

*J.I.A.* 119, II, 313-343

## THE DEVELOPING ROLE OF THE GOVERNMENT ACTUARY'S DEPARTMENT IN THE SUPERVISION OF INSURANCE

BY C. D. DAYKIN, M.A., F.I.A., F.S.S., A.S.A.

### ABSTRACT

Following a brief outline of the origins of the actuarial profession in the United Kingdom, the paper traces the involvement of actuaries in the supervision of insurance in the U.K., and recalls the origins and early development of actuaries in government. In 1919, the Government Actuary's Department (GAD) was formed, and the paper explores the developing role of GAD in the supervision of insurance and how insurance supervision has evolved into a close partnership between the actuarial profession and the supervisors.

### KEYWORDS

Insurance Supervision; Government Actuary's Department; Appointed Actuary; Legislation

### 1. INTRODUCTION

1.1 The current system of insurance supervision in the U.K. places an unusually high level of responsibility on the company, and, in the case of life insurance, on a key professional individual within the company—the Appointed Actuary. Other European countries rely much more on detailed regulatory requirements, in many cases leaving little room for professional responsibility or the exercise of professional judgement.

1.2 The main exceptions worldwide, in particular where the actuary plays a role approaching that in the U.K., are the Republic of Ireland, Australia and Canada. The last of these is currently in the process of developing the actuarial role further, for both life and non-life companies, and similar discussions are taking place in the United States of America. The idea of an Appointed Actuary is also being discussed in New Zealand. Within Europe the role of the actuary is being expanded, and there are prospects that the EC Framework Directives will accelerate the move away from prescriptive regulatory systems towards arrangements which place more emphasis on freedom of action for insurance companies, in conjunction with greater professional responsibilities.

1.3 The U.K. Appointed Actuary system dates only from 1973. However, the tradition of freedom of action, and of relatively unconstrained professional responsibility on the part of the company actuary, coupled with a high degree of disclosure, goes back to the Life Assurance Companies Act 1870.

### 2. THE ORIGINS OF SCIENTIFIC LIFE ASSURANCE

2.1 Although forms of mutual insurance, not so different from modern P & I

(Protection and Indemnity) Clubs, can be traced back to Jewish shipowners some 2,000 years ago, the first marine insurance policies involving the payment of premiums to specialised underwriters are thought to date from the first half of the 14th century. Lewin (1987) refers to an Italian insurance policy of 13 March 1350 as the oldest surviving policy document. There is evidence of marine insurance in London by 1426 (Lewin, 1990), but the underwriters were all Italians, some of them known to be from Venice and Florence.

2.2 By 1575, when the Office of Assurances was established in the Royal Exchange at the instigation of the Privy Council (Lewin, 1987a, 1988), not only was marine insurance available (which constituted the bulk of the business transacted), but also short-term life assurance.

2.3 In its earliest days life assurance was dealt with in much the same way as general insurance, with the cover being fairly short term and the premiums assessed on the basis of the underwriter's experience and judgement, but with no formal scientific basis. In the 17th and early 18th centuries some insurers operated on the same principles as a dividing friendly society, with the premiums received in the year being divided among the claimants each year. Early in the 18th century the Amicable Society established life assurance on a basis which involved some build-up of reserves.

2.4 The development of the basic actuarial concepts of combining a life table with an interest rate took important leaps forward with the work of De Wit (1671) and Halley (1693), and then with the publication by Abraham De Moivre in 1725 of his *Treatise of Annuities on Lives* (see also Sibbett (1989) and Lewin (1989)). In 1756 James Dodson, a Fellow of the Royal Society, calculated an age-related scale of level annual premiums and proposed the formation of a life assurance society, based on the principle of equitable rates of contribution for a guaranteed sum payable on death. Dodson himself died in 1757, and in 1761 Dodson's group of associates were refused a Royal Charter to establish a new life office, but the efforts of this group were eventually rewarded with the establishment of a mutual insurance company, the Society for Equitable Assurances on Lives and Survivorships (now the Equitable Life Assurance Society) in 1762 (Ogborn, 1962). The founders believed that what we would now describe as an actuarial approach would result in a more soundly managed life insurance operation and better value to the policyholders. This represented the beginnings of scientific life insurance and a landmark in the development of the actuarial profession.

2.5 The Equitable grew and prospered, and remains a major player in the life assurance market of the 1990s. Other companies were established on similar actuarial principles, and the late 18th century saw an expansion of the life assurance market in the U.K. and the spread of similar ideas to other countries.

2.6 In 1833 a group of Scottish actuaries and other insurance company managers started to meet together regularly as the Managers' Association. This was the precursor to the Associated Scottish Life Offices (ASLO), which celebrated its sesquicentenary in 1991.

2.7 Early in 1848 William Thomas Thomson, an Edinburgh actuary, suggested to some London actuaries that it would be a good idea to form a similar association in London. A preliminary meeting was held on 15 April 1848 of the actuaries and chief officials of the London life insurance offices. A committee of 10 was formed to consider the matter and recommended subsequently the holding of occasional meetings rather than the formation of a society.

2.8 On 10 June 1848, at a general meeting of representatives of all the London offices, the recommendations of the Committee of ten were rejected and it was decided to pursue the idea of establishing 'a scientific and practical association amongst the Actuaries, Secretaries, and Managers of the Life Assurance Societies of Great Britain'. This led to the formation of the Institute of Actuaries.

2.9 The minority who were in favour of the report of the Committee of ten then formed themselves into a private association, called the Actuaries Club, membership of which was restricted to actuaries of life offices who did not become members of the Institute of Actuaries (see Taylor (1990) for more details of the origins of the Actuaries Club).

2.10 The Institute of Actuaries held its first meeting on 14 October 1848, with John Finlaison elected as President. The Institute was to be a professional body with the objects of regulating the practice of the profession of actuary, promoting knowledge and research and promoting the status of the profession. In spite of a number of earlier attempts to gain formal recognition, it was not until 1884 that a Royal Charter of Incorporation was granted.

2.11 In the early years of both the Actuaries Club and the Institute of Actuaries, actuaries from influential Scottish life assurance companies were active participants. However, in 1856 the Scottish actuaries decided to form their own professional body based in Edinburgh, and the Faculty of Actuaries was born, receiving its Royal Charter of Incorporation 20 years before the Institute, in 1864.

### 3. EARLY MOVES TO ESTABLISH LIFE INSURANCE SUPERVISION

3.1 The first evidence of government concern about the operation of insurance goes back to the 16th century, when the Privy Council decided that there was a need to regulate the insurance market and established by Letters Patent in 1575 the Office of Assurances in the Royal Exchange. The Office was put in the hands of Richard Candeler, and seems to have had, for a time, a monopoly on all insurance business in the City of London (Lewin, 1987a, 1988a).

3.2 The first legislation to regulate the insurance market was passed in 1601—'An Acte concerning matters of assurance amongst Merchantes' (Lewin, 1987a, 1988). The first Parliamentary Committee on insurance matters appears to have been that established in 1720 to enquire into the practice of marine insurance (Walford, 1867). It was not until the 19th century, however, that legislation to control life insurance companies was introduced. Many of the life insurance

companies which were established in the late 18th and early 19th centuries had prospered and built up sound reputations, but the first half of the 19th century saw a rash of new life companies being established and a large number of failures or mergers. In introducing the 1870 Bill, the Vice-President of the Board of Trade, Stephen Cave, commented that 285 pure life companies had been formed up to that point, of which only 111 had survived.

3.3 The development of many new life offices led to a much increased number of insurance salesmen, some of whom adopted questionable practices in their desire to sell policies to the unsuspecting public. The ethics of the management of some of the companies were also suspect, with some promoters out for a quick profit and with little concern for the policyholder.

3.4 Views diverged between the proponents of free trade, urging the benefits of an open market for the wider spread of life assurance cover and for greater competition, and the advocates of a more controlled market. The actuaries of the longer-established life offices were, not entirely disinterestedly, keen to control entry into the market.

3.5 Members of Parliament were also concerned about the possibilities for abuse and saw the need for some protection for policyholders, although the government of the day did not want to restrain free trade. Legislation to regulate friendly societies had been first introduced in 1793, but insurance supervisory legislation did not appear on the Statute book until 1870. Although friendly societies were subject to some regulation, there was still a basic presumption in favour of non-interference. The report of the Select Committee on Friendly Societies in July 1825 commented: "Your Committee take this opportunity of observing that it is, in their opinion, only in consideration of advantages conferred by the law that any restrictive interference can be justified with voluntary associations established for lawful and innocent purposes."

3.6 The 1853 Select Committee on Assurance Associations, chaired by the Rt. Hon. James Wilson, MP, took evidence from a number of leading actuaries and insurance men of the day. John Finlaison, the Actuary and Principal Accountant of the Check Department of the National Debt Office, the nearest there was at that time to a Government Actuary, was one of the leading advocates of the newer life offices and a supporter of a free market. As the first President also of the Institute of Actuaries, Finlaison argued that the right approach was to rely on the professional expertise of actuaries, and to protect the public by giving official recognition to the Institute of Actuaries and by controlling entry to the profession by examination.

3.7 Finlaison also advocated a confidential system of investigation by government to determine the solvency of life offices, involving consultation between the independent investigating actuary and the actuary to the company. He was, however, very much against the publication of information, as being detrimental to the interests of the newer offices.

3.8 Others, such as Charles Ansell, the actuary of the Atlas Assurance Society, and William Thomas Thompson, the manager of the Standard Life Assurance

Company, were in favour of the compulsory registration of assurance associations and the submission of information in confidence to a registry. However, they did not envisage the registry having any powers of intervention in the affairs of insurers. Dr Farr, statistical adviser to the Registrar General, argued that returns should be submitted, signed by the actuary, and that "some power might very well be given, perhaps to the President of the Board of Trade, in certain cases, to send down an actuary to look over the accounts and ascertain their accuracy. . .".

