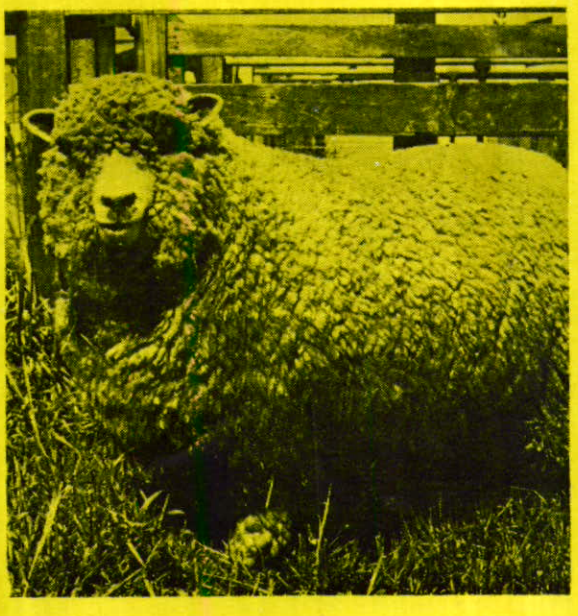
chemistry in new zealand



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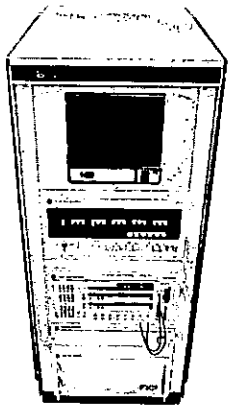

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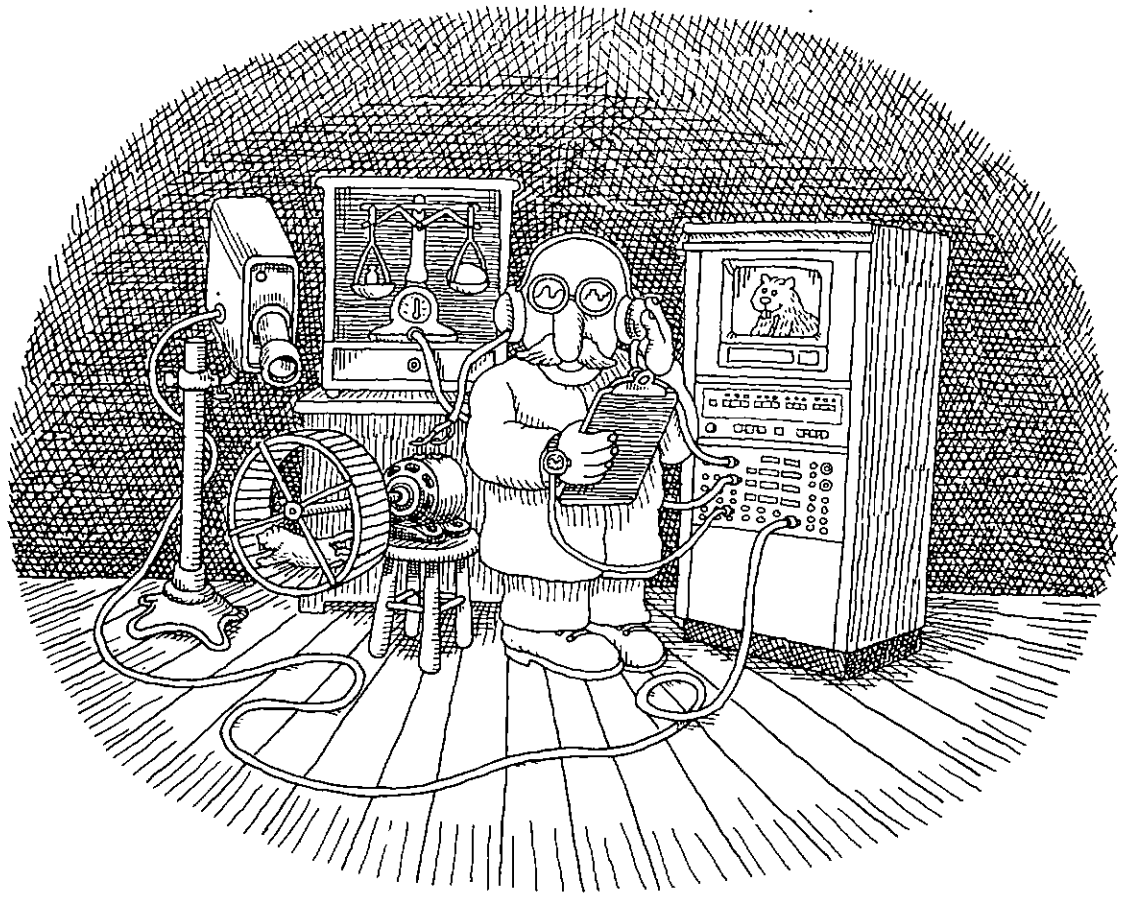

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FEBRUARY 1975
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chemistry in new zealand

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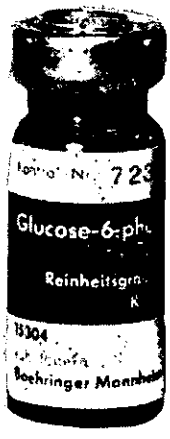
analytical bio chemistry



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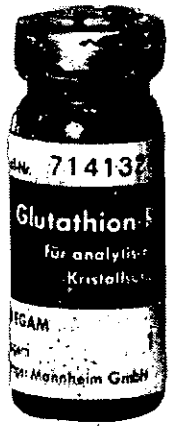
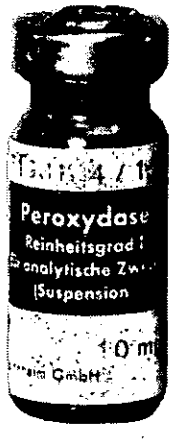


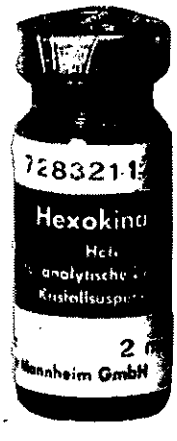
enzymology

Enzymologic research revolutionizes biology not only because of the mushrooming number of newly-discovered enzymes. To the extent to which the biologist advances into cellular regions, he will become an enzymologist; to the extent to which the enzymologist interprets biological functions of cell components enzymatically, he will become a biologist. Thus, enzymology has become one of the main pillars of all biological disciplines.



food analysis

The first knowledge of biochemical processes, of the role enzymes play in them and the first experiences with enzymatic analytical methods were gained with foods. Analyses with the aid of enzymes have many advantages in food analysis: enzymatic methods are fast, safe and reproducible. The measurement of enzyme activities as a criterion of the condition of foods is supplemented more and more by enzymatic analysis of the components of foods.



clinical chemistry

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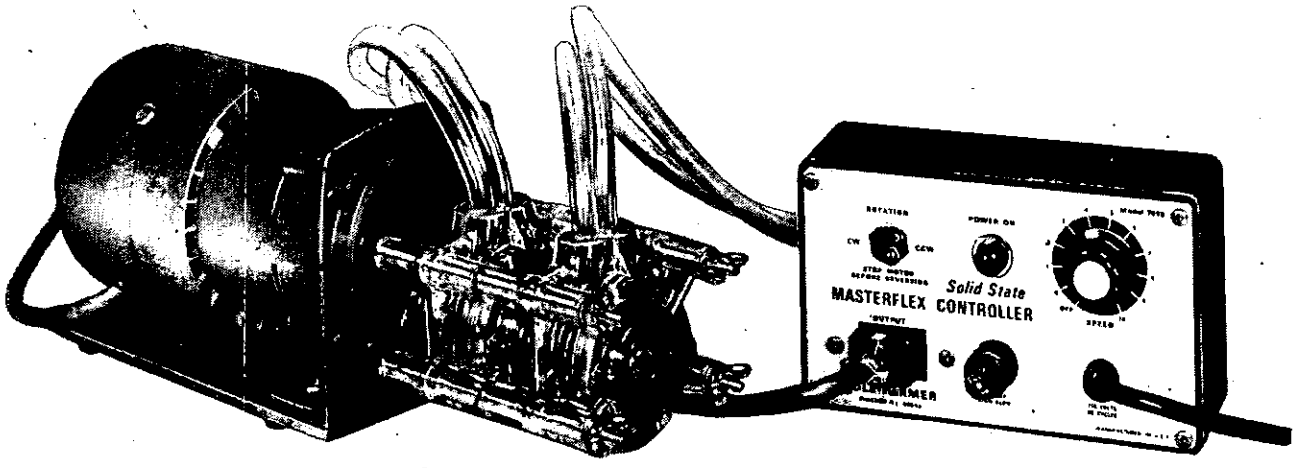

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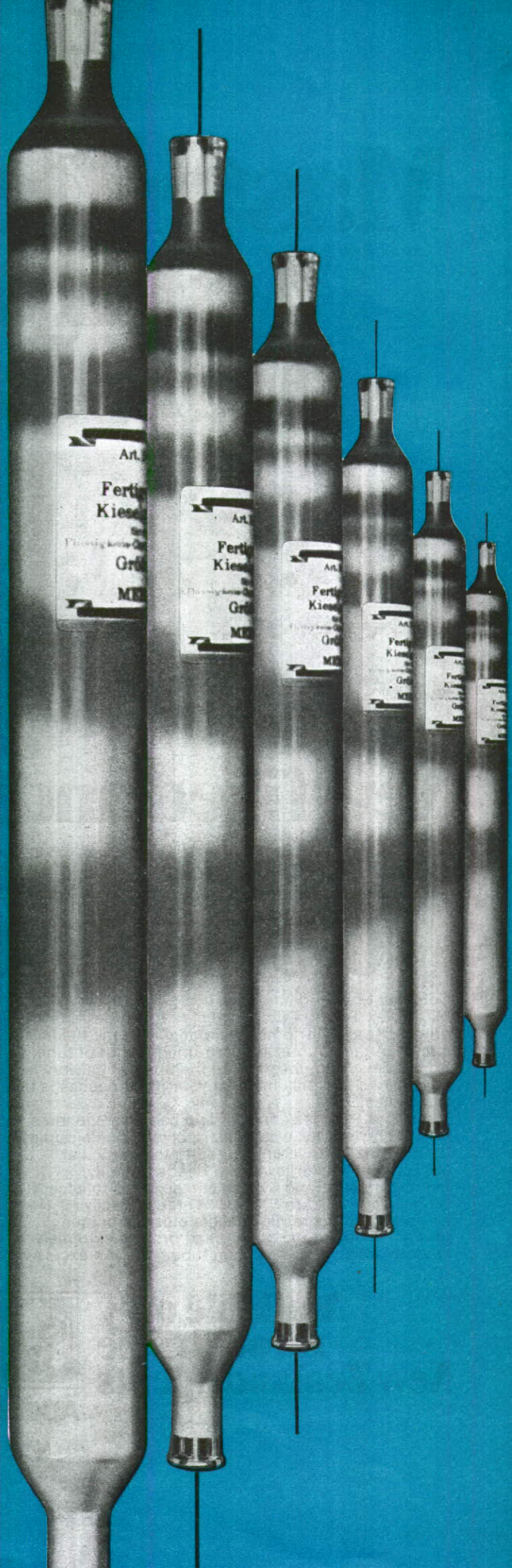

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Plenary lecture for the Symposium on "Professionalism in Chemistry", N.Z.I.C. Conference, August 1974.

