

# chemistry

in new zealand



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# chemistry

## in new zealand

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### 183 The Institute — Professional or Amateur

by Dr. P. K. Foster, President NZIC, 1974.

---

### 188 Chemistry Teaching in Chinese Universities

by Ellen Faed, M.R.C. Toxicology Unit, Medical School of Otago University.

---

### 192 Teaching of Chemistry in China after the Cultural Revolution

by P. D. Buckley, Dept. of Chemistry, Biochemistry and Biophysics, Massey University, Palmerston North.

---

#### Regular features . . .

187 Formation of New Groups. Prizewinners, 1974.

193 IUPAC News

194 Chemical Society News

195 The Registry

196 Branch News

200 Announcements

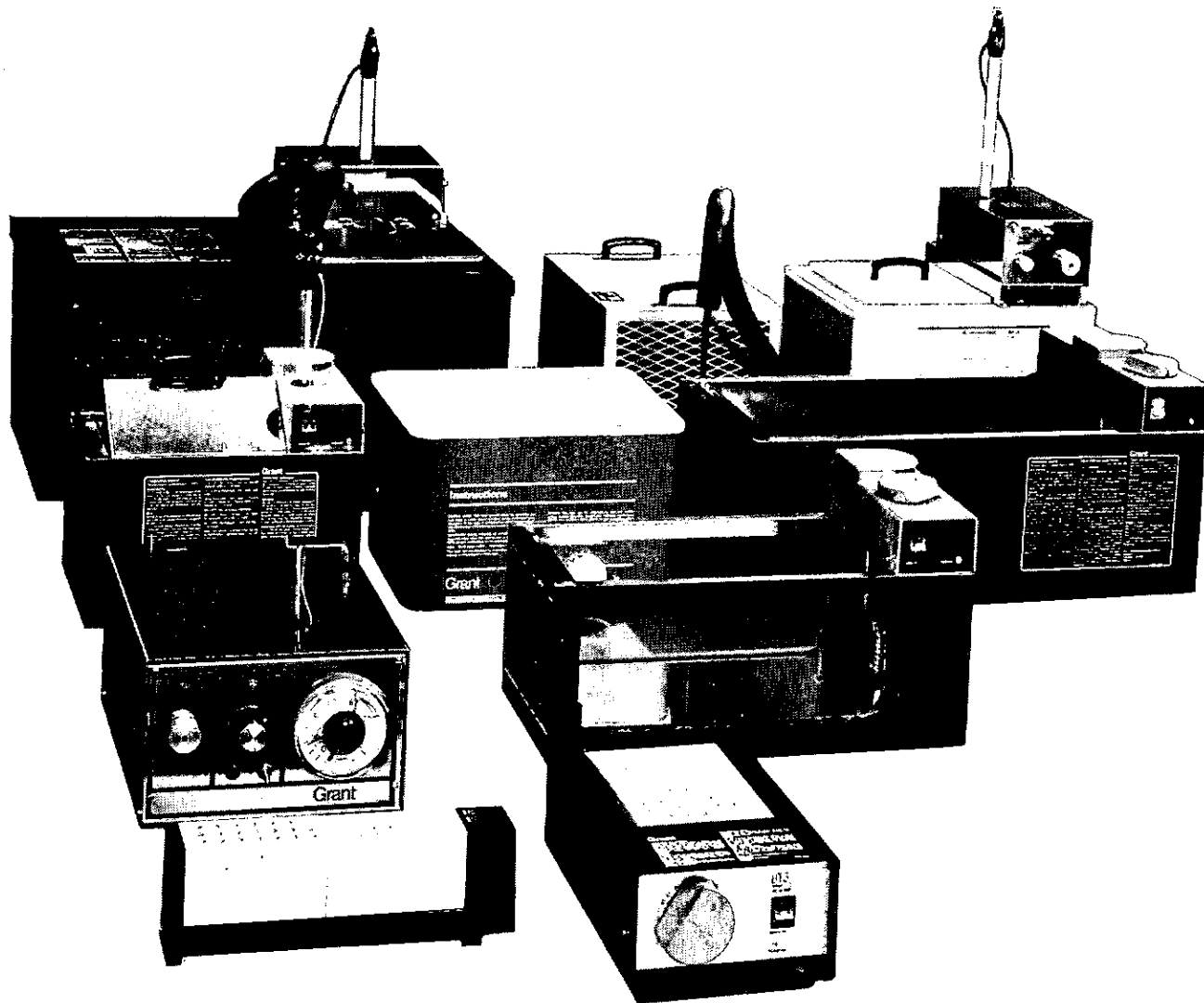
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**Cover**      Fields at Tachai Village, China, previously impoverished, but now productive due to scientific methods and hard work.

—Photo, E. Faed.

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## The Institute . . . Professional or Amateur ?

By P. K. Foster.

The differences between a professional and an amateur are differences in status with associated differences in financial reward. Recent and current Institute affairs which I propose to examine are very much concerned with these differences.

In considering these matters it is important to emphasise the difference between professional body and learned society matters. The latter, the "learned" functions, are internal and inward looking. The former, the professional affairs, are external, and determine how we look to non-chemists.

A popular and important question in recent years, perhaps always, in the Institute has been that of professional body versus learned society. Because of the importance to our members' salaries and conditions of employment, and the connotations of the words, I prefer to frame the question: "Professional or Amateur?"

It is my view that it is the President's duty and responsibility at the A.G.M. to represent the Council, and accordingly to express the collective views of Branch delegates, so far as this is possible. It is equally my view that in return for this and other duties, (one of the "perks" so to speak) he can give his *personal* views on Institute matters in his Presidential Address. At least some, and possibly many, members of the Institute will be delighted to be dissociated from some of my later remarks.

### Historical Background

In thinking about the Institute's functions, I found it useful and instructive to study the 1955 Jubilee issue of the Journal "25 Years of Chemistry."

Dr. McGillivray's editorial emphasised the importance placed on good training as a pre-requisite for admission, and the value placed on the Institute's grades of corporate membership. Mr. Hughson's historical study for the years 1930-55 contains many interesting references to the professional emphasis in the Institute's deliberations.

At the outset (1930) the emphasis was on "well-trained chemists;" in 1936 the first Journal was

produced under Mr. Key's editorship; in 1939 a card index showing each member's special qualifications was prepared and lodged with the Defence Authorities; in 1940 the Minister of Health and the Public Service Commission were approached with regard to the use of the terms "pharmacist" and "chemist"; in 1942, a major victory—as a result of representations, the Public Service Commission agreed to the Institute's suggestions for salary rates for graduates entering the Public Service; in 1944 the first Salary Survey was carried out.

