Article

The mechanism of prosperity: New Zealand Association of Scientists 1954–73

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The issue is: Have the authorities properly looked after the mechanism of prosperity and not only retained the best scientists but attracted further talent from overseas?

This concluding remark by Dr F B (Brian) Shorland[1] in his Presidential Address in 1955, reported in the media [1] as well as in *New Zealand Science Review* [2], was the issue that occupied a prominent part of the Association's activities over most of the next twenty years. Time and time again, representations were made to Government and officials about the need to provide competitive salaries and working conditions for New Zealand's scientific workforce.

Salaries

Data on the numbers of scientists leaving for much better paid overseas positions were given by the Association to MPs in September 1955 before the parliamentary debate on the estimates for DSIR (Department of Scientific and Industrial Research, the main employer of scientists in New Zealand), and 'the House accepted the fact that scientists were at that time underpaid. A revision of salaries came into effect on 1st April 1957.' [§16/10/1958][2] However, a year later, NZAS had to take to task the Minister of DSIR, Hon P N (Phil) Holloway, for saying that the taxpayer could not afford 'to enter into a contest with the rest of the world when it comes to salary payments' [3]; the Association countered that the 'average scientist in New Zealand rarely achieves the same total earnings as the artisan who is regularly employed and works overtime' and 'New Zealand cannot afford not to continue to employ scientists of the highest calibre' [4]. The NZAS report was backed up by estimates of the value of successful government research in New Zealand on bush sickness, grass grub control, wheat breeding, timber preservation, fish liver oils, clubroot-resistant rape, spontaneous combustion of wool [§16/10/1958] and topics reported on in a paper [5] by Dr W M (Bill) Hamilton, subsequently Director-General of DSIR. It also gave salaries for comparable university and government scientific posts in Commonwealth countries. The latter information was subsequently published in *New Zealand Science Review* [6], with comments that the higher salaries overseas 'must make the holding and replacement of scientific personnel in New Zealand very difficult' and declining staff numbers in DSIR despite increased funds being available suggesting 'difficulty in replacing the losses of scientific staff with persons of the desired calibre'.

Relativities

A complicated interplay of relativities was involved in all these salary issues. The procedures were summarised well in an Association submission presented much later to a Royal Commission on Salary and Wage Fixing Procedures in the State Services, set up in 1968 in an attempt to settle the still unresolved issues (see below) [§ ?/02/1968]. To a large extent, scientists are in an international marketplace, whatever government ministers might choose to believe. In New Zealand, if the rewards for university scientists were seen to fall behind those overseas, particularly in Australian universities, and if the rewards for government scientists were behind those in the UK, say, or the USA, there would inevitably be an inducement to go overseas, particularly if the facilities offered there were much better than here. If scientists in government research lost relativity with those in universities, there would be a great incentive to move there. Moreover, within government research organisations, notably DSIR and the Department of Agriculture, salary claims through the Public Service Association were conditioned by relativities with other occupational classes and by the salaries the Public Service Commission (or its 1962 successor, the State Services Commission) was able to go up to; to give a suitable differential for promotion, the higher salaries for top scientists would have to move into the region of those for top public servants in other departments, which were determined by Cabinet Committee.

A further equity issue, which was noted in the NZAS salary surveys for scientists [7] and technicians [8], was the differential between salaries for men and women. The Association 'supported the principle of equality of pay for men and women of equal qualifications in science who are employed on comparable work' [9]. It would doubtless have approved the campaigns of

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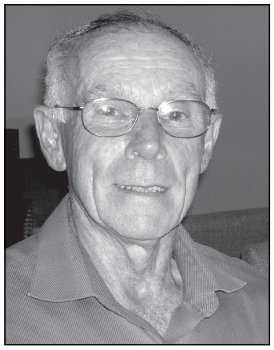
[1] In most instances, initials have been given in the original, but I have added a person's given name where possible.

[2] § with a date refers to an unpublished minute or file note of that date.



Geoff Gregory graduated with honours in Forestry at the University of Oxford in 1960. His lifelong career as a science editor began in the Commonwealth Agricultural Bureaux and continued in the Society of Chemical Industry in London, followed by the Open University. He immigrated with his family to New Zealand in 1972, to join what became the Science Information Division of DSIR, becoming its Superintendent from 1978 until its restructuring in 1984. He was then transferred to New Zealand Geological Survey, where he was in charge of the information section until DSIR's restructuring in 1992. He was given early retirement in 1993, since when he has run his own freelance editing company, Word Therapy. He was honorary editor of *New Zealand Science Review* from 1974 to 1984, and has been its production editor since 2003.

Dr Brian Shorland, during his Presidency, 1954/55. He was on NZAS Council from 1963 for over a couple of decades, and took over as Hon Editor of *New Zealand Science Review* from 1986 for many more years. He received the NZAS Medal for Service to Science in 1970. The NZAS Shorland Medal, instituted in 1998, is named is his honour. [Photo from *New Zealand Science Review* 1955, 13: 131.]

the Council for Equal Pay and Opportunities (formed in 1957 as a coalition between several women's organisations and the Public Service Association), which were effective in seeing the passage of the Government Service Equal Pay Act in 1960 and the Equal Pay Act (applying to the private sector) in 1972 [10]. Nevertheless, the NZAS salary survey of 1968 still showed that, when the mean salary for all ages was $4,350, a 'similarly aged and qualified woman could expect to receive on average $402 less than her equivalent male counterpart' [11].

Fluctuating economic conditions

The Government's funding restrictions in the late 1950s might have been affected by the sharp drop in prices for New Zealand's main export commodity, wool, during 1957–1958. However, on a world perspective, western nations in competition with the USSR were pouring considerable funds into science. As noted by Dr J G (Gordon; 'Doc' to his students) Gibbs in his 1958 NZAS Presidential Address, the launching of the first Sputnik in October 1957, and the traverses of the Antarctic (with three NZAS members in the base party) and the Arctic in the same year were all 'in the nature of fundamental research' [12].

