

ACTUARIES AND GENERAL INSURANCE

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1. PURPOSE OF PAPER

1.1. At the 1984 seminar of the Institute's General Insurance Study Group the author presented a draft of some guidance notes which were intended to be the starting point for establishing a framework of recognized good practice for United Kingdom actuaries working in general insurance. The draft, amended to take into account comments made at and subsequent to that seminar, appears as Appendix A, with the title "Notes on recommended practice (abbreviated to NORP) for actuarial reporting in general insurance". It was felt that in presenting the notes to the profession at large, an introductory paper would be helpful, not only in explaining some of the issues covered in the proposed NORP but in discussing more generally the role of the actuary in general insurance and what an actuary should be prepared to advise on.

1.2. This paper:

—Outlines the history of actuarial involvement in general insurance in the U.K. and includes as Appendix B a bibliography of papers by U.K. actuaries in the U.K. actuarial journals, in the transactions of the International Congresses and in the ASTIN Bulletin.

—Discusses the current involvement of U.K. actuaries in general insurance and why it is perceived that there is a need for a NORP for actuarial reporting in general insurance business.

—Discusses what the profession should be aiming to achieve in general insurance.

—Extends and explains some of the points made in the draft NORP.

1.3. Many of my actuarial colleagues have helped in the production and formation of this paper and I am grateful for their contributions. The responsibility for any errors, omissions or points which are not made with sufficient clarity is, however, mine.

2. HISTORY OF ACTUARIAL INVOLVEMENT

2.1. The involvement of actuaries in general insurance in the U.K. is not new. The journal of the Institute includes two papers presented in 1879 and 1880 on fire insurance. Workers' compensation was the subject of Institute and International Congress papers in 1902-03. Then interest by U.K. actuaries in

general insurance appeared to wane and, apart from one paper to the Faculty in 1931 on employers' liability, did not manifest itself again for about another 50 years. This contrasts with actuarial history in the United States of America, where the need to justify premium rating levels for governmental approval was a major factor leading to the creation of the Casualty Actuarial Society. One can but presume that the existence in the U.K. of insurance industry cartels, helped by minimal inflation and an absence of present-day levels of claim consciousness, enabled insurers to charge rates which were usually sufficient (whatever that may mean) and, where they were not sufficient, for losses to be recovered out of future premiums.

2.2. Given this environment, the main thrust of actuarial involvement when it first re-emerged in the 1950s was generated by a few actuaries who were interested in the mathematical theory underlying general insurance. In the U.K. this movement centred around R. E. Beard and the contacts with the European actuaries who had been developing risk theory. The formation of ASTIN (Actuarial Studies in Non-life Insurance) in 1957, as a section of what is now the International Actuarial Association, for the promotion of mathematical research in general insurance created a forum for the development of these views. In the U.K. with no requirement to justify rating levels to the authorities, the practical use of the risk theory developing around ASTIN was generally thought to be limited. 'Technical' actuarial involvement in general insurance arose from the occasional consultancy brief or from the presence of actuaries in a major U.K. reinsurance company. Reinsurance operated in a free market and excess of loss treaties in particular gave rise to what were perceived by the reinsurers to be actuarial problems.

2.3. In the early sixties the motor tariff was under attack from new insurers who had successfully identified market segments which, at least initially, were over-priced. With inflation escalating and with some well publicized failures, the climate shifted to insurers looking for analytical advice on their general insurance business. Companies foresaw the breakdown of the tariffs, and some composite companies requested the advice of their actuaries. By the end of the sixties most major insurers were employing one or more actuaries whose jobs related solely to general insurance.

2.4. Further impetus for professional activity emerged from:

—The requirements of the Department of Trade for claim frequency and claim settlement analyses in the annual returns. The impetus thus given to a more analytic approach to the assessment of outstanding claim reserves resulted in the employment of actuaries in a number of companies.

—The work by actuaries employed by one U.K. insurer on models to represent claim frequencies and claim amounts for private cars (ref. Johnson & Hey), and its extension into the model used by the Motor Risk Statistics Bureau of the British Insurance Association as it was then called.

—The brief period of price control in the early seventies, believed to be the only

U.K. example of a requirement for rate increases to be authorized. The price control formula was developed with actuarial assistance and in many cases actuaries prepared the rating increase applications to the Department of Trade.

2.5. Actuaries working in general insurance had been encouraged to get together by the Research Committee of the Institute, and the General Insurance Study Group (GISG) was formed in 1974.

—A number of papers emerged, either as Institute papers or as occasional research papers which were deposited in the Institute library.

—From 1974 the GISG has held annual two-day out-of-London seminars on general insurance. The initial objective of these seminars was both to be of educational value for actuaries and to develop actuarial techniques in this area. Some of the papers discussed at the seminars, together with the occasional research papers mentioned above, provided material for use in the preparation of the Institute's first text-book on general insurance, written by B. Benjamin.

—There has been an occasional broadsheet for actuaries interested in general insurance—*The GIRO Bulletin*. This Bulletin, of which there have so far been 40 issues, has been circulated for the last eleven years to interested actuaries who have asked to be put on the circulation list. At the 1985 GISG seminar in Cheltenham it was proposed that the Bulletin be re-launched with extended objectives. The concept was that the Bulletin should not only be a means of public discussion between actuaries on technical subjects but also disseminate information about what actuaries are doing in general insurance and about developments within the industry itself.

2.6. An important milestone was reached following the collapse of the Vehicle and General in 1971 when the Institute of Mathematics and its Applications held a conference on claim reserving. Papers were presented by actuaries, an accountant, a statistician and a representative of the Insurance Division of the Department of Trade.

2.7. In the early seventies two actuaries, R. E. Beard and G. C. Taylor, acted as consultants for the Department of Trade and from their work the claim reserving methods known as the chain ladder and separation methods received a certain amount of prominence. The problems arising in Australia on workers' compensation reserves gave rise to considerable actuarial activity in that country. In the U.K. there was a period of pressure from the Department of Trade to set up a minimum statutory formula for establishing claim reserves. Following resistance from actuaries and insurers alike, such pressures for a formula minimum have ceased.

2.8. The increasing activity of actuaries in general insurance led to a decision by the Institute to introduce the subject of general insurance into its syllabus in 1978.

2.9. In terms of actuarial activity, the position of actuaries within direct writing companies has not changed much over the last few years, although it is noticeable that companies with American parentage are tending to use more actuaries. There has also been a substantial growth in the activities of consulting actuaries. There have for a long time been some actuaries engaged in non-life reinsurance, mainly in the major reinsurance companies. More recently there has been a significant growth in the number of actuaries working in the London market reinsurance companies and in Lloyd's underwriting agencies. The London market group of non-life actuaries, now 18 strong and rising, is playing a major role in the development of non-life actuarial activity.

3. THE PRESENT SITUATION

3.1. The employment of actuaries in general insurance takes various forms.

—There are actuaries working for composite companies who are employed in a technical role. The actuary may regard the work as one of a number of actuarial jobs within the company and with a career progression which will take him or her back into the 'mainstream' of actuarial activity or elsewhere within the company.

—Other composite company actuaries may consider themselves as having a career pattern in general insurance.

—Other actuaries are employed by companies with no life activity. Many of these are associated with reinsurance and with the London market. There are now actuaries employed as such by Lloyd's underwriting agents.

—The 'technical' role considered above is that associated with the setting of reserves and the establishment of premium rates or, more generally, with the organization and interpretation of statistics for management. One or two have found themselves in the underwriting area looking at individual risks. Other actuaries may become involved through their financial or planning activities in the assessment and monitoring of profit from the general insurance operation and on capitalization needs and security aspects.

—Yet more actuaries may, at various levels, be engaged in general management, without any specifically actuarial responsibilities.

—Consultancy work may include advising new companies or Lloyd's agencies on a variety of matters (e.g. proposed minimum reserving methods for Lloyd's), valuations of claim reserves, for potential vendors and buyers of insurance companies etc.

—Actuaries working for the Government Actuary's Department may participate in the supervisory process for all insurance companies, including general insurers. In particular they may be asked to give an opinion about the likely adequacy of the provisions for outstanding claims in a company's return as a basis, where appropriate, for the seeking of further information from the company.

—Actuaries employed as investment analysts for stockbrokers and security assessment services are increasingly engaged in assessing the adequacy of the technical reserves as part of the process of considering the financial strength and performance of general insurers.

—There are now actuaries employed in accounting partnerships who are engaged in general insurance and, in particular, the auditing of claim reserves.

—There are also a number of actuaries employed by universities who take part in educational or research work in general insurance, and others employed by industry bodies or by the Institute itself.

3.2. Within a direct-writing general insurance company the role of an actuary is, unlike that in a life office, not an accepted fact of life. For the function of establishing reserves and setting premium rates, the actuary more often than not finds himself one of a team contributing to the decision process. Within the organization the actuary may find himself reporting to an accountant, an underwriter or a claims manager or directly to the general manager; or he may report as part of the planning team.

3.3. There are at least two features which may have discouraged the employment of actuaries on a functional basis in general insurance.

—Some job advertisements for general insurance actuaries have produced a poor response. Possible reasons could be a hesitation on the part of potential applicants to move to an area where there is no established role or where the management itself may only be paying lip service; geographical location or lack of career progression opportunities within an organization; and the fact that most jobs are aimed at the 'newly qualified' where there is already an excess of demand over supply.

—Actuaries may be thought to be expensive and alternatives, such as statisticians, may be thought capable of doing a similar job.

3.4. Just as British actuaries have to meet competition from statisticians, they may also have to meet competition from the U.S.A. casualty actuaries. Since some general insurance companies are now of American parentage and around half of Lloyd's business relates to the U.S.A., those engaged in the management of these businesses are accustomed to dealing with casualty actuaries. The casualty actuaries can point to a professional qualification, sharing three examinations with the Society of Actuaries but having seven of their own. The Institute has to balance the need for a specialist education corresponding to that of the Casualty Actuarial Society against the need to maintain the unity of the actuarial profession in this country. The success of the actuarial profession in general insurance depends ultimately on the impression created by actuaries working within the area.

3.5. In the U.K. there is no statutory role for actuaries in general insurance corresponding to the roles for actuaries in relation to life assurance and pensions. One consequence of this is that there has been no explicit guidance from the

Institute for actuaries working in and reporting on general insurance. Actuarial bodies in other countries have begun to issue guidance, but in the main this is as a reaction to the emergence of legislation relating to the actuarial certification or assessment of claim reserves.

—In many states of the U.S.A. there is a requirement for some or all claim reserves to be certified by loss reserving specialists. The specialists have to give evidence that they have the knowledge and experience as such. Once transitional arrangements have worked their way through, the specialists will effectively be casualty actuaries or other actuaries working within a professional code requiring sufficient experience and a familiarity with the CAS syllabus. The CAS has prepared a “statement of principles regarding property and casualty loss liabilities”. These principles relate to the statutory accounts of the U.S.A. insurers and the statement covers definitions, considerations and procedures but not the question as to what is meant by a proper or a sufficient standard of reserving.

—In Canada there is an expectation of legislation from the federal government introducing certification of claim and premium reserves by an independent actuary (or, in the absence of sufficient actuarial expertise, another qualified person) that the estimates are fair and reasonable. The Canadian Institute is currently working on recommendations for financial reporting by its members on property and casualty companies, hoping that a final version will be adopted in 1986. The current draft refers to certifying that proper (i.e. a good and sufficient) provision has been made. Already the province of Quebec requires the certification of unpaid claims (until 1989 by non-actuaries). Additionally all companies are obliged to hold an additional reserve of 15% of unearned premiums which may be reduced if an actuary (or currently non-actuary) can certify that the expected loss ratio on the unearned premiums is less than 95%. In the light of 300 companies and 30 casualty actuaries in Canada, their Institute is working on the manpower problem.

—In Italy legislation passed in 1978 required the regular actuarial certification of certain reserves, with effect from 1982. The Italian Institute prepared a statement giving guidance to its members in providing the required certificates. The certifying actuary, who is not an employee of the insurer, is appointed by and reports to the auditors rather than the insurer. The insurer must also change its auditors every three years.

—Although there is no requirement for certification in Australia, there has been a court case in which there was disagreement between the advices given by two actuaries. There is the prospect of further public disagreement among actuaries, on, for example, the level of claim reserves for the nationalization of workers compensation business in Victoria. The Australian Institute has produced an exposure draft of a “note on professional practice” on the estimation of outstanding claims. It is now fairly common as a matter of good practice to support the private returns to the Insurance Commissioner on workers’ compensation by an actuarial report.

—The role of actuaries in Finland has been significant, in particular in the development of the whole regulatory environment. The fact that supervisors have themselves been actuaries has proved useful in gaining acceptance for the methods, which extend beyond claim reserves towards a view of the totality of reserves.

4. ROLE OF THE ACTUARY

4.1. Actuaries in the U.K. are currently providing a numerical and analytic facility in general insurance which insurers, auditors and supervisors amongst others find of practical use. There are two separate aspects which are worth dwelling on in considering the role of the actuary and the profession's objectives in general insurance.