It is chastening to record that with a membership of 300 in 1946, the Annual Report occupied eleven foolscap pages; in 1948 attention was given to contracts of service between chemist and employer; 1950, Sub-Committees of Council were at a peak, with fourteen reports submitted to the General Meeting. Also the Professional Status Committee was established to study matters relating to unions, standards of admission, graduate membership, etc.

This surely conveys the impression of an active body, properly concerned with its standing and functions as a professional organisation.

### Current Professional Activities

What of the present? Is the Institute active in considering and protecting its professional position?

Without necessarily being exhaustive, one can draw up quite an imposing list of professional matters which are currently or have recently been under consideration by the Institute, through its Branches and their delegates which constitute the Council:

- (a) Appointment of an Executive Secretary. For the first time, the Institute has an Officer whose sole employment is in the service of the Institute, especially by provision of back-ground research material. Many of the current items referred to are under action by the Executive Secretary.

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President NZIC 1973-74.

- (b) Manpower survey—what are the characteristics of the present population of professional chemists?
- (c) Employment of chemists in the Health Services. Submissions to Government are being prepared to achieve parity of employment of chemists in hospitals, with employment in other branches of the State Services.
- (d) Technician entry to N.Z.I.C.—the terms and conditions under which this should be sought are being examined.
- (e) Rules changes—the provision of greater flexibility without lowering of standards, and of a Commentary to assist in uniform interpretation.
- (f) Financial planning—the provision of an Annual Budget with consequent improved forward planning of Institute subscriptions.
- (g) Conference—a Sub-Committee is considering the role of Conference in the light of the professional requirements of members, and the developing importance of specialist groups in meeting the Learned Society requirements of our members.
- (h) The Institute Journal—what is its role in our developing Institute?
- (i) Energy Resources—a Sub-Committee has been formed to protect the position of sources of energy which may alternatively be considered as sources of chemicals.
- (j) Salary surveys — the continued analysis of salaries, with special reference to the relative position of industrially-employed members.
- (k) State Services Commission salaries—the relative commencing salaries of professionals and technicians have been the subject of submissions to the Commission.
- (l) Professional fees—a report is being made to Council on this matter.
- (m) Tertiary Technical Education — both terminating (pre-N.Z.C.S.) and advanced (post-N.Z.C.S.) courses for chemical technicians are currently under debate within the Institute.

### Professional Status

In this section I would like to summarise one recent and one current illustration of the *direct financial importance*, to two sectors of our membership, of maintaining our professional status.

### Salary Surveys

The last two salary surveys, in 1969 and 1971, were carried out during a period of economic recession in New Zealand, and in the context of this address yielded three significant pieces of information:

1. The extent to which industrial chemists are paid by position or status, was quantified. It was shown that the basis of determining salary in industry was quite different from that in Government.

2. In the two year period between the surveys Government salaries increased by 35%, while industrial salaries increased by only 18%.
3. The rate of increase in Government salaries was no more than that enjoyed by New Zealand generally.

To me the conclusion is inescapable. The financial position of our industrially employed members is directly dependent on their professional status and reputation with their employers. When the crunch came in 1969, their salaries became 17% lower than the average for the community and Government, with allowance for inflation. It follows that any action by the Institute, whether deliberate or by default, to lower the status of our profession has a direct effect on the income of 30 percent of our members.

### Hospital Employment

Here, we are dealing with a situation which has developed over many years. In describing this, I gratefully acknowledge the information and effort supplied by Mrs. Wignall, our Executive Secretary.

The hospitals provide a situation in which technicians were able to influence, and retain their influence over, the appointment, training and promotion of professional scientists. The Institute's enquiries show that, while a separate Hospital Scientific Service system may shortly be established with parity with D.S.I.R. employment conditions, the pertinent facts in brief are:

1. The technicians set up the Training Scheme.
2. The technicians set up the Registration Scheme which is a barrier to professional participation.
3. Professional scientists are assessed by a Committee of medicos and technicians. Note that there is no representative of the Clinical Biochemists Association and that appeals on staff gradings can be made back only to the same Committee.

There are many details which could be described. Enough to say that it has taken 7 years for a professional scientific service for hospitals to come anywhere near being in sight.

Again the effects of inadequate representation of professional status can be quantified in terms of direct income to our members. A recent advertisement for the post of Chief Clinical Biochemist for the Wellington area, showed the responsibilities to include a staff of 34, the development of new laboratories and equipment, and generally servicing the clinical biochemical needs of a population of 330,000 people with the latest developments. These responsibilities are at least fully equivalent to those of a D.S.I.R. Divisional Director. The Biochemist's job is able to command with present scales, an *absolute maximum* of about \$11,500, while the *average* salary for a D.S.I.R. Director is about \$15,500 with a range of about \$14,000 to \$17,500.

Here again is proof of the direct financial importance to our members, of our professional status, i.e. of how we look from outside, not of how we look to each other.

## Technician Entry

It is in the light of these two examples, that I believe one aspect of this question must be viewed. While there are many aspects that could be summarised, there is one of principal concern. This is the fourth criterion.

In drawing up proposals for means of effecting technician membership, Council adopted four criteria:

1. To maintain and protect the rights and status of the present members within the Institute.
2. To maintain and protect the democratic rights of corporate members.
3. To offer status and privileges to career technicians, to the mutual advantage of both the technician and the professional membership.
4. To recognise the complementary roles of technician and professional.

In making recommendations to Branches, Council interpreted the fourth criterion as requiring a parallel but separate system. It was agreed that a common grade of initial membership, i.e. putting University graduates and Technical Institute certificate holders together in a common grade, conflicted with the recognition of *complementary* roles. Any common grade was held to imply "that Universities and Technical Institutes do *not* have complementary functions that their students do not have complementary roles, and perhaps worst of all carries the connotation that the technician does *not* have an important contribution to make, and career to pursue, in his own right." (*Chemistry in N.Z.*, October, 1973).

It is over this question of common vs. separate initial grades that disagreement between the Branches has so far not been able to be resolved. It is such a fundamental matter, and of such far-reaching importance to the Institute, that a unanimous view is essential in my opinion. While a majority view could clearly have been obtained in Council, no member of Council wanted progress on this issue by majority decision.

