphantly to clear his conduct as a statesman, and obtained from him many expressions of gratitude and promises of protection, which, however, were not redeemed when needed in after years.

In 1811, by Mr. Barrow's desire, he compiled an account of the enemy's force, involving the analysis and comparison of more than eight hundred dispatches, as well as of many thousand foreign

and English newspapers. He formed a digest out of all this intelligence for every port and arsenal in Europe ; and framed a list of every foreign ship of war, with particulars of their age, force, &c., and of the increase and loss of the enemy's naval power during the previous six years. This list experience showed to be perfectly correct, and it was even relied on in Parliament as accurate. Such information had never before been obtained with even tolerable authenticity.

In the same year Mr. Yorke employed him to investigate the abuses of the sixpenny revenue at Greenwich Hospital, which was a fund instituted in 1696, and intended to support the out-pensioners by a tax of *6d.* a month on all seafaring men. He compiled, with great labour, a report on the subject, in which he showed that 10,000 additional pensioners might be constantly maintained on that establishment, and also that the allowance of the existing pensioners might be much increased by including the class of fishermen, boatmen, and mercantile sailors among the taxpayers, as well as by the reform of many abuses in the office and by the abolition of sinecure places.

For some years past petitions had been repeatedly sent up by the various departments of the Government, praying for a revision of their salaries. The matter having been more than twice forced upon the notice of Parliament, Mr. Finlaison was, in 1813, directed by Mr. Croker to inquire fully into the case of the Admiralty departments, and to apply systematic principles of justice to the consideration of the subject, which had never before been done. After six months of close attention, he completed the elaborate report upon which was founded the present system of salaries in the Admiralty.

In 1814 he compiled the first official Navy List, a work of immense though humble labour, the accuracy and usefulness of which is now well known. It was issued monthly, and as long as Mr. Finlaison remained at the Admiralty he undertook the troublesome duty of correcting and editing it.

From 1817 to 1818 he was occupied in framing one of the most useful records ever formed in any nation, a biographical register of every commissioned officer in the Navy—in number about 6,000—describing their services, merits and demerits. This laborious work he engrafted on to his system of the digest and index ; and its value is obvious when it is considered that it affords the means of deciding, with perfect justice, on the claims of individual officers ; and, in the event of any expedition

being undertaken, renders it easy to select the *élite* and flower of the Navy, or to fix at once upon those officers who, from previous local experience or other causes, would be most fitted for the service—a matter of great importance.

In 1819 his labours were still further increased by the resolution of the Lords of the Admiralty to apply his method of arranging papers to all the hydrographical information that had ever been received at the office, in manuscript, print, or charts, and to consign these last also to his custody. Deeply impressed with the importance of the measure, and fully aware of the immense benefit to hydrographical knowledge which should result from it, he undertook the task with energy and enthusiasm, though as the whole of his time was engrossed by the routine of his daily duties, the extent of geographical and nautical study which the nature of the service demanded, was entirely acquired in his few moments of leisure.

Mr. Finlaison had thus, during the ten years of his official career, accomplished no fewer than ten important and laborious public services, of which some were in their nature ephemeral, though of the utmost consequence at that time, while others—for instance, the Admiralty system and the Navy List—having stood the assaults of adverse criticism, and the more formidable tests of time and of two great wars, continue unchanged in design to the present day. He also introduced into the Record Office, and strictly enforced, a custom of civility towards the public and a readiness to impart information, which, had it been universally carried out, would effectually have prevented the “Circumlocution Office” from acquiring celebrity.

At this time the reputation which he had gained induced Mr. Barrow, and several other distinguished members of the Royal Society, to recommend that he should become a candidate for election into that body. He, however, declined to do so, from motives which had their origin in the peculiar independence of his disposition. He preferred that his name should be known to scientific men from his works, and not from his being casually thrown among them. He undertook, also, about this period, to frame a digest of the library of the Royal Society upon the plan of the Admiralty system. An outline of this plan was laid before the council and approved, but the immense call upon his time in matters of state, in 1819, compelled him reluctantly to abandon the work.