In the same Presidential Address, Dr Gibbs also spoke of the Murray Report on the Future of the Australian Universities, published the previous year, as a result of which an injection of £A25 million was made by the Australian Government to their universities. They immediately began advertising for a huge influx of staff 'at salaries which at professorial rank exceed those offered by New Zealand by 33 per cent, in New Zealand currency, while, in addition, Australia provides much better facilities for specialization and research' [13]. This, and the nationwide publicity that ensued, prompted the New Zealand Government to set up its own Committee of Inquiry, with Sir David Parry as Chairman, for which Dr Gibbs produced an Association submission. In the Annual Report of NZAS Council for 1959, it was noted that, 'Although the economic situation at the beginning of the year did not permit the increasing of scientists' salaries as an end in itself, Council felt compelled to adopt a policy for increased salaries because of the need to arrest the damage that is being done by the continuing loss of scientists… The Parry Report is certain to appreciate the urgent need for increasing university salaries and, if adopted, should open the way to corresponding improvements in the salaries of scientists' [14]. It did, and it was an opportunity for negotiation: however, as a result of the consequent university increases, government scientists lost parity, and a scientific officer in government employ who had been equated with a university lecturer in science in 1957 was expected to increasingly lag behind, to be £700 behind his university colleague by 1962 [15].

Government scientists were so disadvantaged at the time that I J (Ivan) Pohlen, in his Presidential Address in 1959, had referred to 'the same dismal story of underpaid scientists in understaffed laboratories', making New Zealand 'one of the most backward countries in the world in this respect' [16]. Moreover, the laboratory conditions under which some scientists had to work were 'incredible' [i.e. bad], although the 'recent discoveries of the cause of facial eczema and of the commercial grade of bauxitic soils were originated under these conditions' [17].

The story of the state of New Zealand science was taken up by *Nature* [18], much to the dismay of Council of NZAS - President Pohlen asserted in an editorial that the information given there did not emanate from them or from the annual report of DSIR, and its publication in the world's most widely read scientific journal could not fail 'to undermine the high scientific standing of New Zealand, and effectively to discourage the few potential recruits from overseas' [19].

Nevertheless, a year later, when the economy had improved with wool prices increasing and export markets becoming more secure, NZAS jointly with the NZ Institute of Agricultural Science published its own statement on 'The crisis in New Zealand science' [20], a document that a joint delegation presented to the Deputy Prime Minister, Hon Clarence F Skinner, and Minister of DSIR, Hon Phil Holloway in April 1960. It stated that the crisis 'is caused by restriction of scientific development in a time of prosperity and when other Governments are accelerating their expansion of scientific work' [21]. The crisis showed itself by loss of scientists (including new graduates) to other countries, shortage of teachers, failure to recruit from overseas, and 'a sense of frustration among those who for various reasons stay in New Zealand and faithfully carry on work they know is vital but unappreciated' [22]. The statement named 150 experienced scientists (most with masters' degrees or doctorates) who had left for Australia, the UK, the USA, or Canada in the previous decade [23]. A revised scale, leading up to a salary of £1,700, was subsequently implemented, but the disparity with university salaries remained. NZAS Council was 'not satisfied' and presented a further case to the Public Service Commission [24].

Negotiations continued, as did disparities. A whole issue of *New Zealand Science Review* at the end of 1964 was devoted to salary scales. In it were published new scales for DSIR decided in March 1964 alongside those of September 1964 awarded by the Public Service Arbitrator in Australia for the Commonwealth Scientific and Industrial Research Organisation [25] with a letter remarking that they showed 'the same gross lack of relativity' that had existed ten years previously [26]. Government pronouncements appeared equivocal. In a series of letters between NZAS President G E (George) Rushworth and the Prime Minister, Rt Hon Keith Holyoake [27], the latter claimed that 'the only grounds for maintaining this relationship [parity between Government and university scientists at the lower levels] for so long was tradition'. The Prime Minister did, however, announce in June 1965 an increase in salaries for the top public service scientists to give parity with their equivalents in the universities [28]. At the same time, the Minister of Science, Hon Brian Talboys, while complaining about the image of science 'as an esoteric and glamorous activity that is practised overseas', was criticising universities for training increased numbers of graduates 'for export', i.e. 'specialising in disciplines of low priority for this country' [29].

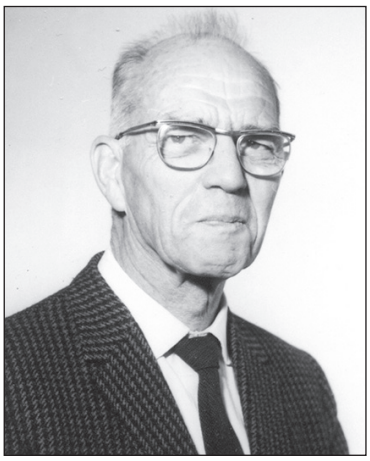
NZAS conducted a full salary survey in 1965 and, after analysis by former President Dr R D (Roy) Northey, published (in January 1967) a full set of graphs compiled from the 1,092 returns (49% response) [30]: 'The outstanding fact which has emerged from the analysis is that scientists above the age of 30 and possessing a doctorate degree, who are employed by Government, are paid, on the average, £400 to £500 less per annum than comparable scientists employed by universities.' [31] 'The average scientist employed by Government in research or school-teaching receives between £100 and £400 less than the average paid to all scientists according to their respective age groups.' [32]

A single advisory committee

At the beginning of 1968, Council of NZAS prepared a comprehensive submission based on this salary survey, responses to questionnaires, and more detailed suggestions from several groups of scientists. It was presented to a Royal Commission of Inquiry into Salary and Wage Fixing Procedures in the State Services by NZAS President Prof J F (James) Duncan, Past President Dr Shorland, and long-standing member and DSIR Director (and ultimately Chairman of the State Services Commission), Dr M C (Merv) Probine [§ ?/02/1968]. It detailed the existing procedures and problems engendered by them, giving examples of disparities between New Zealand and overseas salaries, and between different organisations within New Zealand, and their effects on retention and recruitment of scientific staff. The main proposal was that a single committee should be established to advise Cabinet on all professional salary scales within the state services, state-supported institutes, the universities, and (for graduate teachers) within the education service. As a result of the Royal Commission's deliberations, the State Services Co-ordinating Committee was 'beefed up as the official negotiating body' in disputes affecting the wider State sector, including teachers, nurses, postal workers and railway workers [33].

By the end of the decade, many of the problems appeared to be diminishing. The Association's survey in late 1968 showed a narrowing of the gap between Government-employed and university scientists [34], and a 1970 survey within the Research Division of the Department of Agriculture showed 'close parity' between the two groups. However, it was felt that the 'salaries of all scientists must remain a major concern of the Association' [35]. Meanwhile the National Research Advisory Council (NRAC) in its second publication had addressed the issue of the 'brain drain' [36]. It said that for Government departments [in 1967] 'those holding masters' and doctors' degrees who left for overseas posts were matched by an equal number with the same qualifications recruited from overseas, and there was a net gain of bachelors' [37].