Before dealing with two aspects of the basis of the disagreement which have surprised me considerably, I would like to put the academic content of the N.Z.C.S. in perspective. To this end I circularised Heads of the six Chemistry Departments on the credits which a Certificate holder can receive on applying for admission to a degree course in their Departments. Their answers are summarised in the following table:

University	Fraction of Degree Credited	Merit Requirement
Auckland	up to 36/102	"with merit"
Waikato	up to 7/22	"depending on grades obtained"
Masse <sub>y</sub>	up to 36/102	"outstanding merit"
Victoria	up to 36/102	"with merit"
Canterbury	up to 3 Stage I Units	"particular merit"
Otago	Chem. Interm.	unstated

The relative difference in academic content of the two qualifications is uniform and clear, and in my view hardly surprising in view of the relative times spent in formal and on-the-job training. (As a former member of the Membership Committee, I cannot help but comment in passing that, were a common holding grade introduced, the Membership would *in practice* have to consider it as two. The integration of "knowledge, training and experience," as required by the Rules, would automatically split University and Technical Institute students into two groups, because of the distinctly different knowledge and training components.)

Now to express my surprise, which is due to two attitudes; the attitude of some of the academically employed members of our Institute, and the attitude of the great majority of the industrially employed members. These are both to be considered in the light of the direct financial effects of external status on our profession.

## Some Academic Attitudes

The responsibilities of University academic staff have been described as being principally toward their discipline and their students. What has been of surprise to me, in the course of the discussions over a common holding grade for graduates and technicians, has been the lack of concern of some academics for their students (past, present and future) as shown by not objecting to the concept of a common holding grade. I am thinking in particular of those students with three or four year degrees who will go, or have already gone, into industry and other areas of applied endeavour without contributing to the University research programme. I have shown tonight how the financial income of such people is directly affected by their external status in the eyes of their employers. I have shown how the academic contents of the University and Technical Institute course relate officially. In fulfilling their duty to their students:

Why are not *all* academics objecting to connotations of academic equivalence?

Why are not *all* academics concerned at the possible effects on their students?

I gave a hint to one answer five sentences earlier. It is an answer that is disturbing but I think gaining some credence. This answer is that there is insufficient concern over those students who will not be contributing to the University research programme.

It is an ugly answer, but whether you like it or not, silence is often taken as consent. If the Universities don't object, *at all levels*, to connotations of academic equivalence, we must start to wonder.

## Some Industrial Attitudes

Even more surprising has been the silence of the industrially employed members of the Institute. Here we have a substantial number, 30 percent of our membership, who as recently as 1971 were suffering a *decrease in income of 17 percent rela-*

tive to other chemists, and to New Zealand generally. Moreover this position was shown to be due to the problems in industry of establishing and maintaining sufficient status.

I have yet to hear of any reasonable effort by industrially-employed chemists to protect their own interests by opposing any implication that can lower their status.

It has been argued that, since B.Sc. graduates and N.Z.C.S. holders are regarded as equivalent by some employers, the Institute can regard them as equivalent. Why aren't our industrially employed members asking at every opportunity what the Institute is doing to protect them and asking what is their Institute doing to show employers that they are *not* equivalent?

I am staggered at their apparent apathetic acceptance that the Institute can even consider proclaiming equivalence of their training and potential value with that resulting from a work-based qualification, with an academic content obtained from a different system of tertiary education, with different objectives, to satisfy different ambitions and to provide for a different career.

It could be argued, in the face of this, that our industrial members deserve scant consideration the next time they are in trouble. Its up to them!

### Rules and Membership Committee Functions

What is insufficiently realised is the method and the time and trouble, taken to protect the status of the Institute—to reserve Corporate membership to professional chemists. My earlier remarks are meaningless if the standards of admission are not rigorous, and not rigorously applied. I would like to summarise the present position, and for this will draw largely on the Rules Commentary.

The yardsticks for our system are that we accept University statements of a certain level of academic knowledge and attainment, for the non-Corporate graduate grade. For Corporate membership the Institute as a qualifying body approves applicants for subsequent approved professional experience. It is important that there is:

- proof of academic attainment
- proof of professional practice
- proof of the minimum experience
- and proof that such experience is subsequent to academic qualification.

These are all simultaneously necessary conditions and it is the obligation of the applicant to supply the evidence.

It is possible for professional experience to be obtained in a wide variety of occupations. The following list is not intended to be complete, but to give an idea of the breadth of the fields: teaching; laboratory work, including research, analysis, consulting, development; quality control etc.; management, whether of laboratory or technical production; technical information services, libraries.

It should be noted that it is equally possible not to get professional experience while being employed

nominally in some of these categories. For example, a graduate could work in a library fully exploiting his academic knowledge in a professional manner. Equally there are purely clerical functions in libraries which cannot be regarded as professional.

These preceding remarks apply specifically to admission by the so-called "standard route" of University degrees followed by employment as a professional chemist. It is to be emphasised that this route is not taken for granted, neither by Membership Committee nor by Council. A small but significant number of graduate members are being warned that it appears from their job description that corporate membership appears unlikely in four years time.

Major changes in the rules which come into force at the end of this year, are incorporated in the removal of the so-called "examination route." Increased formality by way of interview for non-standard applicants is now considered under Rule 9.3. This states:

"Any applicant not complying with Rule 9.2, shall be deemed to have complied with the required standard of attainment, only if a majority of members of the Membership Committee shall have certified, that in their opinion, the training, knowledge and experience of the applicant are fully equivalent to the required standard of attainment. A candidate in this category shall be required to submit himself for a professional interview, and may be required to pass such examinations as shall be prescribed from time to time by Council." (Note, *may* not *shall*.) The practices which this Rule formalises have two objectives:

To increase the rigour of inspection of applicants without standard qualifications, the interview is mandatory; equally, to provide greater flexibility and opportunity for a valid professional case to be made and justified; where standard academic qualifications are not held.

It is impossible to define professionalism in an objective and unequivocal way. It is in the application of this rule in particular where uncertainties requiring personal judgment are most likely to occur. It can be noted that if exact definitions were possible, admission to the Institute would be a purely clerical job and the Membership Committee would not be needed.

The professional interview is seen as giving the flexibility of application of this rule, and the opportunity for those who have the equivalent qualifications, to make the special case peculiar to their circumstances.

While a definition of professionalism is not possible, the following examples of the way in which it is often demonstrated serve as an indication of the sort of requirements which would be sought by the interview committee:

1. Evidence of integration of academic knowledge with one's professional duties as noted above.
2. Creativity in one's duties, e.g. by the combination of existing academic ideas in new ways to meet particular problems.

3. The ability to change to new fields of work and new types of problems as opposed to being highly skilled from long experience in one limited field only.
4. Responsibility in the management of other scientists particularly of professional scientists.
5. Ability to exercise judgment, particularly on the unexpected.
6. Evidence of adequate quality of professional reports and papers.