Amateurism or Professionalism in Chemistry

A. M. Kennedy

In inviting me to take part in this Symposium, Professor Cambie was kind enough to say he would welcome any topic provided it was appropriate to the general theme of "Professionalism in Chemistry". For better or for worse I chose a title that was vague in the extreme. As I tried to fit my talk to it, I was reminded of the story of the medical student in Dublin who, coming ill-prepared for an examination, complained that the questions were not fair. The examiner invited him to set them himself. This he did — but could not answer them — and so he failed.

In thinking of amateurism as it contrasts with professionalism I was, I think, being influenced by some remarks I made in proposing the toast to the Institute at the 1969 Conference dinner in Dunedin. I had been talked into doing this at rather short notice by a group whom I likened, in my toast, to the band of thieves who set upon the man who was going down from Jerusalem to Jericho in the New Testament story. They included a Pro-Vice-Chancellor, a Pro-Rector, a Dean, and one of their Associates — a sometime Reader, and all of them were chemists.

I marvelled at their guile in fashioning an innocent chemical engineer to their devious ends, and said to myself — what manner of men are these? I looked to the dictionary for help, and found that a chemist was a man well-versed in chemistry — well able to deal with elementary substances. So I began to understand dimly.

I turned to the Conference programme and found the Director-General of Agriculture and the Director of the Nuclear Sciences Research Institute — both of them chemists; and I was reminded of those other chemists who had risen to high positions in Government and whose influence in shaping government research and science policy had extended so far beyond the chemical laboratory and into so many areas outside the traditional domain of chemistry. And I looked further and found the Director of the Dairy Research Institute and the Director of the Pottery and Ceramics Research Association; and I thought of other chemists who, like these, were influencing applied research in many different fields.

Then I listened to our President, the Pro-Rector aforesaid, and reflected on those many chemists from within and outside the universities whose contributions to university administration have been so significant. And I looked around the lecture-rooms and saw men from the front-line of the profession: chemists from industry, some of them former Presidents of this Institute, some occupying high positions in company management; and I was reminded of the difficult role these men have had to play through the years under the critical gaze of commerce and the community.

And so, as I proposed the toast to the Institute, I suggested we should honour it because it had brought together men practising the profession of chemistry in such diverse ways and in so many different walks of life; and whose influence was felt at all levels and throughout all strata of our society.

Time and again as I have listened to a chemist describing some work he has carried out, perhaps the elucidation of an organic structure or the solution of a difficult industrial problem, I have been struck by the way in which the speaker has taken on the role of the amateur detective who is about to unravel a great mystery, and by the manner in which he has carried along the audience in the wake of his enthusiasm. Well — so it is with the chemists I talked about that evening. They are men who are wholly professional in the way in which they apply their skills and knowledge, whether in the pursuit of chemistry, or in matters of management, or in

Department of Chemical Engineering,
University of Canterbury.

their involvement in community or public affairs. And yet as one thinks of them as individuals, one is aware that they are still able to play the role of the amateur — of the man who cultivates his study or art for the love of it and not for professional gain.

It is a curious paradox and I think it influences the way in which we, or society, or particular organisations or institutions, draw heavily on these men — far outside the normal obligations of their particular occupation. We may persuade ourselves that our asking is justified because it opens up the stage on which the amateur can play; yet, in asking, we expect to get, and know we will receive, a truly professional performance whatever the role.

One may find this duality in other professions — if so, I have never been as aware of it. It may be, as Dr Ellis has suggested in another context, that chemists are equally adept with words as with numbers and that this is the characteristic that differentiates them from the members of most other professions. At any rate, one can see traits of versatility and enthusiasm, and an ability to co-ordinate and administer the work of others, in the life and work not only of the present leaders of the profession but of so many of their predecessors.

In the obituary notice for William Skey, first Colonial Analyst, we are told that outside his laborious official duties (which included the performing of more than 10,000 separate chemical analyses) he made many original contributions to chemical science: the discovery of awaruite in the ultra-basic igneous rocks of West Otago "which is highly interesting as being the first recognition of a meteoric-like iron as native to our planet"; the discovery that hydrocarbon in oil-shales is chemically and not merely mechanically combined; and the isolation of the poisons of many native shrubs. His suggestions for purifying water-tanks in India and for the application of cyanogen salts to gold-saving "are now in practical use all over the world". He used to say that chemistry, farming and poetry were the three things he took most interest in, and would sit up at night in the laboratory composing and printing his poetical fragments with a hand-type press.

His successor as Colonial Analyst, J. S. MacLaurin, came to the post with qualifications that would still be regarded as outstanding: a Masterate with First-class Honours; a Doctorate of Science, Fellowship of the Chemical Society of London, backed up by an eight-year period as a consulting analyst. Besides being Dominion Analyst he was appointed Chief Inspector of Explosives in 1909 and Chief Gas Examiner some years later. Between times he acted as analyst to the Geological Survey and did research on kauri gum and *Phormium tenax*. Beginning with one cadet assistant, he built up the Dominion Laboratory into an organisation with a staff that included 32 graduate chemists, a central laboratory in Wellington and branches in three other cities. It was said of him that he was equally successful in administrative as in purely scientific work — a thought that one could echo of his successors down through the years.

MacLaurin retired in 1930, the year that this Institute was founded and a year after Mr D. F. Sandys Wunsch came to New Zealand. Educated at New College, Oxford, and McGill University he had, like MacLaurin, the sort of background that might have led him into what S. G. Brooker has called an indefinitely prolonged meander through the halls of ivy. Instead, he chose a down-to-earth career in mining and the chemical industry, and this brought him, in due course, to the management of Dairy Products Ltd, Edendale. Pat Wilson of Edendale has described the new managing director's arrival: "The morning after Mr Wunsch arrived, Bill McDonald pulled up at the dairy factory yard in his Model T truck and said to Dan Tither and George Dickson, 'Have you seen the new man for the sugar?' 'No,' they said, 'What's he like?' 'Well, he's got short pants and a red beard, but he looks as though he might have the ability.' 'Well,' said Dan Tither, 'He'll need long pants and a white beard and plenty of ability if he's going to make a go of that place.' "

He had long pants and a white beard when I met him during a visit to the Dominion Laboratory made by the Council of Scientific and Industrial Research, of which he was a member for about twenty years and chairman for five. And he made a go of that place; so that, when he retired as managing director of the Lactose Company of New Zealand in 1950, the company had an international reputation. Sandys Wunsch was deeply interested in all forms of science, which must have been a great asset to the S. and I.R. Council, but he was also a pioneer in the application in this country of chemical engineering principles to industry. He was a founder member and a former Vice-President of the Institution of Chemical Engineers, and it was no coincidence that the chemists he employed had to slog away in their spare time to achieve corporate membership of the Institution.

Professor S. R. Siemon was always mindful of the role played by H. G. Denham, Professor of Chemistry and some-time Rector of Canterbury College, in starting the teaching which led to the establishment in 1945 of courses in chemical engineering at the College. Denham, like Sandys Wunsch, had been Chairman of the Council of Scientific and Industrial Research. He was also a prime mover in the founding of this Institute and its third President. It was during his term of office that the Code of Ethics was prepared and the first annual conference held. Fifty years ago, he gave a talk to the Canterbury College Engineering Society which he called, "The

Chemical Engineer". In it, he quoted some remarks made by Donnan a few years earlier, which still bear repeating:

"Hitherto, our general practice in Great Britain has been to keep the chemist and engineer apart, both in training and in after-life. In my opinion, this practice has resulted in enormous damage to the progress and efficiency of our chemical and allied industries. We often find the engineer with little or no knowledge of or training in chemistry in charge of the design, erection and control of chemical plant and processes. We find him as general works manager. Nor can we blame him. Somebody has got to build the mill and make the wheels go round . . . but it must be the chemists and engineer-chemists who control the testing and running of the plant, who find out its imperfections, and continuously strive to remove them and so improve the economy and efficiency of the plant . . . The engineer-chemists, and especially the chemical engineers, must see to it that the most economical and most labour-saving machinery is employed."

In talking about the engineer-chemists — and I think he meant here the versatile creature into which so many of our earlier industrial chemists have had to evolve — Denham went on to describe the way in which these men, together with the chemical engineers, would build on the processes developed by the laboratory and research chemists; how they would collaborate in the design, construction, operation and control of chemical plant. He said . . . "It is needless to remark that men of this class must possess certain essential qualities of temperament — sound horse-sense; cool, quick judgement; power of controlling workmen; and courage in the face of danger."

In referring so briefly to a few of the pioneers of our profession, I would like to suggest that these men displayed a love for their work, in all its aspects, in a way that distinguishes the true amateur; and yet they were professionals through and through, in the quality of their own work and the standards they set themselves and expected of others. They were active in the affairs of professional bodies and learned societies — yet they were the last people who would have needed such bodies to fall back upon. Being professional was, to them, an unspoken component of their everyday life. I would guess that they contributed enormously to the professional recognition accorded to chemists in their own organisations and in the community at large. They were men of stature, broad in their interests, sure of their authority, needing no committee or council to hide behind.

In reading about them, I am reminded of a story that Professor A. V. Hill tells. It was at the time of a dock strike and enormous lorries were going in and out of the gates carrying impressive notices, "By the Authority of H.M. Government," or "By permission of the T.U.C." Among them was a tiny donkey-cart driven by a little old man with a bashed-in bowler. On the cart was a notice, "By my own bloody authority".

I wonder why, then, we have become so concerned in recent years with professional status — with the need not only to be, but to be seen to be professionals. The men are as good as they ever were. Perhaps it's just a factor of the growth and increasing complexity of the present day, even in a country as compact as New Zealand. When the Institute of Chemistry was founded in 1930 the country had to contend with a mere handful of chemists. The barriers separating the universities, government and industry must have been less obvious — or perhaps men like Denham bestrode them more easily.

Now the Institute has well over a thousand members. There is strength, almost to the point of self-sufficiency it would seem, in the universities, in government, in industry, and in the teaching profession. Universities have become research centres in their own right, vying with government departments and research associations for funds and people. Industry has expanded and become less dependent on overseas people and technology — more demanding on the chemist in its quest for diversification and in-depth processing. Chemical engineering has become an accepted discipline, making it less easy for the chemist in industry to evolve into Denham's engineer-chemist. The importance of secondary-school teaching to the future strength of the profession has been more acutely recognised. The growth of the technical institutes has forced a new look at the traditional patterns of educating, employing and recognising chemists.

With all the modern aids at our disposal, communication has become more difficult, not less, and barriers have been erected where none were before. Yet never has it been so important, as in this time of environmental concern and of energy and other resource limitation, for chemists in all branches of the profession to be at one with each other — able to communicate and collaborate.

One of the objects for which this Institute was established was to promote the *science* and *practice* of chemistry *in all its branches* — and the usefulness and efficiency of persons engaged therein. To me, this implies easy communication at all levels. Yet look at our annual conference. In 1950 one-third of the membership from industry took part; now about 10% attend, even though the industry group is numerically the strongest in the Institute. The universities group is much smaller, yet far more members come from the universities than from in-

dustry. This is not simply a matter of a shift in emphasis in the programme itself. In 1971, out of about 90 papers 6 came from the universities, 18 from the DSIR and research association, and only 1 from industry. In 1973 a special effort was made to attract papers of industrial interest and 9 were contributed by industry, out of over a hundred general and specialist papers. Yet if we go back to 1950 we find that, of the 27 papers offered at the conference 7 came from the universities, 15 from government departments and only 1 from industry.

Clearly the conference programme has been research-dominated for a long time. This is not for want of trying on the part of successive conference committees who always solicit papers well in advance and who would, I am sure, willingly accept any papers having an industrial or commercial flavour. Nor is it uniquely our problem. Last April the Institution of Chemical Engineers held its first annual research meeting in London. Symposia topics were carefully chosen to attract papers from industry and a very low fee was set. Of the 150 people who took part 20 came from industry and the rest from universities; there were 36 papers of which only 3 were given by industrial people. Some organisations manage better than this. At the 1974 annual conference of the N.Z. Institution of Engineers the programme included 10 papers from university authors, 9 from the Ministry of Works, 9 from the DSIR, and 16 from industry and consultants, and the audience mirrored this broad spectrum of the profession.