—Given the current environment, what should the actuary be prepared to report on?

—What changes in the current environment should the profession be seeking?

The resolution of these two questions may give the profession a necessary coherence in its participation in general insurance.

4.2. The first question is concerned with the extent to which an actuary may assume professional responsibility. There is a useful distinction to be made between advice given within a reference framework for which the actuary is not responsible and advice for which the actuary may assume full professional responsibility.

—Typically the 'limited' advice would relate to assessments of reserves of a 'static' nature, for example the assessment of the technical reserves in a balance sheet. Here management must be responsible for the establishment of reserves. Within the context of what may be called the guiding accounting principles, an actuary may assume responsibility for making estimates of the future outgo but merely advise on how these estimates could be translated into a reserve. The actuary would thus state the various assumptions which he regarded as part of his given brief.

—The unconstrained advice would normally relate to a 'dynamic' situation where more specific regard could be paid to the underlying uncertainties. Typically one would think in terms of the overall financial strength of a company, including its continued ability to satisfy statutory and accounting requirements.

4.3. In looking at ways in which actuaries might contribute to the change in the environment, there are several strands of contemporary thought including:

—Certification of claim reserves by reserving specialists, essentially actuaries.

—Seeking changes in the current regulations concerning solvency margins, which must be considered having regard to European Community directives.

—Encouraging, either through legislation or through self-regulation by means

of rules or codes of good practice, professional reporting on the financial condition of companies and the adoption of a concept of 'total solvency' in such reports.

4.4. As has already been described, a movement towards the certification of claim reserves has started outside the U.K.. Actuaries have a strong but not unique claim to being the reserving specialists. If reserves were to be certified then this could be done, as it is in some states of the U.S.A., on generally accepted actuarial principles. The adoption of industry standards for insurance accounts on the lines indicated in Section 5 below could lead to a suitable opportunity for the actuarial profession to use the accounting reference framework in developing its own bases for reserving. A good case can be made out for there to be actuarial opinions on the technical reserves attaching to the accounts provided by insurers in accordance with a voluntary code of good practice. The actuarial opinion would depend on a proper blending of numerical and statistical methods with the opinions of claim specialists, underwriters and administrators.

4.6. An actuarial report on the financial condition of a company could be said to be looking at the total solvency of the insurer, with the aim of deciding whether the assets were sufficient to make it extremely unlikely that the company would be unable to meet its liabilities. It may, however, be advisable to avoid referring to total solvency so as to avoid confusion with the statutory basis.

4.7. The views expressed here differ from those expressed by Daykin *et al.* in their 1984 paper on the solvency of general insurance papers. They suggested that an adequate provision for outstanding claims and unexpired risks should include an allowance for inflation and a margin of perhaps $1\frac{1}{2}$ standard deviations above the mean estimate. The view now stated is that the actuary may assume responsibility for the best estimate of the outstanding liability but that the responsibility for the level of provision is that of management in a reference framework subject to legislative and accounting constraints.

5. THE NOTES ON RECOMMENDED PRACTICE

5.1. The notes refer to "guiding accounting principles" and this concept is fundamental to an understanding of the NORP. The NORP has been designed to cover a whole range of actuarial reporting and the background for each report could vary. For instance, a report may have been commissioned to establish the claim reserves to be set up in the statutory returns and the Companies Act accounts of a U.K. insurer in respect of its direct U.K. motor account. The background for such a report would be very different from that of one commissioned on the reserving and capitalization requirements of a captive company set up offshore. For this reason the notes do not purport to set out what should be the correct accounting principles to follow; that would be presumptuous. Nor are the notes written on the basis that the accounting background is irrelevant; for that would show naivety on practical realities. What the NORP

does state is that the actuary must consider the guiding accounting principles and frame the report accordingly, either by saying that the recommendations are in line with the guiding accounting principles or to rationalize any divergence. Although the actuary may well advise on the guiding accounting principles, the responsibility for those principles rests with management.

5.2. The draft NORP has been developed at a time when both the accounting profession and the insurance industry have been realizing the need for a degree of standardization, although the meaning of the word 'standardization' is itself flexible. The actuarial guidance notes being developed in other countries relate only to the particular accounting framework of the country concerned. The draft notes presented here are intended to be complementary to any accounting reference framework which may be applicable.

5.3. Within the U.K. there are several different frames of reference. Of the five listed below, actuaries could take professional responsibility for the last two only.

- That used by the regulators for solvency supervision. The frame of reference for companies is statutory and supervised by the Department of Trade and Industry. For the solvency supervision of a Lloyd's syndicate it is more complex, being that prescribed through the Council of Lloyd's (effectively a self-regulating authority) but subject to aggregation with other syndicates for the purposes of the DTI.

- That used in reporting to shareholders, normally but not always under the Companies Acts, with any further constraints imposed on listed companies through the requirements of the Stock Exchange.

- That used by the Inland Revenue in the assessment of tax.

- One which could be used by management to make a realistic assessment of the 'added value' from a year's operations.

- One which could be used by management to consider the capital needs of the insurer.

Frames of reference which in principle are distinct may overlap in practice. For example, a liability valuation which is appropriate on a 'going-concern' basis is not necessarily appropriate on a 'break-up' basis.

5.4. Where actuarial reports relate to the valuation of items in reports drawn up under the U.K. Companies Acts, the guiding accounting principles are those which give a 'true and fair' view as required by company law for all companies. To back up the concept of a 'true and fair' view, accounting standards have been developed by the professional bodies of accountants. These standards provide a basis for qualification of the audit report and would be influential in a court of law on whether or not a true and fair view had been given. U.K. accounting standards are issued as Statements of Standard Accounting Practice (SSAPs) which may be considered as technical rules of valuation, measurement and disclosure for accounts prepared under the Companies Acts. There is a certain element of compulsion about SSAPs and they are not designed to deal with the

problems of particular industries. Some standards have been controversial and have been criticized for allowing either too little room or too much room for manoeuvre, or for being inconsistent or not based on a 'conceptual framework'. It appears that some accountants regard a conceptual framework, i.e. a theoretical structure to underlie the technical rules, as a holy grail, as yet unattained and probably unattainable. If a conceptual framework is an unattainable goal for accounting standards, then it must also be unattainable for actuarial standards for reporting on technical reserves. There may however be scope for a conceptual framework in reporting on the financial strength of an insurer.

5.5. Particular industries or special interest groups may see the need for special guidance. In 1983 the accountants took the decision to permit the issuance of guidelines under the heading of Statements of Recommended Practice (SORPs), with the accent on the word 'recommended'. They have less force than SSAPs, being drafted by an industry committee prior to submission for approval by the Accounting Standards Committee of the professional accounting bodies. Within the general insurance industry, after the initial proposals made by an accountants' committee, there now appears to be agreement on the need for a SORP. Indeed, at the time of writing a SORP is being drafted by the Association of British Insurers. It is expected that it will lay down general principles whilst still retaining an element of discretion. For example, it could well permit statistical methods of quantifying claim reserves without detailing such methods. A suitable follow-up by the actuarial profession could build further detail on guidance for statistical estimation of reserves in the context of a SORP.

5.6. The industry SORP, when it emerges, will relate to accounts prepared under the Companies Acts.

—Although the definition of profit for Corporation Tax purposes does not necessarily coincide with that for the Companies Acts accounts, there is some link between the two. For instance, if it were to be decided that provisions for claim handling expenses, reserves for weather catastrophes and the adoption of discounting principles were logical elements in a true and fair view, then presentation of accounts on this basis might lead to a decision by the Inland Revenue to change their interpretation of taxable profit so as to allow for all these items. Insurers might, on the other hand find that, to their disadvantage, only the discounting is taken up in their tax accounts and not the provisions for claim handling expenses and catastrophes.

—If and until the regulations under the Insurance Companies Act are changed, the returns to the DTI have to be prepared "in accordance with generally accepted accounting concepts, bases and policies or other generally accepted methods appropriate for insurance companies". There may well be a need to modify the SORP as a basis for preparing statutory returns. The possibility of a different basis of calculating technical reserves in the DTI

returns and the Companies Acts accounts is the logical outcome of the different objectives of the two presentations, yet there is a natural reluctance to adopt this divergence of bases because of the confusion it would be likely to cause.

—A further layer of complexity may arise from the preparation of a European Community directive on insurance accounting, but the actual introduction of a directive appears to be some years off. Accounts in France and West Germany are prepared under rules based on tax and company law using mandatory principles. The innate conservatism of such principles, which do not present a fair view, seems likely to produce some major disagreements on fundamental issues. In 1979 a study group of accountants from various member states, working in a personal capacity, submitted a report to the Commission setting out proposals for a directive to harmonize insurance accounts. This report in turn refers to rules which had been proposed by the insurance supervisors of the European Community for the technical reserves to be taken into account in assessing solvency. The report of the accountants' study group is being considered in an informal working party of official representatives to help the Commission prepare a draft directive which commands sufficient support to warrant detailed negotiations in a formal Council Working Party.

There is no easy path through this complex of issues. It has been argued that a SORP for the U.K. Insurance Industry could well set the standard for Europe. Meanwhile, all that an actuary can do is to be aware of the issues and in reporting on the technical reserves to ensure that the terms of reference for the reporting have been agreed and that the report is seen as being within the context of a reference framework for which the actuary cannot take professional responsibility.

5.7. One controversial issue is the distinction drawn between provisions and reserves. One view is that there is no clear way of distinguishing the two. The contrary view is that the main basis for communication is the framework established by the Companies Acts, where a provision is an amount charged against profit to cover an expected liability, even if the exact amount or timing of the liability is uncertain, whilst a reserve is an amount set aside, either voluntarily or compulsorily, out of profit in order that that amount should not be distributed. This implies that one should have provisions, rather than reserves, for outstanding claims and unearned premiums. On the other hand, amounts set aside to cover catastrophe claims and large fluctuations would be treated as reserves. The regulations under the Insurance Companies Act adopt a different convention in following the European directives, identifying technical reserves as covering claim and premium provisions.

5.8. The issue which makes the discussion on provisions or reserves real is tax. The approach in France or West Germany is to have legislation which defines the technical reserves eligible for tax relief, and these reserves may contain an

amount to cover future adverse fluctuations. Indeed the Germans have a claim equalization reserve, based on a formula devised by German actuaries, as part of their technical reserves and therefore eligible for tax relief. The U.K. approach has, in essence, been to follow the concept of provisions, with its own case law built up over the course of this century. The amalgamation of Anglo-Saxon and continental European frameworks is proving difficult, with many inbuilt inconsistencies. A theorist might argue that tax relief ought to be available to cover realistic estimates of claims already incurred, plus an amount to cover that element of the premium which has been collected but which could be considered as covering future claims. For example, if a catastrophe claim is expected once every ten years and does not happen in the first year, then the amount collected should not generate a tax payment. Similarly, if the 'realistic' assessment of the outstanding claim liability proves insufficient, then it is unfortunate to have paid tax if this proves to be irrecoverable. In the U.K., with its case law concerning provisions and reserves, covering such fluctuations cannot be done explicitly. It could perhaps be argued that such fluctuations have been allowed for to some extent by not discounting, although another view of not discounting is that it makes allowance for unexpectedly high rates of escalation of claim costs through judicial and other factors. Thus the arguments for and against discounting are inextricably linked with the tax issues, the choice of the appropriate reference framework and the degree to which such reference frameworks are interconnected. The draft NORP has remained neutral on these issues, concentrating instead on ensuring that a clear statement is made of what has or has not been done.

5.9. The notes do not give a definitive view on what a 'best estimate' is and whether it should form the basis of a reserve. This is an issue which could be covered in greater detail once the industry has agreed on a SORP. Meanwhile, the draft actuarial NORP requires the actuary to take the issue into account and to state the reference basis on which the reserves have been estimated. To illustrate the difficulties which may arise in discussing the concept of a 'best estimate' we may take the case of a liability claim in which it can be assumed that if the insurer is held liable the claim will cost £100,000 but that there is only a 1 in 10 chance that the insurer will be held liable. (In practice both the probability and the amount would themselves be estimates.) It is easy to see the three arguments which could point to the best estimate being £100,000, £10,000 or zero. In practice the actuarial 'expected value' approach may not necessarily give the best estimate, especially for a portfolio where one or two large claims (or recoveries) may predominate.

5.10. The draft NORP states that it is essential for the actuary to comment on the nature of the data available and the extent to which local knowledge of the portfolio has been gained. It is important that actuaries should not be regarded as having an automatic procedure for producing their results. The absorption of the background and an element of subjective assessment remain essential. It is not expected that full information will be available, but the onus is on the actuary to

gather such information as is practical in the time available and to state the extent to which such information has been available.

5.11. The draft NORP refers to cross-funding. An insurer has to set up sufficient provision to cover both outstanding claims and unearned premiums. Depending on the choice of the reference framework, one can produce a report saying that the provisions are adequate if the claim and premium provisions are in aggregate adequate. Alternatively, one can say that the provisions are adequate only if both the claim provisions and the premium provisions are individually adequate. The report of the Vehicle and General Tribunal appeared to criticize an actuarial report which adopted the former view. This has led to the current climate of opinion which regards the two as separate provisions whose sufficiency should be separately assessed. This appears to be inconsistent with what happens elsewhere in the same reference framework where, under the three-year accounting system derived from the Lloyd's method of distributing profit, claim and premium reserves are effectively combined when deciding whether the funds for the open years are adequate and hence whether any transfer from the profit and loss account is required.