3.9 The case of the Institute for formal recognition was undermined, as far as politicians were concerned, by the divisions within the actuarial ranks. A number of the actuaries of the major life offices who had remained members of the Actuaries Club, and had not joined the Institute of Actuaries, were quite influential with Members of Parliament.

3.10 James Wilson's preferred solution was to require the life offices to publish their accounts on a standardised valuation basis, and to leave it to the insurance-buying public to distinguish between the sound and the unsound. The members of the Institute of Actuaries argued that it was unrealistic to expect the insurance-buying public to interpret this information, and that the remedy lay, not in a standardised valuation basis and publication of the results, but in ensuring that the actuaries in the companies were properly trained and qualified.

3.11 In their report, the Select Committee outlined the contrasting views of those arguing for regulation or freedom of action, as illustrated by the following extracts:

"On the one hand, even admitting the general wisdom of the principles of non-interference on the part of the Government in matters of trade, it has been contended that the question of life insurance differs so materially in its general character from ordinary trading transactions, that it may fairly be considered as an exception to that rule. This exceptional treatment has been justified and supported, on the ground that the obligations undertaken by such associations have reference to a very remote and uncertain period; that the object which persons have in view in effecting insurances upon their lives, is generally of an important and solemn character, *viz.*, the provision for widows and orphans after the death of their natural protectors; that, unlike any ordinary transaction of trade, a contract once entered into cannot be discharged or abandoned, if doubts of the stability of the office should arise, without a great sacrifice of premiums paid in past years, and the necessity of effecting new policies in other offices at increased rates of premium, owing to the greater age of the insured. . . . On these considerations, as a special case, it has been contended by different witnesses of great experience, that interference on the part of the Government is not only justifiable, but a matter of high duty, for the protection and information of the public."

"On the other hand, it has been contended with equal ability, that insurance business forms no exception to ordinary trade in these respects; that the Acts which have already been passed with a view to controlling the operation of insurance societies have been hurtful rather than beneficial for the very objects they had in view; that an apparent compliance with the provisions of an Act of Parliament and a certificate of complete registration, while they have proved entirely ineffectual for their professional objects, and no real security to the public, have afforded facilities under the sanction of Parliamentary authority, . . . embodied in regulations administered by a public department for the formation of companies and the perpetration of frauds which could not otherwise have been accomplished. And it has been further contended that it is impossible to make such regulations, consistent with the free development of private enterprise, which, so far as the public is concerned, will not prove more prejudicial by lulling private prudence and vigilance, than beneficial in respect to any increased security which they can confer."

3.12 The Committee went on to report that some had even argued for "the appointment of Government actuaries, under a department of the State, who should have a direct supervision of the proceedings of all insurance companies", but this idea seems to have been quickly dismissed.

3.13 In their recommendations, the Committee supported a relatively free development of new life insurance companies as being in the interests of the general public, but proposed a minimum paid-up capital requirement of £10,000, to be invested in public funds, as evidence of the bona fide intentions of the promoters and to act as additional security for the liabilities.

3.14 They went on to recommend a requirement for a full investigation of the assets and liabilities at least once every 5 years, and the publication of the results through depositing them with the Registrar of Joint Stock Companies, who would make them available to the wider public on request. They also recommended publication of an annual statement of new business, premium income, sums assured, premiums receivable and assets, together with disclosure of the mortality and interest assumptions underlying the current premium rates.

3.15 In their concluding remarks the Committee referred to the arguments for strengthening the actuarial profession, and gave slightly lukewarm support to the possibility of Parliament granting incorporation, with the caveat that the actuaries really needed to get their own act together, "as considerable difference of opinion prevails on the subject among the actuaries themselves", an allusion to the division between the Institute of Actuaries and the Actuaries Club.

3.16 In 1856, amendments to the Joint Stock Companies Act unintentionally exempted life offices from the strictures of the 1844 Act, without replacing them with any new rules. In 1857 and 1859 James Wilson tried, unsuccessfully, to bring in legislation to deal with the problem, but he met opposition within the House of Commons from MPs who were directors of life insurance companies, representing the conflicting views of old and new offices (Walford, 1887). Efforts to introduce insurance legislation then lapsed for a few years.

#### 4. THE ORIGINS OF THE TERM 'ACTUARY'

4.1 As far as is known, the first usage of the term actuary by a business concern was when The Society for Equitable Assurances on Lives and Survivorships was formed in 1762. The deed of co-partnership specified that the chief official of the Society was to be called the Actuary. Ogborn (1956) surmised that the name was chosen by Edward Rowe Mores, the leader of the group who established the society, reflecting Mores' own love of Latin (he used to talk to his daughter primarily in Latin from when she was quite young). One of the main duties of the official would be to register the contracts made by the Society, a task having some similarities to the role of the *actuarius* in recording the decisions of the Senate in ancient Rome.

4.2 In the early years of the Equitable the Actuary did not have a mathematical role at all, and was more akin to the post of company secretary,

being responsible for the minutes of the proceedings and orders of the Court of Directors and of the General Courts or Meetings of the Society. He also had to keep the books of the Society, including accounting for receipts and payments, and be present at the Society's office for 6 days a week to receive proposals and execute other business.

4.3 As already mentioned, the initial actuarial calculations for the Equitable were carried out by James Dodson, but he was not described, or thought of, as an actuary. The first Actuary of the Society who combined the skills necessary for that post, as initially conceived, with mathematical ability, was William Morgan, who was elected Actuary in 1775, at the age of 25, and served in that post for 55 years (for an account of Morgan's life, see Elderton (1931)).

4.4 Morgan was consulted when the National Debt Office began the sale of life annuities in 1800. Unfortunately he fell into an elementary actuarial trap by adopting a mortality table which provided suitably prudent margins for life insurance premiums, the so-called Northampton Tables, produced by Morgan's uncle Dr Price in 1783. This meant that for the next 20 years or so, until the error was pointed out by Finlaison, the government was significantly undercharging for its annuities.

4.5 Morgan was largely responsible for the creation of the actuarial profession, giving advice on a wide variety of topics and recommending individuals to be appointed as actuaries to other life offices. He gave evidence to various Parliamentary Committees, and was probably influential in securing a reference to actuaries in the Friendly Societies Act 1819. Here there was a clause requiring tables to be approved by two persons known to be professional actuaries. Unfortunately this requirement was repealed by the 1829 Act, but it was subsequently reinstated in a somewhat different form.

## 5. THE FIRST GOVERNMENT ACTUARY

5.1 John Finlaison was the first actuary to be described as Government Actuary, although, as we have seen, the Government had received actuarial advice prior to this, for example from Morgan. Finlaison was appointed to the post of Actuary and Principal Accountant of the Check Department of the National Debt Office on 1 January 1822, at the age of 38, and held the post for almost 30 years (until August 1851).

5.2 Finlaison was born in Thurso, Caithness in August 1783, and qualified for the Scottish bar in Edinburgh. However, he decided to enter government service in July 1805 with the Board of Naval Revision. Following the dissolution of the Board in 1808, Finlaison was appointed to a position in the Admiralty, and in the following year he became Keeper of the Records. He made a name for himself in his first year by designing a system for indexing the records and correspondence of the Admiralty, so that items could be readily retrieved. The system received international acclaim, following presentations by Finlaison to a large number of

visiting foreign dignitaries, including Grand Dukes Nicholas and Michael of Russia and Archdukes John and Lewis of Austria.

5.3 He was responsible for creating the Admiralty library, and then became the person to whom everyone referred to write reports and to extract information on all manner of subjects. He produced a detailed analysis of every foreign warship in Europe, created a biographical register of every commissioned officer in the British Navy, and edited the Navy List, which he started.

5.4 These and many other activities demonstrated the virtue of a very well-ordered mind, which excelled at dealing with organisational problems, coupled with a rare ability to draw material together in a logical way and present it coherently. He was not much engaged, however, in anything distinctively mathematical, although he did undertake some trouble-shooting on financial problems, such as the 'sixpenny revenue' fund at Greenwich Hospital.

5.5 However, from 1812 to 1819 he worked on the establishment of a widows' and orphans' fund for civilian employees of the Royal Navy, and this brought him into contact with the principles of life insurance and actuarial science. In 1819 he carried out an investigation into the general condition of friendly societies on behalf of a Select Committee of the House of Commons, and thereafter he became the consulting actuary to a number of societies.

5.6 Perhaps his most significant actuarial contribution to public life at that time, however, was his work on the mortality tables for government annuities. In 1819 he pointed out that the current government annuity tables were erroneously based on a fairly heavy mortality experience, which provided a margin for life assurance business, but the reverse for the sale of annuities. Finlaison was commissioned by the Chancellor of the Exchequer to carry out an investigation into annuitants' mortality and to produce a new set of annuity tables. For this he carried out a major mortality investigation based on the records of various tontines from 1695 to 1789, as well as information regarding government annuitants themselves. By 1823 he had completed a set of tables for single lives and he then went on to produce tables for joint lives, the whole exercise involving a massive amount of labour, in the absence of mechanical calculating devices.

5.7 Although Finlaison's appointment as a sort of Government Actuary represented the beginning of a tradition which was to flower at a much later date, there does not seem to be any evidence that he became involved at all in the supervision or oversight of life insurance companies as such, although, as we have seen, he did play a part with regard to friendly societies.

## 6. THE FIRST LIFE ASSURANCE ACT

6.1 Following the Select Committee report of 1853, there was a lull in political activity aimed at regulating life insurance companies. The Companies Act of 1862 introduced limited liability for shareholders, and this had the beneficial effect of encouraging more reputable men to set up companies. The unlimited



liability which had prevailed prior to this had tended to discourage all but those who had nothing much to lose from getting involved.