DSIR staff numbers had apparently grown from 930 in 1953 to 1625 in 1970 [38]. Between 1956 and 1969 seven new Divisions of DSIR had been established, together with research institutes for the meat, wool, building, and coal industries [compiled from 39: Appendix]. However, by 1972, the economic situation had again changed as New Zealand strove to diversify its export markets to take the place of the UK, which was negotiating to enter the European Economic Community the following year [40]. In a reversal of what had applied for the previous two decades, the NRAC forecast for the medium term was for a severe oversupply of science and agriculture graduates by 1978 – a 'shocking waste in trained manpower if the universities continue to produce graduates in the numbers projected' [41]. On the other hand, there were too few physicists and barely enough mathematicians and chemists being trained [42]. NZAS recommended the identification of key areas and the mobilisation of scientific resources into them, and urged that the improved balance between supply and demand should not 'cause manpower planning to be forgotten' [43].



Dr Gordon Gibbs, a tireless worker for NZAS, being its President in 1956/57, 1957/58, 1962/63, Treasurer in 1959/60, 1960/61, 1961/62, 1966/67, as well as being Abstracts Editor until 1956 and holding office in the Wellington Branch in the late 50s. In 1969 he was the first recipient, along with Dr Charles Fleming, of the NZAS Medal for Service to Science, and this photo was taken about this time. [Photo courtesy of his son, Doug Gibbs.]

In a 1974 article about national recognition of scientists, F R (Frank) Callaghan, who had succeeded Sir Ernest Marsden as head of DSIR until 1953, said that salaries of scientists were 'unquestionably higher, in relation to those of other vocations, than they were twenty years ago. The Government gave the lead in this direction, in the new scales introduced between 1969 and 1972. The whole attitude of the State Services Commission appeared to change in the direction of improving its recognition of the contributions which scientists had made, and could make, to the national prosperity' [44].

Science technicians

In an extended discussion at the 1953 AGM about including science technicians as Associate Members [45], it was agreed that NZAS should give support and 'take such action as is required to enable technicians to become formally established as a co-ordinated group'. The Association had just published a survey of the status, qualifications, and conditions of employment of science technicians [46]. This showed that considerable anomalies existed in salary rates, and prospects for advancement were poor, and concluded that qualifying examinations in the different branches of science needed to be set up, and generally more attention needed to be given to science technicians [47]. NZAS Council felt an obligation to continue to represent them until they could set up a nationwide organisation of their own, and over the next few years worked to establish a 'Technician Membership' class and build its membership until they were in a position to decide whether to launch their own separate group [48], which NZAS would help them to do.

New rules enabling the Association to form Technician and Student sections were not drawn up until 1957, owing to difficulties in getting people to sit on NZAS Council, which nevertheless had made it one of their priorities at a Council meeting on 20 November 1956 [§ 26/3/1957].

Technician certification

In early 1958, Council set up a technicians subcommittee, chaired by W J (Bill) McCabe, to advise on technician mem-

bership, and it sent a delegation to the Supervisor of Technical Education in the Education Department to gain support for establishing recognised career entry qualifications based on a two-year basic course with supplementary specialised courses [§ 31/8/1958]. According to the submission [§ undated but presumably Feb 1958], most technician training at that time was done in the establishments where they worked, and it was quite variable in quality. It was considered 'much better, both economically and from the students' point of view, that the general training of technicians be carried out by competent teachers, in places properly equipped for training'. The deputation was apparently well received [49]. The Technicians Certification Act was passed in 1958. It set up a Technicians Certification Authority (TCA) to prescribe courses and syllabuses and to conduct examinations for technicians; to appoint examiners; to prescribe conditions for entry to such courses and approve schools to conduct them; and to issue diplomas or certificates to those successfully completing a course [http://www.nzlii.org/nz/legis/hist_act/tca19581958n51261/]. G V (Geoff) Wild, Acting Director of Education and a member of NZAS, was appointed Chairman of the TCA, which absorbed the existing controlling authority for Engineering Certificates as an executive committee and created additional ones for other technician groups [50]. Bill McCabe was named as the NZAS representative on the committee for chemical technicians, which hoped to be able to enrol the first students in its examination programme in 1961 [§ 31/8/1960]. He became President of NZAS in 1960/61, but left to take up an International Atomic Energy Fellowship at Wantage, UK [51], and his successor as NZAS representative on TCA, H (John) Offenberger, reported that the first certificates in chemistry would be awarded in 1963, intermediate certificates in physics and plant biology would also be awarded, and the initial NZAS recommendation of an intermediate certificate of science with a final certificate of the major option chosen was to be implemented [§ 31/8/1963].

At the 40th ANZAAS Congress a few years later, John Offenberger was able to report, in summarising the whole scheme of education for science technicians, that, 'In New Zealand, the science technician does well. The standard of the New Zealand certificate is high.' [52]

A separate institution for technicians

In 1958, an 'open letter' had been circulated to twenty organisations, mainly government departments, and to the media, seeking their help in contacting technicians; the letter was also published in *New Zealand Science Review* [53]. It said that the experience of NZAS would be helpful to technicians wishing to improve their salaries and conditions, and invited them to join (at 25s per annum, 5s less than scientist membership), so as to make effective representation until they felt able to establish their own association. By 1961, the technician representative on NZAS Council, J E (John) Mautner, reported that technician membership had risen to 64, and was hoped to soon reach 100, enabling a technicians' subgroup to be formed to carry on the negotiations for themselves, although still under the NZAS umbrella until the technicians themselves decided otherwise [§ 31/8/1961]. A year later, John Mautner's successor, F A (Frank) McNeill, was able to report that the target membership had been obtained, a full meeting of technicians from the six major centres of scientific activity had been held on 27-28 June, a draft constitution drawn up by regional committees for a New Zealand Institute of Science Technicians had been finalised and approved, and it was agreed that the new body should become operational as quickly as possible [§ 16/7/1963]. With the blessing of NZAS (although the loss of subscription revenue from technician members was not made up by a recruitment drive for scientist members [§ 18/9/1967]), the new Institute was to be formed on 1 October 1963, after which the technician membership grade in NZAS would cease to exist [§ 31/8/1963]. The formation of the new Institute, extracts from the constitution, and a call for members were published in *New Zealand Science Review* [54].