Mr M. S. Carrie has said that industrial chemists are not always free to discuss their work; nor is it always easy for them to persuade management that conferences are worthwhile. Dr Foster in his 1969 conference paper, "The only substitute for profit is loss" epitomised the problem when he said that research is for being pure at, technology is for being profitable at. Publication and communication are essential for the research worker. The technologist has largely completed his work when it is profitably applied. Publication, even if it is allowed, may be uneconomic when looked at through the cost-benefit spectacles of the industrialist. Dr Foster suggested that the research and technologist groups in the Institute could get along very well in their respective jobs without much communication — that, in fact, when they try to talk to each other, they are apt to misunderstand each other's motives and rationale.

It is quite obvious, if one reads the Institute's journal, that there is some recognition of the barriers that can exist between research and technology and the complementary roles that the research worker and technologist should play in the profession. Despite this, whether one regards the present form of conference as the result of a take-over by the research people, or looks at it as the filling of the void created by the opting-out of the technologist, it is clear that our conferences are not helping, as effectively as they might, to promote the science and practice of chemistry in all its branches.

I want to look briefly at one aspect of the communication process that concerns those of us in the universities. There has been much talk in recent years of the symbiosis that should exist between the universities and industry. Dr J. C. Andrews, in a talk he gave to the Canterbury branch shortly before his death, referred to some remarks made by C. S. Marvel in his Perkin Medal address.

"There is sometimes a feeling among chemists that the interests of the university teachers and the industrial chemists are in conflict . . . It is my view that the interests of the two groups are so closely interwoven that anything that is good for one group will be good for the other . . . they grow together in a symbiotic relationship."

Mr Carrie in his 1967 Presidential address suggested in his own inimitable manner that the technologist is the spearhead in the advance of scientific knowledge; and he and S. G. Brooker urged the universities to recognise the challenges faced by the chemist in industry. Dr Johns, in turn, argued that the Institute should try to promote an effective technical symbiosis between the theorist and the technologist for the future of creative science; while we were reminded, back in 1961, by an editorial in the Journal that this symbiosis between theory and practice is proclaimed in the motto of the Institute — per libram et librum — by balance and by book.

Of course there are contacts at a grass roots level; in local branches or between individual chemists on a personal plane. And I suspect that most university departments have been making efforts to bridge the gap. Certainly lectures by men from industry form an essential part of the Chemical Process Technology course offered by Canterbury's chemistry department, and a key part of the laboratory work takes place in an industrial plant. I expect that much the same happens with the Applied Chemistry course at Otago and with Industrial Chemistry at Victoria. In my own department I have found chemists or chemical engineers from industry — or, for that matter, from government departments and the research associations — more than willing to come and talk to our students about their work and to show by example the challenges that the young graduate may face.

But students come and go. The staff go on — if not for ever, certainly for longer. It is they with whom I am more concerned when talking about the difficulties of communication at a professional level, and the fallacy of assuming that because we say a symbiotic relationship should exist, then so it will.

And after all, if the university teachers are given a lively awareness of the real technical problems in industry, their enthusiasm will soon rub off on the students.

Here, I fear, the process has been sadly one-way. Industry has been freely critical of the universities — and rightly so at times. But how much drive has there been from industry itself to interest university departments in its problems. I can think of very few occasions where an industrial company has made a deliberate attempt to generate such interest, either by suggesting lines of research that could profitably be tackled (I mean real problems, not "non-problems" of the kind suffered by Lucky Jim); or better still by inviting some of the younger men to leave their halls of ivy and meet the technologists on their own ground: to see around the plant; perhaps to lecture or just talk informally; or maybe to consult. There is much lip-service paid to the need for exchange visits of this kind, but I find myself reminded to Liza Doolittle's words in Lerner and Loewe's version of Shaw's Pygmalion. "Words, words, words . . . I'm so sick of words — Show me."

As Dr Foster has suggested, there is a good chance that the research worker and technologist will misunderstand each other's points of view and motives when they try to talk to each other; but this does not mean that a good research worker cannot be a useful source of expert opinion for industry, any more than one can argue that the problems a technologist faces are less challenging than those of the research man simply because they are not taken to the point of publication. While it may be difficult to see how the academic, in a brief confrontation can help the professional on-the-job man, he does have a much closer acquaintance with the fundamentals of his subject than the man who has been out a few years. When Undershaft, the industrialist, was recruiting Cusins, the professor, in Shaw's Major Barbara, he said — "This is a serious matter of business. You are not bringing any capital into the concern." Said Cusins, "What — no capital? Is my mastery of Greek no capital? Is my access to the subtlest thought no capital?" The academic, in the process of confrontation may not be applying the subtlest thought; but if he manages to remind the young and not-so-young graduates that the basic laws of nature still apply as well in industry as in the university laboratory, he will be doing a worthwhile job.

I suggest that there's a real challenge here and it may be too important to leave it to the universities and industry to look after in the fullness of time. Perhaps the Institute should take up the challenge, as the professional body for all chemists and the one organisation that can bring together all who are concerned with the science and practice of chemistry.

Having offered this opportunity to the Institute, may I now talk for a few moments about what I believe has been a lost opportunity. Denham foresaw the growing importance of the engineer-chemists and the chemical engineers in industry, but he believed that these people would be essentially chemists, not engineers. Certainly my own department, like many others, was fostered in a chemistry basement; but, like these others, it has long since been adopted by an engineering school. This is a recognition of the fact that the chemical engineer is essentially an engineer, not a chemist. The same trend has occurred in industry. Even in a company as traditional as I.C.I. in the United Kingdom, the jobs which it was formerly thought could only be handled by a combination of chemist and mechanical engineer are now done by chemical engineers.

In New Zealand industry the opportunities for the chemist to evolve into a chemical engineer are bound to decline — and not just because of the increased output from our universities. Thirty years ago chemical engineering theory could be encapsulated in a classic textbook by Walker, Lewis, McAdams and Gilliland, and an encyclopaedia of data and tables called Perry's Handbook, known as the chemical engineer's bible. The industrial chemist of that era, and the product of the five-year chemical engineering degree planned by Denham and implemented by Siemon, could reasonably pass muster as an engineer *or* a chemist, whichever way you prefer. Both species could meet comfortably together in the Institute as in industry.

The chemical engineering graduate of today has had to master a formidable body of literature in his own field. He can no longer masquerade as a chemist. He is not even an applied chemist, though I suspect there are some members of this Institute and some employers who persist in the illusion that this is so, and judge his performance accordingly. He will have taken general chemistry to about Stage II level, with a good deal more thermodynamics and reaction kinetics. He may have taken a couple of Chemistry III papers (without the accompanying practical work). But he is more likely to have read additional mathematics, or computing methods, or industrial administration, or metallurgy, or applied microbiology. Even if he has taken the Chemistry III papers, and come to the chemical engineering degree by the B.Sc. (Chemistry) route, as in good many now do, it is unlikely that the work he does on graduation will satisfy the professional experience requirements for Institute membership. One can judge this by noticing that of the 140 or so New Zealanders who have graduated in chemical engineering from Canterbury over the last seven years not more than one or two have applied for Institute membership.

Perhaps I should make myself clear. I am not advocating easier membership of this Institute for chemical engineers — if anything, the reverse. Nor do I want to overemphasise the strength of the chemical engineering membership. Ten years ago, there may have been fifty; now, there are perhaps sixty, about equally divided between those chemists holding professional qualifications in chemical engineering and those who are academically qualified. The chemical engineer has his own Institution if he wants professional recognition; but he had, until quite recently, no organisation that could offer him the functions of a learned society. The Institute of Chemistry might have done this — indeed, this was foreshadowed in an article by Dr Butler in the Jubilee issue of the Institute journal; and again by Dr McGillivray in his 1971 Presidential address when he talked of the Licentiate member. But by then the die had been cast. The N.Z. National Committee of the Institution of Chemical Engineers — a group, incidentally, ocmprising three Fellows of this Institute — had asked all local members of the Institution whether they would like to see a specialist group formed within the Institute of Chemistry, or one within the N.Z. Institution of Engineers, or the formation of a local branch of the British Institution. The response was overwhelmingly in favour of linking with the engineers.

By May 1971 the Group had been formed. It now has about 260 members and, by its active and vocal participation in the last three annual conferences of the Institution of Engineers, has succeeded in changing irreversibly what had seemed for generations an immutable conference structure. Although many of the Group members are not eligible to join either the Institution or this Institute, the fact is that over the last three or four years more than seventy have become members of the N.Z. Institution of Engineers.

It is rather ironical that in 1918 some practising chemical engineers in Britain approached the Institutions of Civil and Mechanical Engineers to see if they would sponsor a specialist group for chemical engineers within their Institutions. They were turned down, and so they linked up instead with the Chemical Engineering Group of the Society of Chemical Industry. Had a chemical engineering subject group been formed under the umbrella of the Institute of Chemistry, it may have gone some way towards offsetting the present research-oriented specialist groups and restoring the imbalance that exists in our conference programmes. It may have helped draw in more industrial chemists and allowed a wider body of chemists and chemical engineers to meet and draw sparks off each other — an interchange that would surely be as valuable as that we seek between the academic chemist and his industrial counterpart.

I have talked a lot about the learned society role of the Institute, because this is what brings the membership together on occasions like this. If the Institute succeeds in this role, it will surely be able more effectively to perform its other function as a body established to advance the interests of the profession of chemistry and of those engaged therein. Here, I am thinking particularly of the industrial chemists. Chemists in the universities, in government, and in teaching have organisations that can look after questions of status and salary negotiations. Not so the industrial chemist who, to judge from Dr Foster's recent surveys, has been falling behind the chemists in other sectors as far as salaries are concerned. Council has already asked branches to consider what the primary role of the Institute should be and whether it is effectively able to maintain and protect the rights and status of its members. In this regard we should remind ourselves that while trade union affiliations may not yet pose the problems here that face professional chemists in Britain, it may not be long before this Institute has to consider, as the Royal Institute of Chemistry has done, whether a conflict of loyalties between the Institute and a trade union could arise, and whether, indeed, the Institute should act as a trade union for its members.

I have used the term professional or professionalism freely in this talk without attempting a definition. For those who want one, I commend a recent paper in "Chemistry in Britain" by Dr F. A. Robinson, President of the Royal Institute of Chemistry. He gave five criteria which characterise the professional person. We sometimes overlook one of the most important — the particular relationship that exists between the professional and the client, which arises from the complexity of the subject-matter with which the professional deals and deprives the client from making informed judgments himself. The self-imposed code of ethics set out in our rule-book is designed to correct any imbalance in this sort of relationship.

This particular criterion reflects the historical basis of professions like medicine and law, and its significance is obvious in regard to the situation that exists, say, between a consulting chemist and his client. But an employer in industry is in much the same position as a client when relying on the advice or skill of a chemist on his staff in matters that are beyond his own personal knowledge or experience. Dr Robinson foresees new ethical problems arising for which guidelines may have to be drawn by his Institute. For example, the Department of the Environment may insist that a *named* chemist in a company be made responsible for monitoring waste disposal and ensuring that limits laid down by the Department are not exceeded. As a result, chemists could find themselves in direct conflict with their employers. Where does the professional's loyalty

lie: to his employer, as in a lawyer-client or doctor-patient relationship; or to the public?