6.2 A large number of life insurance companies came into being in the 1840s and 1850s, but few survived for very long. Some were involved in appalling swindles, such as the celebrated West Middlesex case (Sibbett, 1989). Matters came to a head with the demise of the Albert Life Assurance Company, a company which had been founded in 1838 as the Freemasons and General Life Assurance, Loan, Annuity and Reversionary Interests Company, with the not inconsiderable capital of £500,000, of which, however, only £75,000 was paid up. In 1849 the name of the company was changed to the Albert Life Assurance Society, and thereafter it embarked on a frantic programme of acquisitions and mergers, absorbing over the next 20 years, either directly or at second hand, a total of 26 other companies (Walford, 1871).

6.3 On 13 August 1869 an application was made to the Courts to appoint provisional liquidators, it being estimated at that time that the company had a deficiency of £1 million on liabilities of £4 million. The winding-up was governed by general companies legislation (Companies Act 1862), but many aspects of how it should be applied in the case of a life insurance company were unclear, as indeed were more general issues, such as whether the shareholders' liabilities were limited and the extent to which the former shareholders of the absorbed or merged companies were implicated. Details of the case, the attempt at a reconstruction and the eventual arbitration process are given in Walford (1871).

6.4 A month after the application to the Courts for the winding-up of the Albert, a similar application was made in respect of the European Assurance Society. This company began in 1819 with the formation of the European Life and Annuity Company. In 1858 the business was amalgamated with that of the People's Provident, founded in 1853, and a year later took the name European Assurance Society.

6.5 The European, like the Albert, pursued a policy of acquisition and merger, and had absorbed a total of 34 other companies by 1869. Amalgamations were sometimes very costly, as a sum had to be paid to the shareholders of the company taken over, even though some of the companies were almost certainly in deficiency.

6.6 The case of the European exposed the weaknesses of the legislative structure. There were two grounds in the Companies Acts of 1862 and 1867 for obtaining a winding-up order. The first was that the company was 'unable to pay its debts'. The second was where the Court was of the opinion that it was 'just and equitable that the Company should be wound up'. The first ground did not apply to the European, at least as interpreted by the Courts, who focused on ability to sustain current cash flow, without any regard to liabilities to make payments in future.

6.7 Unfortunately it did not prove possible to sustain a case on the second ground, and the company continued in business. Alexander Finlaison, the then Actuary of the National Debt Office, son of the first 'Government Actuary', was

asked to carry out a valuation of the company. His valuation balance sheet, presented to the AGM in 1871, showed a surplus of £95,165, but this took into account unpaid calls on shareholder capital of £551,250. In the event the company was finally subject to a compulsory winding-up order in January 1872.

6.8 These events, and, perhaps most particularly, the demise of the Albert, prompted renewed political concern over the lack of any supervision of the activity of insurance companies. Legislation was introduced into the House by Stephen Cave, as Vice-President of the Board of Trade, and this became the Life Assurance Companies Act 1870 ('the 1870 Act').

6.9 Although there was still uncertainty about the definition of who should be considered qualified as an actuary (apart from north of the border, where the Faculty was already incorporated, with a Royal Charter), the political climate at Westminster was favourably disposed towards a non-dirigiste approach to insurance supervision. The emphasis was to be on disclosure, rather than on detailed prescription of how life insurers should carry on their affairs. Actuaries were to carry out regular valuations of the business, but they were not to be told what valuation methods and assumptions to use.

6.10 The 1870 Act required that a separate account should be kept of all receipts in respect of life assurance and annuity contracts of the company, and that this fund should be regarded as the absolute security for the life policies. This approach gave particular safeguards in the case of composite companies which were also carrying on general insurance business, but also implied total separation of the life and annuity business transactions from any shareholders' funds.

6.11 The 1870 Act required regular investigations to be carried out into the financial condition of the company by an actuary, albeit that at that time companies which had been established prior to the passing of the Act were required to have such an investigation only every 10 years! New companies were required to be looked at every 5 years, or more frequently if required under the company's constitution. A key feature of supervision, which has remained the case right up to the present day, was that the annual accounts of the company, together with the abstract of the actuarial valuation when carried out, and also an abstract summarising details of all the business in force, had to be deposited with the Board of Trade, which then made them available to the public through the Registry of Joint Stock Companies.

6.12 In 1870 the idea of statutory supervision of insurance companies was relatively new. Sprague (1872) compared the new U.K. legislation with that recently introduced in the U.S.A., particularly in Massachusetts and New York, which had the expressed objective of "securing the solvency of all Life Insurance Companies doing business in the respective States, so that all the contracts of assurance entered into by them shall be duly fulfilled". Sprague went on to argue "firstly, that no legislative enactments whatever can succeed in absolutely securing the solvency of Life Insurance Companies; secondly, that even if this could be done, it would be highly undesirable that it should be attempted". In his

view it was best to allow insurance companies a good deal of freedom, but require them to make their affairs public. Some idea of how the American system developed can be gleaned from the remarks of the President of the American Society of Actuaries, Emory McClintock, at the Annual General Meeting of the Institute of Actuaries on 8 June 1895 (McClintock, 1895).

6.13 This doctrine of 'freedom with publicity' remains the fundamental principle of insurance supervision in the U.K. today. Even if the average member of the public could not necessarily understand the information disclosed, at least other actuaries would be able to. Sprague (1872) commented: "Altho' the returns are not sufficient to enable the value of the liabilities of each Company to be rigorously estimated, yet they are quite sufficient to enable actuaries, and through them, the public, to judge of the stability and future prospects of the Life Offices of the country, on far surer grounds than were formerly available". Subsequent legislative changes improved the quality of the information available to the outside observer, so that it became, and in principle remains, the case that a third party actuary could form a reasonable assessment of the financial position from the data which is in the public domain.

6.14 By this time, however, the Institute of Actuaries was quite well-disposed towards legislation which involved the publication of accounts and actuarial valuations. The Editor of the *Journal of the Institute of Actuaries* argued "that never more than now has interference on the part of the State been needed in order to enforce such a measure of publicity as would enable persons of ordinary intelligence to judge of the solvency of the companies to which they have committed their interests". At the Annual General Meeting of the Institute following the appearance of the 1870 Act on the Statute Book it was remarked that "short as has been the period during which the Act has been in operation, its good results are already discernible in the internal reforms it is effecting, and in the improved accounts now published by the offices".

6.15 The legislation covered, not only the regular monitoring of life insurance companies, but also a requirement for deposits to be made, and events such as amalgamation and liquidations, which had been the cause of many of the difficulties. Amalgamations, or transfers of business, would have to be sanctioned by the Court, after policyholders had been consulted and provided with a certain amount of relevant information. The Court could not give its sanction if policyholders with 10% or more of the sums assured objected.

6.16 Insolvency for winding-up purposes was to take into account all contingent and prospective liabilities on policies already written. The Court was given the power to reduce the amount of contracts instead of granting a winding-up order. An amending Act was passed in 1872, which laid down the basis for valuing a policy and an annuity in a winding-up.

6.17 Apart from the winding-up rules, no guidance was given on how to value either the assets or the liabilities. This vindicated the leading members of the actuarial profession, who had contended for the responsibility for making such judgements to be left with the profession. This view was upheld, in spite of

evidence of unsound practice by some actuaries of the time, using, for example, a gross premium valuation with no explicit allowance for future expenses and bonuses.

6.18 Sprague (1872a) observed that, in the absence of a statutory solvency standard, actuaries giving evidence before a Court regarding a winding-up petition could come to entirely different views as to whether a company was solvent or not. He suggested that a standard of solvency might be fixed and a public officer appointed, whose duty it would be to make valuations of all the life offices on the standard solvency basis, with a view to publishing an annual report showing how much each office exceeded or fell below the legal standard. A few years later, however, his Presidential address clearly indicated that he had become disenchanted with this idea (Sprague, 1886).

## 7. A PERIOD OF CONSOLIDATION

7.1 There followed a period of greater stability and consolidation in the life insurance market. The actuarial profession grew and prospered. Examinations were introduced in 1850 to ensure high educational standards, and in 1884 the Institute of Actuaries was granted its Royal Charter of Incorporation.

7.2 Responsibility for supervising the affairs of insurance companies rested with the Board of Trade. In February 1873 the Board of Trade wrote to the Treasury explaining that they were anxious to obtain a supplementary clerk possessing acquaintance with actuarial work combined with proficiency in accounts. They had identified someone in the Education Department who was eminently qualified—William Vaughan, an Associate of the Institute. The Treasury approved his transfer and he became known as the Actuarial Clerk at the Board of Trade. From 1886 to 1889 he held the title Actuary and Chief Bookkeeper.

7.3 On some occasions, at least in the early days after the passing of the 1870 Act, the Board of Trade sought the views of the Institute of Actuaries on issues of interpretation relating to actuarial aspects. Nicoll (1898) records that the Board of Trade sought an opinion from the Institute as to what items should be included under the heading of 'Expenses of Management' for a particular company. The Institute responded that they were not able to discuss the affairs of any individual life assurance society. However, when the Board of Trade posed the question again in more general terms the Institute gave the opinion requested.

7.4 As can be seen from a report by Malcolm & Hamilton (1874), Assistant Secretaries to the Board of Trade, the Board initially took seriously its responsibility for monitoring the accounts and statements deposited with them by the companies. This led to the Managers' Association (of Scotland) sending a deputation to London to speak to the President of the Board of Trade with a view to discouraging the government from such active supervision.

7.5 Nicoll (1898) considered that this deputation led to a change in the Board of Trade's stance relative to insurance companies. As he indignantly stated:

"The only part of the Act which lends any colour to the supposition that the Board of Trade are required to supervise, as they apparently proposed to do, the returns sent into them by the offices is Section 18, which imposes certain duties upon the Board in the case of companies 'which make default in complying with the requirements of the Act'. . . . The Act otherwise limits the province of the Board of Trade simply to accepting deposit of the statements required from the offices".

Sprague (1886) commented along similar lines that

"It is a characteristic feature of British legislation on the subject, that, while a public department has been charged with the duty of seeing that all the offices transacting business make certain periodical returns, it has not been authorized to pronounce any opinion upon the financial condition of the companies".