Organisational worries

By late 1955, NZAS was beginning to struggle to find people to hold office and this was hampering the projects that it wanted to tackle. V J (John) Wilson had completed a year as Secretary of NZAS after ten years as Editor of *New Zealand Science Review*, and Dr Gordon Gibbs had discontinued his role as Treasurer to become Vice President and take on organisation of the abstracts section of the journal, and their roles remained vacant, causing the writer of the editorial in March 1956 to say that nobody seemed to want to do 'real work' for the Association, and 'the continuing work and successes of the Association are in jeopardy through apathy.' [55]. NZAS President R W (Dick) Willett, who would later become Assistant Director-General of DSIR, wrote 'At best the Association has been kept afloat, at the worst it has stagnated, neither state being particularly praiseworthy, nor ennobling …'; he wondered whether it was 'over-centralised and consequently drunk with rules of its own making, and bemused by accountancy' [56]. A letter in the same issue of *New Zealand Science Review* [57] suggested reconstituting NZAS as a national body with constituent member bodies not individual members. A response to this asserted that most of the problem arose from the objects being insufficiently precise, and that NZAS should appoint a specialist secretary and treasurer rather than expecting scientists to do it in their spare time [58].

Past President C G (Ces) Mason had already proposed at the 1956 AGM that the incoming Council prepare a report on the basic operational functions of the Association to present to a special general meeting [59]. None of the past Councillors offered themselves for re-election at the AGM, and Council ended up with two nominated and two co-opted members but still four short of the prescribed number [§ 12/3/1957]. They were able, however, to prioritise their activities for the special meeting, held in March 1957 [§ 26/3/1957], making the principal objective to be to improve the professional status of scientists, by liaison with comparable bodies overseas and in New Zealand, and publicise the findings of science and the practical and potential gains to be made from research [§ 12/3/1957]. In his 1957 Presidential Address later that year, Dr Gibbs was able to report with optimism that, among other activities, they had drawn attention to the emigration of highly qualified scientists and offered proposals about it to the Minister, offered data on the monetary returns from research to MPs and the Press, and replied to media statements that had presented the work of scientists 'in a disadvantageous light' [60]. A circular issued that year [§ undated but calculated to be 1957 from reference in it to the number of *New Zealand Science Review* volumes issued] outlined the Association's achievements of the previous four years; it concluded, 'the Association is now respected as a responsible body representing the professional scientists and acting as the voice of New Zealand science … You cannot

afford to ignore the Association if you seek to earn your living as a scientist'.

Later that year, Dr O F (Oskar) Nauen organised a survey of NZAS members about their views on Association matters and received a 40% response [sr17(6)107]. Of those responding, 90% believed the Association served a useful purpose and 65% considered the organisation adequate, but only 15% were prepared to take office; 75% favoured an increase in subscription to pay for a Secretary [61]. In his 1958 Presidential Address, Dr Gibbs was able to report an increase in membership 'for the first time in three or four years' [62]. At the AGM, too, a full complement of officers was appointed, including A E (Arnold) Bainbridge as Treasurer and Dr Gibbs as Secretary (with Dr Northey as his deputy during his sabbatical break); a public accountant, N Goddard was appointed Executive Secretary in the following June.

The Association progressed with renewed enthusiasm. Its 21st Anniversary was celebrated at a gathering in Wellington in October 1962 to which Hon Blair Tennent, Minister for DSIR, and other Ministers, Right Hon Walter Nash, Leader of the Opposition, and F J (Frank) Kitts, Mayor of Wellington, were invited. It was an opportunity to recall the invaluable contributions made by NZAS to the cause of science and scientists [63]. At the AGM, members had resolved to establish a special commemorative endowment fund for the Association's Silver Jubilee in 1966 and had set up a committee to decide on suitable uses for the fund [§ 2/10/1963]. Recognising that £1 donations from members would not raise sufficient to provide useful income from its proposed Silver Jubilee Trust Fund, this committee, convened by A Dryburgh, recommended other fundraising activities such as raffles, Selwyn Toogood shows, and applications to industry, Golden Kiwi, etc. Their order of priority for using the fund was to (1) create a full-time secretariat, (2) obtain a building to provide space for the secretariat, other scientific societies, and commercial tenants, and (3) provide grants for research of direct benefit to New Zealand [§ 2/10/1963].

Nevertheless, by 31 August 1965, the Association had accumulated a debt of £560, and the new President, W F (William) Chubb was moved to write to all members asking for a donation of £1 10s, as recommended at the AGM [§ ?/1/1966]. The Treasurer in 1967, Past President Dr Gibbs, wrote, '… during the period [1963-1966] of these activities, the Association did not have an Honorary Treasurer, or anyone on Council who was responsible for expenditure'. He added, 'Just now the Association is physically and literally a very sick body. The Canterbury Branch has been in recess for some five or six years; the Auckland Branch, after requesting evidence of support by attendance at its Annual General Meeting in 1965, failed to get a quorum at that meeting, and has wound itself up; the Wellington Branch containing about two-fifths of our membership, is active, and holds regular monthly luncheon and committee meetings; and Council argues interminably about even simple routine matters, in spite of which several projects have been initiated during the year' [§ 18/9/1967]. He and Council member and Past President Ivan Pohlen resigned in July 1967 'as a protest against the frustrating difficulties caused by a want of helpful collaboration among Councillors' but was persuaded to return to present his views, and President Dr Chubb, in a letter to members, urged them to participate in nominating Officers and electing candidates in the subsequent postal ballot [§ 26/9/1967]. Membership at that time was only 415 out of a potential of 'possibly more than 2000' [§ 18/9/1967]. Professor J F (James) Duncan, who had made his acceptance conditional on a good response to this letter, was elected President, while P C (Phil) Alve was elected Treasurer and R F (Roy) Benseman was elected Secretary. The NZAS Rules were changed to enable affairs to be conducted by a Wellington-based Standing Committee for six meetings per year to complement four meetings of full Council which out-of-Wellington members would be paid to attend [64].

A list of officers from 1954 to 1973 is presented in Appendix 1.

The new President, expressing surprise at finding himself in the role, enunciated a change in focus for the Association towards (1) formulating a clear policy for science in New Zealand directed towards the greatest economic benefit for the country and (2) demonstrating to the public at large that 'an investment in science frequently leads to a substantial saving of money or the production of an income'. He felt that, if successful, such operations would lead to more adequate recognition in terms of financial return and facilities [65]. At the end of his two 'very active' years of leadership, Prof Duncan was able to outline progress by way of 'publicity, a national policy for science, administrative reorganisation, scientists' interests, and the "new look" *Science Review*'. He also projected that the Association could not only 'be instrumental in assisting national development, but it could also bring a recognition of science that no other society in this country can achieve' [66].