The position of librarian at the Admiralty having brought

before his notice many valuable State papers relating to the American rebellion, he was, in 1813, induced to attempt the completion of Sir Redhead Yorke's Naval History, which was intended to form part of Campbell's *Lives of the Admirals*. Mr. Finlaison carried out his design in part, by continuing the History down to the year 1780. His remarks on the political aspect of the American question show both a very wide and accurate extent of reading, and also a knowledge of the true principles of commercial and colonial policy, very unusual at the time when he wrote; at the same time his analysis of Rodney's inglorious action with De Guichen, off Martinique, on the 17th of April, 1780, shows an acquaintancè with naval strategy which gained him very high commendation from Sir W. Domett and other eminent naval officers. This portion of the work was printed for private circulation, but, for many reasons, its publication was delayed; and afterwards, when his attention was turned to the subject of life assurance, he found himself unable to spare the time necessary for completing the history, and finally abandoned its further progress.

In 1815, Dr. Barry O'Meara, having been appointed physician to Napoleon at St. Helena, commenced a correspondence with Mr. Finlaison, his private friend, on the subject of the Emperor's daily life. Copies of these celebrated letters were given by him to Mr. Croker, and by him transmitted to the Government and the Prince Regent. Dr. O'Meara wrote under the positive assurance that these letters should never be suffered to become public; and, in 1824, Mr. Finlaison burned them all by his desire. Some of the copies, however, fell into other hands, and were published in 1853, in a book entitled *Napoleon at St. Helena, and Sir Hudson Lowe*. Intelligence of the proposed publication of this work having reached the ears of Lord Clarendon, he at first thought of suppressing it by an injunction; but before instituting proceedings, he requested Mr. Finlaison to read over the proof sheets and give his opinion as to the danger of permitting its issue. Having, with some difficulty, obtained the proof sheets from the publisher, Mr. Finlaison found that the author had not obtained possession of any documents of importance; and Lord Clarendon, judging that it was not a book likely to attract much attention, withdrew his opposition.

He now completed a work upon which he had been zealously employed since 1812. This was the fund for the maintenance of the widows and orphans of all who were employed in the civil departments of the Royal Navy. He first suggested it in a letter

to the heads of the departments, and at once obtained Mr. Croker's full co-operation and warmest approbation. Mr. Finlaison then first directed his attention to the principles of life assurance, a science which was little understood. It was upon this study that his future labours were to be spent, and on the investigation and discovery of its laws that his eminent reputation was to depend—a reputation that gained him honourable notice in the history of his country.*

Starting with small knowledge, he worked assiduously and ably for seven years, during which time he mastered the principles of the subject, constructed the necessary tables, matured the whole plan of the undertaking, and obtained the means of forming a Society to execute it. Through Lord Melville's intervention, his generous efforts terminated successfully, by the establishment of the fund by Order in Council, 17th September, 1819.

Many other Societies were framed on this model: among others, the Naval Medical Supplemental Fund, for providing an annual pension, of not less than £40 additional to that allowed by Government, to the widows of medical officers. This charity, although commenced subsequently to the preceding, and in imitation of it, was completed before it, and established under Government authority in August, 1817. Mr. Finlaison took the greatest interest in this Society, which owed its existence and subsequent prosperity entirely to himself. His financial skill enabled him to construct its valuable system of accounts, which he gradually perfected by the experience of several years; and his management as secretary, gave the Society, in the twelfth year of its existence, an annual income of £9,000, with trifling expense to individual members. The unworthy and ungenerous treatment he then received from its directors, who not only refused to remunerate him for a new and elaborate system of tables, but endeavoured to injure his character in the eyes of the Chancellor of the Exchequer, by the grossest falsehoods, compelled him to throw up the ungrateful office of secretary and manager, after he had, during twelve years, devoted much of his time and talents, almost gratuitously, to the service of the Society. In a letter written at the time of his resignation, he speaks thus of the stability of his scheme:—

“Many similar Societies have been dissolved through their unskilful construction, while this institution, to which I can triumphantly refer as the

* *Vide* Lord Macaulay's *History*, vol. i., p. 283.

only one in the empire which has its foundation deeply laid in scientific skill, is established on such principles of cohesion, the result of long and patient investigation, as that neither time nor accident, except the suicidal act of its own rulers, can in the slightest degree affect its efficacy."

It is worth recording that this "suicidal act" did take place; and that, owing to the mismanagement of its directors, the Society gradually sank, till, singular to say, it died in the same year with its founder and benefactor.