There have been successful applications of these criteria by interview committees already, i.e. they have led to clear-cut decisions, and no examination has been necessary.

Finally, with regard to maintenance and uniformity of standards, there is a further protection of professional status. With reference to introduction of the professional interview, the Registrar keeps a Precedents Manual. The Membership Committee are required to supply to the Registrar, in writing, their reasons for their recommendations to Council in special cases. The Manual will be available to the Membership Committee and so should additionally ensure consistent interpretation of the rules and maintenance of standards.

## Conclusion

Our Institute fulfils several learned society functions: branch meetings, annual conferences, specialist groups, awards of prizes, funding of overseas visitors. To the extent that these functions are financially supported or underwritten by the Institute as a whole, they are supported 30 percent by our industrial members.

Most of us work in an environment where our salaries are corrected for inflation under the aegis of the P.S.A. Our status, being relative to other professionals, does not have to be protected on the grounds of professionalism. Our interests are almost entirely in the learned society functions of the Institute. This is shown by Conference attendance. About 35 percent of all University members attend Conference, and 30 percent of all Government members attend Conference. Only 10 percent of our industrial membership attended.

We have the means for protecting our status, we know it affects the income of a large group of members. Matters of status are matters of differentiation, not of equality but differentiation of training, experience and function. As in another important part of our lives where status is so important:—

Vive la difference!

## FORMATION OF NEW GROUPS

### Chemical Education Group

At its meeting on 29 November Council approved the formation of a Chemical Education Group within the Institute. It is envisaged that the group will include teachers of chemistry at all levels, secondary, technical institute, teachers college, and university and that a session on chemical education will be included in the annual conference.

The first chairman of the group will be Professor G. N. Malcolm of Massey University. A session is planned for Conference in Palmerston North, August, 1975.

It is proposed to create an addressograph set for the group. If you wish to be listed as a member and to receive communications concerning the group please send your name and address to:

The Registrar,  
N.Z. Institute of Chemistry,  
P.O. Box 1926, Christchurch.

## POLYMER CHEMISTRY GROUP

Notice has been given of the formation of the above specialist group within the Institute of Chemistry. Those not yet involved with the group and who wish to have their names placed on the circulation list are asked to contact either the chairman:

Mr. A. C. Kennett,  
c/o D.S.I.R. Chemistry Division,  
P.O. Box 2224, Auckland.

or Secretary:

Mr. N. R. Edmonds,  
P.O. Box 2359, Auckland.

## NEW ZEALAND INSTITUTE OF CHEMISTRY

### Prize-winners for 1974

The Easterfield Medal was awarded to Dr. H. J. K. Powell, Senior Lecturer (Inorganic Chemistry) at the University of Canterbury, for research in the general field of heat changes in chemical reactions, and development of thermodynamic techniques in chemical analysis, as outlined in his Address "Thermodynamics of Complex Formation."

Dr. L. K. Creamer, a Canterbury University graduate, of the N.Z. Dairy Research Institute at Palmerston North, was awarded the I.C.I. prize for his work in both fundamental and applied protein chemistry. In particular he has made significant contributions to the theory of casein micelle structure, and to the understanding of the course of protein breakdown during cheese ripening.

The Chemical Essay prize was won by Mr. K. R. Bedford, a Ph.D. student of Auckland University, whose essay, "The Stereochemistry of Bi-molecular Olefin-forming Eliminations," dealt in detail with the effects of spatial arrangements involved in a particular class of chemical reaction.

1974 is remarkable for the number of visits to China by NZIC members. Here are two independent reports of a visit with a student group and lecturers' group.

## Chemistry Teaching in Chinese

### Universities

Ellen Faed

Recently I visited China as a member of a N.Z. University Students Association delegation. During the course of our tour we visited two universities, Peking and Chengchow, where we learnt a little about their chemistry teaching.

When we arrived at the universities we were given introductory talks tracing their histories and describing in detail changes since the Great Proletarian Cultural Revolution (GPCR). Because politics permeates every aspect of life in China, it is impossible to understand education without knowledge of this event.

One of the major topics of debate during the GPCR was the relation of industry and technology to society. The Maoists argue that although material abundance is made possible by large-scale technology and the division of labour, if industry is allowed to follow its own logic people will find themselves deprived of relative freedom. Society will be run by a new group of dictators, the technocrats, as has happened in the Soviet Union. But Marxist-Leninist doctrines call for a diffusion of responsibility and decision-making (under the leadership of the party). The Maoist solution to this problem is to build small and medium industries in communes and country towns, rather than big integrated industrial complexes in large cities. They are trying to build a society in which the cities do not dominate the countryside economically, intellectually and culturally.

To carry out this policy it is necessary to persuade scientists and engineers to go willingly to work in the country areas rather than wanting to stay in the cities. One method used to develop this attitude is to send all secondary school graduates to work for 2-8 years before they can apply for admission to university. Most of the present university students in China were sent to the country to

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(MRC Toxicology Research Unit, Medical School, Dunedin).

work during the GPCR. This has fostered in them a desire to serve the workers and peasants. This is in marked contrast to attitudes before the GPCR when students were trained to be a spiritual elite.

Elitism was another target of attack during the GPCR, as was the fact that many science and engineering graduates were incapable of putting their theoretical knowledge into practice. Traditionally in China the educated elite, the Mandarins, were highly impractical people, and the emphasis on theory rather than practice in the education system continued after Liberation. In lectures students were passive receptors of knowledge which they crammed for exams. They had no practical experience or problem-solving ability. At Peking University we were told of a pre-GPCR textbook in physical chemistry. Students found it difficult, and could not see practical applications of the theory it contained. A professor recalled a student asking him the use of the book, and he replied: "After graduation you will know," but he was merely hiding his own ignorance. During the GPCR he went with a lecturer to a chemical factory with the task of compiling new teaching material. They took part in manual labour, received political re-education from veteran workers, and consulted with workers and technicians, discussing both theoretical and practical problems. Finally, they wrote a book, "Basic theory of chemistry," which both workers and students could understand. As a result of their contact with academics and introduction to chemical theory, workers in the factory designed a new reaction vessel for a catalytic process which was superior to the apparatus then in use.