New Zealand Science Review

A major activity of NZAS, absorbing the main part of its income, has always been to publish *New Zealand Science Review.* At the 1954 AGM of the Association there was an extended discussion of this activity. The Christchurch Branch delegate thought that if the Association did nothing else but publish this and the *Directory of New Zealand Science* it 'would be satisfying the demands of the Branch as to what the Association should do' [67], and other delegates echoed this support. Nevertheless, the cost was a concern to all, as it continued to be for the next two decades. To keep costs down, Council later formalised its production as six issues per year (as this had already been occurring through combining issues). Issues were generally intended to be 16 pages long, but special issues, such as one on noxious animals (vol. 17, no. 3) had been bigger [68]. The subscription was kept at £1 per volume, and Council kept open the option of increasing the size of issues as funds permitted [§ 31/08/1958].

As for the content, increasing the amount of Association news, or including topics for the wider public or general scientific news were left for Council to review after the 1954 AGM [69]. Council authorised the Editor to broaden the scope and sought help from 'Honorary Reporters' among its members to send in short items about their colleagues' work, locating 'current research against the background of any field of scientific investigation' [§ 31/08/1958], or personal items; it was felt that, if this were able to attract an additional 500 subscribers, the journal would pay for itself [§ 31/08/1958]. The succession of Editors every year or two from 1954 to 1961 – N T (Neville) Moar, L J (Lindsay) Rollo, P (Patricia) Smyth (subsequently under her married name, P Bergquist), and A S (Arthur) Wickens – managed to obtain a variety of readable review papers with popular appeal, although neither the anticipated help from voluntary reporters nor the increase in subscribers materialised. By 1961, however, the financial situation had improved, as a

result of the smaller issues and only 4 issues being produced in that year, and Council felt able to afford an honorarium of £7 per issue (adding to the unit cost of printing of £10 per issue) for the new Editor, F A (Frank) Stephens [§ 31/08/1961].

The 1954 AGM had also considered the abstracts section valuable, though costly to print, and its continuation was voted to be reviewed after a year [70]. A member survey about the abstracts, to which less than 50 of the 560 members responded, was ambivalent, and at the 1955 AGM, Council was recommended to discontinue their publication, but to seek an alternative, cheaper way of providing the information – 'a list of titles would be better than nothing' [71]. The abstract section was dropped at the end of 1955, and a list of titles did not appear until the 'new look' of 1970 [see below].

Frank Stevens was succeeded by A J (Arthur) Sutherland during 1965, and the new Editor asked for 'brief articles, notes, and comments relevant to the aims of the Association', book reviews, and 'lively and interesting' correspondence [72]. Some increase in advertising revenue had been obtained in 1965, but bringing the journal up-to-date by publishing two extra issues in 1964/65 and producing extra copies of the salary survey issue (vol. 22(6)) for free distribution to all scientists in the *Directory of New Zealand Science* had been expensive and contributed to the serious debt NZAS had incurred by 1966 (see above) [§ 18/08/1967]. In 1968, Council appointed a Board of Management for the journal, with the objectives of ensuring it was published regularly and on time, improving the quality of the contents and widening its scope, and improving its finances through advertising revenue and increased numbers of subscribers [73].

Author and subject indexes to the contents of volumes 11 – 27, compiled by past Editor John Wilson, were published in *New Zealand Science Review* volume 29(6).

A 'new look' for *New Zealand Science Review* was introduced in 1970 [74]. Apart from a change to an A5 format with a plain single-coloured cover, each issue (of which there would be six per year) would contain an editorial (intended to provoke discussion), Association news, a single article of a type intended to interest all members, and a section listing titles of all papers published recently in New Zealand scientific, engineering, and educational journals. To this were later added: letters from readers, 'possibly a report from Parliament', and information services (about forthcoming conferences, etc.) [75]. The format attracted few advertisers, however. Roy Benseman, who had been NZAS Secretary for the preceding two years, stepped in as Honorary Editor, but after two and a half years of 'painstaking and well-received' work, felt unable to continue, and the good intentions had to be suspended. The last three issues of volume 30 did not appear until the following year, and, making 'a virtue of necessity' in the absence of editorial input, contained reprinted resolutions from the United Nations Conference on the Human Environment 1972 [76] – see below.

By the end of 1973, President F E (Frank) Studt was able to announce that the honorary editorship was to be 'taken over by J G (Geoff) Gregory, who works in the Information Service of DSIR and edits *N.Z. Journal of Science*' [77]. Stating that the policy would 'continue to be to provide a forum for the exchange of views on topics, mainly concerning science policy, of interest to Association members', the first issue for 1974 set the tone for the next several years, with an editorial, report on Association activities, miscellany of 'Talking Points', and articles about the Unesco International Instrument on the Status of Scientists 1973.

Directory of New Zealand Science

H S (Henk) Jansen undertook the task of editing the 4th edition of the *Directory* [§ 31/08/1960], and his wife [unnamed], whose 'devoted work as compiler far exceeded the call of duty' [78], distributed 4500 questionnaires to science graduates, of which half had been completed and returned by August that year [§ 31/08/1961]. The compiling and indexing was completed over the following year and the Directory was published in March 1963. Like the previous edition, it contained separate directories of scientists (a total of 2170, including 473 members) and technician members of NZAS (73), but added a comprehensive index arranged by 'subjects on which they are engaged'. There was a list, compiled by Frank Stephens, of 760 science teachers, by school or technical college with an alphabetical index. There were also lists, compiled by S H (Stuart) Wilson, of New Zealand scientific institutions and societies, and scientific serial publications. The price was 45 shillings.

By 1972, a questionnaire form had finally been prepared for the 5th edition of the *Directory* and was being tested on a small group of scientists before being circulated generally. However, this issue was not to appear until 1975 [79].

Promotion of science

A continuing concern of NZAS was the difficulty of explaining science to the public. It was felt that an important activity of the Branches was holding public lectures, but reports suggest that audiences were small and it was difficult to attract public interest. For example, in 1955 the Wellington Branch organised six public lectures under the umbrella of 'The Outlook in Science' and covering physics, chemistry, mathematics, zoology, geology, and botany, but felt that the attendance 'was not commensurate with the time required for their preparation' [80]. The lectures were published in *New Zealand Science Review* [81].

The later policy of the journal was to publish articles that would inform scientists, too many of whom could not undertake a public education programme 'owing to their ignorance in fields other than their own', as the first task in communicating scientific achievements to the public [82]. This belief, that a scientist must himself understand science and its place in the world, was repeated in the 1964 Presidential Address by George Rushworth as part of the message that, 'Every scientist must be prepared to publicize science in a comprehensible manner, and to play his part in the community, not only as a scientist but as a man' [83].