The success of the charity thus founded by Mr. Finlaison, together with his subsequent services in an investigation into the general condition of Friendly Societies, upon which he was employed by a Select Committee of the House in 1824, naturally gave rise to a private practice among the various Benefit Societies which speedily sprang up in all parts of England. He constructed tables for many of these, furnished the scheme of some, and entirely constituted others.

From the beginning of the year 1819, Mr. Finlaison, though he still retained the office and performed the duties of Keeper of the Admiralty Records, found himself required to devote all the time and skill at his command to the service of the Treasury, which then stood in great need of an able financier. During the previous year, arrangements had come under the consideration of Government for the payment of all half-pay and pensions by some means beyond the current service. Lord Melville was well aware of Mr. Finlaison's value as a trustworthy public servant, and he also knew that he had acquired considerable reputation at the Admiralty by his knowledge of the principles of finance. He, therefore, advised the Chancellor of the Exchequer (Mr. Vansittart, afterwards Lord Bexley) to entrust to Mr. Finlaison the very confidential service of maturing a scheme for meeting this expense. This was to raise a fund, by resuscitating an old corporation, so as to be in some sort a rival to the Bank of England. In the year 1808 two remarkable modifications had been introduced into the plan for the redemption of the National Debt. The first, brought in by Mr. Percival, was the great operation of granting life annuities chargeable on the Sinking Fund; the other was the savings banks system, soon afterwards commenced by Mr. Rose. Upon both these schemes Mr. Finlaison was now desired to comment, in connection with the "dead weight," by which name the half-pay and pension expenditure was familiarly known, from the accident of Lord Castlereagh so

calling it in the course of a debate. We shall say nothing at present of the report on the savings banks, which led to the commutation of the half-pay and pensions, nor of Mr. Finlaison's services in connection with this measure. They were subordinate to the work suggested by his second report, and to which, for nearly ten years, every faculty of his mind was devoted. His report on the life annuity system was laid before Mr. Vansittart on the 1st September, 1819; and the learning, ability, and extensive acquaintance with every bearing of the subject which it displayed, proved it to be the fruit of many years' previous study. In it Mr. Finlaison first directed the attention of the Chancellor of the Exchequer to the ruinous loss sustained by the Government in granting life annuities to the public at prices immensely below their value. This loss, which had already, in eleven years, amounted to nearly two millions, began from the circumstance that the Treasury had no actuary attached to its service. In the year when the life annuity system was instituted, 1808, there was but one eminently scientific man in practice as an actuary in all England, Mr. W. Morgan, of the Equitable Life Assurance Office; and there was but one English observation on the mortality of mankind—viz., that formed on the bills of mortality in Northamptonshire by Dr. Price, the uncle of Mr. Morgan, expressly for the benefit of the Equitable. How beneficial it was had appeared from Mr. Morgan's Address of the 24th April, 1800, in which he published a statement of the experience of the Equitable during the previous thirty years, which showed that the real decrement of life under the age of thirty was *one-half* that indicated by their tables; at other and higher ages the difference was *two-thirds* and more. Their gains were accordingly enormous. It is obvious that the tables which were so gainful to the Equitable, who, in the shape of premiums, *purchased* life annuities, must be ruinous to the public revenue which was to *sell* them. Nevertheless, the Treasury, in profound ignorance of this palpable truth, applied to Mr. Morgan to furnish tables for the newly-instituted Government annuities; who, accordingly, computed them on the basis of those very Northampton tables he had just proved so inaccurate; and the Government not only accepted his advice, but persisted in that erroneous measure of value for twenty years. Mr. Finlaison's report was not printed till 1824, when it was laid before the committee of finance; but Mr. Vansittart's confidence in the correctness of the Northampton tables was greatly shaken by the revelations it con-

tained, and he at once directed Mr. Finlaison to spare no labour in the investigation of the true law of mortality prevailing in England among the class of annuitants. He was thus plunged into the abyss of a new science, and in the watches of many a night slowly but surely traced out the fundamental laws of life.