5.12. A further version of cross-funding may occur between categories of business. Using the accounting classification of the DTI returns, there are five classes which are commonly accounted for on a one-year basis. Where best estimates of the liability attributable to unexpired risks indicate that the unearned premium provision is insufficient, an additional reserve has to be considered. Separate amounts could be established for each class, with negative amounts being disregarded for the purpose of setting up an additional reserve. Alternatively, negative amounts can be taken into account, before the total (non-negative) additional reserve is established; this would constitute cross-funding. Again, the choice of method implies a framework. Actuaries could point out that the choice of five accounting classes is somewhat arbitrary. Why not the corresponding 14 risk classes of the E.C. directive, or the greater number of risk groups used in the claims analyses in the DTI returns or, in the ultimate, why not on a per policy basis? The draft NORP calls on the actuary to recognize the issues and make his basis of reporting plain.

5.13. The draft NORP does not indicate the structure or the contents of an actuarial report, such matters being dependent on the purpose and readership of the report. It is not expected that a report should describe all the relevant matters covered by the draft NORP but it is expected that all relevant matters should have been considered.

5.14. The final section of the NORP is concerned with financial strength or soundness, and points out that the word 'solvency' may well have a particular legal or accounting meaning, or meanings. Reports on 'solvency margins' can be grouped with reports on technical reserves, with actuaries bearing a professional responsibility only in the context of a suitable framework. If, however, an actuary is called on to report on the financial condition, strength or soundness of an insurer or on the security offered by an insurer, then the actuary can take full

responsibility for that report. The NORP merely outlines some salient points and further guidance could be given by the profession.

6. CONCLUSION

6.1. Even without legislation corresponding to that which supports actuaries in life assurance and pensions business, the involvement of actuaries in general insurance business is increasing. Actuaries find themselves being called on to write reports on a variety of topics. The question has naturally emerged as to whether or not actuaries working in this area should have reference to a set of standards and methodology which is formally documented and agreed by the profession as a whole. If this question is to be answered it is necessary first to clarify the areas in which an actuary may assume a professional responsibility.

6.2. This paper considers two distinct areas of actuarial advice and reporting in the field of general insurance.

—In reporting on technical reserves and on solvency in its regulatory sense, the actuary must establish the reference framework and assume responsibility only in the context of that framework.

—In reporting on the financial soundness or strength of an insurer, the actuary may assume full professional responsibility.

Guidance in the form of notes should be prepared for actuaries working in this area.

6.3. It is the normal procedure for the Institute to issue guidance notes for the profession which relate to issues where the actuary has a statutory role. Such guidance notes are issued after discussion of an exposure draft at a sessional meeting of the Institute and may then be regarded as binding on the profession. With the different background for general insurance, the attached notes could be regarded as an unofficial exposure draft for a form of advice different from the guidance notes appearing in the Institute's *Year Book*. It is suggested that the notes should be called "Notes on Recommended Practice"—presumably NORP 1, which would be submitted to Council for its blessing. The notes would then be on the record as a reference framework for actuarial reporting in general insurance.

6.4. This 'NORP 1' is in many ways a bland document with much sharper guidance needed on specific issues. If the insurance industry agrees on a SORP, the profession should then develop consequential NORPs for technical reserves. Regardless of whether or not an industry SORP emerges, a separate NORP detailing guidance on reporting on the financial strength should be developed. Indeed a case could be made for such a NORP to be turned into guidance notes.

APPENDIX A

NOTES ON RECOMMENDED PRACTICE FOR ACTUARIAL REPORTING IN GENERAL INSURANCE BUSINESS

1. INTRODUCTION

1.1. General insurance business in the U.K. is carried on under the terms of the Insurance Companies Act 1982. Actuaries have no statutory responsibility for general insurance under this Act. Nevertheless from time to time actuaries are called upon to report on the outstanding claim reserves, on all of the technical reserves or on the financial soundness or solvency of a general insurance business. These notes give some guidance to such actuaries.

1.2. In general insurance, unlike life assurance, there is not a long tradition of actuarial involvement in the U.K. In these circumstances it is especially important to give consideration to the nature of the brief given to the actuary. The report may have been commissioned from the actuary specifically in a professional capacity. For an actuary who is an employee of an insurer, there may be some difficulty in identifying the capacity in which he/she prepares the report. The report may be in a form not covered by the guidance notes and may not indicate that the writer is acting in an actuarial capacity. However it may be difficult to prevent the report's recipient from referring to it as an actuarial report. In these circumstances it would be advisable for the actuary to take these guidance notes into account. The final report should state:

- (a) who has commissioned the report;
- (b) where this is different from (a), the addressee of the report;
- (c) the terms of reference given;
- (d) the extent to which the report meets those terms of reference and any departure from or extension to those terms;
- (e) where appropriate, the date of the last similar report and any changes in the bases used;
- (f) where the actuary is acting in a professional capacity, the name of the actuary and that he/she is a Fellow of the Institute of Actuaries (or the professional actuarial body which is appropriate).

1.3. There may be circumstances in which a report has been commissioned where the actuary has a statutory responsibility. Typically these rare instances may relate to some overseas regulatory authorities requiring statements on U.K. branches or subsidiaries. The actuary should ensure that he/she is familiar with the legislation concerned and the report is in accordance with any local professional code of practice.

1.4. Examples of the varying briefs which could be received by actuaries are given below:

- (i) A report commissioned by the management of a company to recommend the level of outstanding claim reserves to be established in the insurer's accounts, both statutory and, if different, financial or fiscal. Such reports may give some discretion to management on the final choice of the reserving amount. The actuary may need to comment on the suitability or otherwise of the chosen reserves as a basis for making decisions on premium rating.
- (ii) A report commissioned by management/shareholders to 'audit' a reserve estimation and to establish its reasonableness. For the purpose of this independent check the actuary would need to have full access to the insurer's data and worksheets of the original computations.
- (iii) A report commissioned by an insurer to provide supporting evidence for outside bodies (e.g. tax authorities, potential purchasers, supervisors, etc.).
- (iv) A report relating to the totality of technical reserves rather than being limited to outstanding claims.
- (v) A report commissioned by supervisors, potential purchasers, reinsurers, investment analysis firms etc., without the knowledge or assistance of the insurer to provide a view on the strength of the reserves. Typically such a report would be based on published data.
- (vi) A report for supervisors on the financial strength of an insurer which will provide sufficient evidence for the supervisor to act (or provide comfort not to act).
- (vii) A report to company management or its shareholders on the capital considered necessary to establish the insurer as being financially sound.

1.5. The reports on technical reserves could cover:

- (i) for business accounted for on a one year basis:
 - outstanding claims (see section 3)
 - unexpired risks (see section 4)
 - technical reserves (which includes both outstanding claims and unexpired risks)
- (ii) for other business, combined reserves which may cover the outstanding liabilities (see section 5) in respect of closed and open years, separately or in aggregate.

2. GENERAL POINTS

2.1. There is no universally accepted terminology for general insurance and the actuary must ensure that the words used are clearly understood by the recipient of the report.

2.2. Where appropriate, recognition must be given to the guiding accounting principles and these must be clearly stated in the report.

2.3. Where the actuary is reporting on the solvency or financial strength/

soundness of an insurer, the word solvency should generally be used in its statutory sense, e.g. an insolvent company is one which has failed to satisfy minimum statutory requirements. Further clarification of the term may sometimes be necessary. The concept of financial strength/soundness covers not only the sufficiency of the excess of assets over liabilities necessary to ensure that claim payments are made as they fall due, but also the ability of the insurer to remain solvent in statutory terms as further business is written.

2.4. Following E.C. directives, actuaries may use the words provisions and reserves interchangeably. They must, however, be aware of the distinction under the Companies Acts.

2.5. Reports on reserves may be produced in terms of point estimates or ranges of acceptability. So far as is possible, reports should indicate the sensitivity of the estimates to variations from the stated assumptions.

2.6. The actuary should consider the relevance of cross-funding, i.e., whether a liability is sufficient in aggregate but one part is deficient. For example:

- (i) unexpired risks by outstanding claims or vice versa;
- (ii) combined reserves for one cohort year by another year or years;
- (iii) one class of business by another class of business.

Such cross-funding may be acceptable provided it is in accordance with the guiding accounting principles. Given the purpose of the report, and where appropriate, the actuary should indicate the degree to which cross-funding exists.

2.7. It would be essential for the actuary to comment on:

- (i) the accuracy of the data and, where appropriate, the steps taken to verify the accuracy of the data;
- (ii) the consideration given to the effect of changes in underwriting practices, claims handling, data processing, accounting procedures and known or potential changes in the legal and social environment.

2.8. Where a report covers the position net of reinsurance, the actuary should consider the nature and spread of the reinsurance arrangements and the advisability of setting up a bad debt reserve for non-paying reinsurers.

2.9. Where appropriate the actuary should report on the extent to which the expected basis used in establishing the estimates compares with the actual experience.

3. OUTSTANDING CLAIM RESERVES

3.1. These reserves should embrace:

- known (i.e. reported) outstanding claims
- claims incurred but not reported (IBNR)
- reopened claims
- future claims handling expenses.

3.2. The actuary should give due consideration to the categorization of the business into homogeneous groups. Any report should explicitly state the basis used for classifying claims and comment on the limitations imposed by lack of homogeneity.

3.3. The reserves may be established:

- separately for gross reserves and for reinsurance recoveries, or
- as net reserves.

Especially where the gross account is protected by excess of loss reinsurance the actuary may feel more confident about the net position than the gross. This confidence may be attached to the gross position provided that there is a caveat on the dependence on reinsurance.

3.4. The actuary must recognize in reporting on net reserves that the contract of reinsurance may contain a clause which permits part of the liability to be transferred to the reinsurer on terms which differ from the calculation principles (e.g. 90% of outstanding claims). The actuary should indicate the consistency between gross and net reserves.

3.5. The reported and IBNR reserves may be established:

- (a) On a case by case basis for the reported claims and (normally) a statistical estimate for IBNR. The case estimates would be the responsibility of a claims expert.
- (b) As (a), but with some of the estimates for reported claims being on a statistical basis, e.g. an adjusted average of previous settled amounts (less payments to date).
- (c) Either separately or jointly on a statistical basis. If a joint reserve for reported and IBNR claims is calculated, but it is necessary to show a separate reserve for IBNR, the latter would need to be calculated on a statistical basis and the reserve for reported claims would be obtained as a balancing item.

3.6. The re-opened claim reserve may be calculated as an explicit item. The actuary should consider whether the methods used to calculate the reported and IBNR claim reserves already contain an allowance for re-opened claims.

3.7. The reserve for future claims handling expenses should be consistent with the reporting objectives. For example for reporting on the business as a going concern, these reserves should cover only the variable and overhead costs of the claims department.

3.8. The results produced by statistical methods will be dependent on the methods and assumptions used. The actuary must state the sources of significant error in these assumptions and methods. Where appropriate the actuary should demonstrate the size and probability of the potential error. Even if this is not appropriate, the report should state whether the assumptions made are reasonable and in line with the current state of knowledge.

3.9. There are a number of methods available to the actuary for the statistical

estimation of claims. The choice depends on the class of business, data available and the judgement of the actuary. Particular points to consider are:

- (i) homogeneity or changing mix of data;
- (ii) effect of large claims including catastrophe claims from a single event;
- (iii) cyclical or temporary trends;
- (iv) handling and administration procedures etc.

3.10. In particular, thought should be given to the basis of projection and the effect of actual experience varying from that expected. For example, if the actual experience is worse than expected, the actuary must consider whether the method assumes that:

- (i) the future payments on the existing claims will be proportionately worse;
- (ii) the future payments on the existing claims are unaffected by the bad experience to date; or
- (iii) the future payments on the existing claims will be better than expected as the original estimate of total claims remains unchanged.

These reflect different underlying philosophies.

3.11. In arriving at the estimates of future payments on the existing claims, the actuary must consider the impact of future inflation and the escalation of claim costs. A 'full undiscounted claim reserve' must contain an allowance for future claim escalation at a rate considered appropriate for the claims in question. Where no explicit allowance is made for inflation, the actuary must be satisfied that the implicit allowance is sufficiently prudent and takes into account the nature and term of the assets.

3.12. There must be a statement of whether or not the reserves have been discounted, whether implicitly or explicitly and if explicitly, the rate of discount used.

3.13. Where an opinion is given on reserving levels the actuary should make clear that the opinion is in accordance with the guiding accounting principles. If the actuary is required to give an opinion on the sufficiency or adequacy of the reserves, recognition must be given to the concept of prudence. A reserve based on a 'best estimate' would, if this means a 50% chance of being deficient, be regarded as inadequate and a 'best estimate' is itself dependent on the method chosen.