At Chengchow University Prof. Hu of the Physics Department, told us of his academic career: "Before Liberation I taught in an old-time university, Tsinghua (in Peking), for several years. After Liberation I came to realise the evil influence of the older systems of education on my mind. But I did not understand the revisionist line, and considered it to be advanced (i.e. allowing industry to develop

unfettered by social and political considerations). During the GPCR I came to realise that the revisionist line was incorrect. Fortunately during the GPCR I had an opportunity to go to the country twice, and also to work in factories. I came to realise that when I was teaching my purpose was not clear and was wrong (i.e. teaching physics for the sake of physics). After re-education I realised the purpose of teaching—to serve the masses. I came to realise that all my earlier textbooks were incorrect; they were divorced from proletarian politics and from production. To carry out the revolution in education, one must start by remoulding one's outlook." Such are the pressures on Chinese academics! Prof. Hu was a serene-looking elderly man.

A chemistry student, Wo Shang, also spoke to us about exams. He said that before the GPCR, examination was for the sake of examination, and study was divorced from practice. The system did not test the vocational level of students. Students were always tense in the classroom. As an example of their impracticality, chemistry graduates knew nothing about chemical fertilizers, a vital product of the Chinese chemical industry. The main characteristic of the present examination system is the combination of theory with practice. Open book examinations are used. Teachers join with students to discuss answers, and sometimes they set questions together. Questions are set according to the realities of production. Students are trained to analyse and solve problems, rather than to memorise strings of facts. For example, at the time of our visit they were reviewing lectures and planning examinations. Students and staff were visiting a chemical fertilizer factory for students to discuss topics with workers and teachers. The workers were to raise questions related to production and the students would try to solve the questions in the factory. Finally the students would give their answers to the workers to assess them. In this experimental exam they are trying to combine book knowledge with production. We were told that the students were determined to carry through the revolution in education. The high degree of motivation of Chinese university students makes such experimental exams realistically feasible.

As Chinese chemistry graduates generally become either industrial chemists or teachers, they are all being trained for the former role at undergraduate level. Both universities we visited have small chemical factories on campus—a pharmaceutical factory at Peking, and a factory making nylon and incense at Chengchow. These factories were built by teachers and students during the cultural revolution, and are run by the students, who all work in them in rotation. The chemistry departments also have close ties with production units in their respective cities. The aim is to train chemists who understand chemical processes on an industrial scale, and are useful in industry upon graduation.

Chinese science students are also being trained to work as a team with technicians and workers. Prior to the GPCR, scientists and engineers in factories tended to work behind closed doors, without contact with the people with practical experience. They proved to be very good at devising impractical processes and machines. Now students already

have a practical orientation and a respect for workers and peasants before they enrol at university, because of the 2-8 year work requirement. While at university they gain experience at sharing their theoretical knowledge by assisting staff in running short-term courses for workers and peasants. For example, at Chengchow university we were told that staff and students of the Mathematics Department had gone to factories and communes where they had given lectures on critical path analysis to 20,000 workers and 7,000 peasants. This emphasis on team work in problem-solving, and the opportunities given workers to gain theoretical knowledge, could well release an enormous creative and inventive potential in China.

Because our visit coincided with the end of the academic year, we did not see any actual teaching of chemistry in the universities, but we did see physics laboratories at Chengchow. First-year students were carrying out standard experiments with resistances; second-year students were designing and testing circuits containing transistors (the physicist in our group thought this was rather sophisticated). Each laboratory contained about 15 students, with about 6 women in each. A high staff-student ratio, small classes and close contact between staff and students seem to be common in Chinese universities. This probably makes their experimental examination and assessment procedures workable.

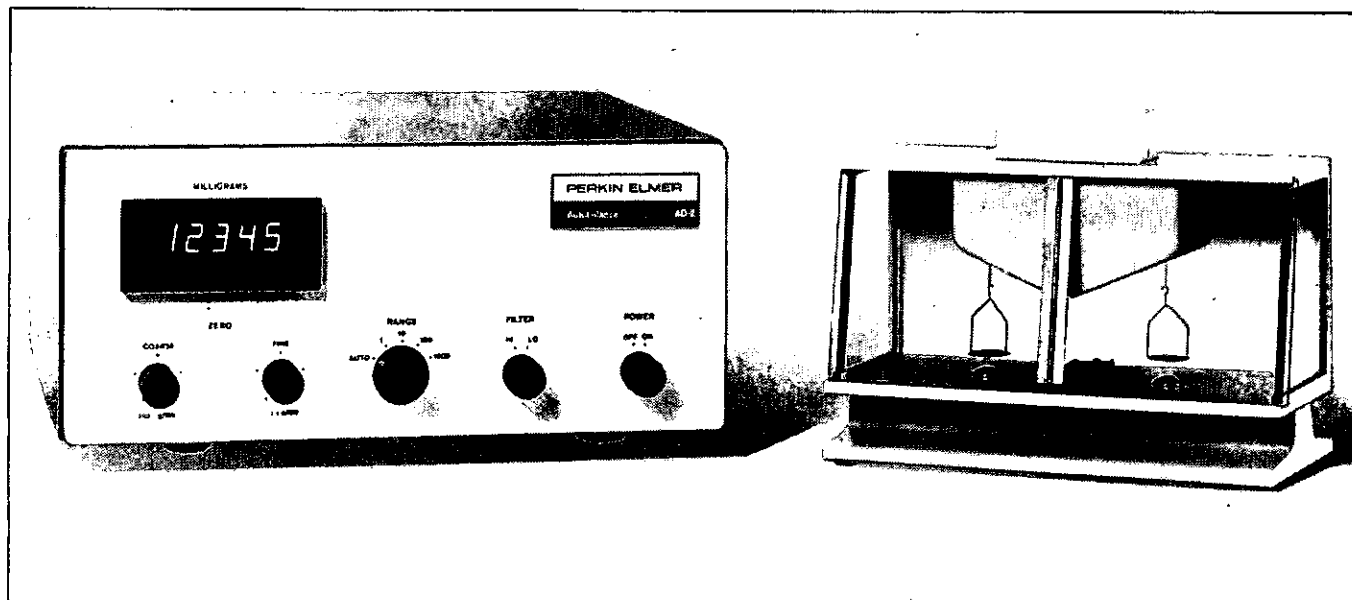
We were told at Peking University that a new approach to lectures is being used there. Lecture notes are given out in advance and class time is used by the teachers to go over difficult points raised by the students. Students are encouraged to put forward creative and constructive ideas. Periodically staff and students discuss the progress of teaching and study.

In summary, it is obvious that there is considerable political control of intellectual activities and tertiary education in China, at a level that New Zealand academics would not tolerate. However, we found no evidence of the searching for meaning and purpose so common among Western academics. Everyone knew what they were doing and why, and the staff and students possessed the usual Chinese vitality and dedication.



Evening rush-hour traffic, Peking.—Photo E. Faed.