He attempted at first to procure the necessary data from the records of the births, marriages, and deaths of the nobility of Great Britain; but, after consuming eighteen months in the trial, he found it would involve too wide a range of reading for his immediate purpose; and, although he had made considerable progress in this laborious research, he was obliged reluctantly to suspend it, and to turn to the Exchequer offices of England and Ireland. Here he found the very materials for his purpose in the records of the various tontines from 1695 to the great tontine in 1789, which, together with the annuitants of the Sinking Fund, and an observation made by himself on the Chelsea and Greenwich pensioners, afforded him the means of comparing more than 19,000 deaths. The incalculable advantage that these data afforded him arose from the fact, that in every instance the age of the deceased was delivered on oath; and, in the case of tontines, that of the surviving co-partners also. In another respect these observations had possibly an advantage, namely, that being taken only from the higher classes, they excluded those lives which could not have any concern with life assurance.

The only observation that had hitherto been made in England, in addition to the old Northampton tables, was the work of his contemporary, Mr. Milne, of the Sun Fire Office, whose data were only 900 deaths of both sexes indiscriminately, and whose ages were most imperfectly conjectured. Some idea may be formed from this fact of the superior extent of Mr. Finlaison's researches, and of the means he had of attaining perfection in his results. But the gradual conviction forced upon Mr. Finlaison, that none of his predecessors in political arithmetic had ever attained correctness, obliged him to repeat his work twice, thrice, even four times, before the truth of the new results became unquestionable; and the time which, during four years, he devoted to the intense labour of calculation, very considerably exceeded an average of *twelve* hours a day. With less enthusiasm in the cause, his task would not have been concluded in any reasonable period.

The methods of adjustment which he employed for this purpose are given in his report, 1829. From this it appears that

nineteen observations were adjusted from the formula (Milne's notation)—

$${}_1a = \sqrt[3]{\sqrt[5]{a_{13} \cdot a_{12} \cdot a_{11} \cdot a_{10} \cdot a_{9} \cdot a_{8} \cdot a_{7} \cdot a_{6} \cdot a_{5} \cdot a_{4} \cdot a_{3} \cdot a_{2} \cdot a_{1}} \times \sqrt[5]{a_{12} \cdot a_{11} \cdot a_{10} \cdot a_{9} \cdot a_{8} \cdot a_{7} \cdot a_{6} \cdot a_{5} \cdot a_{4} \cdot a_{3} \cdot a_{2} \cdot a_{1}} \times \sqrt[5]{a_{11} \cdot a_{10} \cdot a_{9} \cdot a_{8} \cdot a_{7} \cdot a_{6} \cdot a_{5} \cdot a_{4} \cdot a_{3} \cdot a_{2} \cdot a_{1}}};$$

while two more, being those from which the tables of life annuities were calculated, were adjusted from the formula—

$${}_1a = \frac{1}{25} (5{}_1a + 4{}_1a_1 + 4{}_1a_2 + 3{}_1a_3 + 3{}_1a_4 + 2{}_1a_5 + 2{}_1a_6 + {}_1a_7 + {}_1a_8 + {}_1a_9).$$

The result of his studies was the discovery that the average duration of human life had sensibly increased during the century. These tables also were the first which exhibited the difference between male and female mortality, although it had been loosely remarked for many years previously. Their accuracy in this respect has been impugned, and, in the case of advanced ages, appears to require some modification; but the recent elaborate and very extensive researches made by his son and successor, Mr. Alexander Finlaison, have shown that the error is small, and that he had attained almost as great accuracy as was possible with the data at his disposal.

The following extracts from the reports of 1829 and 1860 will exhibit the difference in a few cases.

The results in Mr. John Finlaison's report are extracted from observations 9 on female life, and 20 on male life, pages 44 and 58. Those in Mr. Alexander Glen Finlaison's are taken from observations 14 and 15, pages 140 and 144.

Males.

Age.	1829. Mortality per Cent.	1860. Mortality per Cent.	Difference
3	1 24862	0·97842	-27020
8	·60403	·64628	-04225
13	·52586	·59678	-07092
18	·93132	1·04714	-11582
23	1·41513	1·36790	·04723
28	1·27163	1·17380	·09783
33	1·24605	1·17550	·07055
38	1·31414	1·32440	-01026
43	1·35342	1·36200	-00858
48	1·42012	1·54340	-12328
53	2·14940	2·08640	·06340
58	2 96085	2 59970	·36115
63	3·55167	3·45860	·09307
68	5·26964	5·24080	·02884
73	7·22627	7·53160	-30533
78	9·79843	10 99010	-119167
83	16·22553	16·23580	-01027
88	30·95338	21·95490	8 99848
93	46·00000	31·91890	14 08110
98	100 00000	71·42857	28·57143

Females.