Although Robinson did not mention it, there is a converse situation that could arise in relation to the Department of Environment's own Alkali Inspectors. For the last century, the Alkali Inspectorate has been exercising control over air pollution in Britain and has made spectacular gains by collaborating with industry, rather than trying to coerce it by prosecution. The Inspectors have kept a code of strict confidentiality and, even now, will give no information on the amount of effluent that a company is actually emitting. Because of this, the Inspectors have recently been coming under heavy fire — in particular, from a Ralph Nader-inspired group, but also from television and the other news media. Where is their professional loyalty to lie?

I see nothing in our Code of Ethics that would help a chemist faced with this sort of problem. Is it time to take a fresh look at our professional code of conduct, to give our members guidelines that will help them act in a socially responsible manner, knowing they will have the full support of their professional body? I suggest that matters like this are too urgent to be dealt with by sporadic correspondence in the Journal or leisurely discussion at annual conferences. We seem to deliberate overlong in some matters. Perhaps this is a reflection of the academic influence on Institute affairs — the desire to dot all the i's and cross all the t's. Maybe we need more of the technologist's philosophy — a greater sense of urgency.

The matter of technician status has been under discussion for quite a long time. Dr McGillivray raised it in 1971, especially as it affects the non-graduate chemist who may not qualify for membership under the present rules. Since then, the journal has carried a few articles or comments on membership qualifications, but the casual reader could be forgiven for thinking that the bulk of the membership — including the industrial chemists for whom the question of technician status is surely vital — are content to echo Ogden Nash when he says of the stork

> From long description I have heard
> I guess the creature is a bird
> I've nothing else of him to say
> Except I wish he'd go away.

A year or two ago the N.Z. Institution of Engineers debated its education policy at great length. It reaffirmed its preference for academic qualification by way of a university degree, but it also agreed to accept qualification by the Institution examination while there were still enough worthwhile candidates unable to take a full-time degree course. It rejected the proposal that additional facilities for professional engineering education should be provided outside the universities on the ground that there is already a well-tested route by which N.Z. Certificate of Engineering holders of sufficient merit can obtain a Bachelor of Engineering degree with two further years of full-time study. The sacrifice can be great, but so are the rewards, judging by the response of employers to these men. By the end of this year more than a hundred N.Z.C.E./B.E. graduates will have emerged from Canterbury and a similar number from Auckland. Roughly ten percent of the N.Z.C.E. output from the Institutes follow this route, making up about ten percent of the intake to the engineering schools.

No doubt this policy will be looked at afresh from time to time. The point I would make is that the debate was not confined to branch committees and the Council. It involved long and heated argument around the table, at frequent meetings of the Institution's Education Committee and Executive Committee for Professional Qualification. And, I hasten to add, on these committees, as on Council itself, the academics — who might be expected to have a vested interest in preserving the status quo — were outnumbered almost ten to one.

I raise this, not to take sides in the issues that face the Institute of Chemistry, although I hope that if comparisons with engineering are made, all the facts will be used. Rather, I want to come back full circle. I have talked about a number of issues; some of them hardy perennials, others have hardly confronted us as yet. I have suggested that our pace of debate may be too leisurely, for the old as for the new problems, and that it tends to be curiously lop-sided; that, in particular, the voice of industry is not heard loudly or clearly enough.

I have inferred that we ask, and expect, a great deal of professional chemists in this country, and the Institute is no exception. We need only look at our salary and membership surveys, or our secretariat, or the editorship of the journal. When we ask people to take on these tasks, we know that the dedication of the amateur will be stamped with the hallmark of the professional; that we will get complete and adequate service, even if the charges are unreasonably low — if I can misquote Item 10 of our Code of Ethics.

But I wonder if this is still good enough; whether we need more organisation so that tomorrow's problems can be looked at today. Should we set up working groups at branch level, as Professor Vaughan suggested a year or two ago? Or do we need some national committees to support and advise Council on matters of education, of qualification, of ethical practice — even if it costs us each a few more dollars on our annual subscription to enable these committees to meet regularly. Have we reached the end of the road with the dedicated amateur? Do we, as chemists, take our professionalism seriously?

NOTICES

N.Z.I.C. CONFERENCE 1975

Planning for the 1975 Conference, to be held at Massey University, is well underway. Professor R. D. Batt is Chairman of the Conference Committee and Dr. M. J. Hardman Secretary. The Conference will be officially opened on Wednesday August 20th and run through to Friday August 22nd. Tuesday August 19th will be available for specialist group sessions.

Most members of the Institute will have come into contact with Emeritus Professors L. H. Briggs, H. N. Parton and F. G. Soper, sometime in their careers. These men all of whom are Honorary Fellows of the Institute and have made a significant contribution to Chemistry in New Zealand, have been invited as guest lecturers to the Conference. Their lectures promise to be of great interest.*

**Note*

It is with regret that we note the death of Professor Briggs in January. An obituary will be published later.—Ed.

The N.Z. Association of Clinical Biochemists are holding their Conference on the Monday and Tuesday prior to the N.Z.I.C. Conference (18 and 19 August).

SYMPOSIUM

The Biological Role of Metal Ions

A one day symposium concerned with "The Biological Role of Metal Ions" is to be held on the Monday preceding the Conference (August 18 1975). It is being organised by the Manawatu Branch of the New Zealand Institute of Chemistry and the New Zealand Biochemical Society and aims to bring together a variety of people including chemists, biochemists, soil scientists and veterinary scientists who all have the common interest in the role metal ions play in biological systems. Already considerable support has been shown around the country for this idea.

The programme will consist of three sections covering the following general areas:

(1) The role of metal ions in biological systems, in particular proteins and other important biological macromolecules.

(2) The interaction of metal ions with the smaller biologically important molecules, including the study of model systems.

(3) The application of physical and analytical methods to the study of metal ions in biological systems.

Each section will contain a review lecture followed by related short research papers. Those wishing to present papers should send titles for consideration to Dr E. N. Baker, Dept. of Chemistry, Biochemistry and Biophysics, Massey University by Friday April 25th 1975.

SYMPOSIUM

HAZARDS WITH CHEMICALS

A symposium arranged by the Auckland Branch of the NZIC.

2 p.m.-9 p.m. Wednesday, 23rd April, 1975 at the Engineering School, Auckland University.

This symposium will be aimed primarily at chemists who are concerned with handling chemicals. Topics to be covered include the transport and storage of chemicals, the implications of the new dangerous goods act, the roll of the fire brigade in dealing with chemical accidents, toxicological effects and the protection of the consumer. The future responsibility of the NZIC and its members with respect to chemical hazards will be discussed.

Enquiries to Dr A. F. Wilson,
N.Z. Forest Products Ltd.
Private Bag, Auckland.

Prize winning student paper, Conference 1974

Immunological Studies of Facial Eczema in Sheep

by A. F. Erasmuson

As is commonly known, a disease of cattle and sheep occurs in New Zealand called by one of its more obvious manifestations — facial eczema.[1] It is observed mainly in the northern parts of the country, but has been reported as far south as Nelson and Marlborough, and also in Victoria, Australia, and in South Africa — carried there, so rumour has it, on the soles of rugby boots. The cause has been identied as a fungus *(Pithomyces chartarum)* that grows on dead grass and releases toxin-containing spores particularly between January and April after dry weather followed by warm humid conditions. High densities of spores may then exist in the pasture — perhaps without the farmer's knowledge — and grazing animals may become seriously affected before symptoms are apparent.

The toxin is a potent inflammatory agent acting particularly on the bile ducts which, in response to injury, form scar tissue and may in consequence become blocked. A biochemical consequence is that a chlorophyll metabolite, phylloerythrin, accumulates in the blood and causes sensitization of those parts of the skin which are exposed to sunlight. In sheep this results mainly in the outbreak of distressing sores on the face, while in cattle udders and other unprotected parts of the animal body are affected.

At present several methods are being used to combat the disease. The most prevalent procedure involves spraying of grazing areas with Thiabendazole, a very effective but relatively expensive benzimidazole fungicide, which affords protection for about six weeks. Alternatively, the farmer can remove stock from pastures when spore counts are high (as determined by a counting procedure which he can apply himself) or are expected to be high (as indicated by broadcast information). A long term possible solution centres around a programme for breeding resistant animals, but this approach is highly specific in requiring strains which have this resistance while retaining all desirable genetic characteristics. Immunological methods have not yet been successfully developed, but were a vaccine to become available, its use would allow protection of any animal regardless of its species or breeding. The research work on which I am engaged approaches the problem of facial eczema from the immunological angle.

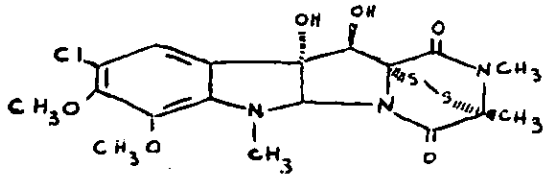
The spore toxins which cause facial eczema are a group of compounds called sporidesmins, the most abundant and important of which is sporidesmin A (I). Work aimed at the identification of the cause of the disease was begun in 1938, but it was not until 1958 that the fungus was identified as the causal agent. Sporidesmin A was then isolated and its chemical properties were established by work done at Ruakura Animal Research Station over the following decade,[2] final structural identification requiring crystallographic work which was completed in Australia in 1966.[3] Its molecule comprises a combined substituted tryptophan and alanine, with an unusual disulphide bridge feature*, and the biosynthetic involvement of these amino acids has been established by ^{14}C-labelling methods.

The dioxopiperazine-disulphide cage structure confers the biological activity on the toxin, and simpler synthetic examples of compounds with this feature have been found to show antiviral properties. Sporidesmins and related substances are therefore currently attracting considerable attention; organic chemists in Australia, Germany[4] and North America[5] as well as New Zealand are engaged in synthetic studies in this area. A highlight was reported last year — a total synthesis of sporidesmin A[5] which involved the condensation of an appropriately substituted indole derivative and a disulphide cage unit to give the intermediate (II). A particularly neat oxidative ring closure led to the diacetate (III) and hence the toxin.

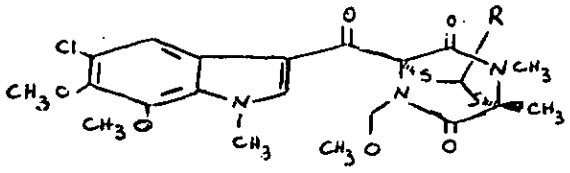
Whereas the objective of that synthetic work was to prepare the natural product, our requirements are for compounds which are structurally related to sporidesmin but which contain additional functionality through which bonding to a protein can be effected. Such compounds are called "haptens", and to be ideal for immunological work they should be

Chemistry Department,
Victoria University of Wellington.

* *Footnote:* Other sporidesmins differ from sporidesmin A in their sulphur functionality.



(I)



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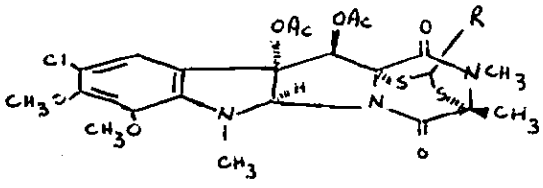

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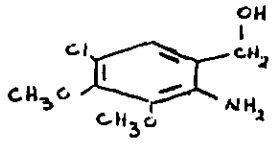

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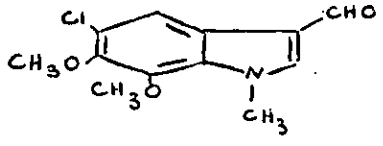

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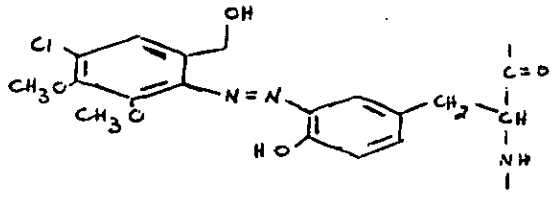

VI

readily obtainable. However, their synthetic availability will be related to their chemical simplicity, and the simpler they are the less will they resemble the toxin. The need, therefore, is to find compounds which have optimal activity and structural simplicity, and the rationale used in our approach to the problem involves the synthesis of haptens of increasing complexity. The first to be prepared was compound (IV), and currently suitable indoles are being synthesised with a view to then elaborating more complex polycyclic substances based on the intermediate (V). Compound (IV) has been linked to bovine serum albumin by way of a diazo bridge, as indicated in (VI), in our first attempt to prepare a synthetic antigen. Injection into rabbits did initiate the production of antibodies, and it is anticipated that later studies with haptens more akin to the natural toxin will provide us with more potent antisera.