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Precision weighing of small samples is now easier and faster than ever before. Perkin-Elmer Autobalances use the very latest electronic techniques to provide speed, convenience, and accuracy for weighing samples in the range from a few grams to a few micrograms. They are the most reliable and most versatile microbalances ever made, and the ultimate answer to every precision weighing requirement.

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- **Autobalanced Beam** — Servo control always returns the beam instantly to a precise position. It eliminates operator control of beam position. No more magnifying glasses and no more hair lines to adjust. All operators get the same answer. No errors!
- **Digital Readout** — All Autobalances have easy-to-read, in-line, digital readouts with lighted decimal points so that the display is always in milligrams or micrograms. No guessing where the decimal goes; no multiplying by range factors; no verniers. The AD-2 has BCD output for calculators, printers, and computers.
- **Autoranging** — An exclusive feature of the AD-2 Auto-balance is its ability to change display ranges automatically to suit the weight of the sample. If sample weight is unknown, simply switch to "Auto", place the sample on the pan, and the balance will immediately select the best range and display the correct weight. Even the decimal point shifts.

- **Speed and Ease of Operation** — Autobalances are easy on users. Weighings can be made in seconds. No experience is required, and almost no training.
- **Design** — Important mechanical parts are designed for ruggedness and then enclosed for protection. Autobalances can be used in environments that would destroy other balances. Electronics are all solid state, very reliable and very stable.
- **Electrical Zero** — Ten milligrams are available on two ten turn pots for easy zeroing and good resolution.
- **Electrical Filters** — Eliminate noise due to poor environments, pan swing, etc.
- **Zero and Calibration Stable Through All Ranges** — No need to rezero or recalibrate when changing ranges.
- **Weighing Chamber** — Large, well lighted, easy access, with heavy base for stability. Easy sweepout and cleanup. Easy right or left hand access. Separated from controls for isolation from disturbances and for easy installation in vacuum chambers, hot cells, dry boxes, etc.
- **Controls** — Simple and logical for easy understanding and operation.
- **Servicing** — Perkin-Elmer Autobalances are more rugged than most analytical balances, and certainly much more rugged than any other microbalance ever made. Servicing should be almost non-existent, but the balance is designed so that 99% of repairs can be done by the users in the laboratory, following simple instructions in the manual.

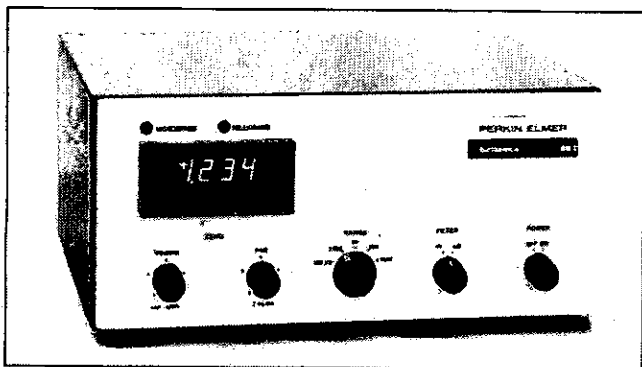
## Applications

**Laboratories:** Tissues, Organs, Insects, Seeds, Eggs, Radiochemicals, Chemicals, Biochemicals, Pharmaceuticals, Reagents, Filters, Lipids.

**Analysis:** CHN, DSC, and AAS Samples; KBr Pellets; Magnetic Susceptibility; Surface Tension; Force and Torque.

**Production:** Cores, Filaments, Precious Metals, Drugs, Tablets, Filters, Volumetric Pipets and Dispensers, Filling, Check Weighing, QC.

**Use Anywhere:** Weigh in Vacuum, Pressure, Heat, Cold, Dry, Wet, Corrosive, Reactive, Radioactive, Noisy, and Almost Any Other Environment.



Model AM-2 Autobalance.

## How They Work

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.

All bearings — fulcrum, sample, and counterweight — are elastic ribbons, for ruggedness and long life with almost no friction or wear.

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
<b>CAPACITY</b> (Sample) (1)	5 Grams	3 Grams
<b>TARE</b> (Counterweight)		
Mechanical (2)	5 Grams	3 Grams
Electrical (3)	10 Milligrams	10 Milligrams
<b>RANGES</b> (And Resolution) (4)	±1 mg to .1 microgram ±10 mg to 1 microgram ±100 mg to 10 micrograms ±1000 mg to 100 micrograms plus Overage 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
<b>READABILITY</b>	±18,000 Counts	±2,000 Counts
<b>TYPE OF READOUT</b>	4½ Place Digital Meter with decimal points, BCD output and Autoranging	3½ Place Digital Meter with decimal points
<b>PRECISION</b> (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
<b>ACCURACY</b> (8) Display (9) Calibration (10)	2 Counts .005%	2 Counts .005%
<b>POWER</b> Voltage		230V 50/60Hz
<b>DIMENSIONS</b> Control Units Weighing Unit		35 cm W x 16 cm H x 43 cm D 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.
- (3) The range available to zero the Autobalance. 10 mg range permits wide variation in containers, and there is ample resolution for easy zeroing.
- (4) Maximum negative reading is about 50 mg.
- (5) Reproducibility. The most important figure of merit for any microbalance. In a given application, the largest specification applies.
- (6) Standard Deviation based on eleven one-milligram weighings.
- (7) Standard Deviation based on eleven max. capacity weighings.
- (8) Agreement with the true weight. These are worst case specifications. Accuracy is generally much better.
- (9) Linearity guaranteed.
- (10) Autobalances are calibrated with special 0.005% accuracy 100-mg weights.

For further information contact:

**Fletcher**  
**HEALTH+SCIENCE**

Private Bag, Auckland.  
Telephone 592-869.

# The Teaching of Chemistry in China after the Cultural Revolution

P. D. Buckley.

In September 1974 I travelled with a party of New Zealand university teachers on a three week trip through China. During the trip I was able to talk with a number of high school and university chemistry teachers. Much of what is written below is based on these conversations.

Visits to schools and universities all followed a similar pattern. The New Zealand party was greeted on arrival with much clapping, hand-shaking and many smiles by a group of teachers and students. In a reception room a member of the Revolutionary Committee of the school or university gave a brief introduction to the general running of the institution, and in particular to the changes that had taken place since the Cultural Revolution. A group tour of selected class rooms and laboratories then took place, and the visit ended with a question and answer session in the reception room.