Age	1829. Mortality per Cent.	1860. Mortality per Cent.	Difference.
3	1·09779	1·07493	·02286
8	·57219	·61279	−·04060
13	·47732	·61345	−·13613
18	·83950	·82793	·01157
23	·86238	·82857	·03381
28	·90490	·86084	·04406
33	·99023	·95716	·03307
38	1·11019	1·02467	·08552
43	1·15152	1·10770	·04382
48	1·19281	1·27960	−·08679
53	1·28756	1·51620	−·22864
58	1·69708	1·87270	−·17562
63	2·27646	2·62970	−·35324
68	3·39883	4·06110	−·66227
73	5·47601	6·07950	−·60349
78	8·75801	9·42750	−·66949
83	11·38146	14·45910	−·307764
88	16·05611	20·67350	−·461739
93	34·81818	29·32050	5·49768
98	65·00000	71·42857	−·542857

By the end of the year 1823, Mr. Finlaison had completed a set of tables on single lives, constructed on the basis of his recent discoveries, and adapted to the purposes of the Sinking Fund. In these he gave the value of immediate and deferred annuities at nine rates of interest, payable half-yearly, for every year and half year of human existence; and it may be observed, that no table of half-yearly annuities had till now been completed in this or any other country. He afterwards calculated a similar system of tables for two joint lives.

The Institute of France took considerable interest in the inquiry upon which Mr. Finlaison was engaged. The Academy of Sciences transmitted many questions on the subject for Mr. Finlaison's consideration; and, in return for the information contained in his answers, they did him the honour to send him a letter of thanks.

The savings bank system, and the report which Mr. Finlaison was desired to make on it, have already been mentioned as contemporary with the report on the annuity system, which led to such important results. His services in connection with the former subject may now be briefly enumerated in the order of their occurrence: they were performed during the progress of his calculations for the tables of life annuities, at the expense of intense mental toil. Before the close of 1819, Mr. Finlaison had furnished the Chancellor of the Exchequer with a very elaborate statement of the

age of each individual in the receipt of naval half-pay or pensions—14,000 persons, thence deducing the decrement of life among them. In 1821 Mr. Harrison employed him for several months in computations relative to the Superannuation Act, and expressed himself much pleased with the exertions and skill displayed by Mr. Finlaison; and in 1822 he was occupied in considerations relative to the commutation of the naval and military half-pay and pensions—which measure, suggested by him in his report on the savings banks, was finally established by the negotiations with the Bank of England, in 1823, for its acceptance of the charge for public pensions in consideration of the “dead weight” annuity. All the calculations connected with this subject were performed by Mr. Finlaison with such unsparing exertion and arithmetical skill as should neither be forgotten nor undervalued—especially as it was plainly stated in the House of Commons, that, in the whole establishment of the Bank, there was not one person capable of computing the new annuity at the fractional rate of interest agreed upon. This measure having passed into a law, it became necessary to ascertain the real decrement of life among the pensioned and half-pay officers of the Army and Navy. The result of Mr. Finlaison’s investigations presented a most perfect view of the extent and progressive diminution of this department of the national engagements, similar to the view of the *rentes viagères* annually published by the French Government. Mr. Finlaison had previously completed the observation on the decrement of life among the Greenwich and Chelsea pensioners, already mentioned as forming part of the data for his law of mortality. It was formed from a registry of more than 70,000 persons, including 8,000 deaths, and presented important matter for the consideration of the Chancellor of the Exchequer.

The business of the savings banks was now committed to the National Debt Office, and an actuary and check-officer was needed. The Government, therefore, resolved to remove Mr. Finlaison from the Admiralty, to fill the newly-created office in the Treasury; and, on the 1st January, 1822, he was appointed Actuary and Principal Accountant of the Check Department of the National Debt Office, the duties of which position he performed for twenty-nine years.