7.6 Meanwhile, a very different approach was being adopted by the Chief Registrar of Friendly Societies, who in 1877 appointed Mr Sutton as Actuary to the Central Office and found his assistance invaluable in all sorts of ways.

7.7 In 1891 the Board of Trade made some proposals for amending the 1870 Act and consulted the Institute and the Faculty of Actuaries, together with the Actuaries Club, the Life Offices Association and the Managers' Association. The proposals related mainly to the winding-up provisions, the major part of the Act being considered as highly satisfactory, both by the Board of Trade and the industry (Hendriks, 1893; King, 1892).

7.8 Nicoll (1898) favoured the appointment of an actuary to the Board of Trade to strengthen the supervisory arrangements. However, the idea of stronger government supervision had been forcefully rejected by King (1892):

"To have a government official who has probably been educated in red tape interfering at every turn would soon paralyse all energy and enterprise. He might be officious and fond of magnifying his office, prejudiced, narrow-minded, incompetent, or even corrupt; and it is difficult to say which class of men would exert the worst form of influence. At the best, he would be narrow and ignorant as compared with the aggregate of the profession outside the government bureau, because he, from the nature of the case, would not have had the education and experience that are gained only by daily intercourse with the public. He would not appreciate the benefits of, or the necessities for, the changes of plan and the new features which naturally present themselves to the active man of business. The government official, therefore, even with the best intentions, could not help being more or less an obstructive."

7.9 Nicoll considered that many government departments would benefit from appointing an actuary. All these actuaries together could form an advisory board to give assistance to the government, for example in connection with proposed legislation for an Old Age Pension Scheme. "These Actuaries, being all Fellows, either of the Institute or of the Faculty, would be quite in touch with these bodies, and the advice they might offer to the legislature would usually be likely to be approved by the profession generally. Hence government measures, involving actuarial or financial matters, would, in most cases, come forth matured and likely to be favourably received by the actuarial profession, and, through them, by the public at large."

7.10 The 1870 Act concerned only life insurance business, and it was not until 1907 that supervision was extended to any general insurance business, with the

passage of the Employers' Liability Insurance Companies Act 1907. Two years later, in 1909, the then President of the Board of Trade, Mr Churchill, introduced a Bill to replace the Life Assurance Companies Acts, 1870 to 1872, and to extend the regulatory régime to cover also fire insurance, accident insurance, employers' liability insurance and bond investment business.

7.11 The principles were essentially the same as in the 1870 Act. Separate funds were to be maintained for each class of business, although it was explicitly stated, in Section 34 of the Act, that segregation of assets was not necessarily implied. A new certificate was, however, introduced which stated that, where there was more than one fund, no part of any such fund had been applied directly or indirectly for any purpose other than the class of business to which it was applicable.

7.12 The actuary's valuation statement, which now appeared in the Fourth Schedule, was only slightly modified from the 1870 Fifth Schedule format, although separate statements were now required for ordinary branch business, industrial life assurance and sinking fund business. The same split was required in the tabulation of business in force in the Fifth Schedule.

## 8. THE ESTABLISHMENT OF GAD

8.1 It was not the issue of insurance supervision which led to the setting up of the Government Actuary's Department, but developments in the field of social security. In 1912 the actuary Alfred Watson, a partner in the firm of R. Watson & Sons (he was the grandson of Reuben Watson who had founded the firm), was appointed to the position of Chief Actuary to the National Health Insurance Joint Committee. With the plans to establish a more comprehensive social security pensions system, the Committee felt a need for actuarial advice on the future finances of the scheme. The benefits were to be provided through friendly societies designated as 'approved societies', and there was likely to be a continuing role for actuaries at the government end in valuing approved societies and ensuring the satisfactory conduct of the business.

8.2 As with his predecessor, John Finlaison, some 100 years earlier, the newly appointed Watson found himself consulted by a variety of government departments on matters of an actuarial nature. In 1917 he was given the title of Government Actuary, in recognition of his broadening responsibilities.

8.3 The Report of the Machinery of Government Committee (the Haldane Committee) had, in 1917, stated the case for actuarial advice to be available from a central source within government:

"The arrangements under which the public service as a whole is now enabled, as occasion may require, to obtain the advice of the Government Actuary, indicate a recognition of the fact that scientific work of this character may best be performed at a common centre and by a single staff, which thereby gains a variety of experience, and concentrates in itself an amount of knowledge, beyond the grasp of actuaries exclusively employed in a single Department, or (as was until recently the common practice) called in to advise upon isolated problems by individual Departments at different times."

8.4 In 1919 the Ministry of Health was created and the Treasury "being of opinion that the position of the Government Actuary under the National Health Insurance Joint Committee was no longer appropriate, and that he should be enabled to undertake any actuarial work required for the public service", created the Government Actuary's Department by Treasury Minute, with its own Parliamentary Vote. The Treasury then advertised the new service which was to be available in the following words:

"My Lords wish to draw general attention to the fact that the Department of the Government Actuary is in a position to deal with all actuarial questions on which advice may be required from time to time by Departments. Such questions should accordingly be referred in future to that Department, and in no case should outside Actuaries be engaged, or consulted with a view to their employment, without the prior sanction of this Board."

8.5 Quite soon after the appointment of Alfred Watson to the post of Chief Actuary to the NHIJC, in November 1912, he was approached by the Board of Trade regarding the possibility of advice on insurance companies returns. The Board was using the services of a consulting actuary, T. Gans Ackland, to scrutinise the returns made under the Assurance Companies Act 1909. Unfortunately for the Board of Trade, there were six companies to which Ackland was the consulting actuary, and clearly he could not be expected to comment on his own valuation report. Incidentally, he was paid 5 guineas for the examination just of a Fourth Schedule, and 8 guineas for a combined Fourth and Fifth Schedule return.

8.6 Watson was reluctant to take the job on himself, because of his limited experience of life assurance companies. However, he recommended a senior member of his staff, Samuel J. H. W. Allin, who had trained in a life office and had subsequently been consulting actuary to a number of companies. The Board of Trade were happy for Allin to undertake the work and the arrangements were set in hand, with Allin to be remunerated on the same basis as Ackland. The Treasury reluctantly concurred, although not without protesting that a civil servant should not be paid sums additional to his salary by another government department. The general principle was established that payment should take the form of reimbursement of one department by another.

8.7 Ackland died in June 1916 and there was some discussion regarding the possibility of Allin looking at all the returns. In late September, when Watson returned from a few weeks' leave, agreement was reached on this. On 12 January 1917, Marwood of the Board of Trade wrote to the Vice-Chairman of the National Health Insurance Joint Committee to put things on a more formal footing. He requested that the Committee might "be so good as to allow their Chief Actuary, Sir Alfred Watson, to act as Actuarial Adviser to the Board in all matters in which such advice and assistance might be required".

8.8 A letter of 7 September 1916 from Allin to Watson records what the duties were to involve:

*"Companies Section work*

Report generally on the Returns sent in by individual Companies. Occasionally advise as to meaning of Sections of the Act from an actuarial point of view.

In the event of new legislation as regards the Act advise generally on proposals made (no legislation is contemplated)."

The letter went on to refer to Unemployment Assurance, on which the Board of Trade was also seeking Watson's advice.

8.9 Questions dealt with by Allin included, not only points on the published actuarial valuations of companies, but also presentational points and matters of interpretation of the Act. Some flexibility was envisaged under Section 2 of the Act to accommodate the forms to particular circumstances, but Allin and his colleagues at the Board of Trade were reluctant to see too many departures from a standard format.

8.10 With the establishment of the Government Actuary's Department in June 1919, the arrangements for actuarial advice to be given to all government departments were formalised. GAD had its own source of finance in a Parliamentary Vote, and it does not appear that other government departments were expected to pay for the service.

8.11 The legislation relied on 'freedom with publicity', and the Board of Trade was inclined towards non-interventionism. For much of the time this was a successful policy, but there were a number of problem companies and a small number of life office insolvencies. The first important failure after the passing of the 1870 Act was the National Standard Life Assurance Company Limited, which was ordered to be wound up in 1916, before the Government Actuary became involved. Actuaries criticised the Board of Trade for not having intervened earlier in the affairs of the company, given that the Returns as at 31 December 1913 showed deficiencies in both the ordinary branch and industrial branch life funds (Collins, 1925; Ferguson, 1976).

8.12 GAD seems to have been closely involved in the liquidation of a relatively modest concern, the National Benefit Assurance Company, in 1922. Sir Alfred Watson came into conflict with the Senior Official Receiver over the role of the Special Manager in the winding up. Sir Alfred argued very strongly that Special Managers should not "enter into arrangements for the transfer of life business from bankrupt concerns to other offices without taking competent actuarial advice as to the stability of the office concerned and as to the suitability of the arrangement proposed".

8.13 The Industrial Assurance Act 1923 required separate funds to be maintained for ordinary business and industrial business, and introduced additional safeguards for industrial branch policyholders. The new post of Industrial Assurance Commissioner was created to oversee the implementation of the Act, and GAD became actuarial advisers to the Commissioner.

## 9. REVIEWING THE ACTS

9.1 Concern at the Board of Trade over the failure of two life assurance companies and the 'Bevan' group of general insurance companies led to the establishment on 30 October 1924 of the Departmental Committee "appointed



to Inquire and Report what Amendments are desirable in the Assurance Companies Act, 1909", under the chairmanship of A. C. Clauson, KC, later Mr Justice Clauson. Allin from GAD was on the Committee, as were two other actuaries, W. P. Phelps and H. M. Trouncer. The Committee produced an interim report in June 1925 and a final report in February 1927.

9.2 The Committee recommended the separation of assets to underpin the separation of funds and a strengthening of the provisions to give life policyholders a priority claim on the assets representing the life funds. They recommended that the supervisory legislation should be extended to cover additional classes of general insurance, such as motor and marine, and they argued for increased intervention powers to enable the Board of Trade to deal with ailing companies. They embodied their recommendations in a draft Insurance Undertakings Bill, which would have repealed and replaced The Assurance Companies Act 1909 and parts of the Industrial Assurance Act 1923.