"Hapten" was coined 50 years ago to denote the non-proteinoid capsule of a pneumococcus to which specific antibodies are formed *in vivo*. The compounds involved were complex polysaccharides, but now "hapten" signifies any non-protein molecule against which antibodies can be directed. Whereas an antibody may be directed against a small region of a large molecule or against an entire small molecule, the foreign body which first stimulates antibody production in an animal, the antigen, must have a molecular weight in excess of about 5000. Sporidesmin itself is much too small to initiate antibody formation, and what must be aimed at is the creation of protein derivatives having surface regions which resemble the toxin, i.e. hapten-protein adducts. This type of synthetic antigen will induce the synthesis of antibodies which contain specific sites designed to complement the hapten regions in a lock-key relationship. Since antibodies are themselves large proteins (m.w. > 150,000) with more than one active site, and since artificial antigens will contain many "template" sites (sporidesmin-like in the present case), the association which can be observed *in vitro* results in large and insoluble aggregates. Precipitation in such tests is therefore an indication of the presence of antibodies in a serum. It does not, however, constitute proof that these antibodies are specific to the artificial hapten used; they may be active towards features of the protein employed in the antigen. To establish that the required antibodies are present, a further hapten-protein antigen must be prepared using a second "carrier protein". If precipitation occurs on interaction with the antiserum, hapten-specific antibodies are demonstrated to be present. Other immunological techniques can be used to determine the detailed characteristics of generated antibodies.

Success in my research will require that suitable antibody-inducing hapten-protein complexes are synthesised. Provided that they meet other biological requirements, it should then be possible to use them either to protect animals directly or in the

preparation of antisera which could also be used for this purpose.

My work complements some being undertaken by Mr J. W. Ronaldson of Ruakura who is studying antigenic materials obtained by use of derivatives of naturally occurring sporidesmin.[6] Dr W. E. Jonas is coordinating the two immunological programmes.

I thank Mr Ronaldson and Dr Jonas (Wallaceville Animal Research Centre) for their co-operation, and the Ministry of Agriculture and Fisheries for a Research Grant.

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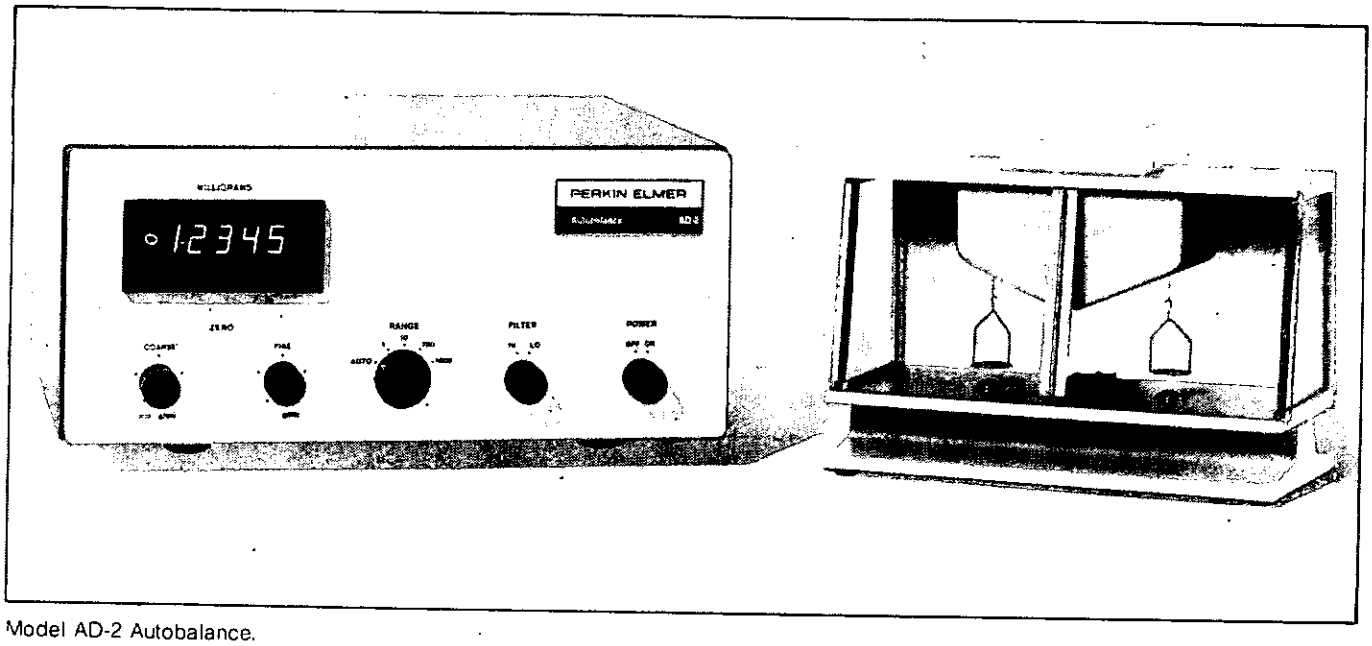

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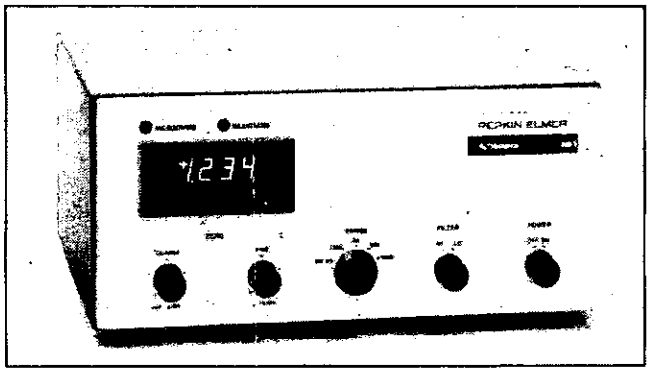

Model AM-2 Autobalance.

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Autobalances are based on simple principles described by Ampere in the early 1800s, but Perkin-Elmer has incorporated the latest technological advances available in the 1970s.

Operation is easy to understand if the Autobalance is considered as an ordinary ammeter, rotated so that the pointer moves up and down. If a weight is attached to the pointer, it drops. Then if current is applied to the coil of the ammeter, the pointer can be lifted back to its original position. The amount of current is a measure of the weight.

In actual operation, if a sample is placed on one end of the Autobalance beam, it deflects only momentarily. A beam position detector senses this movement and causes a current to pass through the coil to restore the beam essentially to its original position. It is simply a high gain electro-mechanical servo system.

All Autobalances use these automatically controlled beams instead of the older manually controlled beams to increase speed and accuracy and to reduce the need for special operator skills and training.

The coil current is amplified and filtered, and then displayed on a digital panel meter with the decimal point always in the proper place.

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The use of servo controlled null-balance principles of operation, along with the finest mechanical designs, plus high impedance measurements, guarantees the greatest precision ever found in a microbalance.

Operation

Setup is fast and easy. Containers up to five grams can be tared mechanically and there are ten milligrams of electrical coarse and fine zero. Calibration is rarely needed and takes only seconds.

Samples can weigh from a few micrograms to five grams and be four inches wide by two inches high. Larger samples can be weighed below the chamber.

Range settings are manual or automatic in the AD-2 and manual in the AM-2. Decimals shift automatically so that the weight is always correct as shown — no guessing where the decimal goes. Changing ranges does not affect zero or calibrate settings.

To weigh: Place sample on pan and read the weight.

Specifications

	AD-2	AM-2
CAPACITY (Sample) (1)	5 Grams	3 Grams
TARE (Counterweight)		
Mechanical (2)	5 Grams	3 Grams
Electrical (3)	10 Milligrams	10 Milligrams
RANGES		
(And Resolution) (4)	±1 mg to .1 microgram ±10 mg to 1 microgram ±100 mg to 10 micrograms ±1000 mg to 100 micrograms plus Overrange and Autorange	±.2 mg to .1 microgram ±2 mg to 1 microgram ±20 mg to 10 micrograms ±200 mg to .1 mg ±1.3 g to 1 mg
READABILITY	±18,000 Counts	±2,000 Counts
TYPE OF READOUT	4½ Place Digital Meter with decimal points, BCD output and Autoranging	3½ Place Digital Meter with decimal points
PRECISION (5)		
Ultimate (6)	0.05 Microgram or better	0.1 Microgram or better
As a Fraction of load when taring (7)	0.5 ppm or better	1 ppm or better
As a Fraction of Range	½ Count or better	1 Count or better
ACCURACY (8)		
Display (9)	2 Counts	2 Counts
Calibration (10)	.005%	.005%
POWER		
Voltage	230V 50/60Hz	
DIMENSIONS		
Control Units	35 cm W x 16 cm H x 43 cm D	
Weighing Unit	25 cm W x 18 cm H x 12 cm D	

Notes:

(1) The maximum permissible weight of sample and container.

(2) The maximum permissible weight on the counterweight pan to balance out the container or sample.

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(9) Linearity guaranteed.

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For further information contact:

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HEALTH+SCIENCE
Private Bag, Auckland.
Telephone 592-869.

BRANCH OFFICERS 1974-75

Auckland:

Chairman: A. Kennet.
Secretary: Dr A. C. Herd.
Treasurer: Mrs R. A. Dormer.
Branch Editor: Dr J. E. Packer.
Delegate: A. Kennet.
Committee: J. G. Fletcher; R. W. Hogg; Dr E. G. Hutchinson; Dr J. E. Packer; Dr A. F. Wilson; J. R. Yolland.

Waikato:

Chairman: Dr M. M. Sutton.
Secretary: Dr E. Payne.
Treasurer: Dr J. H. Watkinson.
Committee: Dr C. E. Devine, T. J. Nisbet, Dr D. E. G. Sheat.
Council Delegate: Dr W. P. Judd.
Branch Editor: Dr P. C. Molan.

Arthur C. Kennett is a Scientist with the Chemistry Division of the Department of Scientific and Industrial Research at Auckland. He was born in London in 1922 and graduated from London University with a Special Honours degree in Chemistry, served four years with the Royal Air Force in the Second World War gaining the Distinguished Flying Cross, then spent 15 years as a Senior Scientist engaged on chemistry of plastics at the Research and Development Centre of the British Oxygen Company. He came to New Zealand in 1964 and has been engaged on Industrial Chemistry with D.S.I.R. since that time, mainly in the fields of plastics and polymers.

Mr Kennett has served on the Auckland Branch Committee for four years with duties varying from Symposia to Council Delegate. He was elected to membership of the Institute in 1964 and to Fellowship in 1973. He is currently Chairman of the N.Z.I.C. Polymer Chemistry Group, Vice-President of the Australasian Corrosion Association Council and Secretary/Treasurer of the Civil Service Institute (Auckland Branch).

Additional interests are four children, tennis and philately.