It was claimed that the major change in the method of teaching since the Cultural Revolution has been the "integration of theory and practice." Much that was taught under the old system was over-elaborate, excessively bookish and often superfluous to the real needs of the students. Since the Cultural Revolution the students and teachers spend time during the year working in factories or in the countryside. Such integration of work and schooling it is hoped will prevent the formation of an educated elite who have a contempt for manual labour. It should perhaps be noted that, in order to discourage such elitist attitudes amongst the students, universities in China did not award degrees, even before the Cultural Revolution.

The university course in chemistry, which formerly lasted for five years has been shortened to three and a half years; and during this shortened course the student spends more time away from the university in a factory or commune. Much time must also be spent in political study.

The meaning given by the Chinese to "integrating theory and practice" can be illustrated by an example given me by a Professor of Physical Chemistry at Peking University. He described how the class and teacher would visit a factory in the petrochemical industry and study the operation of a particular chemical reactor. The teacher and students on returning to the University would discuss the prin-

ciples of kinetics, thermodynamics, heat transfer etc. as they applied to the chemical reactor—theory being discussed in relation to a particular practical application, and not discussed abstractly in a way which the Chinese would describe as divorced from practice. The organic and/or inorganic chemistry involved in the chemical reactor would also be discussed and the students' knowledge of these subjects extended.

Similarly in the high schools the students would be involved in group projects related to factories in the local area. One high school teacher in Shanghai said that groups of students at her school had been analysing the effluent from a local factory to determine if anything of value could be extracted from it. In addition, of course, the usual class laboratory work was carried out, as was shown during a visit to a High School Chemistry Laboratory in Nanching. The laboratory was filled to capacity with students aged about fifteen, individually preparing a variety of gases in simple apparatus, heated when necessary with small kerosine wick-burners.

The examination system in the high schools and universities was strongly criticised during the Cultural Revolution as favouring the student with a good memory. It was also claimed that the exams were often devised to trick the student, rather than to give him the opportunity to demonstrate his knowledge. Since the Cultural Revolution the students are evaluated not just on intellectual achievement but also on attitude. Although written exams remain, they are almost entirely open-book exams.

The place of "graduate" training in the university is still under serious study. Such training has not resumed since the Cultural Revolution.

As a member of a group tour on only a short visit to China, it has not been possible for me to make any meaningful assessment of the value or the effectiveness of the changes introduced since the Cultural Revolution. Language difficulties made a detailed evaluation of the content of Chinese chemistry courses impossible.

Certainly many of the criticisms of the old system of teaching appeared to be valid. The teachers I spoke to were uniformly enthusiastic about the changes being made, but were aware that many problems remain and that further change will be required.

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*Department of Chemistry, Biochemistry and Biophysics, Massey University.*

## Announcement of the Purposes and Aims of the IUPAC Commission on Physical Organic Chemistry (111.2)

The Commission was established in early 1974 and charged with the task of standardising the nomenclature in physical organic chemistry particularly with regard to the naming of reactions, the symbolization of mechanisms of reactions, and the definitions used in the field. In the opinion of the Commission, the best possible solutions to these problems will be obtained if individuals communicate their own ideas to the Commission. It should thus be possible to set up nomenclature systems which are acceptable to the majority of physical organic chemists.

With regard to the first problem, a system for the naming of substitution reactions has been proposed [J.C.S. (1954), 4717], which, in the opinion of the Commission, could easily be extended to include other reactions.

The Commission does not wish to attempt to decide which of several possible mechanisms for any reaction is correct. Rather, its purpose is to develop a system or systems for naming or symbolising models of the mechanisms which might obtain. A chemist seeking to define the mechanism of a particular reaction often seeks to discriminate between several conceivable models; the object is to develop terminology to represent the various mechanistic models. The nomenclature system should be capable of specifying the nature of the reactants, transition states, intermediates, and possibly the rate-limiting step.

Suggestions concerning areas of uncertainty in the definitions used in physical organic chemistry are also welcome.

The Commission hopes that all physical organic chemists will be stimulated to think about these problems and further that they will contribute to the establishment of the nomenclature systems mentioned above.

Fuller reports (ca. 700 and 2000 words) of this announcement are available.

All correspondence should be addressed to the Secretary:  
Dr. J. Penton,  
Eidgenössische Technische Hochschule,  
Technisch-Chemisches Laboratorium,  
Univeritätsstrasse 6  
CH-8006 Zurich,  
Switzerland.

## Five Important New Publications Available from IUPAC Secretariat

### Recommendations on Nomenclature for Chromatography

Nearly 10 years ago the Division of Analytical Chemistry approved a set of recommendations for the nomenclature of Gas Chromatography. Since then the Commission on Analytical Nomenclature has been endeavouring to produce a unified nomenclature applicable to all forms of separation processes, and proposals have been made for Liquid-Liquid Distribution and for Ion Exchange. In the present proposals,\* prepared for the Commission by Dr. D. Ambrose, Prof. E. Bayer, and Prof. O. Samuelson, the work has been extended to all forms of chromatography. For the sake of uniformity, compromises have inevitably had to be made, as a result of which, for example, there are some changes from the recommendations on Gas Chromatography. Account was taken, in the drafting, of other relevant proposals.

Published in *Pure and Applied Chemistry* (Vol. 37, No. 4, 1974) and available as a reprint (ii + 16 pages) from the IUPAC Secretariat, price \$1.20 (£0.40) surface post or \$1.80 (£0.60) airmail.

### Electrochemical Nomenclature

The present document constitutes Appendix III to the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* [Butterworths: 1970 and *Pure Appl. Chem.* 21, No. 1 (1970)] prepared by the Commission on Physicochemical Symbols, Terminology, and Units in 1969. It consists of recommendations for usage of symbols and terminology in electrochemistry. These recommendations are by no means complete and it is hoped that they will be supplemented in the future. The Commission on Electrochemistry has discussed these recommendations extensively and in its deliberations has been greatly helped by comments received from many other interested scientists. These comments revealed considerable differences of opinion. However, the Commission hopes that these recommendations will be widely accepted and hence will serve to avoid some of the confusion which may exist as a result of different usages in electrochemistry.

Published in *Pure and Applied Chemistry* (Vol. 37, No. 4, 1974) and available as a reprint (ii + 16 pages) from the IUPAC Secretariat, price \$1.20 (£0.40) surface post or \$1.80 (£0.60) airmail.

### Quantities and Units in Clinical Chemistry

The Commission on Quantities and Units in Clinical Chemistry is a part of the Section on Clinical Chemistry of IUPAC. The Expert Panel on Quantities and Units is a part of the Committee on Standards of IFCC. These two bodies, the Commission and the Expert Panel, have worked on this document—the former mainly concerned with basic philosophy, the later with problems of implementation.