From the first moment of his undertaking the subject of life assurance, until the production of the report of 1829, he continued constantly impressing upon the members of the Government the enormous loss which the country sustained by persisting in using the erroneous tables; but, so far from meeting with the encourage-

ment and commendation which might have been expected, he received nothing but neglect and contempt. Persons in high position refused to see him; and, when he had positively forced himself into their presence, would give no heed to his statements. And yet, when the matter came before Parliament, these were the very people who publicly declared that "they could never get any account from him!"

The anxiety which he suffered during the time when he was devoting his best energies to the service of his country, may be traced in his letters. He writes to Mr. Walpole, Secretary to the Chancellor of the Exchequer, in 1824, of the extreme cruelty "of leaving me to expend my talents, time, and labour, like a galley slave, at the rate of sixteen hours a day, eleven of which were constantly employed on the calculations for the life annuities; and this without being able, by the most fervent eloquence or the most pathetic complaints, to extract one shilling from the Treasury, as the records of that office will show, between Lady Day, 1819, and the month of April, 1821, save the sum of £500; and out of these, my private resources, I had to pay the clerks employed, to find them accommodation, to find an extensive collection of books, to defray the expense of stationery and all other contingencies that might arise."

Again, in a letter to a noble lord, dated March, 1828, praying for his assistance to defend his reputation in the House of Commons, when the correctness of a recent report by him, on the tremendous loss the Government was still sustaining in the matter of life annuities, was impugned by the ministry, he writes:—"In the simplicity of my heart I fancied that a service which went to prevent the loss of millions of the public money would have been rewarded by honour and profit. I have been fatally undeceived: my salary has been stopped; I have met with nothing but envy, malice, and hatred, for my discovery: and, although I have every year reiterated my warnings, not a jot of attention was paid me till now, when my statements are called extravagant. This is the same imputation on an *actuary's* character as cowardice is on that of an *officer*, and cannot be endured."

It was the accidental production of a letter from Mr. Finlaison, addressed to the Secretary of the Treasury, Mr. Herries, and dated 30th April, 1827, that occasioned the inquiry alluded to above. It was inadvertently laid before Lord Althorp's committee of finance by the Treasury themselves, in March, 1828. On the motion of Earl Grey, this letter was printed by order of the House of Lords,

and it was then shown that the annuitants of the first year, ending September, 1809, had already received back principal and interest of all that they had paid, and ought, therefore, in justice, to be all dead. But, far from being so, four out of every ten were still alive, and likely to live for many years. The same letter established, that, in the previous year, 1827, the loss sustained by the public revenue was advancing at the rate of £8,000 PER WEEK! and it further proved that this loss was concealed by the method of preparing the yearly accounts. This discovery caused the immediate suspension of the life annuity system, which was remodelled upon the basis of Mr. Finlaison's tables, and resumed in November, 1829.

In the same year Mr. Finlaison produced his report on the evidence and elementary facts on which his new tables of life annuities were founded, printed by order of the House of Commons, September, 1829. This important parliamentary document contained twenty-one new observations of the law of mortality, and one of the law of sickness prevailing among the labouring classes in London.

In the recent report on life annuities by Mr. Alexander Glen Finlaison, it is shown "that the loss saved to the Government by the adoption of Mr. Finlaison's tables, was, in five years, £390,501; by which it may be estimated that the substitution of Mr. Finlaison's tables for the old Northampton rates has already made a difference to the country of nearly £3,000,000 sterling."

In the year 1830 Mr. Finlaison was occupied in the investigation of the affairs of the London Life Assurance Association, and drew up a report containing many valuable suggestions for their benefit. By the end of the year 1831, he had, in conjunction with Professor De Morgan, completed an elaborate report on the affairs of the "Amicable"; and, in the succeeding year, he furnished them with a new set of tables. He also computed the tables for the Royal Naval and Military Life Assurance Society, which was established in 1837. Mr. Finlaison had a large share in the constitution of this Society, where he held, till his death, the office of consulting actuary. It may be mentioned here also, that, in 1839, he furnished the scheme and prepared the tables of the New York Life Assurance and Trust Company, the first institution of the kind established in the United States.

As the Government adviser on all measures involving political arithmetic, Mr. Finlaison's counsel and powers of calculation were

in constant requisition; and, from the year 1830 till his retirement from official life in 1851, there were few sessions of Parliament in which he was not called as a witness before some committee for the consideration of some important financial measure; few Crown commissions to which he did not render some important service—of which that in 1849, on church leases, under Lord Harrowby, may be specially mentioned; and scarcely a single department of the Government which did not apply to him for advice and assistance.