Max Sutton gained his B.Sc. (Hons.) Chemistry, M.Sc. and Ph.D. at the University of Leeds. While in Leeds he investigated the kinetics of some reactions of importanct in hydrogen flames with Dr G. Dixon-Lewis. He then went to the University of Canterbury where he worked as a Post-doctoral Fellow with Professor Leon Phillips from 1966-68, studying atom-molecule reactions in a mass spectrometer flow discharge system. In 1968 he went as a Research Associate to the Centre for Research in Experimental Space Science at York University in Toronto; here he investigated the rates and mechanisms in some ion-molecule reactions with Professor H. I. Schiff. He went back to Britain in 1969 to Shell Research Limited, Chester, where he studied nitric oxide pollution problems and then returned to New Zealand in 1972 to work with the late Eric Allan at the Ruakura Agricultural Research Centre, Hamilton. He is now responsible for the research, development and analytical work which is carried out in the Spectrochemical Laboratory at Ruakura. The research work in this laboratory is aimed at the development of new and improved methods of analysis using atomic absorption and emission techniques.

Manawatu:

Chairman: Dr. W. B. Sanderson.
Secretary: Mr C. R. Southward.
Treasurer: Dr E. W. Ainscough.
Committee: Mr R. Chittenden; Dr L. K. Creamer, Mr B. E. Hassall; Dr L. N. Nixon; Dr R. D. Reeves; Dr J. G. Robertson; Dr K. R. Whittle.
Council Delegate: Dr W. B. Sanderson.
Branch Editor: Dr L. K. Creamer.

Dr W. B. Sanderson is Supervisor of Applied Research at the New Zealand Dairy Research Institute in Palmerston North. Dr Sanderson graduated B.Agr.Sc.(Dairy Tech.) from Massey University in 1962. He joined the staff of the Dairy Research Institute for a short period before continuing his studies at the University of Wisconsin where he obtained both his MS and PhD Degrees. Following Dr Sanderson's return to New Zealand in 1966 he rejoined the staff of the Dairy Research Institute and worked predominately in the field of milk proteins and milk powder production.

In 1971 Dr Sanderson was appointed Supervisor of the Applied Research Division at the Institute and in this capacity is responsible for the research in the manufacture of butter and milkfat products, casein, milk powders, whey products and the development of new uses for dairy products. Dr Sanderson became a member (associate) of the N.Z.I.C. in 1967.

Otago:

Chairman: Dr G. W. Emerson.
Hon. Secretary: Dr M. G. Shepherd.
Hon. Treasurer: J. Urquhart.

Committee: Assoc. Prof. D. J. Brasch; Prof. A. D. Campbell; J. W. McChesney; J. L. Grigg; Dr B. M. Peake; Dr R. Laverty.
Delegate: Assoc. Prof. D. J. Brasch.
Branch Editor: Dr B. M. Peake.

Dr George Emerson is a Senior Lecturer in Biochemistry at the University of Otago. He graduated M.Sc. in Chemistry in 1958. In 1957 he was a Sir George Grey Scholar and between 1958 and 1962 a Travis Research Scholar. He joined the staff of the Biochemistry Department in 1963 as an Assistant Lecturer being promoted to Lecturer in 1964 and to Senior Lecturer in 1969. Dr Emerson completed his Ph.D. on the carbohydrate metabolism in *Mycobacterium smegmatis* in 1967. His post Ph.D. research interests have continued to be in the area of carbohydrate metabolism and he spent 1974 working in Dr Cooper's laboratory at Leicester University using mutants to examine gluconeogenesis in microorganisms. He is also involved in a project with Wilson Distillers to examine the formation of fermentable carbohydrate from barley and distillers wort.

Apart from Biochemistry, Dr Emerson has been actively involved with the New Zealand Railway and Locomotive Society. He was Chairman of the Otago branch for a number of years and is co-author (with Jim Dangerfield) of the book "Over the Garden Wall", which deals with the history of the Central Otago railway.

Christchurch:

Chairman: P. R. Richards.
Secretary: Dr R. G. A. R. McLaghan.
Treasurer: Dr C. G. Freeman.
Branch Editor: Dr I. L. Weatherall.
Delegate: Dr W. S. Simpson.

Committee: Dr J. R. L. Walker; Mrs C. C. Winterbourn; Dr M. H. G. Munro; Dr P. Meredith.

Peter Richards is Head of Science at Riccarton High School. He was educated at Christ's College and graduated M.Sc. from Canterbury in 1961. He taught at Christchurch Boys' High School before travelling overseas for two years in 1966. He returned as Senior Secondary Assistant at Southbridge D.H.S. and spent a year at Cashmere High School before taking up his present appointment in 1971. He has a special interest in design of apparatus for school science and is co-author of a junior science textbook. An enthusiastic photographer, Mr Richards is married with three children.

Wellington:

Chairman: Professor N. F. Curtis.

Hon. Secretary: Mr A. A. Turner.

Hon. Treasurer: Mr T. R. Johnson.

Branch Editor: Professor R. J. Ferrier.

Council Delegate: Dr R. J. Furkert.

Committee: Dr M. P. Heenan; Dr M. F. Coleman; Dr K. R. Millar; Dr R. J. Weston; Mr C. L. H. Stonyer; Mr G. Naish; Mrs H. E. Harvey.

Neil Ferguson Curtis was born and educated in Auckland, graduating B.Sc. (Senior Scholarship in Chemistry) 1952, M.Sc. (First Class Honours, University Research Scholarship) 1953, Ph.D. 1955. A Post-graduate Scholarship in Science took him to University College, London, to work with Sir Ronald Nyholm. He was appointed Lecturer in Chemistry at Victoria University of Wellington in 1957, and was promoted to a Personal Chair in Chemistry in 1971. His research interests are in the general area of co-ordination chemistry, particularly the reaction of co-ordinated amines with carbonyl compounds, and the chemistry of macrocyclic amine ligands.

INSTITUTE PRIZES

Entries for the following Institute prizes must be received by the Registrar, Box 1926, Christchurch, by April 30, 1975, or the General Secretary, Box 250, Wellington, as stated below.

1. THE I.C.I. PRIZE

This prize of $100.00 and a medallion has been donated by I.C.I. (New Zealand) Ltd. The conditions of the award are as follows:

1. The prize shall be awarded to a member of the Institute who, in the opinion of the Council, has made some contribution to some branch of chemical science, the contribution to be judged by research work published or accepted for publication during the five years immediately preceding 30 April in the year of the award.
2. Applications by members, or nominations, which may be submitted by Branch Committees or by individual members, must be accompanied by copies of papers presented in support of the entry. The Council itself may nominate candidates for the award.
3. A nomination or application, once made, shall stand for five years, but material which fails to satisfy clause 1 shall automatically be deleted, and additional material may be presented at any time.
4. If in the opinion of the Council there is no candidate of sufficient merit, the Council may refrain from making the award.
5. The prize shall be presented at the annual conference of the Institute or at a meeting of the Branch to which the prizewinner belongs.
6. A member to whom the prize has been awarded shall not be eligible for re-nomination.

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2. THE CHEMICAL ESSAY PRIZE

The New Zealand Institute of Chemistry shall offer annually a prize for an essay or review on a chemical topic. The conditions of the award are as follows:

1. The prize shall be open to anyone who has not attained the age of 25 years before April 30 in the year of the contest, whether a member of the Institute or not.
   (Note: Entries from students will be welcomed).
2. The entry shall be not longer than 5,000 words.
3. The entry shall be in a form suitable for publication and the Institute shall have the right to publish the winning entry.
4. Applications, in completed form, must be received by the General Secretary, P.O. Box 250, Wellington, not later than 30 April in the year of the contest.
5. The entries shall be judged by a Committee of examiners set up by Council for the purpose. The President of the Institute and the Editor of the Journal shall be ex officio members of this Committee.
6. The award shall be made by the Council after consideration of the report of the Committee of examiners, and the presentation of the prize shall be made, whenever possible, at the annual conference of the Institute.
7. No award shall be made if, in the opinion of the Committee of examiners, there is no entry of a sufficiently high standard of merit.
8. The value of the prize shall be such sum as the Council may from time to time determine, and the prize shall be spent on books or instruments to the satisfaction of the Council.
   (Note: The value of the prize is at present $50).

EASTERFIELD AWARD (next award 1976)

(1) The medal shall be awarded to chemists within New Zealand in recognition of the quality and originality of their research work.

(2) Candidates must be under the age of 35 years at the 30th April 1973.

(3) The award will be open to all chemists whether or not they are members of the Royal Institute of Chemistry or the New Zeaalnd Institute of Chemistry.

(4) The major portion of the candidate's research work submitted must have been carried out in New Zealand.

(5) No person may be awarded the Easterfield Medal more than once.

(6) The successful candidate will be required to deliver a lecture on the subject of his research at the Annual Conference of the N.Z. Institute of Chemistry, or on some other suitable occasion.

(7) The medal shall be awarded biennially and presented to the successful candidate on the occasion of his lecture.

(8) The Selection Committee reserves the right to make no award in any year if the standard of work submitted is not of sufficient merit.

(9) Expenses necessarily incurred by the Medallist in connection with the delivery of his lecture will be defrayed.

(10) Applications by or on behalf of candidates for the award must be in the hands of the General Secretary of the N.Z. Institute of Chemistry not later than 15th April 1976 and must be fully supported by all relevant papers (either published or unpublished).

BRANCH NEWS

Auckland

D.S.I.R.

Miss M. P. Bartrum has retired from Chemistry Division. In 1938 she became the first woman M.Sc. graduate in chemistry of the University of Auckland, working with Dr L. H. Briggs. After a year at Training College she has worked at Ruakura for two periods, Lincoln College, and for the last 19 years for Chemistry Division in Auckland mainly in the fields of timber and foods.

Dr R. H. Meinhold has been appointed to the staff of Chemistry Division at Auckland. Since completing his Ph.D. at the University of Auckland in 1972, he has been at Leeds working with Professor N. N. Greenwood.

Mrs S. L. Nolan has been transferred to Auckland from Chemistry Division Petone.

University

Professor P. B. D. de la Mare and Dr M. J. Taylor returned from leave in January.

Three members of the staff are taking long leave in 1975: Dr G. A. Bowmaker who is going to Oxford, Dr D. J. McLennan who is remaining in Auckland for the major period, and Dr B. E. Swedlund who is going to Santa Barbara.

Manawatu

Massey University

Dr W. R. Sharman, who has been working on a postdoctoral fellowship in the Department of Chemistry, Biochemistry and Biophysics has been appointed to a position in the Building Research Association of New Zealand. He has been seconded to the Meat Research Institute at Hamilton for one year.

This year the Department of Chemistry, Biochemistry and Biophysics will be offering "Cell Chemistry" as a new extramural paper. This is a first year paper which emphasises the application of chemical principles to the reactions of biological systems at the cellular level. It commences with an introduction to Organic Chemistry which leads on to a study of cell functions and an introduction to the subject of biochemistry. The first year papers "Chemical Principles" and "Chemical Reactions" which were offered in 1974 will also be available extramurally in 1975.

Applied Biochemistry Division D.S.I.R.

Dr G. B. Russell has recently returned from a year's leave spent with Dr G. M. Price at the A.R.C. Unit of Insect Chemistry and Physiology situated in the Chemistry Department of the University of Sussex. He was studying the metabolism of the moulting hormone in the blow-fly.

A workshop-seminar was held on "Plant Nutrition and Ion Uptake" in the Social Sciences Block of Massey University on November 27-28. It was sponsored by Grasslands Division and Applied Biochemistry Division of D.S.I.R.

A working party on "Biochemical and Microbiological Aspects of the N-Fixing Rhizobium — Legume Relationship" was held on December 9-10. The principal speaker was Dr Clive Pankhurst who spoke to the title "N-Fixation: The World Scene".

New Zealand Dairy Research Institute

Mr P. G. Hobman has returned to the Institute following several years leave to complete a B.Tech(Biotech.) degree at Massey University. He is now in the Casein Section where he will be making a study of the fine grinding of dried protein products.