3.14. Where separate gross and reinsurance recovery reserves are being calculated, the actuary should state whether similar principles are being used for both these reserves. If not, then there must be comment on the appropriateness of the different principles.

4. UNEXPIRED RISK RESERVES

4.1. These reserves should embrace:

- the unearned premium reserve (UPR)
- an additional amount for unexpired risks not covered by the UPR.

4.2. The UPR may be a reserve net of an allowance for deferred acquisition costs, or it may be gross with these deferred costs shown as an asset.

4.3. The calculation of unearned premiums should normally be a standard accounting calculation. The actuary should consider the appropriateness of the approximations made in these calculations, in particular those relating to:

- (i) the incidence of risk over the policy duration;
- (ii) the grouping of base dates, e.g. daily, monthly, quarterly or at mid-year;
- (iii) the treatment of non-annual premiums.
- (iv) the choice of base date, e.g. debit of premium, inception of policy.

Where a date of debit calculation is applicable, consideration should be given to the prudence of ignoring unbooked premiums and lapses and, where appropriate, to establish the appropriate estimates.

4.4. The amount of acquisition costs deferred will depend upon the philosophy underlying the accounting principles used including any statutory constraints. The actuary must identify these principles before commenting on the appropriateness of any quantification of the deferred amount.

4.5. The unexpired risk reserve may be considered to be the amount necessary to cover the future outgo arising on the exposure to risk still existing at the accounting date. This amount may be considered as the product of the unearned premium and an appropriate claim ratio. This claim ratio should allow for claims handling expenses. If the claim ratio is based on historic ratios, exceptional influences should be removed, suitable adjustment made for rate changes and the ratios projected forward. The projected ratio should then be adjusted to allow for known events between the accounting date and the computation date.

4.6. Where a measure of exposure such as vehicle years is available, the unexpired risk reserve may be calculated as the product of the outstanding exposure, projected claim frequency and projected average claim amount, including handling costs.

4.7. The additional amount for unexpired risks should be the excess, if any, of the unexpired risk reserve over the unearned premium reserve (net of deferred acquisition costs). This amount may be further reduced in accordance with the guiding accounting principles by anticipating future investment income (to the extent that it has not already been anticipated) in the outstanding claim and unearned premium reserves, again taking into account the nature and term of the assets.

5. COMBINED RESERVES

5.1. In view of the various types of funded accounting methods which exist, the actuary must ensure that he/she recognizes the accounting concept involved. In particular the actuary needs to consider:

- (i) the definition of the cohort and
- (ii) the duration at which a profit is first allowed to emerge, i.e. the point of first closure.

5.2. The calculation of the estimated outstanding amount at the point of closure would cover not only outstanding claims, which may or may not have been notified, but also handling expenses, premiums and commission. The actuary should consider whether each of these items requires a separate calculation or whether one aggregate figure will suffice. The terminology IBNR may be used but it should be recognized that it may be essentially different in character from that used in one year accounts.

5.3. The guidance given for reserves for outstanding claims and unexpired risks is equally applicable for combined reserves.

5.4. The basis for the calculation of open year funds is a cash accumulation amount augmented by the additional amount considered necessary to ensure the sufficiency of the reserves. The very nature of the funded business often means that information is not available on which a satisfactory estimate may be made. The actuary however can:

- (i) establish a model of an expected emergence of premiums, claims, commission and expenses in the open years;
- (ii) take adverse divergences from this model as the additional amount required to support the open year fund.

The model may be based on past experience and on views on current levels of profitability.

6. FINANCIAL STRENGTH AND SOUNDNESS

6.1. An actuary may be called on to report on the solvency of a company. Where this relates to a past accounting date, then the report would refer to an assessment of the technical reserves and a check on whether the shareholders' capital and reserves are sufficient to comply with the regulations in force.

6.2. Where the actuary is concerned in reporting on the continuing solvency of an insurer over a period, i.e. on the financial soundness of the insurer, due consideration must be given to:

- (i) expected profitability of new/renewed business;
- (ii) fluctuations of all types relating to claims experience;
- (iii) fluctuations in asset values; and
- (iv) suitability of the reinsurance arrangements;

in projecting the experience over the period to establish whether or not the shareholders' capital satisfies regulatory standards.

6.3. When asked to comment on the security offered by an insurer, an actuary must recognize that there may be aspects of a subjective nature which are not necessarily within his/her competence. Any report should identify wider issues considered. These may include:

- (i) departures from expected profit margins through bad management, etc.;
- (ii) security of reinsurance arrangements; and
- (iii) possibilities of fraud.

In addition, and within the competence of the actuary, is the possible discovery of deficiencies in the technical reserves. Any report by the actuary should recognize these issues and describe the vulnerability of the insurer to these risks. The report should consider ways of managing the risks involved. In particular the actuary may be willing to indicate the amount of shareholders' capital considered commensurate with acceptance of the risks. This advice may take into account the availability of fresh capital as required.

APPENDIX B

PAPERS ON THE SUBJECT OF GENERAL INSURANCE

Journal of the Institute of Actuaries

<i>Vol. Year</i>	<i>Authors</i>	<i>Title</i>
21 1879	Walford, C.	On the scientific application of data to the purpose of deducing rates of premium for fire insurance.
22 1880	Miller, T.	Fire insurance—a theory of statistics.
36 1902	Nicoll, J.	Compensation to workmen for accidents. Legislation in the U.K. and other countries in regard to accidents.
93 1967	Beard, R. E.	On the compilation of non-life insurance statistics.
97 1971	Johnson, P. D. & Hey, G. B.	Statistical studies in motor insurance.
98 1972	Eriksen, J. E. & Jones, E. J.	Note on determination of premium rates for motor vehicles (third party risks) insurance in New Zealand.
101 1974	Abbott, W. M., Clarke, T. G., Hey, G. B., Reynolds, D. I. W. & Treen, W. R.	Some thoughts on technical reserves and statutory reserves in general insurance.
105 1978	Reid, D. H.	Claims reserves in general insurance.
106 1979	Coe, L. D.	Tropical cyclones.
106 1979	Craighead, D. H.	Some aspects of the London reinsurance market in worldwide short-term business.
107 1980	Hey, G. B., Meins, P. G., Rowlandson, W. F. J., Sanders, D. E. A. & Wilkinson, R. C.	Compensation for personal injury.
107 1980	Balzer, L. A. & Benjamin, S.	Dynamic response of insurance systems with delayed profit/loss sharing feedback to isolated unpredicted claims.
108 1981	Abbott, W. M., Clarke, T. G. & Treen, W. R.	Some financial aspects of a general insurance company.
109 1982	Balzer, L. A. & Benjamin, S. (intro)	Control of insurance systems with delayed profit/loss sharing feedback and persisting unpredicted claims.
109 1982	Pollard, J. H.	Outstanding claims provisions: a distribution-free approach.
110 1983	De Jong, P. & Zehnwirth, B.	Claims reserving, state-space models and the Kalman filter.
110 1983	Taylor, G. C.	An invariance principle for the analysis of non-life insurance claims.
111 1984	Coutts, S. M.	Motor insurance rating: an actuarial approach.
111 1984	Taylor, G. C.	Solvency margin funding for general insurance companies.
111 1984	Daykin, C. D., Devitt, E. R., Khan, M. R. & McCaughan, J. P.	The solvency of general insurance companies.
113 1986	Benjamin, S. & Eagles, L. M.	Reserves in Lloyd's and the London Market.

Transactions of the Faculty of Actuaries

<i>Vol. Year</i>	<i>Authors</i>	<i>Title</i>
13 1931	Brown, H. W.	Employers' liability insurance.
32 1971	Plackett, R. L.	Risk theory.

Journal of the Institute of Actuaries Students' Society

<i>Vol.</i>	<i>Year</i>	<i>Authors</i>	<i>Title</i>
8	1948	Riebesell, P.	The mathematics of non-life insurance.
13	1956	Beard, R. E.	Some statistical aspects of non-life insurance.
15	1958	Beard, R. E.	3 R's of insurance—risk, retention and reinsurance.
17	1963	Beard, R. E.	Some statistical problems arising from the transaction of motor insurance business.
17	1963	Harding, V.	Non-life insurance and the statistician.
18	1968	Rowland, W. R.	The effect of the 1965 Finance Act on general insurance and ordinary life assurance business.
18	1968	Johnson, P. D.	Actuarial aspects of motor insurance.
18	1968	Scurfield, H. H.	Motor insurance statistics.
19	1971	Guaschi, F. E.	Non-proportional reinsurance.
19	1971	Shaw, G. J. M.	Credibility theory (expository article).
19	1971	Scurfield, H. H.	Practice of fire insurance (expository article).
19	1971	Grimes, T.	Claim frequency analysis in motor insurance.
20	1972	Stewart, C. M.	The verification of technical reserves in non-life insurance (expository article).
21	1975	Bennett, M. C.	Why N.C.D.?
21	1975	Johnson, P. D.	How insolvent are we?
22	1978	Bennett, M. C.	Models in motor insurance.
23	1979	Bennett, M. C. & Taylor, J. M.	Motor outstanding claims.
24	1980	Lockett, J. E.	Catastrophes and catastrophe insurance.
25	1982	Lyons, G. E.	Aviation Insurance (synopsis).
26	1983	Craighead, D. H.	Analysis of a London market reinsurance office's accounts.
27	1984	Coutts, S. M.	Claim frequency analysis in motor insurance.
28	1985	Lyons, G. E.	Outstanding claims reserves (synopsis).
29	1985	Taylor, J. M.	Extended warranty insurance.
29	1985	Smith, P. D.	Non-life insurance—practice not theory.

Occasional Actuarial Research Discussion Papers

<i>No.</i>	<i>Year</i>	<i>Author</i>	<i>Title</i>
2	1975	Taylor, G. C.	Separation of inflation and other effects from the distribution of non-life insurance claim delays.
3	1975	Taylor, G. C.	Survey of principal results from the theory of risk.
4	1976	Bennett, M. C.	NCD systems in motor insurance.
6	1976	Puzey, A. S.	Distributions fitted to non-life claim events and amounts.
7	1976	Sachdeva, B. S.	Description of non-life market.
9	1976	Taylor, G. C.	A review of credibility theory.
10	1976	Rowland, W. R.	Non-life accounting.
11	1976	Gillespie, R. G.	Risk theory.
12	1976	Giddings, J. M.	National and industry non-life investigations.
13	1976	Abbott, W. M. & Booth, G.	Solvency.
14	1976	Laing, R. H.	Catastrophe.
15	1976	Brown, A. S.	Taxation of non-life insurance.
16	1976	Tattersall, O. J.	Expenses in general insurance.
19	1976	Craighead, D. H.	The Lloyd's system.
20	1976	Bennett, M. C.	Models in motor insurance.

International Congress of Actuaries

Papers presented by British Actuaries

<i>No.</i>	<i>Year</i>	<i>Author</i>	<i>Title</i>
ICA 1	1895		No relevant papers submitted.
ICA 2	1898	Brown, S. S.	Compensation for accidents to workmen in the United Kingdom.
ICA 3	1900		No relevant papers submitted.
ICA 4	1903	Strong, W. R.	The growth of accident and employers' liability insurance in Great Britain.
ICA 5-14	1906-14		No relevant papers submitted.
ICA 15	1957	Beard, R. E.	Analytical expressions of the risks involved in general insurance.
ICA 16-17	1960-64		No relevant papers submitted.
ICA 18	1968	Beard, R. E.	Some observations on NCB schemes in motor insurance.
		Eagles, L. M.	The actuarial assessment of a newly established motor insurance business.
		Harding, V.	The calculation of premiums for excess of loss reinsurances of motor business.
ICA 19	1972	Johnson, P. D. & Hey, G. B.	Fluctuations and secular changes in claim costs.
ICA 20	1976	Plymen, J.	Profitability and reserve strength of non-life insurers.
		Ramachandran, G.	Extreme value theory and fire insurance.
		Rushton, I. L.	Some uses of models in general insurance management.
ICA 21	1980	Rushton, I. L.	A general insurance forecasting model.
			An application of model office techniques to the solvency question.
		Baxter, L. A., Coutts, S. M.	Applications of linear models in motor insurance.
		& Ross, G. A. F.	
		Clarke, H. E. &	Mathematical density functions applied to a liability insurance portfolio.
		Eagles, L. M.	
		Reid, D. H.	Reserves for outstanding claims in non-life insurance.
		Benjamin, S.	Solvency and profitability in insurance.
ICA 22	1984	Abbott, W. M.	Discrimination in private car insurance in the U.K.
		Coutts, S. M., Devitt,	A probabilistic approach to assessing the financial strength of a general insurance company.
		E. R. F. & Ross, G. A. F.	
		Daykin, C.	The development of concepts of adequacy and solvency in non-life insurance in the E.E.C.
		Pountain, C. &	Claims reserve adequacy as a factor in investment assessment.
		Rice, P.	
		Reid, D. H.	Solvency: the expression of the relationship between capital and insurance markets?
		Ryan, J. P.	Application of simulation techniques to solvency testing for a non-life office.
		Treen, W. R. &	The effects of financial factors on general business solvency.
		Thomson, A. K.	