9.3 The Clauson Bill was never enacted, although the government did subsequently take action to strengthen the powers of the Board of Trade in a winding-up situation through the Assurance Companies (Winding-up) Acts 1933 and 1935. Motor vehicle business was brought within the scope of the 1909 Act by Section 42 of the Road Traffic Act 1930, and aviation business by Section 20 of the Air Navigation Act 1936.

9.4 By 1930 Allin was assisted in his work on advising the Board of Trade by G. D. Stockman, who, from the retirement of Allin in January 1933, was to become GAD's leading expert in this field for the next 20 years or so.

9.5 In a memorandum of July 1935 from Stockman to Sir Alfred Watson, forwarded by the latter to the Board of Trade, the then current role of GAD was detailed. Originally, Allin had been responsible only for an examination of the returns for which an actuary was responsible under the 1909 Act, specifically with a view to establishing whether they conformed to the provisions of the Act. Gradually, however, a wider view was taken of the role and, subject to the limited powers given by the 1909 Act, the Board of Trade was advised on possible action to improve the position of policyholders and to make the published information about companies more transparent and informative.

9.6 The position was changed significantly with the coming into force of the Assurance Companies (Winding-Up) Act 1933. Stockman wrote:

"As a result of the provisions of this Act the Board of Trade is enabled to take direct action to secure the winding-up of a company which is insolvent.

Rightly or wrongly, public opinion has interpreted this Act as placing upon the Board the responsibility for securing that any company which is unable to meet its liabilities, both immediate and contingent, should be wound up before material loss is inflicted upon its policyholders.

As a result a very important change has taken place in the point of view from which returns have to be examined and not only has it been necessary for us to look for signs of insolvency in the case of companies of which the position is open to question but also, in the case of those which are above reproach, it has been necessary to make sure that features which in their case are unimportant are commented upon if, in the case of a company of less standing, these might provide a ground upon which criticism should be made.

We have been brought very intimately into the consideration of cases of suspected insolvency. In these cases it is necessary firstly to make an exhaustive examination of the returns to decide whether, and if so what, additional information should be obtained from the company and secondly, where this is obtained, to re-examine the position of the company in the light of the further information. Such action has already been taken in the case of two companies (the North and South and the London General). In the case of a third (the Anglian) the Board took action on the same lines as had been agreed with us in respect of one of these two. In the case of the North and South Insurance Company, where the Board of Trade presented a petition for winding-up to the Court, not only did we prepare the necessary financial statements but we assisted in preparing the affidavits and the brief, working in close association with the officials of the Board throughout the legal proceedings; on every occasion you were represented in Court.

As a result the work, and responsibility, of your Department have been very materially increased. Further, whereas in the past the Board of Trade consulted you only in cases where an actuary was concerned, it now consults the Department freely both officially and unofficially irrespective of whether actuarial questions are involved."

9.7 Stockman went on to discuss the heavy work associated with the aftermath of the Clauson Committee, including negotiations with the industry on the possibility of an Act along the lines of the Insurance Undertakings Bill and the search for the better protection of policyholders and third parties injured by motor vehicles.

9.8 In this and other matters GAD was already beginning to be consulted on aspects which were not of a specifically actuarial nature. Stockman and his assistant Thomas spent much of the four months from May to August on the examination of Board of Trade returns. Other involvement was less predictable, but further detailed examinations of some companies, whose solvency was in doubt, were necessary, involving general insurance as well as life insurance companies.

9.9 Notes by Stockman of a conversation with Marker of the Board of Trade in September 1935 record how he had suggested to Marker that he should make an informal approach to the Chairman of the Life Offices Association regarding the inclusion of certain material in the printed volume of the Board of Trade returns.

9.10 It was suggested that this "act of courtesy in consulting them would probably be appreciated and be repaid by their goodwill, of which he might find himself in need sooner or later in obtaining information for the purpose of deciding whether or not the provisions of the 1935 Act should be utilized in the case of a particular company and in obtaining early information when the question of the solvency of a particular company is in doubt".

9.11 This period seemed to mark a significant increase in the willingness of the Board of Trade to consult both the Life Offices Association (LOA) and the British Insurers Association (BIA), particularly in regard to companies requiring special attention. It was thought that informal consultations with the industry might yield useful information regarding weaknesses in critical companies and assist the Board of Trade in taking timely action under the powers of the 1935 Act, which were felt (by Stockman at least) to be as extensive as would be politically possible at the time.

9.12 That GAD was much involved at this time, not only with life insurance, but with certain aspects of general insurance, is evidenced by the inclusion of G. S. W. Epps (who was to become Government Actuary on Watson's retirement in June 1936) on the Board of Trade's Departmental Committee on Compulsory Insurance when it was set up in February 1936, following the failures of 5 companies transacting motor vehicle insurance. The Committee was chaired by Sir Felix Cassel, Bart., KC, and reported in July 1937. The Secretary to the Committee was Stockman from GAD.

## 10. POST-WAR DEVELOPMENTS

10.1 Any thoughts of further legislation in response to the Clauson and Cassel Committee reports had to be shelved with the outbreak of war. GAD was considerably weakened by the call-up of some actuarial staff and the assignment of others to statistical or similar duties in other departments.

10.2 Immediately after the War, however, the Government took prompt action to plug some of the gaps in the 1909 Act, and the Assurance Companies Act 1946 received the Royal Assent in March 1946. This Act introduced the subdivision of classes of business into long-term business, which included ordinary life and annuity business, industrial assurance and bond investment business, and general business, which covered all the other 'non-life' classes. Certain classes of business, including sinking funds and continuous disability insurance (now PHI), were still not covered by the legislation.

10.3 The 1946 Act introduced a solvency margin requirement in respect of general business (10% of general premium income or £50,000, whichever was greater), but left the adequacy of the long-term business fund to the actuary. However, actuaries and others were concerned that it would still not be possible to ring-fence the long-term assets and liabilities in the event of an insolvency.

10.4 In 1951 GAD was organised into 4 divisions, each headed by a Principal Actuary. Division I was concerned with National Insurance (social security) matters, whilst Division IV was largely concerned with pension schemes, including a number of Indian funds and other colonial superannuation schemes. Division III dealt with demographic matters, but also the Industrial Injuries Scheme, workmen's compensation, the pneumoconiosis and similar compensation schemes in the coal industry and some overseas social security.

10.5 Division II was headed by Stockman, and was mainly involved in advice on the supervision of insurance companies and friendly societies, including advising some foreign governments, such as Pakistan and Egypt. However, the division was also responsible for a significant amount of public service pension scheme work. Some details of the work of GAD at this time are given in Maddex (1954).

10.6 With Stockman coming up to retirement, GAD was short of people with life office experience, and Herbert Tetley was recruited in 1951 to be one of the Principal Actuaries. In 1958 he took over as Government Actuary and was at the

helm during the next period of development of the GAD role in insurance supervision.

## 11. THE INFLUENCE OF EUROPE

11.1 The process of developing a single market in insurance started within the Organisation for European Economic Co-operation (OEEC), the predecessor of the OECD, in the mid 1950s, when an Insurance Sub-Committee was established to explore ways in which the European insurance market might be opened up and international trade in insurance encouraged (Daykin, 1984).

11.2 In November 1956 the OEEC Insurance Sub-Committee commissioned a report from Professor Campagne, Chairman of the Verzekeringkamer, the insurance supervisory authority of the Netherlands, on whether it was possible to establish minimum standards of solvency for insurance firms. It was hoped to move towards a European-wide standard of supervision of solvency, so that each country would be able to rely on supervision carried on in the other countries for the purposes of allowing insurance companies from those countries to carry on business.

11.3 The report to the OEEC Insurance Sub-Committee (Campagne, 1957) started from the position that an appropriate level of solvency margin should be determined according to risk-theoretical calculations, with a view to ensuring a specified low probability that the reserves and margins should prove to be inadequate. However, the report moved rapidly from the theory to a pragmatic solution, in view of the absence of data to derive a theoretically satisfactory result.

11.4 Further consideration and analysis along the lines of the Campagne Report suggested figures for the minimum solvency margin which varied from 3% of 1 year's premiums for Germany to 31% for the Netherlands. Nevertheless, the report of the Working Party on Minimum Standards of Solvency (Campagne, 1961) concluded that 25% of premium income should be regarded as a reasonable minimum margin of solvency for non-life business.

11.5 Consideration was also given in Professor Campagne's report, and in the subsequent report of the OEEC Insurance Sub-Committee, to a solvency margin in respect of life assurance business. The recommended level was 4% of the mathematical reserves, calculated on the premium basis with a modest Zillmer adjustment.

## 12. EARLY DEVELOPMENTS IN THE EUROPEAN COMMUNITY

12.1 Following the establishment of the European Economic Community by the Treaty of Rome in 1956, the Conference of EEC Insurance Supervisory Authorities began to address the same problems as those already under consideration in the OEEC. The objective was to move as quickly as possible towards the ideal of a free market in insurance within the EEC. The first stage

was to establish the credentials which insurance companies must demonstrate before being allowed to establish branch operations in other EEC countries and write business there.

12.2 The U.K. was closely involved in the OEEC/OECD developments, but not, of course, in the early EC discussions, which at that time concerned only the original 6 members: France, Germany, Italy, Belgium, Netherlands and Luxembourg. In 1963, there were three active OECD Committees on insurance matters: the Buol Committee on life insurance technical reserves, the Homewood Committee on general insurance technical reserves and the de Florinier Committee on solvency margins. The meetings were attended by Homewood, the Assistant Secretary at the Board of Trade, and Colin Stewart, the new Principal Actuary in charge of the insurance division at GAD.