Dr F. G. Martley has returned from two and a half years of leave spent at the Animal and Dairy Science Research Institute in South Africa and at the C.N.R.Z. Dairy Research Centre in Jouy-en-Josas (near Paris). One of his projects will be to study the manufacture of Camembert cheese under New Zealand conditions.

Dr R. J. Lowrie of the Starter Section has resigned.

Dr D. J. Woodhams, Head of the Milk Powder Section, has resigned to take up the recently created position of Project and Process Officer with the Northern Wairoa Co-operative Dairy Company in Dargaville.

The small animal centre is ready for occupation. It will be used for assessing the nutritional quality of a range of traditional and new dairy products. Previously this work had been carried out in collaboration with the Applied Biochemistry Division of D.S.I.R. but with the increasing number of analyses, more extensive facilities were required.

Wellington

Victoria University Chemistry Department

The Head of Department, Professor J. F. Duncan, was awarded the O.B.E. in the New Year's Honours List.

The 1974 Research Medal of the New Zealand Association of Scientists has been awarded to Dr Brian Halton.

Drs J. H. Johnston and R. J. Speedy have been appointed to Lectureships with responsibilities in applied chemistry and physical chemistry, respectively.

Chemistry Division

Mr G. Chamberlain recently retired from the position of Information Officer and Librarian at Chemistry Division.

Mr Chamberlain started working for the D.S.I.R. in 1935 in Auckland where he spent 10 years carrying out scientific investigations for the Police. He transferred to Wellington in 1945 where he was in the paint and petroleum section for 7 years before taking up the position of Information Officer at the Dominion Laboratory in Wellington, he kept this position with Chemistry Division when the laboratory moved out to Gracefield.

Mr Chamberlain intends to spend his retirement pursuing his varied hobbies, these include an extensive collection of spiders, building and operating radio sets, and skin diving (which is now restricted to instructing due to health problems).

Dr I. Miller of the Organic Section has replaced Mr Chamberlain as Information Officer at Chemistry Division.

Dr N. K. McCallum recently returned from Israel where he spent the previous 16 months on a Post Doctoral Fellowship with Professor Mechoulam. In Israel Dr McCallum examined the metabolism of THC and the metabolic interactions between cannabinols.

Dr G. J. Leary, from the Organic Section spent three weeks in Australia at the end of January. He visited a number of laboratories in Melbourne and then attended the Australia-N.Z. Society for Mass Spectrometry Conference in Canberra from 28-31 January.

Dr W. Passl of the Pharmaceutical Section presented a paper entitled 'Drug Registration Data Proofs and Pallatives' at the ANZAAS Conference in Canberra, 20-24 January 1975.

Soil Bureau

Dr B. K. G. Theng has returned from the University of Bonn where he has spent the last eighteen months on an Alexander van Humboldt Fellowship working with Professor Scharpenseel.

THE REGISTRY

CORRECTION

In The Registry published in the issue of December, 1974, the following new members appeared erroneously in the list of Fellows; they should have been listed as Graduate Members—

Graduate Members

PAUL, Ivan Keith, B.Sc., Aerosol Products Ltd., Auckland (Manufacturing Chemist).

SIMPSON, Peter Annes, M.Sc.(Auck.), N.Z. Sugar Co. Ltd., Auckland (Shift Chemist)

WALTERS, Peter, B.Sc. Chemistry Dept., Auckland University. (Research Student).

IUPAC NEWS

FURTHER APPENDICES TO IUPAC INFORMATION BULLETIN

Seven more *Appendices on Provisional* (formerly *Tentative) Nomenclature, Symbols, Units and Standards* and five more *Technical Reports* (titles given below) are published in August 1974. The Appendices are available free-of-charge; subscribers to the *IUPAC Information Bulletin* are sent all Appendices automatically upon publication.

(a) **Provisional Nomenclature Appendices**

No. 34. Proposed Terminology and Symbol for the Transfer of Solutes from One Solvent to Another (Commission on Electroanalytical Chemistry).

No. 35. Status of the Faraday Constant as an Analytical Standard (Commission on Electroanalytical Chemistry).

No. 36. Recommendations on Usage of the Terms 'Equivalent' and 'Normal' (Commission on Analytical Nomenclature).

No. 37. Recommendations for Nomenclature and Spectral Presentation in Chemical Electron Spectroscopy Resulting from Excitation by Photons (Commission on Molecular Structure and Spectroscopy).

No. 38. Recommendations for the Presentation of NMR Data for Publication in Chemical Journals—B. Conventions Relating to Spectra from Other Nuclei (Commission on Molecular Structure and Spectroscopy).

No. 39. Definitions, Terminology and Symbols in Colloid and Surface Chemistry—Part II. Heterogeneous Catalysis (Commission on Colloid and Surface Chemistry).

No. 40. Nomenclature of Corrinoids (IUPAC-IUB Commission on Biochemical Nomenclature).

No. 41. Chemical Nomenclature, and Formulation of Compositions, of Synthetic and Natural Zeolites.

No. 42. Recommendations for Sign Conventions and Plotting of Electrochemical Data.

No. 43. Recommendations for Nomenclature of Ion-Selective Electrodes.

No. 44. Recommendations for Publication of Papers on Molecular Absorption Spectrophotometry in Solution between 200 and 800 nm.

(b) **Technical Reports**

No. 9. Recommended Method for Aflatoxins in Copra, Copra Meal, and Coconut (Section on Food).

No. 10. Development of a Method to Evaluate Sampling Plans Used to Estimate Aflatoxin Concentrations in Lots of Shelled Peanuts (Section on Food).

No. 11. Collaborative Study of the Determination of Aflatoxin M_1 in Milk (Section on Food).

No. 12. Proposed Guidelines for Testing of Single Cell Protein Destined as Major Protein Source for Animal Feed (Section on Fermentation).

No. 13. Report on International Education of Medicinal Chemists (Section on Medicinal Chemistry).

Appendices are available free-of-charge from the IUPAC Secretariat, Bank Court Chambers, 2-3 Pound Way, Cowley Centre Oxford OX4 3YF.

REPORTS PUBLISHED BY IUPAC IN 1973

The following Reports were published by the International Union of Pure and Applied Chemistry during 1973 in its journal *Pure and Applied Chemistry*.

Recommended Methods for the Analysis of Alkyd Resins (Section on Organic Coatings)—*Pure and Applied Chemistry*, Vol. 33 (Nos. 2-3) (1973), pp. 411-436.

Abbreviated Nomenclature of Synthetic Polypeptides (Polymerized Amino Acids) (IUPAC-IUB Commission on Biochemical Nomenclature)—*Pure and Applied Chemistry*, Vol. 33 (Nos. 2-3) (1973), pp. 437-444.

Compounds (IUPAC-IUB Comission on Biochemical Nomenclature)—*Pure and Applied Chemistry*, Vol. 33 (Nos. 2-3) (1973), pp. 445-452.

Tables of Wave numbers for the Calibration of Infrared Spectrometers—Parts III and IV: 600-1 cm^{-1} (Commission on Molecular Structure and Spectroscopy)—*Pure and Applied Chemistry*, Vol. 33 (No. 4) (1973), pp. 605-652.

A Collaborative Study of Dynamic, Mechanical and Impact Properties of PVC-II (Macromolecular Division)—*Pure and Applied Chemistry*, Vol. 35 (No. 3) (1973) pp. 315-351.

Recommendations for Presentation of Raman Spectra for Cataloging and Documentation in Permanent Data Collections (Commission on Molecular Structure and Spectroscopy)—*Pure and Applied Chemistry*, Vol. 36 (Nos. 1-2) (1973), pp. 275-278.

TO THE EDITOR,

I would like to applaud Dr Foster for the views expressed by him in his Presidential Address to our Institute as published in the December issue of "Chemistry in New Zealand." However, I wish to warn him and other members, especially those employed in the public sector, against a note of complacency that creeps into his penultimate paragraph.

As an honorary officer of the New Zealand Public Service Association, I feel that he has rather misjudged the role of the Association. The P.S.A. protects our salaries not because of our professional status, but because we are Public Servants, and in fact, our salaries are judged mainly against clerical salaries with our relevant qualifications being taken into account.

My colleagues and I periodically come into contact with members of other professional bodies, in connection with our employment. It is a not uncommon occurrence that we are treated particularly by lawyers, with less than the dignity we consider our professional status deserves.

I feel that the Institute could and should do much to raise our standing as a profession, an important part of our status that I think Dr Foster has rather under emphasised, particularly vis-a-vis other professional bodies.

J. F. LEWIN, M.N.Z.I.C.,
Chemistry Division, D.S.I.R.,
Lower Hutt.

CHEMICAL SOCIETY MONOGRAPHS FOR TEACHERS

The Registrar's stock of early titles is exhausted. He holds a few copies of the following only:

No. 11 Industrial Chemistry Organic.
No. 13 Osmosis.
No. 17 Biochemistry.
No. 18 Crystal Chemistry.
No. 20 Silicon Chemistry.
No. 21 Analytical Methods (plenty)
No. 22 Photochemistry.
No. 23 Atomic Nucleus.

New titles not yet ordered are:

No. 24 Principles of Free Radical Chemistry.
No. 25 Some Aspects of Technological Economies.
No. 26 Elements of Organometallic Chemistry.
No. 27 The Hydrogen Bond and other Intermolecular Forces.

The average price is about $1.50. It is always most difficult to estimate demand for these publications. Would members interested in existing or forthcoming Monographs please notify the Registrar so that he can judge the appropriate order.

One of New Zealand's leading stainless steel fabricators, Burns & Ferrall Limited, has recently fulfilled an order which demonstrates the firm's growing international reputation for the manufacture of precision scientific equipment. The order for the Wellcome Foundation Ltd. in the United Kingdom was to supply the Foundation's subsidiary in the United States, Cooper U.S.A. with six specialised vessels for the storage and blending of anaerobic animal vaccines.

The Wellcome Foundation is recognised as a world authority in the manufacture of vaccines and antisera, with manufacturing and marketing units throughout the world, including New Zealand. The New Zealand subsidiary, Cooper New Zealand Ltd., has in the past commissioned Burns & Ferrall to manufacture similar vessels. As a result of the technical skill demonstrated in making these, Burns & Ferrall won the U.S.A. contract in the face of world-wide competition.

The vessels are unique in that anaerobic vaccines require a completely controlled environment, and design is such that temperature and the atmosphere can be closely controlled. So that the vaccines may be agitated during storage, the vessels are fitted with a stirrer propelled externally by magnetism ensuring that there is no possibility of interference with the controlled atmosphere in the vessel.

With the continued expansion of the Wellcome Foundation's activities in the U.S.A. and throughout the world, Burns & Ferrall are hopeful that additional orders will be gained for these vessels.

BOOK REVIEWS

"ORGANIC PHOTOCHEMISTRY"

By J. M. Coxon (University of Canterbury) and B. Halton (Victoria University of Wellington). Cambridge University Press, London, Great Britain, 1974. vii + 196 pp. £1.90 U.K.

The field of organic photochemistry experienced a true renaissance in the early to mid-sixties, and several books appeared aimed at the advanced undergraduate and beginning graduate student. Unfortunately most of these texts failed to include the parallel developments in the area of orbital symmetry which have become so necessary for a true understanding of modern organic chemistry. Several more recent monographs have grafted an orbital symmetry section onto a more classical presentation of organic photochemistry with very unsatisfactory results. Now, however, this difficulty has been overcome with the appearance of a truly integrated approach by the present authors.