A good opportunity to reach the public had been afforded by the Science Week in Schools visits to laboratories organised by the Wellington Branch, with press and radio coverage [§ 31/08/1958]. However, the best coverage of science by the media ever before obtained was provided in the wake of the announcement of two Russian cosmonauts in separate capsules making contact in space on 13 August 1962, an event that occurred at the opening of the Tenth New Zealand Science Congress in Christchurch, celebrating the Centenary of the formation of the Philosophical Institute of Canterbury (which had become the Canterbury Branch of the Royal Society) [84]. NZAS was a participating body at this Congress, and its Christchurch Branch had organised a well-attended buffet luncheon [85].

The 1957/58 NZAS President, Dr Gordon Gibbs, was invited to serve on a New Zealand Broadcasting Service committee advising on a new experimental feature, *Science Report*, which had been welcomed in scientific circles. Unfortunately its broadcast time, 1.30 pm on the third Sunday of the month, did not bring a wide audience, and the programme was discontinued [86].

In 1971, papers delivered at a Royal Society Symposium on Science Broadcasting were published in *New Zealand Science Review* [87]. NZ Broadcasting Corporation had found that, on radio, short magazine-style programmes worked best, but the reticence of many scientists to talk publicly about their work, in many cases because of peer accusations of publicity-seeking, was a worry [88]. For TV, it was considered that though 'it must be made known to [the man in the street], that these scientists, these strange people doing these strange jobs, are so engaged for everyone's benefit', science programmes appealed only to minority audiences [89]. The editorial in this issue suggested that 'the public are to some extent becoming disenchanted with science' and 'we can stay with the action only if we broaden our outlook to include not only scientific problems but also human ones [90]. This perspective for the Association continued to be recognised into the 1970s [see below].

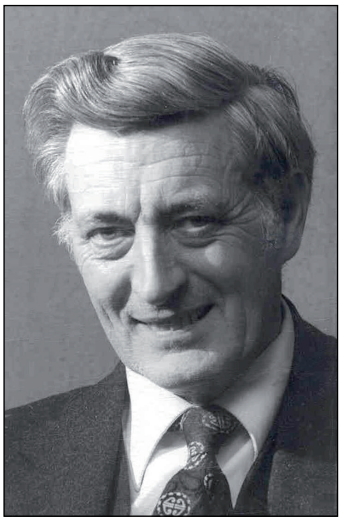
School science fairs

NZAS made a major contribution to the Wellington Science Fairs from their inception [91]. Following the initiative of Prof L H (Lindsay) Briggs in starting the Auckland Science Fairs in 1960, the Wellington Science Teachers Association started the Wellington one in 1964, and Prof James Duncan, who later became President of NZAS, became its Chairman, while its Organising Secretary for many years, who became Treasurer for NZAS from 1967 for many years afterwards also, was Phil Alve. Both NZAS Council and the Wellington Branch were represented on the Science Fair Committee, and NZAS President George Rushworth was one of the judges for the 1964 event [92]. In addition, as other regional science fairs sprung up with support from local branches of the Science Teachers Association and the Royal Society of New Zealand – in Hawke's Bay in 1968, Dunedin in 1972, and others later – NZAS provided money for some prizes.

At the third Wellington Science Fair, Prof Duncan in his Chairman's speech expressed a wish to build to a nationwide science fair, and this did eventuate, but not until 1977, when Philips (NZ) joined with Kiwanis Clubs of NZ, regional branches of which had sponsored some regional fairs, to ask Prof Duncan to Chair the Consultative Committee, which set up the organisation and management structure for it [93].

Awards

The Association had inaugurated a Research Medal in 1951, at which time it had been suggested that an award recognising outstanding service to science should also be made. However, it was not until the AGM of 1968 that a set of rules was adopted to make an annual award for Outstanding Service to Science [94]. Its terms of reference were broad, but it would 'probably … in the first instance' recognise contributions towards making science more relevant to New Zealand's economic development or increasing the status of science within New Zealand. The first recipients, in 1969, were Dr Charles Fleming, who had been the first recipient of the NZAS Research Medal, jointly with Dr Gordon Gibbs, past President of NZAS (see Appendix 2).



Professor James Duncan, President in 1967/68, 1968/69, NZAS representative on the National Development Committee, founder of the Wellington Science Fairs and later the New Zealand Science Fairs, and NZAS representative and first Chairman of the short-lived Commission for the Future. In 1973, he received the NZAS Medal for Service to Science, newly renamed the Sir Ernest Marsden Medal for Service to Science. [Photo from ref. 129.]

In 1973, the award was renamed the Sir Ernest Marsden Medal for Service to Science in honour of the Association's former Patron, who had died in 1970.

Science policy

Coming into power in 1960, the National Party under Rt Hon Keith Holyoake was obligated to translate its pre-election promises for science [95] into policies assisting 'State Departments, universities, and industrial enterprises generally in developing scientific research …' The following year it established a Royal Commission on the State Services, and Dr Gibbs, as Secretary NZAS at that time, presented the Association's submission, covering all aspects of the coordination and administration of science, including closer relationships between government laboratories and university science departments [§ 31/08/1961]. It called for a special authority, composed of scientists 'renowned for their scientific contributions and for their administrative ability' to report on the future organisation and integration of scientific work in New Zealand, and was considered 'one of the most significant actions that the Association has taken in recent years' [§ 31/08/1961].

Extracts from the Royal Commission's report were published in 1962 in *New Zealand Science Review* [96, 97]. That year the Government introduced a National Research Council Bill intended to implement some of the Royal Commission's recommendations, but NZAS Council opposed it in its first form because it considered that the constitution and functions of such a body should first be 'considered by a committee properly qualified to evaluate the requirements of science and industry' and including 'necessarily' independent scientists from overseas [§ 31/08/1963]. Nevertheless, the establishment of the National Research [Advisory] Council (NRAC) with fifteen specialist committees to advise it 'was announced with a flourish in the press' in late 1963 [98], and the Prime Minister, in a letter to the Association, stated, 'The Government is determined that the Council will be an effective body' [99], although an NZAS editorial echoed concerns that 'the appointment of numerous subcommittees, each of which has to report back, is the classic way of getting nothing done, while at the same time producing a convincing smoke-screen of lots of activity and effort' [100]. Membership of the NRAC subcommittees was published in *New Zealand Science Review* [101].