ASTIN Bulletin

<i>Vol.</i>	<i>Year</i>	<i>Authors</i>	<i>Title</i>
1	1958-61	None	
2	1962-63	Munden, J. M.	Some analyses of car insurance claim rates.
3	1964-65	Beard, R. E.	Some notes on the statistical theory of extreme values.
4	1966-67	None	
5	1968-71	Beard, R. E.	Technical reserves in non-life insurance with particular reference to motor insurance.
6	1971-72	Stewart, C. M. Beard, R. E.	The assessment of solvency. On the calculation of the ruin probability for a finite time period.
		Johnson, P. D. & Hey, G. B.	Statistical review of a motor insurance portfolio.
7	1973-74	Ramachandran, G.	Extreme value theory and large fire losses.
8	1975	Beard, R. E.	Ruin probability during a finite time interval.
		Clarke, T. G. & Harland, N.	A practical statistical method of estimating claims liability and claims cash flow.
		Reid, D. H.	Representations of claims arising from a risk portfolio.
9	1976-77	Johnson, P. D.	How insolvent are we?
10	1978-79	None.	
11	1980	Waters, H. R.	Premium rates under inflationary conditions.
		Adreadakis, M. & Waters, H. R.	The effect of reinsurance on the degree of risk associated with an insurers portfolio.
12	1981	None.	
13	1982	None.	
14	1984	None.	

Papers submitted to ASTIN but not published in the bulletin.

<i>Year</i>	<i>Authors</i>	<i>Title</i>
1981	Abbott, W. M.	Some notes on various aspects of profit analysis.
	Rowland, W. R.	Two practical examples of a total information system.
	Ramachandran, G.	Extreme order theory and third party motor insurance.
	Coutts, S. M. & Devitt, E. R.	Introducing probability statements to the revenue account: confidence limits for outstanding claims.
1982	Dickson, D. C. M. & Gray, J. R.	Approximations to ruin probability in the presence of an upper absorbing barrier.
1983	Coutts, S. M.	Motor premium rating.
1985	Bennett, M. C.	Household insurance statistics by geographical area.
	Daykin, C. D. & Bernstein, G. D.	A simulation model to examine questions of solvency in the light of asset and run-off risks.

Papers published in the proceedings of the 4 countries ASTIN symposium

<i>Year</i>	<i>Authors</i>	<i>Title</i>
1984	Masters, G. A.	Rate making.
	Bennett, M. C. & Johnson, P. D.	The treatment of large claims when deciding on a premium structure and on the relationships between the premiums for different groups.

ABSTRACT OF THE DISCUSSION

Mr P. D. Smith (opening the discussion): Tonight's paper is timely. It is a truism that non-life business is more complex than life business; but far less attention has been paid to the professionalism required of a non-life actuary than to that of his life or pensions colleague. The increasing use of non-life actuaries, some relatively junior, has increased the danger of an internal report being quoted, possibly out of context, prefaced by: "Our actuary had advised that . . .". Employed actuaries may not have a statutory rôle, but they do have a great professional responsibility; the paper shows the complex nature of that responsibility.

Probably the most difficult problem for a non-life actuary is the extent to which he needs to rely on the advice of others.

Section 4.4 says: "The actuarial opinion would depend on a proper blending on numerical and statistical methods with the opinion of claim specialists, underwriters and administrators". It is very important that any actuarial report should show clearly the extent of this other input. If, for instance, an underwriter had identified a significant change in his book and given a quantitative estimate of its effect, an actuary could quote this estimate and state that it appears to him to be reasonable in the light of other available information. Probably more usual is the situation where an underwriter has identified the change but is either unwilling or unable to quantify its effect. Indeed, he may even say that quantification is impossible. In this case an actuary's report should state that the quantification is his alone, but that he has shown the result to the underwriter who has not rejected it as impossible. The problems are all far worse for an actuary involved in reinsurance where there is a very long information chain; an underwriter's quantitative estimate may be based on pious hope by somebody further down the chain. I have laboured this point somewhat, but it strikes at the heart of so many of the considerations listed in the paper.

I have a number of specific points. In §3.1 of Appendix A, I would often split the two items, reported claims and IBNR, into three items: the current outstandings on reported claims, the future development of those claims, and the true IBNR. This introduces a fourth reserving method in §3.5: true IBNR together with case estimates for reported claims, plus a statistically derived percentage of claim development. For some business this percentage may well be negative (often substantially) representing run off surplus. This may be deemed to transgress certain accounting principles in that most statistical reserving methods in use at the moment implicitly take credit for such surpluses.

Section 3.8 of Appendix A says that when a statistical method is used the actuary should state his assumptions, and where appropriate, the size and probability of potential error. The author points out that this quantification will not always be possible, in which case the actuary should state that the assumptions are reasonable and in line with the current state of knowledge. For some areas, for instance, industrial disease or pollution IBNR, this point is absolutely crucial. A report should state that the statistics from the past may be almost useless and the assessment is little more than a 'what if' calculation. In particular, it may be necessary to state absolutely explicitly that the potential error might well be exceedingly large compared with the reserve.

Mr C. D. Daykin: The profession needs to give careful thought to its rôle in general insurance and the way in which that rôle is going to develop in the future. For that reason alone, it is important that we should be discussing this paper tonight.

The profession has gradually come of age in its involvement in general insurance and seems to be increasingly involved across a broad spectrum of activities. One of the most significant developments which is alluded to in the paper is the increasing use of actuaries by London Market companies, Lloyd's syndicates and reinsurers. This has given us grounds for believing that there are many in the general insurance world who see the benefit of having actuarial advice and are increasingly seeking it. Unfortunately, however, the rôle of the actuary has perhaps not expanded as much as might have been hoped for in the composites, where actuarial involvement first began.

The first paragraph of the NORP seems to lay great stress on the rôle of actuaries in advising on technical reserves and on solvency. While that may be reasonable for a first NORP, it does seem to me

that one of the increasing areas of involvement—and a very important area—is in rate making. There is also the development of reinsurance programmes and looking at reinsurance security. If we are going to have a note on recommended practice, then we need to cover these areas as well.

Section 3.11 of the NORP talks about taking into account the nature and term of the assets when determining the implicit allowance for inflation. That seemed slightly misplaced as it suggests that those factors should only be taken into account in cases where allowance is not made explicitly for inflation. I would have hoped that we could move towards an actuarial statement that the nature and term of the assets is important whenever one is considering the reserves, and particularly perhaps whenever one is considering the possibility of discounting. Possibly the phrase ought to go in § 3.12 rather than § 3.11.

Section 3.13 of the draft refers to the question of a 'best estimate' reserve, being one with a 50% chance of being deficient, as inadequate. While I have every sympathy with that view, I am not sure that it is one which is necessarily taken by those who are drawing up the accounting guidelines. Clearly, the important point is the reference framework, as the author notes in the paper. That will be so also in relation to § 4.2 which refers to the question of the unearned premium reserve and deferred acquisition costs. Here again, the relationship must be one which depends on the reference framework, and if an accounting standard were to lay down guidelines in that area, our NORP would presumably refer to that.

In § 4.5, on the unexpired risk reserve, the statement is made that this can be regarded as the product of the unearned premium and an appropriate claim ratio. This seems to me to beg one or two questions, particularly that of the reference framework for the unearned premium reserve. Surely, it is better to start from the point of view that the unexpired risk reserve is a full assessment of the unexpired risk, including an allowance for the possibility of an adverse claim ratio; it should also allow for incidence of risk, and so on. The unearned premium reserve may well be on an accounting basis, and that would then give rise to an additional amount for unexpired risks which would be the balance.

I am not sure that it is necessarily helpful to talk about solvency only in the sense of meeting supervisor's requirements as the author does in § 2.3 of Appendix A. The word solvency also needs to be used in a Companies Act sense: that the assets exceed the liabilities. I would prefer to be rather more precise. If a sufficient solvency margin has been maintained to satisfy the supervisors, the company can be said to have "met the statutory solvency requirements". To throw another pebble into the pool: true solvency may be something different again. What matters in the last analysis is whether the assets will be sufficient to meet the liabilities as they emerge. This might be judged on a simple run-off basis with no future business, or it might allow for the continuation of business for a year or two.

In principle what is needed is a comparison of the proceeds from the assets and any future premiums with the claims and expenses outgo. Because of the uncertainties involved, a statement of this nature might have to be in terms of probabilities. But it is in this area that the actuary advising on the financial strength of the company can bring his professional expertise to bear. He might look at the company in terms of some sort of stochastic model, and might then come up with the statement that on certain assumptions, and in the light of his investigations, he considers that the assets are adequate to meet the liabilities with a certain probability. He may make that statement conditional upon certain conditions being fulfilled for example in relation to the investment strategy being pursued or the type of new business to be written in coming years.

This brings us back to the question of the reference framework. Section 4.7 of the paper refers to a working party paper presented to the Institute in 1984 (*J.I.A.* 111, 279) and refers briefly to the suggestion in that paper that the provision for outstanding claims should contain a prudent margin. That paper started from the reference framework we have at the moment for reporting to the supervisory authorities, and argued that for it to make sense with the sort of solvency margins which exist, and with the way in which the supervisors perform their function, technical reserves need to be established for supervision purposes with prudent margins. One could go on from there to discuss what the solvency margin ought to be, as opposed to what it actually is in the E.E.C directive, and that was the programme of work which the solvency working party set itself. It was also argued that thought should be given to the question of the nature and terms of the assets and that that should give

rise to an appropriate technical reserve. Further work, however, has driven us to concentrate on a different reference framework: advising on the financial strength of the company. This seems to us to lead more towards consideration of the true solvency position and is one which we consider would be more helpful in supplementing a simple formula-based statutory requirement. For this purpose, the reference framework for the technical reserves is not particularly important, although one could envisage perhaps a framework based on an accounting statement of recommended practice complemented by actuarial guidance notes for the technical reserves. On top of this there would be a small statutory minimum solvency requirement. That would be enough to meet the requirements for a company doing an ordinary range of business with fairly safe assets and no particular problems. The true solvency position of the company would still in our view need to be assessed by somebody with more expertise and understanding about the nature of the company's business. This would need to be an actuary or somebody with similar qualifications in relation to analysing uncertainty. Their rôle would be to look at the total financial position of the company, the nature and spread of the assets, the type of business on the books, the reinsurance recoveries, and so on, to take into account variability and uncertainty. The actuary would report to management and also to the supervisory authority, as does the appointed actuary of a life company.

The drawing up of a detailed note on recommended practice in this area is something which the solvency working party ought to take on board. Perhaps when we have completed our work on the simulation modelling we will turn our attention to what a note on recommended practice might say and put forward something for the Institute's consideration.

Mr D. H. Craighead: I am a little puzzled as to why in the case of the five different frames of reference listed in § 5.3 the author feels that actuaries could only take professional responsibilities for the last two. Is it that he feels that the profession is not yet sufficiently equipped to take responsibility for the other three, or is it that those three do not lend themselves to a professional approach? I feel strongly that I must disagree in either case.

In the sphere of funded business considerable amplification would be required in the suggested NORP, as set out in Appendix A, before it could be accepted for use by the profession. Funded business, by which I mean Lloyd's and the London Market, is of such a specialist nature and differs so extensively from the general insurance business of the primary carriers that the directives required for an actuarial approach must make allowance for this both in emphasis and in specific aspects. I hardly feel that I could adequately set out such requirements at short notice; indeed the task would better be performed by the London Market Actuaries Group. However, I suggest the following directives additional to those already set out by the author. These points relate more specifically to reserving; other aspects would apply in the case of such matters as rating. Some of them sound a warning note which differs in type from the sort of approach used by the author in Appendix A, but I feel that there are very real reasons why they are required in this case.

- (1) The market varies so much in its nature, in the way business is written, in the protective reinsurances placed, and in the administrative systems used, that it is essential that the actuary should obtain a clear view of the methods in use, and the reasons for their use, by the client concerned.

- (2) Clarity of view must extend to the background of the insurance business and to general market trends. In particular long-tail business presents many unique problems which must be understood—at least in outline.

- (3) Regard must be had to the many changes in the nature of the account from one year to the next; in particular to possible changes in the delay factors involved.

- (4) It is frequently necessary to be satisfied as far as possible as to the accuracy of the statistics on which predictions are being made, and of how those statistics have been assembled, particularly as to the rates of conversion used between different currencies.

- (5) Some insurances, particularly those of contractors' all-risks policies, can prove to be of several years' duration and it is necessary to ascertain how they have been handled in the statistical reports.

- (6) The protective reinsurances written are almost always different in nature and impact from

the incoming business. Hence in arriving at an IBNR reserve it is necessary to consider separately projections of gross figures, reinsurances and net figures, bearing in mind that future reinsurance recoveries may differ as to the impact on future claims still to be advised from what has happened in the past, due to limitations of excess points or reinstatements.

(7) If there is any suspicion that ultimate loss ratios for business written in the open years will exceed 100%, then losses on premiums anticipated but not yet advised must be taken into account.