A concise introduction to the terminology of photochemistry and an equally brief description of common photophysical processes in the first chapter is followed by chapters on (a) intramolecular reactions of the double bond, (b) carbonyl group, (3) cycloaddition reactions and (4) oxidation, reduction, substitution and elimination reactions. Pertinent references to original research are collected at the end of each chapter. The presentation is clear and concise and the structural diagrams well laid-out and legible. The index is fairly complete and usable. The only drawback is the absence of problem sections for the various chapters, which places a greater burden on the course instructor. Inclusion of a few problems might have aided a senior undergraduate student to appreciate the difficulty in rationalizing photochemical processes from a knowledge of product distribution and stereochemistry.

The book is remarkably error-free and the balanced presentation worked quite well in a graduate-level course taught by the reviewer. To reiterate, the book's strength is the combination of present organic theory with practical examples. The presentation may equally serve to introduce students to the principles of orbital symmetry conservation.

In summary, this book can be highly recommended for any undergraduate or graduate level introduction to photochemistry and/or reactions governed by orbital symmetry. As such it is an excellent companion text to "Organic Reactions and Orbital Symmetry" by Gilchrist and Storr (Cambridge University Press).

CHARLES W. SPANGLER,
Associate Professor
Northern Illinoisc University
De Kalb, Illinois 60115

"PLASTICS AND THE ENVIRONMENT"

Published by Hutchinson Betrarm Ltd., London.

The British Plastics Federation, in 1973, under the technical Editorship of Dr J. J. P. Staudingfier, issued a series of monographs concerned with plastics and the environment.

It must be remembered that the views expressed by all the authors are about the rubbish and plastics environment in the United Kingdom. In New Zealand the magnitude of the waste problem should never be more than 6 percent of the United Kingdom problem and if suitable actions are taken could be considerably less.

The five monographs have been reviewed in the order of their appearance as follows:-

106/1 "Plastics, their Contribution to Society and Considerations of their disposal" (58 pages) Dr. W. C. Fergusson 25 p

The author of this monograph may congratulate himself on a concise survey of the plastics status, application, nature, type, waste and disposal prospects.

The narrative is written mostly in favour of plastics and tends to overlook some of the disadvantages. For example the pulverising of some plastics is not a simple operation. However, he destroys any misconceived ideas that plastics litter is a menace which cannot be adequately handled and utilised.

107/1 "The Storage and Collection of Refuse" (35 pages) by A. E. Higginson, 25 p.

This monograph, like the first, is written in free flowing style to include very useful information on the volume and changing nature of refuse since 1935 projected to the year 1986.

The omission of the word plastics from the title is justified although in some sections the author leaps strongly to the defence of plastics, emphasising the small amount of 2 percent by weight in domestic refuse and how plastics bags have quietly but effectively contributed to the clean odour-free collection of rubbish. He has not mentioned the irritation of having the same plastics bags (and paper bags) torn to pieces by animals (including children) and the wind, particularly when left at the kerbside during a strike by refuse collectors. One virtue of the plastics bag is odour retention and then when placed in a substantial container the handling of rubbish is comparatively pleasant.

108/1 "The Disposal of Solid Wastes" (51 pages) by F. L. D. Flintoff, 25 p.

The third monograph in the series which is concerned with solid waste disposal and to some extent with air and water pollution continues with the theme of dispelling the doomsday syndrome about plastics. The author finds by extrapolation (always a risky exercise) that plastics will not exceed 10 percent of thermodomestic waste (and 4 percent of all the solid waste) by the year 2000. Since the disposal of plastics creates no special problem, the contemplation of such an increase is not a disturbing thought.

109/1 "Recycling, Reuse and Recovery of Plastics" (27 pages by F. L. D. Flintoff) 25 p.

As stated by the author the purpose of this booklet is to consider the recycling, recovery, reclamation and salvage of plastics.

In some ways it is the most valuable booklet in the series because it is devoted to the feasibility of dealing with plastics wastes and not the emotional aspects of whether plastics waste is a menace or not.

In addition, the sections are well referenced by actual examples of recycling plastics in Europe, the United States and Japan.

110/1 "Degradability of Plastics" (31 pages) by Dr E. M. Evans, 25 p.

No doubt this monograph will appeal most to the Polymer Chemist because it is well illustrated with polymer chain units and compounds for controlling the breakdown of the chains under light conditions.

It is doubtful if any of the methods described have been shown to work on a realistic scale but a summary of the work being carried out in the UK, North America and Japan is interesting and should provide the reader with a basis for his own ideas. In addition to the section on solar degradation there is a short but informative section on biodegradation of plastics.

The British Plastics Federation should be complemented in producing this set of monographs which must appeal to all interested in the waste problem and particularly those problems involving plastics waste. It is difficult to see how so good a survey has been produced at such a modest price.

One copy of each is held by the Auckland Technical Institute Library.

A. C. KENNETT.

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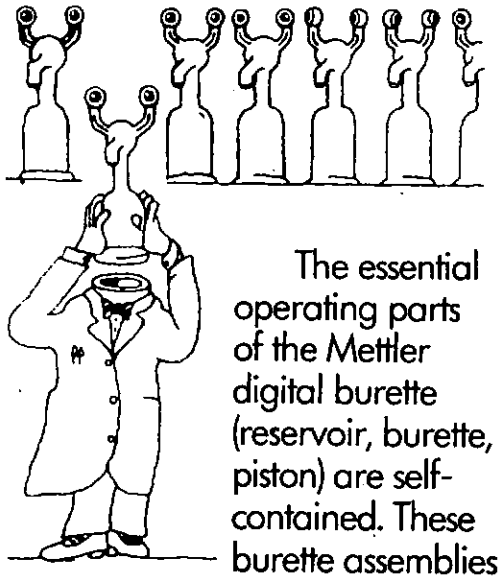

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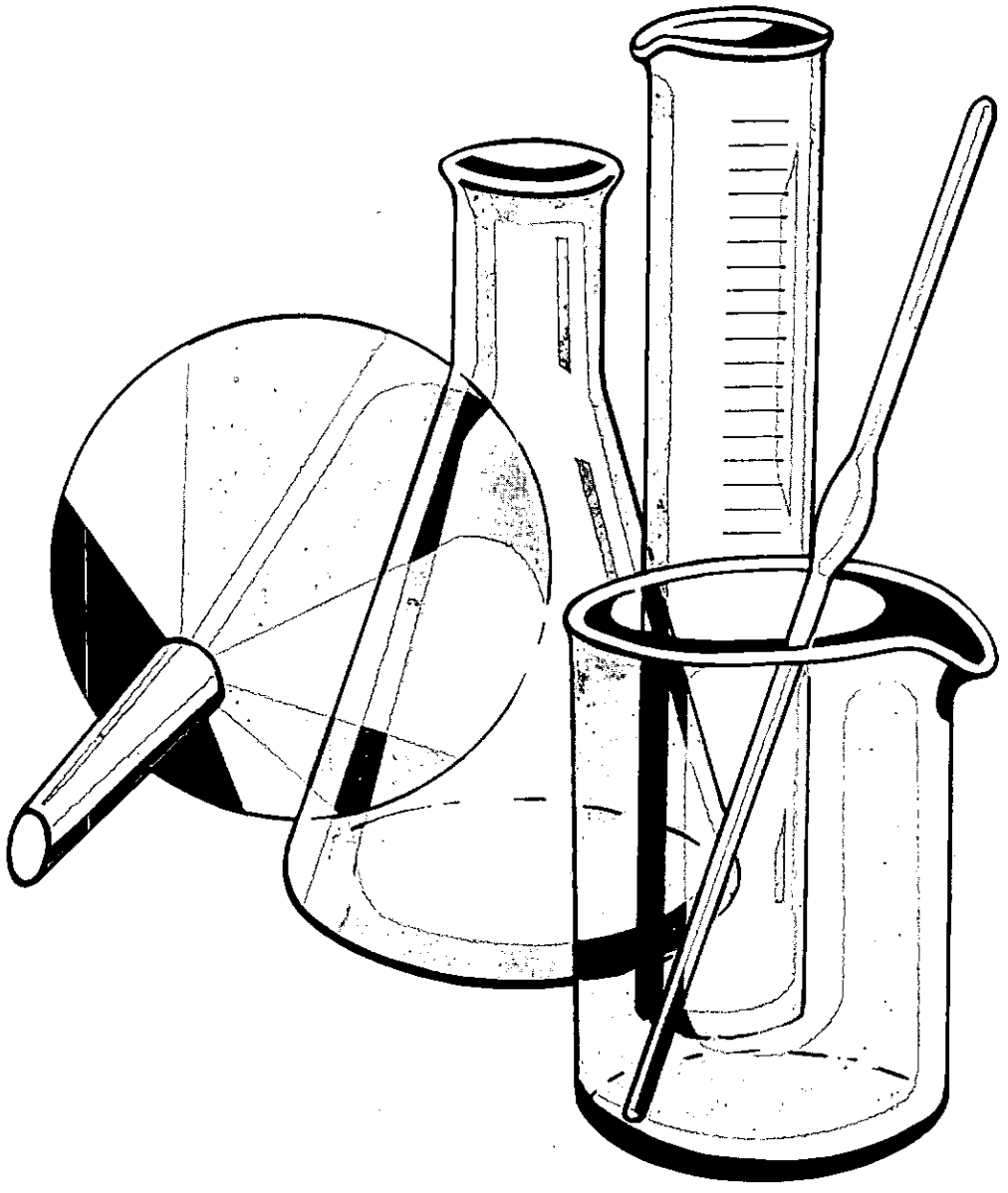

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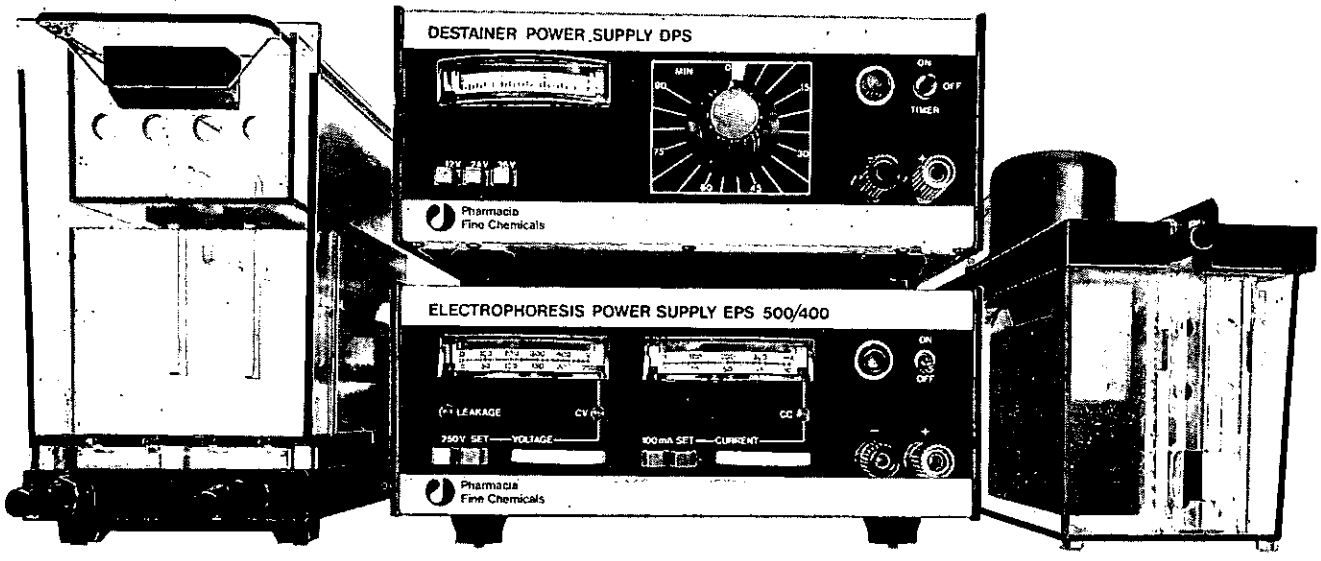

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