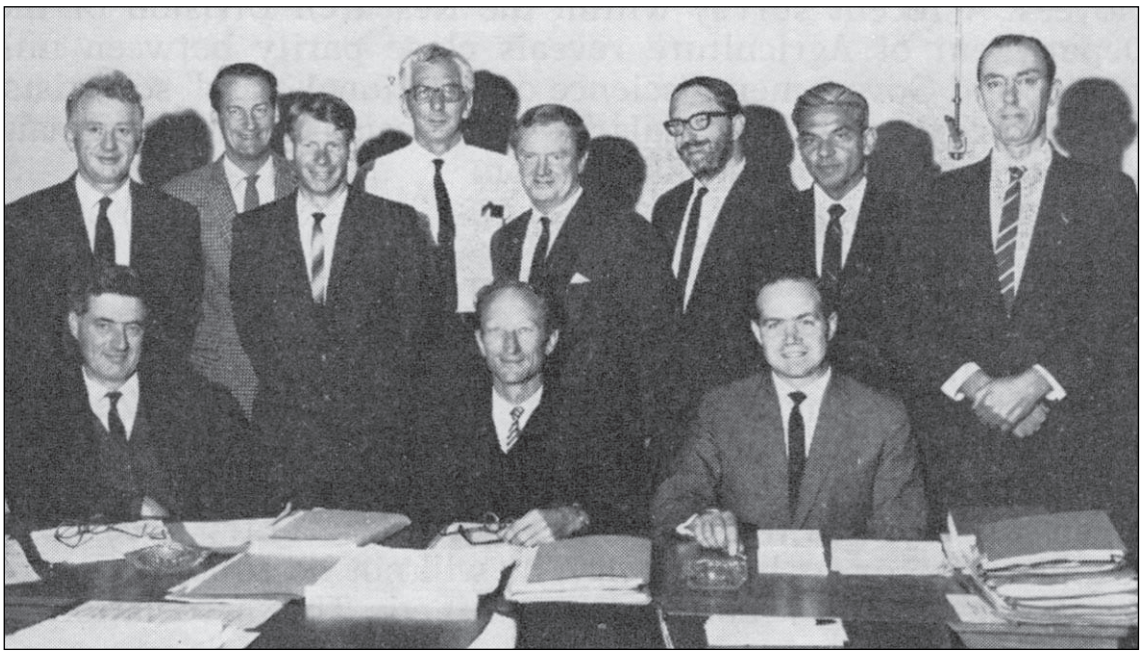
When NRAC's first report was published, following a year's investigation into 16 research fields, it was reviewed

'with considerable pleasure' by NZAS Council, as its views were something they 'had been saying for years' [102]. Saying that Government-financed research should be considered as an investment by the taxpayer, it recommended immediate increases in funding of research in agriculture, forestry, transport and building industries, mineral resources, and operational research in DSIR [103]. However, in a summary of NRAC and its working parties' recommendations 1965-67, published in 1968 as part of an overview by NZAS President Prof James Duncan for the upcoming National Development Conference (NDC), it was pointed out that most of them had not been implemented [104}.

NZAS expanded the membership of its Science Policy and Professional Status Committee in order to encompass the research and fact-finding necessary to make representative and authoritative recommendations to the NDC, as it was considered that they would carry considerable weight [105]. Professor Duncan's article mentioned above considered the results of a questionnaire sent to NZAS members seeking their opinions about the value of their work to the national economy. As well as citing the article by Dick *et al.* (1967) [106] dealing with profitable investments in science in four industries, members provided examples from eight other existing industries (mostly primary industries) and numerous examples of potential new activities based on their specialty [107]. Working through further suggestions from members about industries that could be developed 'using the brain-intensive activities of scientists' and about how scientific skills could be most effectively used was expected to be the main activity of NZAS Council over the coming years [108]. The Association organised a conference in July 1969 to consider the targets subsequently set by the NDC [109]. Opened by the Minister of Science, Hon Brian Talboys, who expressed the Government's 'appreciation of the vast contribution science will make to our growth' and congratulated Prof Duncan on his appointment to the newly formed National Development Council [110], it was attended by over 100 scientists ('generally senior') and reported on to all MPs and the National Development Council [111].

The National Development Council was subsequently made a Sector Council of NRAC, responsible for advising the Government on the amount and disposition of the Science Budget, according to functions not disciplines (with apparently 'no Government department admitting to doing any work of a fundamental nature'!) [112]. Its report for the year ended 31 March 1970 was apparently especially informative, as it came at the end of the first phase of its activities and listed all its earlier recommendations and the extent to which they had been implemented as well as indicating future developments [113]. The Association later published a wide-ranging review, refined by comments from members, of the NDC's recommendations, devoting a whole issue of *New Zealand Science Review* to it; it included the identification of key areas of research and supply and demand for scientists and technicians for them, as mentioned above [114].

NRAC's activities continued after the change of Government in 1972 [115]. Its recommendations had to encompass the UK entry to the European Economic Community in 1973, when its share of our export markets was declining markedly and had fallen below 50% [116], while guaranteed access for two of our major commodities, butter and cheese, was being phased out. The Chairman of NRAC, A H (Arthur) Ward spoke to a meeting of the Royal Society of New Zealand about the changing demands this would place on scientific research here [117]. Acknowledging helpful input from the Association and other organisations such as the Royal Society and the Institute of Agricultural Science, he thought that, irrespective of problems the UK's entry would bring, New Zealand's research should



NZAS Council 1969/70: (from left, seated) Prof James Duncan (Immediate Past President), Dr Alan Kirton (President), Derek Belsey (Secretary); (from left, standing) Dr Bernard Swedlund, John Morris, Dr Alan Eyles, Roy Benseman (Editor), J D Pansing, Frank Studt (President-to-be, 1971/72, 1972/73), Ray de Zylva, Phil Alve (Treasurer). Absent, Dr Brian Shorland, John Offenberger (President-to-be, 1973/74, 1974/75). [Photo from *New Zealand Science Review* **1970, 28(1): 5.]**

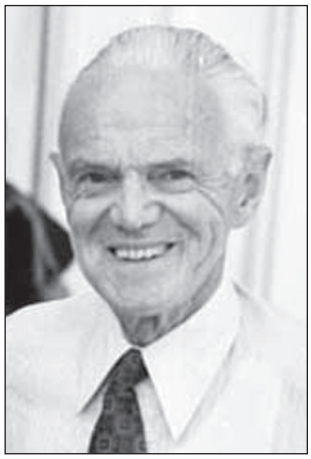
continue to make best use of our natural resources and practise diversification and preparedness to take advantage of changing markets. He conceded that more of our science would be diverted to problems of the environment.