12.3 The de Florinier Committee made little progress, as it was decided that there was no point in trying to take further the discussions on solvency margins until some principles had been established for technical reserves. The life insurance committee made a preliminary report in 1966, and their final report was published in 1971 (Buol, 1971).

### 13. THE U.K. MARKET IN TURMOIL

13.1 The 1960s were also an important time for the development of the insurance market in the U.K. On the life insurance side there were some noteworthy product developments, in particular the beginnings of unit-linked business and various types of guaranteed income bonds. A number of new companies began to spring up to exploit these opportunities.

13.2 Similarly, in non-life insurance there was an intensification of competition, with a number of new motor insurers in particular trying to edge into the market. The fraudulent activities associated with the demise of Fire, Auto and Marine concentrated the minds of the supervisors at the Board of Trade. However, the major test case turned out to be the Vehicle & General (V & G).

13.3 Following the dramatic rise and subsequent heavy fall of the V & G, a tribunal spent months analysing the role played by the various parties, and in particular by the Board of Trade. Some of the civil servants involved were heavily criticised, in some cases perhaps rather unfairly, for their failure to intervene earlier in the affairs of the company. However, the case was a vivid illustration of the inadequacies of the information which non-life companies were at that time required to include in their returns, the very circumscribed powers of the Board of Trade to intervene in the affairs of a company, and the absence of formal actuarial involvement in general insurance.

13.4 During the late 1960s the Board of Trade sought advice from ASTIN, the non-life insurance section of the International Actuarial Association, and from a leading U.K. non-life actuary Bobby Beard, on how to make material improvements in the information available to the supervisor about non-life insurers. Stewart at GAD was closely involved in these discussions, although

GAD's part in the routine scrutiny of non-life insurance companies was, at that time, relatively limited.

13.5 This process led to the general insurance sections of The Insurance Companies (Accounts and Forms) Regulations 1968 and, in particular, to the requirement for general insurance companies to supply information, by each year of origin, relating to the year-by-year settlement of claims and the amounts estimated to be outstanding. The supervisors would dearly have liked to have had such information in the V & G case. Had the requirement been introduced a few years earlier, events could have turned out very differently.

13.6 As the claim run-off information from companies' returns began to accumulate, it became practicable for GAD to analyse it and to advise the Board of Trade, then reconstituted as the Department of Trade and Industry (DTI), on the apparent adequacy of the reserves for outstanding claims, including reserves for claims incurred but not yet reported. Following his retirement from the Pearl, Bobby Beard spent a period at the DTI, assisted for a year (1973/74) by Peter Hinton, a nearly qualified actuary from GAD.

#### 14. THE APPOINTED ACTUARY SYSTEM

14.1 The supervisory régime at the beginning of the 1970s, and the involvement of GAD, has been described by Stewart (1972). Although Stewart himself had been much occupied by the international activities through OECD, and with the problems on the non-life side, of improving the supervisory régime on the one hand, and dealing with the V & G issue on the other, GAD's bread and butter work on insurance supervision continued to be on life insurance.

14.2 Life insurance supervision, as it had done for 100 years, still rested fundamentally on the company actuary to value the liabilities, and to ensure the adequacy of the assets representing the life fund to cover the liabilities and, much more than that, to give a good return to the with-profits policyholders. Actuaries at GAD, as they had done since Allin first became involved in 1912, carefully monitored the actuarial valuation reports and advised the DTI where there could be potential problems, for example because of weak reserving bases, over-optimistic or inept management, misguided or unlucky investment policy.

14.3 GAD actuaries had some direct contact with company actuaries, but correspondence was mostly conducted at third hand, through DTI and the company secretary. In the absence of any valuation regulations, the adequacy of actuarial valuation methodology and assumptions was very much a matter of personal opinion, although experience built up over many years at GAD had established some ground rules.

14.4 The actuaries of most of the well-established companies had traditionally adopted a very cautious approach to valuation, preferring to retain plenty of margins within the life fund. This was a major justification for the decision not to introduce a life solvency margin in 1946 when the general insurance solvency margin was brought in. The actuary was essentially responsible for maintaining

adequate implicit margins, not only to cover reasonable technical reserves, but also to cope with adverse circumstances.

14.5 GAD's involvement in life insurance was not, of course, restricted to the scrutiny of the annual returns. Under the 1958 regulations, a full actuarial valuation was required at least every 3 years, with a simple certificate from the actuary in the intervening years to confirm the adequacy of the long-term business fund. GAD was also closely involved in processing new applications for authorisation to write long-term business and in many policy issues, either of a general nature, or relating to the affairs of particular companies. However, at the beginning of the 1970s, there were still only two people engaged more or less full time at GAD in advising the Board of Trade, with a modest proportion also of the time of the GA and DGA.

14.6 From the beginning of life insurance supervision in 1870 a fundamental principle had been that the publication of the regular actuarial valuation report, together with a detailed statement of the business in force, should be sufficient to enable a third party (presumed to be an actuary!) to satisfy himself as to the reasonableness of the valuation and indeed, in principle at least, to reproduce the results independently.

14.7 It should be noted, however, that it had never been the regular practice at GAD to attempt to check the actuary's calculations by carrying out such a valuation from the information in the returns. Attention is focused on whether the methodology used is appropriate and whether the assumptions adopted are sufficiently prudent.

14.8 The adequacy (or inadequacy) of the information in the DTI returns has frequently been a concern at the GAD. However, opportunities to improve the situation do not occur very often. From time to time the actuarial profession has lent its weight to demands for improvements (e.g. Smith, 1973; Ford, 1974).

14.9 However, a number of events conspired together in the early 1970s to usher in a new phase of life insurance supervision in the U.K. The V & G débacle, although not involving a life office, raised supervisory sensitivities. Then there was the rapid growth in the number of new and modestly capitalised proprietary life companies. As already discussed, there were also the international discussions and concern within the DTI, the GAD and the Institute and the Faculty of Actuaries to reinforce the role of the actuary.

14.10 The result was the introduction in the Insurance Companies (Amendment) Act 1973 of the concept of the 'Appointed Actuary'. The relevant provision was consolidated into Section 15 of the Insurance Companies Act 1974. The idea was to upgrade the actuary from someone who carried out a valuation of the assets and liabilities every 3 years, and an approximate valuation every year, to an identifiable professional person within the company who could monitor the financial position on a continuous basis.

14.11 The provisions in the Act, however, offered very little indication of the role which was intended. The key lay in the discussions which had taken place with the actuarial profession, the idea being that the Institute and the Faculty of

Actuaries would fill out the bald statutory requirement with a guide to assist members to a fuller understanding of the responsibilities of the Appointed Actuary to a long-term insurance company.

14.12 The Appointed Actuary system was put to the test before it had properly been established, with the stock market collapse at the end of 1974 and the property slump which led to the insolvency of the Nation Life Insurance Company earlier that year. The Appointed Actuary arrived at his office one morning to find it in the hands of the liquidators of the parent company, an event which led inexorably to the collapse of Nation Life itself, because of massive write-downs of properties on the insurance company's own portfolio.

14.13 The discussions within the actuarial profession, and between the profession and the DTI and GAD, were given added impetus by the collapse of Nation Life and by a cluster of small life insurance companies getting into difficulties in 1974—Lifeguard, Capital Annuities and London Indemnity & General. Prior to these events there was a presumption that, with an actuary at the helm of each life company, everything would be alright. Moreover, many senior actuaries were sceptical about the idea of the Institute and the Faculty giving 'guidance' to their members.

14.14 Under the firm leadership of Gordon Bayley as President of the Institute of Actuaries, the profession tackled the issues head-on. A Joint Committee on Financial Standards (i.e. a joint committee of the Institute of Actuaries and the Faculty of Actuaries), under the chairmanship of Mike O'Brien (who was to be the next President of the Institute), drew up the first draft of the Guide (Actuaries and Long-Term Business) which was issued in May 1975. The recommendation to issue the Guide was accepted by both Councils, with the caveat that it might need to be adapted in the light of experience. The Guide was discussed at the Institute of Actuaries in January 1976 (Barrow, 1976) and on subsequent occasions. It came to be known as GNI (Guidance Note 1), being the first of what has now become quite an extensive series of guidance notes for actuaries involved in different areas of responsibility.

14.15 The Appointed Actuary has responsibility for determining the mathematical reserves in respect of the life business and for ensuring the continuing financial viability of the company. He or she also has a major part to play in safeguarding the reasonable expectations of policyholders.

14.16 The Appointed Actuary is to be kept fully informed of all matters bearing on the financial position of the company, including premium rates, investment policy, reinsurance arrangements and distributions of profit to policyholders and to shareholders. The Appointed Actuary should have the right of direct access to the Board and should be present whenever matters of importance for the future financial condition of the company are under discussion.

14.17 When the Appointed Actuary legislation was introduced there was no requirement for a life insurance company to hold an explicit solvency margin. It was regarded as the professional responsibility of the Appointed Actuary to



monitor the overall financial position of the company, and to ensure that the size of the life fund and the way in which it was invested were such as to ensure that the future liabilities of the company towards policyholders, including meeting their reasonable expectations, could be met with a high degree of probability. Although the Statute required the Appointed Actuary to carry out a formal investigation into the financial condition of the company only once a year, the profession regarded it as the Appointed Actuary's duty to monitor the financial position on a continuous basis. Thus GN1 states that the Appointed Actuary is to take all reasonable steps to ensure that he is, at all times, satisfied that if he were to carry out an investigation, the position would be satisfactory.

14.18 The Appointed Actuary is now also required to take all reasonable steps to ensure that the company will not make any distribution or allocation of profit (to policyholders or to shareholders) without having first obtained and considered a report from the Actuary with observations and recommendations.

14.19 The Guidance Notes envisage that there could be occasions on which the Appointed Actuary might need to advise the DTI directly of a situation where the company is following a course of action which could lead him to qualify a subsequent actuarial certificate. In practice this has happened only rarely, but the threat is important in ensuring that company management takes notice of what the Appointed Actuary says.