(8) If discounting is to be allowed, then regard must be had to the high degree of variability found in claims settlement rates, and the extent to which those rates can change over short periods of time. It becomes all the more essential to allow for full claims escalation due not only to ordinary inflation but also to the impact of legal decisions and social attitudes. The rate of claims inflation can be several times that of such bench marks as the retail price index.

(9) While cross-funding between different classes and types of business is normal, the extent to which this occurs should be made clear in the report for purposes of assistance and future underwriting.

(10) Attention should always be drawn to the possibility of claims arising in old years of account from causes entirely unforeseen, as happened in the case of asbestosis.

May I say in passing that the concept of unearned premium reserves, and even unexpired risk reserves, is inappropriate to funded business and should not be used.

While we must necessarily be constrained by statutory requirements and accounting standards in respect of minimum standard of reserving, I should judge it a failure on our part if we feel that a true and fair view of the accounts prevents us from stiffening the reserves wherever possible. It is for the purpose of preserving additional strength that implicit reserves generally are accepted in insurance and do not have to be made public. The reinsurance market is both highly cyclical and subject to entirely unexpected losses from occurrences in the past. It is essential that strong reserves be built up over the period of the account, where that is possible. The current attitude of the Inland Revenue is a difficulty in this regard although I have always found them understanding of genuine problems. The Institute could serve a useful purpose by initiating discussions with the Inland Revenue to arrive at a reasonable basis of procedure in the future. In saying this, I am well aware that it is a matter for companies, but I feel that in addition there is a professional viewpoint and it is for actuaries as a profession to be involved in discussions of this nature.

Mr F. E. Guaschi: The paper sets out a statement of recommended practice—not recommended theory: the practice of actuaries working in general insurance, not of those outside making recommendations. What makes a general insurance actuary different, from say a life actuary, is that a life actuary has been brought up to believe that he is the person who calculates the reserves, and very rarely does he discuss the matter with anyone else in the company. He might have to discuss it with an auditor, or maybe the Inland Revenue or the Department of Trade. In general insurance it is different. We are very late into the field, as I have said here on many occasions. I have found during the period that I have been working in general insurance that you can only understand the real problems if you discuss methods of reserving with underwriters and technical claims managers who may not understand the theory, but who do understand the sort of things that Mr Craighead was talking about: the catastrophes and the sudden events. That cannot be emphasized too strongly.

Most of the practices of life insurance can be carried straight into general insurance. For example, we are all used on the life side to thinking about a continuous valuation process. That is very important in general insurance; in fact more important than it is in life insurance. In some companies, for example, one has to do a valuation every quarter rather than once a year, or every five years. This idea of a continuous process turns out to be a very important one because although other professions are skilled in taking what I call 'snap shots' at the year end, we are the 'ciné men'—we understand how things move.

Actuaries are used to the idea that a valuation is not merely concerned with the liabilities; no valuation is complete without an assessment of either premium rates or the contribution rates. In general insurance we are used to looking at retentions, claims fluctuations, solvency levels, premium growth, actual to expected, analysis of surplus, and discounting—all things that you are used to on

the life side. So it is no good just thinking about a general insurance valuation as some kind of trick whereby one looks at a triangle of run-off and then gets an answer. That is only the beginning of the story. We as actuaries have to think of all these other things as well. In case anyone imagines that this is unimportant: I was examining a valuation the other day where the business for the latest year looked to me as though it was written on inadequate rates, and yet any standard valuation basis would make it look as though the company was all right. However we are not in the business of just saying: is it all right now? We are in a continuing business.

I like to think of the Institute as a focal point for the continuous study of these things. We are a learned profession as well as being practical people; over many years we have undertaken much research. We may not be numerically large, but I think we have the right kind of expertise. The Institute must encourage new entrants to the profession to become involved on the general insurance side, not just by taking the relevant examinations but by working in a general insurance company. I know from my previous employment how important it is to recruit young people and to have them working in the profession and in general insurance from the start. It was no good, as I found many times, having life actuaries now and again giving advice to the general insurance people. They just do not listen.

I have spent the best years of my life in general insurance—about twenty years now. I believe that we are best qualified to keep the study of this subject going. Having been over to the other side of the Atlantic and seen how the Casualty Actuarial Society has helped in the development of general insurance reserving, and in advising the supervisory authorities there, I am sure of this.

Dr D. H. Reid: I should like to start by picking up the points made in § 4 which concern the rôle of the actuary in general insurance. It is quite clear to me that this area represents a natural development of the actuary's activities in long-term business. I start from that premise. One means by which this might be achieved is that upon which the paper dwells at some length: the area of the formal reporting of general insurance. I should like to draw attention to another area in general insurance in which the actuary, with his background and abilities, would seem to me very well suited to participate: operational planning and management of a general insurance operation.

There are currently unresolved questions in these areas to which the profession might be expected to make a significant contribution. The sort of problems which arise are as follows. In general business there are at least four generically different types of premium setting problems. There are those where a substantial element of cross-classification by rating factors and other factors is present; for example, in private car insurance, household comprehensive insurance, and more generally, personal lines insurance. Secondly, there are premium setting problems relating to 'burning cost' or 'experience rating' contexts, where we think in terms of rating a whole portfolio of business; for example, motor fleet, or employers' liability insurance. Thirdly, there are those where the rating is carried out essentially on a collective basis, market-wide: for instance industrial fire insurance. Fourthly there are those which we have just heard about from Mr Craighead; those of the London Market where rating may be on the basis of minimal formal information and depends substantially upon the existence of risk sharing arrangements.

In looking at the setting of premiums, claims experience would form a very important element. This throws into sharp relief the need for reserving methods which are consistent with the requirements of each of these areas. For instance, under the second example we would need to be able to model claims at the level of individual risk, which in this case would be the fleet or employers' liability experience of a particular company. Claims reserving in these contexts would perhaps not require the levels of safety which were mentioned earlier, and which are needed for reserving in support of solvency type valuations. The whole area of claims reserving is in my opinion wide open for investigation. In the literature, this tends to have been looked at from the point of view of reporting an insurance operation. But it seems to me that there is at least as great a need for a study of questions in relation to the operational side of the business.

In setting premiums, regard must be had to the market-place. It is often suggested that this is an area where 'commercial judgement' must be applied, and the actuarial approach may not have a specific rôle to play. I would strongly dispute this: it is my belief that in most instances in general insurance the problem can be broken down into its elements just as it can for any other selling

operation, and considerable development of conceptual pictures of the market-place is possible. Of course, one of the effects of such a development is to sharpen up questions to which previously only very broad answers were required: for example, thinking of personal lines business, if for a given complex of rating factors it is possible to forecast both the claims experience and the net growth of a portfolio for a particular level of premium in a certain market context, how should strategic planning objectives be developed from this level of detail? In other words, a move from the macro- to the micro-planning of an operation is required, and in my opinion the general background of the actuary—perhaps given suitable experience and certain additions to his training—is at least as close to what is needed as that of any other profession.

In my opinion these areas and many others represent those where the profession should be involved putting to test its numerate, probabilistic and inventive abilities. In the course of such activity, a wide variety of models appropriate to the differing situations encountered would be generated which would serve as the foundations for the construction of relevant reporting bases. Without such involvement in general business—similar to that which after all underpins the success of the profession in long-term business—the profession will remain on the side-lines of general insurance, tossed between the currents of whatever 'principles' may be adduced by other professions, or by statutory requirements, and of whatever understanding may be gleaned second-hand from statistical material produced to specifications designed by others with an understanding of the business inferior to that which in my opinion the actuarial profession should aspire.

Mr D. I. W. Reynolds: It seems to me that the paper approaches the subject of development of the actuarial profession in general insurance narrowly and in some ways from the wrong angle. That reflects what I perceive as being the profession's approach over the last decade or so. Section 1.2 refers to the aims of the profession—the aims that it should have in general insurance—and in §4.1 the author asks: what changes in the current environment should we be seeking? One area where we should be seeking a change in the environment is within this hall and within our own approach. I believe that we should be concentrating more on the problems of the industry, for the companies themselves, for investors and for the supervisors. It is only if, as a profession, we can provide solutions to the problems the industry perceive that they will turn to us. My impression to date is that we have been defining problems and looking to apply our skills to them rather than looking to solve widely perceived problems.

The industry is aware of the potential difficulties in claims assessment; but these are not perceived as its principal problems—maybe because of actuarial advice already given. It may be helpful to spell out what I consider to be some of the areas where the general insurance industry does consider that it has problems, and where our attention may need to be directed. The list is not exhaustive; it would not necessarily obtain general agreement, but is my personal view.

I start with liability business. How is it possible to write liability business with very long tail claims settlement and the unpredictable response of the courts and legislatures? There is more to this than looking at the problems of setting reserves; it may be right but unhelpful to report how difficult it is to set claims provisions in these circumstances. As actuaries I believe that we have something positive to say about the interaction of cost to the community of its approach to liability, equity between the various parties and the rôle of insurance. A second problem is the capital needs of the industry. If these are too high, it reduces the return that investors can have and may restrict availability of support. Within a conventional actuarial framework I would want adequate coherent reserves taking into account the matching between assets and liabilities. This is definitely not an accepted accounting framework in general insurance; I do not believe there is one. Our author is making it up; the concept he is using does not exist in accounting terms. Once you introduce the sophisticated concept of actuarial matching you are implying that there is no such thing as the value of liabilities or the value of the assets separately. A valuation is an expression of the inter-relationship between the assets and the liabilities.

Example two. In NORP §2.6, the author mentions cross-funding. Within an actuarial framework you consider cross-funding from the point of view of a standard of adequacy and whether the insured has an option to withdraw and hence to withdraw his contribution to your profit. However, if you are in an accounting framework, then aiming at a expected value leads to a full cross-funding. Once you

move from that position you are really talking about an ill-defined margin which will be added; there is, as far as I am aware, no guiding accounting principle. Example three: the same problem arises if there are contracts with a share of profit or loss. It seems reasonable to provide for the return of profit to the insured, say on group or fleet business, but can you credit yourself with the return from losses? My recommendation in both these examples has been to credit yourself with half of the expected return from losses because it seems prudent, and because you can demonstrate that it releases surplus in a more sensible pattern under changing circumstances. But I am afraid I had to invent my own principle.

Example four: should reserves in the London Market be related to premiums received to date or to estimated ultimate premiums? I am always amused to see an actuary exposed to this subject for the first time. He cannot understand that it could ever be an open question. However, on a flat-earth it is a real puzzle. As a fifth example: consider the subject of catastrophe reserves. Within an actuarial framework you need fully adequate, in the technical sense, catastrophe reserves as soon as you accept a premium for the risk. Within an accounting framework, you would need an expected value and, I suggest, any acceptable margin for prudence would in practice bring you nowhere near an actuarial standard of adequacy. What is the guiding accounting principle—other than a dog-fight with the taxman? What should be the reserve to close an open year at Lloyd's? Actuarially, the amount paid by the accepting syndicate should be a purchase price based on return on capital. What are the accounting principles to apply?

Over a long period of time accounting principles seem to have nothing to say in the field of general insurance on certain aspects of data. It is a common actuarial experience to find that almost no attention has been paid to collecting data for the purpose of analysis. Reinsurance outwards arrangements have been acceptable over a long period on what can only be described as 'works of art'. Clearly there has been no understanding of any need to model them. In parts of the business, such as credit insurance, the accounting system is such that off-movements are not recorded against the original cohort, so it is not possible to tell whether the business has made a profit.

The author has started to lay the groundwork for actuarial reporting. He admits that there are difficulties but his main recommendation is that the actuary should check the accounting framework within which he is working. Every one of these examples has arisen in practice. I have had to consider the accounting framework within which I have been working, and I have found it wanting to such an extent that I have needed to do what I felt was best under the circumstances, and, of course, to explain it to the client. In many cases the client took no notice. He did not have to, even when he seemed to understand that the accounting procedures would never allow him to know whether he was making profit or not. An important part of the author's message is that we should continue the traditional actuarial principle of explaining in any report the basis on which we have arrived at our figures. Actuaries are used to doing that, even in public documents, but you will not find any firm of accountants doing so. We have a paradox: the author's excellent paper itself, in a very important respect, is not within an accounting framework.

Mr E. A. Johnston: On thinking of the enormous field which non-life insurance presents, I have a feeling that history is repeating itself. After the war there were thought to be great opportunities for actuaries in the statistical field. Advanced statistics was added to our syllabus; papers were written and discussed on the subject. Those opportunities materialized, but not for actuaries; for example, a number of the pioneers in Government statistics were actuaries, but their successors were not.

If you look at it from the employer's point of view, there are plenty of people with a good knowledge of statistics via university degrees; practical know-how can be acquired on the job. The absence of an intensive actuarial training means that there is time for other forms of training and experience (in that respect an actuarial training can be limiting). Above all, the good supply of people entirely adequate to the job means that only normal salary scales have to be offered—quite different from experience in the actuarial field. That latter point is particularly apposite now as anyone who has tried to recruit an actuary with experience in general insurance is only too well aware.