In 1833, by direction of Viscount Goderich, he commenced extensive computations of the duration of slave and creole life, with reference to the emancipation of the slaves on the West Indian plantations. In 1835 Mr. Finlaison performed the calculations necessary to effect the West India loan of £15,000,000, for compensating the slave-owners; and, in answer to certain resolutions on that loan, moved by the late Mr. Hume on the last day of the session of that year, he prepared a report early in 1836, which, as a Parliamentary paper on the higher finance and the funding system, is well worthy of perusal. Mr. Hume's reputation for financial knowledge was so completely annihilated by it, that he was never afterwards regarded as an authority on matters of finance, Mr. Finlaison having proved him to be completely in error on thirteen important questions. His masterly treatment of the subject did not fail to be duly appreciated by Lord Monteagle, by whom the loan was effected.

The demands made on Mr. Finlaison's mental powers had been so great throughout the progress of the measure for the abolition of slavery, that, at its conclusion, he became seriously ill. Great fears were entertained for the safety of his over-wrought mind, and he obtained permission from Lord Monteagle to reside in the country, and thenceforward was obliged to exercise more caution in his devotion to the public service. About this time, being a widower, he married the daughter of Mr. Thomas Davis, of Waltham Abbey.

His valued friend, Dr. Southwood Smith, the father of sanitary reform, having submitted to him the experience of the London Fever Hospital, of which he was physician, for the ten years preceding 1834—an observation which included nearly 6,000 patients—Mr. Finlaison was enabled to make a calculation of the mortality of fever, which presented some curious and instructive results. These were published, in 1835, by Dr. Southwood Smith, in a work entitled the *Philosophy of Health*.

His professional researches were still assiduously carried on, and his knowledge and counsel were called for, to an extent greatly beyond what is generally known, in the measures emanating from the Ecclesiastical Commissioners. In proof of this, his numerous reports may be adduced, on the means of improving church property by the abolition of fines, in 1835; on the great question of church leases, and the steps leading to the "Appropriation Clause," in 1836; and on the church-rate question, in 1837.

There was one service in connection with these measures to which Mr. Finlaison was wont to refer, with some consciousness of superior talent, as one of pre-eminent merit. Some time before the Parliamentary contest on the subject of church rates, Mr. Finlaison, in November, 1836, attended the Cabinet, and had the honour of explaining to the assembled Ministers, that he could demonstrate, by the mere force of arithmetic, and without any survey, the rental of the episcopal and capitular estates, at a minimum. Earl Russell, who was present, might still possibly remember how incredulous many members of the Cabinet were, and that Lord Sidmouth pronounced such a thing to be a flat impossibility. But Mr. Finlaison did prove it, in two memorandums to Lord John Russell, dated January, 1837, which were found to be unassailable. His opinion was fully relied on, and this most confidential service was matured in secrecy, until the month of April, 1838, when his reports were laid before Parliament.

Mr. Finlaison was consulted on certain points connected with the establishment, in 1837, of the registration of births, deaths, and marriages; and the closeness of his estimate of the deaths to be registered the first year—falling within twelve of the whole number recorded, 334,000—attracted much notice when mentioned in the Registrar-General's First Annual Report. He also predicted the number which would be found at the ensuing Census of 1841, with the object of enabling the Registrar-General to estimate the number of clerks to be provided, and he came within 1,200 of the whole female population of Great Britain.

The last Committee of the House of Commons before which he attended as a witness was that which sat, in 1848, upon Feargus O'Connor's Land Scheme. In the same year he sent in to the Treasury the second of two reports on the Act of the previous session for lending money to the Irish landlords, with the tables necessary to give effect to it. None but a very able actuary

could have computed them, from the complexity of some of the conditions.

In 1847, the Institute of Actuaries having been formed, Mr. Finlaison was unanimously elected President, and filled that post till the day of his death. It is not necessary to enlarge upon the affectionate regard which he entertained for all the members, nor upon the uniform kindness which they exhibited towards him. These are best shown by the letters which passed between them in 1851, when, being attacked by a dangerous, and, as it was thought, incurable disease, he tendered his resignation.