14.20 Another effect of the events of 1974 was to underline the need for continued effective supervision by the DTI and the GAD, even with the strengthened role for the Appointed Actuary within the company. This marked the start of a period of expansion of the team at GAD involved in insurance supervisory work and the beginning of much more active life insurance supervision than hitherto.

14.21 Each new Appointed Actuary is invited, following the notification to DTI of the appointment, to come for an informal chat with the Government Actuary. This is an opportunity to establish personal contact, but also a time to discuss the nature of the Appointed Actuary's relationship with the board and with other senior executives. The agenda ranges over each of the areas covered by GN1, such as product design, premium setting, investment policy, valuation, data systems, to explore what influence the Appointed Actuary brings to bear in each area and what arrangements are in place to ensure that he is able to comply with GN1.

14.22 The different facets of the Appointed Actuary role have been discussed by Johnston (1988). The Appointed Actuary is encouraged to get to know the individuals at GAD who are responsible for examining the company's statutory returns and to feel free to contact them informally at any time to sound out the GAD reaction to any proposal or to give advance warning of some development. Subject to the approval of the company, GAD now normally deals directly with the Appointed Actuary on matters relating to the Actuary's valuation report and the financial situation of the company.

14.23 From 1984 GAD has operated a major part of life insurance supervision

as a delegated responsibility, under the terms of a written contract with the DTI, which lays down the respective responsibilities of DTI officials and of GAD. It is the responsibility of GAD to monitor the financial position of each life company, including examination of annual returns, quarterly returns (where applicable) and other information, to discuss matters with the company, and, in particular, with the Appointed Actuary, to clear up any uncertainties or to resolve any disagreements, and then to report to DTI with an assessment of the situation, including any recommendations for further action.

## 15. VALUATION REGULATIONS

15.1 Mention has already been made of the guidance note GN1 and its important role in relation to the duties of the Appointed Actuary in the company. In 1979 the EC Life Establishment Directive was agreed, and the U.K., having joined the EC in 1973, was required to implement the solvency margin provisions of the directive and restrict the intervention powers of the supervisory authority to those prescribed by the directive. These provisions were incorporated into U.K. legislation in The Insurance Companies Act and Regulations 1981 and consolidated into The Insurance Companies Act 1982. The 1981 regulations also incorporated more detailed requirements relating to the valuation of long-term business, following protracted discussions over many years with the actuarial profession.

15.2 The Determination of Liabilities Regulations, as they are known, representing regulations 54 to 64 of The Insurance Companies Regulations 1981, lay the primary responsibility on the Appointed Actuary to assess the liabilities on prudent assumptions. However, the Actuary is required to ensure that the mathematical reserves are at least as great as those indicated by the minimum valuation basis in regulations 55–64. The requirements are amplified by another professional guidance note—GN8.

15.3 Whilst satisfying the requirements of the regulations and GN8 is the responsibility of the Appointed Actuary, it is up to GAD to advise DTI in any particular case whether the regulations (and the professional guidance) have been complied with. In doing this GAD has regard to the standards generally accepted within the profession, and to specific research carried out by the profession, for example in relation to maturity guarantees (Maturity Guarantees Working Party, 1984), AIDS (Institute of Actuaries AIDS Working Party, 1987–1991) and resilience testing (Fine *et al*, 1988; Purchase *et al*, 1989).

15.4 In some of these key areas for interpretation of the regulations GAD has developed its own working rules to define what is acceptable and what is not. Where it is not clear whether the appropriate standard has been met, questions are asked of the Appointed Actuary by GAD to determine whether the position is or is not satisfactory. In a limited number of cases the Government Actuary has written personally to all Appointed Actuaries to set out details of GAD's

working rule (in particular on resilience testing, in November 1985, and on AIDS reserves, in November 1988 and December 1989).

## 16. THE LATEST CHAPTER

16.1 A new phase in GAD's development began in April 1989, when the department moved to a full repayment basis. Whereas previously GAD had had a budget voted by Parliament to provide actuarial services to other government departments, since April 1989 it has operated by charging fees to all clients.

16.2 In 1991 GAD employed 34 actuaries and 17 trainee actuaries, of whom 14 and 2 respectively were engaged in matters concerned with the supervision of financial institutions. The majority of this work was for DTI and related to insurance companies. Advice was also given to the Chief Registrar of Friendly Societies/Industrial Assurance Commissioner and to the insurance supervisory authorities in certain other countries.

16.3 The work of GAD is now organised into 3 directorates, concerned, broadly speaking, with the 3 main areas of work of occupational pension schemes, social security and insurance supervision.

16.4 As part of the process of modernising the system of supervision, and making it more relevant, the GAD and the DTI began in 1991 a programme of visits to companies. On the life insurance side this usually involves a representative from GAD, as well as one from DTI, and includes meetings with the Appointed Actuary, the chief executive, and other senior executives. The visit is not primarily concerned with discussing the returns to the DTI, but focuses on the future strategy of the company, organisational and management issues and the role of the Appointed Actuary, as well as tackling any issues outstanding between the company and DTI/GAD.

16.5 The 268 companies authorised to transact long-term business, including 15 no longer writing business, and representing almost 140 separate groups, are allocated between the 7 Actuaries in the life division at GAD and between the 2 Chief Actuaries, so that each company has a Chief Actuary and an Actuary responsible for monitoring their affairs. One Actuary has special responsibility for dealing with new authorisations. Around 40% of the time at Actuary level is taken up with scrutiny of returns and matters arising therefrom.

16.6 The Chief Actuaries and Directing Actuary spend much of their time on matters relating to the European Community (EC), including supporting the U.K. delegation in Brussels at meetings of Council Working Parties and in discussions with other supervisors. Other policy issues, including interpretation of legislation, possible future legislation, relations with the actuarial profession and industry bodies are also important, and the Chief Actuaries are intimately involved in individual company affairs whenever there is any uncertainty over solvency, or when special situations arise such as mergers, takeovers or transfers of business.

16.7 GAD's involvement in general insurance is less well-developed than on the life side. Although there has been a steady contribution since the mid 1970s, and increasingly from the early 1980s, the major expansion of GAD's role in this area took place only in 1991, with a significant strengthening of the non-life team at GAD, including those with industry experience, and the secondment of an Actuary to the DTI to fill a normal Grade 7 supervisory post there. The value of actuarial advice in general insurance has been increasingly recognised, not only by DTI, but throughout the industry, and this trend may be expected to continue.

16.8 Unlike the position in relation to life companies, GAD does not have a formal role to monitor all general insurance companies, but gives advice to the DTI on individual companies when requested to. Advice usually relates to the adequacy of technical reserves and the security of the reinsurance arrangements. However, GAD is also involved in the design of appropriate initial screening tests for use by the DTI and in the appraisal of actuarial reports on individual companies where these are sought by the DTI.

16.9 One aspect of GAD's role is to maintain close liaison with the actuarial profession and, in some senses, to act as a mediator or interpreter between the profession and the DTI. Members of GAD are currently on the Councils of both the Institute of Actuaries and the Faculty of Actuaries, and on most of the major committees.

16.10 It should be emphasised that GAD is in no sense the insurance supervisory authority. The responsibility for supervising insurance companies rests with the Secretary of State for Trade and Industry, supported by officials in the Insurance Division of the DTI. However, as actuarial advisers to the DTI, GAD has a major contribution to make to the supervisory process. Insurance is a complex and technical business, which is not easily understood by generalist administrators and executive staff at the DTI, who often remain in the Insurance Division only for 2 or 3 years.

16.11 Actuaries at all levels in GAD have generally spent their whole career in contact with, if not actually within, the insurance industry, as well as having a professional qualification of pre-eminent value for understanding and interpreting the financial status of insurance companies.

16.12 Such expertise is, of course, available elsewhere within the industry, and in particular, within other actuarial consulting firms. However, as was appreciated by the Board of Trade in 1912 when Alfred Watson was first appointed to scrutinise the returns of 6 companies, private sector firms with relevant expertise are unlikely to be independent of all insurance companies and many conflicts of interest could arise. GAD has the advantage of being independent, dedicated to providing a service to public sector clients, and in particular to government departments, familiar with the legislative, administrative and political framework in which a government department has to operate, and yet able to offer the fruit of extensive professional and industry experience for the benefit of the insurance supervisor. Such a role may be expected to be valued by the supervisory authority for many years to come.

## 17. CONCLUSION

17.1 The history of GAD's involvement in insurance supervision dates only from 1919, although informal, but equivalent arrangements existed from 1912. Prior to that there were actuaries employed by government, but very few on matters related to insurance supervision. In the life insurance field reliance was placed, from the earliest days of regulation, on the actuary within the company. This was a consequence of the historical development of the role of the actuarial profession, particularly from the time of James Dodson and the formation of the Equitable.

17.2 In the mid-19th century there was a good deal of suspicion about insurance legislation and in particular about any active supervision or intervention in companies' affairs. In our modern consumerist society, regulation has become more and more detailed and demanding. However, the fundamental principle of 'freedom with publicity' remains the hallmark of the British system of supervision. The central role of the Appointed Actuary in life insurance supervision has been well-tested, and found to be robust and effective. Many other countries round the world are studying the system and considering how it might be adapted to their circumstances.

17.3 With a strong actuarial profession, and a dominant role in life insurance and in pensions, the value of actuarial advice to government has long been recognised. An important step was taken in 1919 to form GAD and give it a wide consulting brief. GAD today is even more like a consulting firm, operating within the public sector, but providing independent actuarial advice on a wide range of issues.

17.4 For the insurance supervisors GAD provides high quality professional back-up, a close knowledge of the industry, liaison with the actuarial profession and the capacity to monitor the role of Appointed Actuaries and other experts and to enter into a proper dialogue with them.