I mention this 'water under the bridge' because of the similarities with the non-life field now. The pioneers there are actuaries, and very well they are doing. But I suggest that we should take a look at the requirements of non-life work as seen by the employers. Mr Gauschi suggested that it would be

better for young people to go straight onto the non-life side and train there. That makes sense to me. But we must ask: do the employers of those people who intend to use them permanently on their general business really need them to have an intensive training in life assurance, pensions and institutional investment? This spread makes qualification a formidable hurdle. The early parts of the syllabus have to be sufficient to support that spread which thus tends to build up those early parts as well as the later ones. How about other forms of training and experience of value to the potential manager? Will there really be time for those as well as all the examinations in life assurance etc? Above all there is the question of the salary requirements, and even perhaps the availability of trainee actuaries in the numbers needed.

In everything that has been said about the developing rôle of actuaries in non-life insurance I have not heard one word about the developing rôle of anybody else. A suggestion, which I believe sooner or later we will have to look at, is to carry the Kennedy reforms farther. They were, I am sure, a step in the right direction, but we should consider setting up a qualification specific to non-life insurance which would have parity of esteem with the Fellowship as it stood before non-life was introduced, or as the Faculty Fellowship stands now. This would not be a cut in standards; it would enable us to maintain better standards in each field. It might appear to split the profession into two, but if actuaries do go into non-life insurance in a big way, we are going to have a different profession from the one we have now, and we shall have the same problems of holding that profession together.

Mr J. P. Ryan: I strongly agree with the author's desire for a NORP. My views on this have changed recently: we are coming across sufficiently large problems in the general insurance field that it is becoming necessary to have something to refer to. It is extremely important that this should provide the practising actuary in general insurance with sufficient scope to carry out his task in an imaginative way in an area where there is considerable uncertainty, and where considerable flexibility is required. Against that, I think that the actual NORP would be strengthened if some form of list of recommended methods is made—not that these should be mandatory—to provide a guideline whereby the actuary can say: I did not use that method because I did not think it appropriate. This is particularly important if the other method produces a lower number. It should be quite clear that the actuary has a professional obligation to override them if appropriate but such that he can say to another actuary, a competing company, an accounting firm or an underwriter: this is what my guideline says, this is the method which is appropriate in my judgement in this case; do you have any grounds for not accepting it? I think that is a strong point. I have changed my mind on that in recent years simply because I have come across a number of cases where I would have benefited from that sort of background. But I do emphasize that it should be sufficiently flexible because no single method is going to be appropriate in all cases.

The author could have made the case for saying that we need actuarial certification of reserves somewhat stronger than he did. In the London Market or the reinsurance field it is totally impossible for the DTI, or indeed any outsider, to monitor the solvency of a reinsurance company even when it is writing relatively short-tail business. This has been proved in a few noteworthy cases of late. The present reporting system is wholly inadequate. In my view, the only way round it is some form of certification; at the moment the auditors' certificate is the only independent one. In §4.4 the author makes the point that actuaries have got a strong, but not unique, case. The points that Mr Johnston made could mean that we have a strong and a unique case because then we would have the only syllabus that leads to the qualifications necessary to provide that sort of certificate. This is more on the lines that the Casualty Actuarial Society have gone along in the United States of America. I welcome the remarks made by Mr Johnston, and I agree that the present revisions of the syllabus provide an excellent opportunity for change. I do not think that it is essential that everybody preparing these certificates should have passed these examinations. But if they are in our syllabus we can say we have professional standards in this area and we can hold up professional judgements against any individual who goes against that practice without good reason.

In the list of reports in Appendix A, an important one that was excluded was that where actuaries were required to give an independent assessment of the adequacy of the reserves. The author refers to an audit of reserves. I think that this is likely to become increasingly common especially in the long-tail lines where there is a large amount of independent judgement and where there can be merits in

having a second opinion. This needs to be included in some of the aspects of NORP. In particular, one would not need access to the individual work sheets in this case—indeed, it might be important that you do not, to be totally independent, although that issue should be made clear in any report. It could also deal with the issues of cross-funding, where the report might also be used for management information. Earlier speakers have said that actuaries should move into the rating area, with which I would agree, but I would also point out that adequate or accurate claims reserves are an important corollary in the setting of premium rates. I would take issue with the remarks in § 3.13 of Appendix A where the author says that a best estimate that provides a 50% chance of the reserve being wrong is inadequate. The explicit solvency margin needs to be taken into account in considering any reserving issue. It is particularly important—as people are using these reports for rating purposes as well as for the usual balance sheet—that claims reserves are calculated as accurately as possible without implicit margins.

Any report should make clear where the actuary has relied on other sources of information, and in particular where he has used information from underwriters or from claims adjusters; whether the case reserves has been set adequately, and whether they have been set consistently. The report should also make clear the degree of confidence that the actuary has in his results, and should also deal with bad debt reserves. This can be a very tricky area, particularly in current market conditions. Indeed, a consultant could be in an embarrassing situation where he may have some inside information which he would not be in a position to use. But to state exactly how bad debt reserves have been treated, even if only to say that they have not been included in the report, is essential.

Professor S. Benjamin: If your concept of the world is a flat-earth then it is difficult to aim a missile correctly because one implication is that you have no Newtonian theory of gravity. The author recommends that we should bear in mind the framework of the guiding accounting principles within which we are working. I agree, but I would like to explore some of the practical professional difficulties which face an actuary when trying to work inside this flat-earth framework.

Actuarial principles are based on orthodox theoretical statistics and discounted cash flow. Over the last twenty-five years there has been a revolution in the discounted cash flow aspects of our work leading to fairly sophisticated internally consistent methods based on return on capital. To an actuary accounting principles seem to aim at isolating the reporting year, and cash flow is shifted across its boundaries according to ideas which seem extremely limited in concept and applicability. For example, written premium is re-expressed as earned premium, and initial expenses are deferred. Similarly, where an actuary would make an orthodox statistical or probabilistic statement, accounting principles seem to require using ill-defined expected values with even less well defined 'margins for prudence'. For example these margins can be 10%, or the implicit effect of not discounting. The concept of the margin is not defined as to amount, nor as to unit of measure, nor as a philosophy.

I would like to give some practical examples of the professional difficulties that an actuary can face in trying to practise his expertise on a flat-earth. Example one which our author mentions in NORP § 3.11 is discounting and inflation. He says that the allowance for inflation must be sufficiently prudent (his phrase) and must take into account the nature and term of the assets. I use the word reserves in the actuarial sense of provisions and speak of a standard of 'adequacy' in the actuarial sense of 'strong solvency'—it is a jargon word we have all been using. By 'coherent' I mean a reserve that does not require future capital for insurance, whereas if they are too low they allow easy entry to the market. The consequent third problem is the underwriting cycle, which perhaps should be more properly defined as the business cycle. The cycle is not only related to pricing, but to capital needs, to movements in assumptions underlying outstanding claims, and to the variability of asset values.

Another problem has already been referred to: reinsurance. That is now transacted with less information passing between reinsurer and reinsured than used to be the case, although the risks undertaken by reinsurance companies may have increased. The assessment of the level of security provided by reinsurance is a problem for supervisors, for reinsuring companies and of course for most reinsurers who are rarely the end of the chain. A fifth problem is how results should be reported. A SORP will attend partly to the problems of consistency between companies; but it will not solve, for example, the problems of the effect on current underwriting results of claims run off from previous

years, and the variability of return from capital movements on the assets held. This is an area that potentially is covered by the NORP and will be covered by the simulation model that the Solvency Working Party has developed. Therefore it may well be covered under a NORP with the exercise of proper professional actuarial skills. But I do not believe that the paper, or the discussion so far, has attended to the problem that companies have in reporting to their shareholders.

For completeness, I believe that there are three problem areas which are less amenable to actuarial assistance but which we should not ignore: the first is consumerism. Companies are beset by consumerist pressures. Prices and adequate security for the policyholder are clearly factors that pull in opposite directions, but companies may be under pressure in both directions. The industry is also pressed to provide equity between groups of policyholders while at the same time not exercising discrimination. It seems that some experience we have had in life insurance may be relevant here. There are also problems from new technology and channels of distribution, which change the nature of the information that is available to general insurance companies and may change the nature of the products they sell. Again, more peripherally, we may have a rôle to play.

As a profession I believe that we have the ability, the skills and the professional approach to contribute to the development of the general insurance industry in difficult and changing times, and to help solve its business problems. However, we may so far have looked too much in on ourselves. We have been looking for a rôle in which to exercise our skills and not looking closely enough at the problems at which they should be directed. The latter I believe is the way to make progress, and when we have done so for general insurance—and I believe we will—then there are some interesting problems in banking!

Mr R. W. Whewell (a visitor): I welcome the general thrust of the paper; I think that it is an important development—certainly seen from an auditing and accounting perspective. Auditors welcome assistance from whatever source in forming an opinion on the adequacy or otherwise of technical provisions of a general business insurer. The auditor, unlike the actuary in this situation, has a statutory responsibility: to form an opinion as to whether, within the definition in the Companies Act, the accounts give a true and fair view, save only for the use of certain disclosure exemptions available to insurance companies. Any specialist who can assist him in that task is to be generally welcomed. The accounting profession has recently indicated that it is bringing out a Auditing Standard which will provide guidance to auditors regarding reliance on specialists. I do not think in this hall I need go into the question of whether or not actuaries qualify as people who can be relied upon.

If the suggestions in this paper are taken up by the Institute it will be performing a useful service for the insurance industry. I think it will also open the door for discussions between our two professions on the working relationship based on any standards which the Institute may put forward, be they recommended or mandatory practice. I therefore look forward, in my capacity as co-Chairman of the working party between accountants and actuaries, to taking part in discussions as to how these recommendations will affect the work done by auditors of insurance companies.

Mr J. D. F. Dickson (a visitor): I echo what Mr Whewell has said on behalf of the accounting profession.

I should like to make a general comment based upon two particular points. The first is to do with management information; a topic touched upon by two other speakers this evening. My experience over recent years, when there has been a severe downturn in the underwriting cycle, is that some managements were inadequately aware of the potential financial effect of writing various lines of business. Secondly, I believe there is a substantial contribution to be made by actuaries in the potential variability above and below the amount intended to be provided for outstanding claims. Both of these points seem to me to be related to the concept, put forward in the paper, of 'financial security', although within the paper it was described as 'total solvency'. By contributing and working together in these and other areas, actuaries and accountants have a greater opportunity for ensuring the financial security of general insurance companies.

Mr A. R. N. Ratcliff: Mr Craighead made a very important point by underlining § 5.7 of the note: the difference in treatment of reserves in funded accounts and in one year accounts. There is a grave

danger in a discussion of this nature that people express views which are based on the particular part of the general insurance business with which they are most familiar. Very often we do not define in advance what we are talking about; much of the misunderstanding which exists between us, let alone in the outside world, arises from this omission.

The difference in definition between provisions and reserves is helpfully spelt out in the paper. I think it is important to remember that we are talking in a United Kingdom context. This paper is addressed to U.K. actuaries having to advise U.K. insurers within the context of U.K. standards. We need to be careful when we develop standards to fit a European context: E.E.C. actuaries do not even have a translation for the word 'provisions'; they have no understanding of the difference between the concepts of provisions and reserves. But we have as actuaries—particularly those of us working on one year accounts—to take account of this difference.

It is very satisfactory to hear the amount of agreement between Mr Daykin, Mr Ryan and others who have spoken in relation to the importance of the concept of best estimates, although there may be a 50% error. The importance of this, and the point where this profession can do much to help, is in the assessment of the overall financial strength of the company. In other words: making sure that adequate solvency reserves—i.e. explicit reserves—are set up in order to take account of all the difficulties which are created by the concept of best estimates. What we do not want to do—what we cannot do—is to import into our best estimates the implicit reserves beloved of actuaries working in the field of life assurance. I should like to sympathize deeply with Professor S. Benjamin who works quite obviously on a flat-earth and must earn his money the hard way. Some of us do not live or work on a flat-earth; we live on an earth which is, if not totally spherical, at least reasonably rounded. We find that we can talk with accountants, we can understand what they are talking about; we hope that they understand us. Nevertheless we understand, at the end of the day, that if you work for an undertaker you make coffins and, as has been pointed out to us, if you do not enjoy making coffins then the employer is going to find somebody else who does—and who can make them as well as you do.

Last and not least is the concept of prudence. Actuaries in their life assurance training are taught a great deal about the need for prudent reserving. To accountants the concept of prudence does not mean tucking a little bit away and hoping that the directors will not find out about it. The concept of prudence to an accountant means finding all the areas where there are liabilities and reserving for them adequately. The concept of making hidden reserves or implicit reserves, is forbidden under the international accountancy standards.

Mr I. L. Rushton (closing the discussion): I need hardly say that I welcome this paper: it has given us an opportunity to reflect on the progress in general insurance. I think that our discussion tonight has split into two parts: those dealing with the wider picture and those dealing with NORP itself.