Small world, one world

The so-called 'first space age', from Sputnik to Spacelab, which lasted from 1957 to 1972, had an enormous impact on science and the public's perception of 'rocket science'. In addition, the first colour photographs of the Earth from space (particularly 'Earthrise', taken by Apollo 8 astronauts in December 1968, but also 'Blue Marble', taken on the last manned moon mission, Apollo 17, in December 1972) are considered by some to have had the unexpected effect of transforming thinking about our 'home' planet, 'a grand oasis in the vastness of space'; the worldwide exposure the photographs were given by the media helped to inspire the rise of the 'environmental movement' [118]. In 1972, an international group of prominent scientists and industrialists calling themselves 'The Club of Rome' published *Limits to Growth*, a computer modelling study predicting scenarios of global societal collapse in the 21st Century brought about by overpopulation, food shortages, resource depletion, industrialisation, and pollution [119]. Inspired by this, and in preparation for the first ever United Nations Conference on the Human Environment set down for June 1972 in Stockholm (the 'Stockholm Conference'), a group of ecologists produced a landmark report, *Blueprint for Survival*, published in *The Ecologist* [120]. Given widespread prominent media coverage, its message, that radical change was needed because human population growth and per capita consumption were undermining the means for survival, was hugely influential and a catalyst for political change [121]. A 'put on' (i.e.deliberately provokative) editorial [122] in *New Zealand Science Review*, citing these two publications and recommending taking them with a 'grain of salt' and adopting an attitude of 'I'm all right, Jack' [123], evinced an unusually strong reaction. Former NZAS President Prof John Salmon wished to dissociate himself from the ideas expressed in it [124]. A group of DSIR scientists said that New Zealand, despite its low population and low level of industrialisation, 'was still part of the global scene', and 'maintaining a viable biosphere over the next generation or two is the greatest challenge that faces (or ever has faced) mankind' [125]. These scientists asserted that 'branding them [the *Blueprint for Survival* authors] as "prophets of doom" would be the most irresponsible head-in-the-sand attitude of all time'.

In 1972, the Association had, in fact, shown its environmental concern by joining New Zealand CoEnCo (Conference on Environment and Conservation) 'so that we may attempt to see that the proper emphasis is given to factual background information in causes under consideration' [126]. CoEnCo (now known as ECO) was a federation of environmental and other organisations formed after the protest movement over Lake Manapouri hydro-electricity scheme to service the Tiwai Point aluminium smelter (opened in 1971) showed the need for a unified voice on environmental matters; its founding Chair was NZAS Past President Prof John Salmon [127].

Also, as mentioned above, the last three issues of volume 30 of *New Zealand Science Review*, published in 1973, were filled by summaries of the recommendations of the 'Stockholm Conference' in the belief that it was, in the words of NZAS President Frank Studt, 'an historic event, marking the end of mere scaremongering, and the dawn of an era of constructive action to ameliorate our environment …and no scientist can afford to ignore it' [128].



Sir Bob Falla, long-time member of NZAS, who became its Patron after Sir Ernest Marsden died in 1970. [Photo from ref. 130.]

Conclusion

Despite organisational problems and fluctuating fortunes, NZAS managed to achieve many important outcomes for science and scientists in the 20 years reviewed here. The status of scientists was markedly improved and the national complement of scientists expanded to a point where NZAS was having a real political influence on science policy. Science technicians were helped to gain suitable qualifications and status as a profession with their own representative association. *New Zealand Science Review* was published with reasonable regularity, and the 4th edition of *Directory of New Zealand Science* was published and information assembled for the 5th edition. The branches, particularly the Wellington Branch, prospered for a while, especially when participating in national meetings such as the Science Congresses, but suspended operations when a new arrangement for meetings was decided.

The 70s were to bring great challenges, particularly with the looming oil crisis and changes to New Zealand's main markets, but the Association had shown a resilience that would serve it well during the coming years.

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(Continued overleaf)

Appendix 1. Officers of New Zealand Association of Scientists, 1954–73.

Year	President	Vice President	Secretary	Treasurer
1954/55	FB Shorland	RW Willett	VJ Wilson	JG Gibbs
1955/56	RW Willett	JG Gibbs	-	-
1956/57	JG Gibbs	WJ McCabe	JAF Garrick	-
1957/58	JG Gibbs	NT Moar	-	AE Bainbridge
1958/59	IJ Pohlen	WJ McCabe	JG Gibbs	AE Bainbridge
1959/60	IJ Pohlen	WJ McCabe	JAF Garrick/JG Gibbs	
1960/61	WJ McCabe	RD Northey	JG Gibbs	
1961/62	RD Northey	-	JG Gibbs	
1962/63	JG Gibbs	GE Rushworth	W Freitag	-
1963/64	GE Rushworth	WF Chubb	W Freitag	-
1964/65	GE Rushworth	JG Gibbs/WF Chubb	W Freitag	-
1965/66	WF Chubb	FB Shorland	W Freitag	-
1966/67	WF Chubb	FB Shorland	-	JG Gibbs
1967/68	JF Duncan	AH Kirton	RF Benseman	PC Alve
1968/69	JF Duncan	AH Kirton	RF Benseman	PC Alve
1969/70	AH Kirton	RF Benseman	DC Belsey	PC Alve
1970/71	AH Kirton	FE Studt	DC Belsey	PC Alve
1971/72	FE Studt	H Offenberger	GR Katzer	PC Alve
1972/73	FE Studt	H Offenberger	GR Katzer	PC Alve

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Appendix 2. Recipients of NZAS medals until 1973.

Year	Research Medal	Service to Science (renamed Marsden Medal in 1973)
1951	CA Fleming	
1952	M Laird	
1953	NdeB Hornibrook	
1954	WG Whittlestone	
1955	REF Matthews	
1956	P Whittle	
1957	MT TePunga	
1958	EG Bollard	
1959	KE Lee	
1960	WA McGillivray	
1961	AJ Ellis	
1962	no award	
1963	no award	
1964	DS Letham	
1965	no award	
1966	GW Grindley, RL Bieleski	
1967	no award	
1968	JRL Walker	
1969	RC Cambie, PS Robertson	CA Fleming, JG Gibbs
1970	DE Wright	FB Shorland, WM Hamilton
1971	MP Hartshorn	LR Wallace
1972	AH Kirton	JAR Miles
1973	no award	JF Duncan, PC Alve