## REFERENCES

- ALBORN, T. L. (1991). The other economists: science and commercial culture in Victorian England. PhD thesis, Harvard University (unpublished).
- ANONYMOUS (1862). Memoir of the late John Finlaison, Esq., Actuary of the National Debt, Government Calculator, and President of the Institute of Actuaries. *The Assurance Magazine and Journal of the Institute of Actuaries*, 10, 147-169.
- BARROW, G. E. (1976). Actuaries and long-term insurance business. *J.I.A.* 103, 137-166.
- BENJAMIN, S. *et al.* (1972). Supervision of insurance in the United Kingdom. Discussion. *J.I.A.* 98, 233-250.
- BUOL, *et al.* (1971). Les garanties financières requises des entreprises d'assurance vie. OECD.
- CAMPAGNE, C. (1957). Minimum standards of solvency for insurance firms. OEEC, TFD/PC/565.
- CAMPAGNE, C. (1961). Minimum standards of solvency for insurance firms—Report of the ad hoc Working Party on Minimum Standards of Solvency. OEEC, TP/AS(61)1.
- COLLINS, F. L. (1925). Winding up a life assurance company under the provisions of Section 17 of the Assurance Companies Act 1909. *J.I.A.* 56, 152-180.

- COMMISSION D'ETUDI. (1963). Rapport de la Commission d'Etude des Indices de Solvabilité. CEEn8360/III/C/63F.
- COUTTS, C. R. V. (1937). Memoir of Sir Alfred Watson, KCB. *J.I.A.* **68**, 1-7.
- COX, P. R. (1982). Memoir of Sir George Henry Maddex, KBE. *J.I.A.* **109**, 317-318.
- DAYKIN, C. D. (1984). The development of concepts of adequacy and solvency in non-life insurance in the EEC. *Transactions of the 22nd International Congress of Actuaries*, **3**, 299-309.
- DAYKIN, C. D. (1990). The supervision of life insurance business in the United Kingdom. *Proceedings of the Conferenza Internazionale degli Attuari dei Paesi delle Comunità Europee, Rome, 11-13 July 1990*.
- DAYKIN, C. D. (1990a). The supervision of non-life insurance business in the United Kingdom. *Proceedings of the Conferenza Internazionale degli Attuari dei Paesi delle Comunità Europee, Rome, 11-13 July 1990*.
- DE MOIVRE, A. (1725). Annuities on lives.
- ELDERTON, W. P. (1931). William Morgan, FRS, 1750-1833. *T.F.A.*, **14**, 1-20.
- EUROPEAN COMMUNITIES. (1973). First Council Directive of 24 July 1973 on the coordination of laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of direct insurance other than life insurance (73/239/EEC). *Official Journal of the European Communities*, **L228**, 3.
- EUROPEAN COMMUNITIES. (1979). First Council Directive of 5 March 1979 on the coordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of direct life assurance (79/267/EEC). *Official Journal of the European Communities*, **L63**, 1.
- FORD, A. (1974). Life office returns to the Department of Trade and Industry. *J.I.A.* **101**, 53-87.
- FINE, A. E. M., HEADDON, C. P., HEWITSON, T. W. *et al.* (1988). Proposals for the statutory basis of valuation of the liabilities of linked long-term insurance business. *J.I.A.* **115**, 555-630.
- FERGUSON, D. G. R. (1976). Life office solvency and insolvency. *J.S.S.* **22**, 1-44.
- HALLEY, E. (1693). An estimate of the degrees of the mortality of mankind, drawn from curious tables of the births and funerals at the City of Breslau; with an attempt to ascertain the price of annuities upon lives. *Philosophical Transactions*, **17**, 596-611, 654-656 (Reprinted in *J.I.A.* **18**, 251-262 and reproduced in *J.I.A.* **112**, 283-301).
- HENDRIKS, F. (1853). Contributions to the history of insurance, and of the theory of life contingencies. *The Assurance Magazine and Journal of the Institute of Actuaries*, **3**, 93-120 (includes translated extracts from the writings of Jan de Wit, 1671).
- HENDRIKS, A. (1893). Opening address by the President on 28 November 1892. *J.I.A.* **30**, 265-291.
- HEYWOOD, G. (1985). Edmond Halley: astronomer and actuary. *J.I.A.* **112**, 279-301.
- HMSO. (1918). Report of the Machinery of Government Committee. HMSO Cd. 9230.
- HMSO. (1927). Report to the Rt. Hon. the President of the Board of Trade by the Departmental Committee appointed to inquire and report what amendments are desirable in the Assurance Companies Act, 1909. HMSO Cmd. 2820.
- HOUSE OF COMMONS. (1853). Report of the Select Committee on Assurance Associations. HC965.
- INSTITUTE OF ACTUARIES. (1973). Catalogue of an Exhibition illustrating the history of actuarial science in the United Kingdom with special reference to the Institute of Actuaries.
- INSTITUTE OF ACTUARIES/FACULTY OF ACTUARIES. (1991). The role of the Appointed Actuary in the United Kingdom.
- INSTITUTE OF ACTUARIES AIDS WORKING PARTY. (1987-1991). AIDS Bulletins Nos. 1 to 5.
- JOHNSTON, E. A. (1988). The Appointed Actuary. *J.I.A.* **116**, 27-78.
- KING, G. (1892). On legislation affecting Life Assurance Companies, more especially with reference to the Life Assurance Companies Acts, 1870 to 1872 and their amendment. *J.I.A.* **29**, 481-540.
- LEWIN, C. G. *et al.* (1985). Some landmarks in actuarial science. Catalogue of an exhibition at Staple Inn Hall, November 1985.
- LEWIN, C. G. (1987). 1848 and all that. *Fiasco*, **96**.
- LEWIN, C. G. (1987a). 1848 and all that. *Fiasco*, **99**.
- LEWIN, C. G. (1988). 1848 and all that. *Fiasco*, **101**.
- LEWIN, C. G. (1988a). 1848 and all that. *Fiasco*, **102**.

- LEWIN, C. G. (1989). 1848 and all that—Edmond Halley. *Fiasco*, **116**, 12–13.
- LEWIN, C. G. (1990). 1848 and all that. *Fiasco*, **Ω**.
- MCCCLINTOCK, E. (1895). Response to the President's welcome at the AGM of the Institute of Actuaries, 8 June 1895. *J.I.A.* **32**, 150–151.
- MADDEX, G. H. (1954). The Government Actuary's Department. *J.I.A.* **80**, 107–111.
- MADDEX, G. H. (1947). Memoir of Sir Percy Harvey, KBE, CB. *J.I.A.* **73**, 161–162.
- MADDEX, G. H. (1951). Memoir of Sir George Epps, KBE. *J.I.A.* **77**, 479–481.
- MALCOLM, W. R. & HAMILTON, R. G. C. (1874). Report to the Board of Trade, upon the Accounts and Statements submitted to the Board of Trade, under the 'Life Assurance Companies Act, 1870' HC. Reproduced in *The Assurance Magazine and Journal of the Institute of Actuaries*, **18**, 390–402.
- MATURITY GUARANTEES WORKING PARTY. (1980). Report of the Maturity Guarantees Working Party. *J.I.A.* **107**, 103–231.
- NICOLL, J. (1898). The relation of the actuarial profession to the state. *J.I.A.* **34**, 158–251.
- OGBORN, M. E. (1956). The professional name of actuary. *J.I.A.* **82**, 233–246.
- OGBORN, M. E. (1962). *Equitable Assurances*.
- PICKFORD, M. A. (1983). The Insurance Companies Act 1981 and some of the associated regulations. *J.S.S.* **26**, 69–102.
- PURCHASE, D. E., FINE, A. E. M., HEADDON, C. P. *et al.* (1989). Reflections on resilience: some considerations of mismatching tests with particular reference to non-linked long-term insurance business. *J.I.A.* **116**, 347–452.
- RAYNES, H. E. (1948). *A history of British insurance*. Pitman, London.
- RENN, D. F. (1984). The road to Windsor: Centenary of the Royal Charter of 1884. *J.I.A.* **111**, 223–227.
- SIBBETT, T. A. (1989). Turbulent times (unpublished article).
- SIBBETT, T. A. (1989). Abraham de Moivre, 1667–1754. *Fiasco*, **114**, 8–9.
- SIBBETT, T. A. (1989). Frauds and swindles. *Fiasco*, **117**, 10–12.
- SKERMAN, R. S. (1966). A solvency standard for life assurance business. *J.I.A.* **92**, 75–84.
- SMITH, P. R. (1973). More informative disclosure of life office affairs. *J.I.A.* **99**, 249–291.
- SPRAGUE, T. B. (1872). On legislation as to Life Insurance and Life Insurance Companies. *The Assurance Magazine and Journal of the Institute of Actuaries*, **16**, 77–98.
- SPRAGUE, T. B. (1872a). On the liquidation and reconstruction of an insolvent life insurance company. *The Assurance Magazine and Journal of the Institute of Actuaries*, **16**, 229–243.
- SPRAGUE, T. B. (1886). Opening address by the President on 24 November 1884. *The Assurance Magazine and Journal of the Institute of Actuaries*, **25**, 65–83.
- STEWART, C. M. (1972). The governmental control and supervision of the private insurance industry in Great Britain. *Transactions of the 19th International Congress of Actuaries, Oslo, National Reports*, 169–183.
- TAYLOR, N. H. (1990). 1848 and all that: The Actuaries Club. *The Actuary*, December 1990.
- WALFORD, C. (1867). *Insurance Guide*.
- WALFORD, C. (1871–1874). *The Insurance Cyclopaedia, Volumes I to III*. Charles and Edwin Layton, London.
- WALFORD, C. (1884). History of life assurance in the United Kingdom. *J.I.A.* **25**, 114–133, 207–216, 257–271, 433–437; **26**, 1–24, 120–132, 302–315, 436–465.
- YOUNG, T. E. (1897). The origin and development of scientific and professional societies, with their bearing upon the Institute of Actuaries and its associated profession. A Presidential Address delivered before the Institute of Actuaries on the 29th of November 1897. *J.I.A.* **33**, 453–485.