I should like to start by talking about the progress of actuaries in general insurance, having been involved with it myself for over twenty-five years. It has been a fascinating development. I am delighted to see that despite a slow start we are moving forward into a position where actuaries are more and more accepted in general insurance. I think it is clear that the main thing we have established is that, possibly among others, we are experts in the loss reserving area. We have also established that we can give considerable help to those involved in pricing in general insurance, though others will contribute to it, and there are some, Mr Daykin in particular, who feel that we have a very strong rôle to play in the solvency areas as well. One or two think we can go further: Dr Reid mentioned operational planning and management. I found it fascinating that he should mention that, considering that he was followed by Mr Reynolds, whose job in his own company is that of strategic planning manager: it is already happening. But having in our view established that we are able to do these things, I think that we have to consider that there are others whom we have to persuade that the services we can offer are well worth having, and indeed things that they really do need.

We start with the insurance industry itself. The industry, unfortunately, started from a position which we have had to overturn: the actuary in general insurance was seen as someone involved with ASTIN, who was a theoretical mathematician wishing to apply high flow statistical and probability theory to problems which seemed of little real relevance to those running the general insurance business in this country. We needed to get away from that. We needed the more pragmatic approach.

We needed the ability to deal with practice. I think it was Mr Ryan who emphasized that this paper included a NORP setting out recommended practice. It has taken a long time to move away from the attitudes which came from that background to a position where we were seen as being people who did things on a good, practical basis. The industry has I think moved a long way towards using actuaries; I am sure that there is still some way to go. Professor S. Benjamin spoke more than once, as have others, about the work done in the London Market, and with smaller insurance companies. The position of the actuary is becoming more and more recognized to be of value in that area. At the other end of the scale, with the large insurance companies, there are still some who do not seem to believe that the actuary has a tremendous amount to offer, whereas others have moved on to using statistical or actuarial methods of loss reserving as their main basis for working.

How do we persuade supervisors that we are the right people for this field? The paper shows that in other countries certification by loss reserve specialists or by actuaries is becoming a more accepted practice. Actuaries in Canada are expecting this to happen by the end of this decade, and their president recently stated that they needed to increase the supply of actuaries so as to be able to do all the work that is necessary. It is quite clear to me that we have not yet persuaded the supervisory body in this country that certification by actuaries is a really important matter: which they should be taking forward. This is an area in which we need to work harder to get their support. It has been pleasing to hear the accountants saying that they believe that we have a useful part to play. We need this kind of support to get the actuary's position accepted.

What can we ourselves do to help in this? We have a body of knowledge on techniques and principles in the non-life field. Where there may possibly be a weakness, which was mentioned by one speaker, is that there is too wide a range of techniques but nothing that is accepted as the way to go forward. Those who were trained on the life side some years back will recall that we only had net premium valuations and bonus reserve valuations. I have, however, seen a report about loss reserves by a casualty actuarial firm in Canada which showed the results on eleven different bases—and the basis I personally would have preferred was not included. We must reduce the number of reasonable approaches if others are not going to say that with such a wide range of possible results, what is the point in having an actuarial reserve?

We also have the problem that the actuary has traditionally been considered to be fairly conservative. On the life side it has been customary to build in bonus loadings, in order to produce profit, with the intention of distributing most of it back to the policyholders. That is an approach which is not practicable on the non-life side. In general insurance you have to attempt to get the rating right for each particular year; and for that reason, if no other, you have to try to produce the best estimates for your reserving as the reserves are such an important part of the pricing. It is important to balance our traditional conservatism against commercial needs. I will use the present situation in Australia, as I understand it, to illustrate this. There have been a few failures of insurance companies where actuaries had been involved in certifying reserves. They had been criticized, not unnaturally, for the fact that the reserves proved inadequate. The reserves were based on reasonable inflation assumptions which proved in the event to be completely inadequate because the social inflation effect put a rate of about 8% or 9% up to over 20%. The corollary is that actuaries have reverted to being conservative, and are setting up reserves with every conceivable margin built in, with another 10% on top for good measure. That would be all right if we were dealing with life business where in due course some of the extra margin could be distributed among the policyholders. But in the commercial world of short term business with annual premiums it is impractical, and the actuary's conservatism creates problems.

If actuaries are to become increasingly involved in the general insurance field, as I think all of us would wish, we shall require an adequate supply of actuaries. As Mr Johnston said, we not only have to supply them, but we have to supply them at the right price against other competitors who could hold themselves out to be experts in some of our areas. Statisticians are in an obvious position to compete. What can we offer over and above a statistician to justify our price? We only have two things: there is a professional backing to the work that we do, with all which that entails, which is something which I am sure the accountants would value; we also offer a specific education—a training—in actuarial work for general insurance. We are the only people who do this and therefore this should give us an advantage over statisticians who come in without training and have to be

trained in our techniques by their own companies. Having said all that, I am sure that the actuary will move forward in general insurance. It is up to the Institute to create the conditions for this to happen. One of the things that we need to do in that respect is to have technical support in the form of guidance notes to support the work of the actuary in general insurance. We are not going to be helped from outside. The Government is not going to ask for certification tomorrow; the industry will use us if they find us valuable. We need standards, we need to write up our bases; the production of an NORP takes us forward; I therefore welcome it.

Mr Daykin mentioned asset matching, this is important and needs to be covered by the NORP. In America, for instance, there have been companies with outstanding liabilities of an average of, say, six years matching with fixed interest securities with an average outstanding term of between fifteen and twenty years; of course the impact when interest rates changed was quite considerable. I should like to pick up Mr Ratcliff's reference to provisions and reserves. I do not understand why there is so much concern about this. There is still, as I understand it, a provision in the Companies Acts which permits insurance companies an exemption from distinguishing between provisions and reserves. It is an exemption which is prized and used by insurance companies, and as we do not need to distinguish, why should we quibble about the words?

The NORP itself will now need to be considered by the General Insurance Committee and then by the Council before it is issued. It is a first step towards clarifying the position of the actuary in general insurance: to give him a real basis to move forward. I think this paper has been valuable both in producing that and also in giving us an opportunity to reflect upon and to discuss the progress of the actuary in general insurance.

The Chairman (Mr L. J. Martin) proposing a vote of thanks, said: This evening, ladies and gentlemen, we have had the second paper on general insurance in the current session. As certain speakers have said, it is a practical paper. This I think is alone indicative of the substantial and growing interest, and the involvement of the Institute and its members, in this important aspect of our work. Indeed, I think it is also indicative of increasing public awareness of the profession's entry into this field. We will hear progressively more about this most important subject.

In this area, as we have seen, we are once again working closely with the accounting and other professions. Again, we are aware of, and affected by our overseas colleagues in both the U.S.A. and the E.E.C.

The discussion and suggestions made will, as Mr Rushton has said, be carefully considered by the Council and the General Insurance Committee.

WRITTEN CONTRIBUTIONS

Mr J. Plymen wrote before the meeting (although shortage of time precluded his contribution from being read to the meeting): The ambitious general insurance actuary should abandon the minor problems of claim and risk reserving to statisticians. These are merely accounting devices irrelevant to the results of insurance which is now so loss-making. The actuary should concentrate on restoring the profitability. Financial controls should be extended, particularly the calculation of earnings on capital employed for different classes of business. Investment policy and performance should be optimized. One's knowledge of general insurance should be acquired from the Chartered Insurance Institute examinations. The objective should be to become chief executive, finance director or investments manager because for these positions the actuary is better equipped than members of any other professional discipline.

The appendix should be extended to include a reference to the publications of Donald Savory, the first investment analyst and actuarial stockbroker, who monitored the finances of the composite insurance offices from 1930 to 1960 and became deputy chairman of a major office. Reference should also be made to Plymen and Pullan's contribution to the 1968 insurance conference on the subjects of PMR profitability, weak financial controls and inadequate statistical coverage, all of which are subjects which would benefit from the attention of the actuarial profession.

Mr P. S. Carroll: I too would like to welcome the paper. It represents a broad vision of the role of actuaries and gives a good perspective on where actuaries stand in relation to General Insurance. I would especially like to take up the statistical aspects considered.

In fact throughout the paper and the NORP the word statistical seems to be interchangeable with the word actuarial as applied to methodology. In § 3.3 it is said "Actuaries may be thought expensive and . . . statisticians may be thought capable of doing a similar job", and in § 3.8 it is said "The results produced by statistical methods will depend on the methods and assumptions used." Both actuaries in General Insurance and statisticians doing similar work but not attempting to take the examinations of the Institute, will often have learnt statistics in a university. But a typical B.Sc. or M.Sc. with a substantial statistics content at a British university is not really adapted to the needs of the actuarial profession or of the insurance industry. In the final year of a university course such topics as Markov processes, Bayesian theory and the Design of Experiments are prominent and throughout there is a concentration on mainstream statistics where the distribution of errors is assumed Normal. In General Insurance, however, the relevant distribution may be log-Normal but is unlikely to be Normal. Markov processes are much studied by continental academic actuaries—no doubt this is what Ian Rushton means by "high flown probability theory of little real relevance"—and they have some educational value. Schemes of no-claim discount in motor insurance have been described as Markovian or non-Markovian. But the conflicts of interest in academic statistics are such that Markov processes tend to squeeze out of the syllabus Time Series methods that actuaries really ought to know. Bayesian theory is very interesting and it would be nice to have a specialist course on the Bayesian approach to Credibility theory but the Bayesians do not have much time for non-parametric methods that are outside the main stream. In General Insurance it is often difficult to know what distribution applies either to claim incidence or to the size of claims so non-parametric methods are much to be recommended. As a statistics lecturer I have taught for some years the Design of Experiments which is said by the leading applied statisticians to be the most important subject in statistics. But I do not think fractional replication and confounding is much use to actuaries. I would rather teach topics in actuarial statistics and this would be possible if an M.Sc. were introduced adapted to the needs of actuaries and the insurance industry. This would also fit in very well with Edward Johnston's suggestion that the Institute should recognize a General Insurance qualification with "Parity of Esteem". Those with an M.Sc. and B3 could be excused some of B1, B2 and B4. This would strengthen our case to have actuarial certification as the Institute would be seen to foster the relevant advanced methodology. A further merit of an M.Sc. in Actuarial Statistics is that it would make intelligent use of universities putting actuaries in a position to do research.

While the methodology has developed so as to require a genuinely post-graduate M.Sc. covering the requirements of General Insurance it is important that what can be done is being done to update the statistics content of the A examinations. To this end it is proposed to introduce a new subject "Applied Statistics". Because there are no British textbooks it is proposed to use American and Australian textbooks and study notes. Surely some encouragement could be given to those of us who have several years of teaching experience as well as several years of work experience in composite offices to produce some books. There is much that is unenviable about American actuarial education but they do at least assist the production of textbooks with grants. And it is quite economical to use photo-lithographic means of reproducing from an original out of a word processor. In Waterloo, Ontario they are using a grant to produce a new book on Risk Theory in this way. Statistics is research methodology and there is an important interaction between education and research.

The author, who had replied briefly at the meeting, subsequently wrote as follows: There have been a number of helpful comments on the proposed NORP which I am sure the General Insurance Committee will take into account in the next stage. A number of comments were made to the effect that the NORP did not cover ratemaking or premium setting. Actuaries are involved in this and in the areas described by Mr Reynolds. However it remains important to distinguish between the activities and advice of individuals who happen to be actuaries, where we have no unique claim to giving the advice, and such advice which we may give because we have been asked to give it as actuaries.

Mr Craighead questioned why the actuary could not take responsibility for the first three frames of

reference listed in § 5.3. In fact I proposed that the actuary may take responsibility for a report within such frameworks, but the responsibility for the framework must be with the Government, the accountants and the Stock Exchange etc. unless those bodies have passed on the responsibility to our profession. So far this has not happened, although there are instances where clarification is required and in the absence of such clarification the actuary may find himself inventing a new framework. Professor S. Benjamin outlined a number of practical examples which might cause professional difficulties where the actuary might think he has to undertake such invention. Some of the examples will lead to a modification of the NORP, e.g. the first example and Mr Daykin's comment on § 3.11 would imply a better positioning for the comments on the nature of the assets. Other points made relate not really to the accounting framework but to accounting or administrative systems. Further, example 6 could be resolved by a statement that the problem defined is an open-market valuation problem with one set of names buying and another set (which has substantial overlap) selling. Given a market valuation, determined by the actuary or whoever without regard to accounting principles, the transaction must then be recorded in accordance with the guiding accounting principles for that set of accounts.

Mr Craighead suggested that the section on combined reserves be further reviewed by the London Market Group and this would be helpful. However it is also useful to point out that the actuary reporting in general insurance is, of course, also subject to the memorandum on professional conduct and practice so that there is no need for such explicit statements for the London Market business on the need to get a clear view of the methods in use and the reasons for those methods. This goes for all business and is the rationale behind the requirement to establish the guiding accounting principles. Although it is always worthwhile to stress the divergence between London Market business and 'primary carrier' business, often the differences are either of degree, albeit substantial degree, with some areas of a primary carrier business having the same problems or relate to administrative systems. For instance the problems of contractors all-risks are common to both and are covered in general terms by §§ 4.3 and 5.3. Although there is divergence there is also convergence, e.g. the point on gross, reinsurance and net has already been covered in the previous sections of the draft NORP.