“ To the Vice-Presidents and Members of the Council.

“ 26th April, 1851.

“ MY DEAR SIRS,—Having, for many months past, been afflicted with a disease, which, in all probability, will soon be mortal, I feel that I should make a bad return to the Institute for the honour they have so repeatedly conferred on me, in choosing me their President, if I now continued to hold that distinguished office; and especially in such a time as the present, when I am totally unable to acquit myself of its duties.

“ I request you, therefore, to tender my respectful resignation of the office of President, with my grateful acknowledgments for the kindness and deference which, on every occasion, I have received at the hands of its members.

“ To yourselves, my dear Sirs, collectively and individually, without exception, I never can find words to express the sense I entertain of your kindness to me whenever and wherever we have met; and let it not repent you that, however unmerited on my part, you have shown me such kindness, when I inform you that I receive it as a testimonial from the *élite* of my brethren that my life has hitherto not been unprofitably spent, but that I have, in some degree, enlarged the boundaries of a science that, even in its infancy, promises to be of the utmost benefit to mankind.

“ Farewell.

“ Your affectionate brother and servant,

“ JOHN FINLAISON.”

“ JOHN FINLAISON, *Esq.*, *President of the Institute of Actuaries.*

“ 3rd May, 1851.

“ DEAR MR. PRESIDENT,—We are deputed by the Council to acknowledge the receipt of your letter of the 26th ult., and to assure you that its contents have been the occasion of very sincere regret to every member. Although aware that you had been for some time suffering from indisposition, the Council generally were not in the least conscious that your malady was of so severe or so alarming a character, and they have received the information with deep and unfeigned sorrow.

“ We are requested to convey to you warm and earnest hopes that your valuable life may be spared for many years to come. We are also to convey to you the urgent request of the Council that you will continue to

retain the Presidency of the Institute, and remain the head of that profession which you have been in so great a measure the means of creating, and for which you have so zealously and faithfully laboured throughout your useful life.

“ Believe us, dear Sir,

“ With much respect,

“ Your faithful servants,

“ JENKIN JONES, } *Hon. Secs.*”
 “ ROBERT TUCKER, }

In August, 1851, Mr. Finlaison finally retired from his position as Actuary of the National Debt and Government Calculator, after a confidential and devoted service under the Crown of nearly half a century, forty-two years of which were passed as chief clerk of one or other of two most important public departments—a service unalloyed by the slightest censure.

The last nine years of his life were passed in comparative ease and tranquillity. He applied himself, with unimpaired energies, to his favourite studies of Scriptural chronology and the universal relationship of ancient and modern weights and measures. His researches, which were exceedingly profound on both subjects, led him to form opinions decidedly adverse to the introduction of the decimal system of coinage and metrology into this country. He was on the point of completing a work in which his knowledge of numerical relations gave him unusual advantages, and, in combination with his native mental abilities, promised to render such a treatise of the utmost value to the student of biblical literature, when he was unexpectedly attacked by congestion of the lungs, and, after a brief illness of one week's duration, he passed away, on the 13th April, 1860, in his seventy-seventh year, from a scene in which he had long taken no useless part.

The reader of the foregoing outline of the chief events of Mr. Finlaison's active life, can hardly fail to be struck with the energy and unceasing industry which enabled him to accomplish so many entirely different undertakings. That an orphan boy should raise himself, by his own industry, to acquire a European celebrity, is a matter for high praise; but it is more surprising that a man, whose taste and studies had been entirely devoted to literature, should, by mere perseverance, gain a mastery over an abstruse science to which he had a positive dislike at starting.

The poetical talent which he possessed as a boy, he cultivated with great success, and produced some lyrical poems of considerable merit. He was also an enthusiastic mason, and attained a

high rank in that mysterious fraternity. He bore the chivalrous character of a past age. Incapable of acting with meanness, he could hardly be brought to believe it in others; and he suffered through life from the implicit confidence which he placed in every one. Injustice or oppression he would never endure; and for the oppressed he has not only afforded his time and energy, but has risked making powerful enemies, and on one occasion hazarded his whole fortune on behalf of a perfect stranger. He was affectionate in disposition, witty and animated in conversation, cool in moments of danger; and he died as he had lived, with the courage and resignation of a Christian gentleman.