The aim has been to have clinical chemical nomenclature become a natural part of the evolving international scientific language, especially by drawing upon the recommendations of the International Committee of Weights and Measures, IUB, Technical Committee 12 of ISO, and, of course, IUPAC.

The tentative version of the present publication appeared as Tentative Nomenclature Appendix No. 20 (February 1972) to the *Information Bulletin*. As a consequence of later decisions by international bodies concerned with nomenclature a considerable number of comments, and new deliberations by the Commission and Expert Panel, this Recommendation 1973 contains many, mostly small modifications in comparison with the tentative version.

In cases of conflict, the present document supersedes the larger IUPAC-IFCC Recommendation 1966 and its translation into Spanish. *Recommendation 1966* was the first effort of international organisation towards a rationally standardised presentation of clinical chemical laboratory data. The present publication contains a revised condensation in Sections 3, 4, and 5 of R66. Chemical background material is given in Section 2. Section 6 corresponds to the R66 Part 5 with new kinds of quantities. Section 7 contains examples of clinical chemical quantities in a new generic form, which is further elaborated in a separate publication "List of Quantities" (see below).

Published in *Pure and Applied Chemistry* (Vol. 37, No. 4, 1974) and available as a reprint (ii + 28 pages) from the IUPAC Secretariat, price \$1.80 (£0.60) surface post or \$2.40 (£0.80) airmail.

\*Issued first as Tentative Nomenclature Appendix No. 15 (February 1972) to *Information Bulletin*.

†Issued first as Tentative Nomenclature Appendix No. 28 (November 1972) to *Information Bulletin*.

## List of Quantities in Clinical Chemistry

The aim of this document is to serve as a guide in supplanting present vernacular names for measurable properties in clinical chemistry. Systematic and more informative names are recommended, based on chemical and biochemical nomenclature. At the same time, a preference for 'molecular' kinds of quantities and SI units is stressed. The tentative version of the present publication appeared as Tentative Nomenclature Appendix No. 21 (February 1972) to the *Information Bulletin*.

Published in *Pure and Applied Chemistry* (Vol. 37, No. 4, 1974) and available as a reprint (ii + 24 pages) from the IUPAC Secretariat, price \$1.80 (£0.60) surface post or \$2.40 (£0.80) airmail.

## Atomic Weights of the Elements—1973

On the basis of work published, accepted for publication, or re-evaluated from earlier publications, the Commission on Atomic Weights recommends changes in the atomic weight value for nickel and rhenium. In its 1973 Table the Commission has reverted to the former practice of listing the mass number of the isotope of longest half-life of certain radioactive elements instead of giving no indication of atomic weight value. The widespread use of separated stable isotopes of the rare gas elements is leading to the isotopically depleted material reaching commerce and a warning to users has been added for these elements. Also, the Commission emphasises that the greatly increased use of fission-product materials and separated or enriched isotopic materials carries with it the danger that laboratory samples of anomalous isotopic composition could inadvertently be used.

Published in *Pure and Applied Chemistry* (Vol. 37, No. 4, 1974) and available as a reprint (ii + 13 pages) from the IUPAC Secretariat, price \$0.90 (£0.30) surface post or \$1.35 (£0.45) airmail.

## SAFETY FEATURED AT LABEX INTERNATIONAL, LONDON, 1975

Amongst the comprehensive programmes arranged for the LABEX WEEK (14-18 April, 1975) there are two items on safety. The *Hazard Labelling of Chemicals and Safety in Biological Laboratories* are the titles of two of the discussion meetings being held in conjunction with LABEX International 75.

The discussion on *Safety in Biological Laboratories* has been organised by the recently formed Biomedical Sciences Division of the Institute of Biology and will be chaired by Dr. F. T. Perkins. At the inaugural meeting of this division one of the priorities discussed was safety for workers in biological laboratories and in particular the health problems of those working in medical laboratories, the containment of infectious organisms and the design of safety cabinets.

The discussion on the *Hazard Labelling of Chemicals* has been arranged by the Institute of Science Technology and their President, Professor A. B. Robb, will chair the meeting. In this meeting three twenty-minute papers will be presented followed by an open discussion in which it is hoped the audience will fully participate. Divisional Officer C. Clisby of the London Fire Brigade will speak on the labelling of chemicals and stores in laboratories. Mr. B. Whittaker from the Chemical Industries Association will present the manufacturers' view of hazard labelling, while the users view will be presented by Mr. K. Baker of the ARC Unit of Nitrogen Fixation University of Sussex.

There is currently much more concern over the labelling of chemicals and it has been discussed at various levels both in the U.K. and other European countries. In particular it is anticipated that a European report on the subject will be published shortly before LABEX INTERNATIONAL 75 and if this is the case the discussion will have added topicality.

## CHEMICAL SOCIETY NEWS

### CHEMICAL SOCIETY RESIDENTIAL SCHOOLS

IN ITS INTERNATIONALLY-RENOWNED PROGRAMME OF POST-EXPERIENCE SHORT COURSES THE CHEMICAL SOCIETY ANNOUNCES FIVE ONE-WEEK SCHOOLS TO BE RUN IN 1975.

These are teaching courses essentially for the non-specialist practising chemist who needs to be brought up to date in a particular subject or technique, where progress may well have been rapid since he graduated.

1. "The Uses of Computers in Chemistry"  
University of Manchester Institute of Science and Technology, 13-18 April  
—for graduate chemists with essentially no previous experience of computing. The course will demonstrate the many important and varied uses which electronic computers now find in both fundamental and industrial chemistry; Lectures, tutorials and practical work.
2. "R. & D. Management Studies for Chemists",  
Urwick Management Centre, Slough, Bucks. 24-28 February AND 13-17 October.  
—lectures, exercises, case studies and discussions for young-to-mid-career chemists who have reached a level of some responsibility in line-management of R. & D.
3. "Photoelectron Spectroscopy and ESCA",  
University College of Swansea, Wales, 13-18 April  
—through lectures, tutorials and practical work, world experts in this important new field will carefully take participants to the current state of the art.
4. "High Performance Liquid Chromatography",  
University of Sussex, 1-5 September  
—a full residential school of lectures, tutorials and practical work based on the highly successful two-day review symposium run in 1973.
5. "Quantitative Treatment of Experimental Data in Chemistry",  
University of Manchester Institute of Science and Technology, 15-19 September  
—this well-established "Statistical Methods for Chemists" course is now in its third year of running, and is always over-subscribed.

## CHEMICAL SOCIETY REVIEW

### SYMPOSIA

These are shorter versions of the residential schools. Like the schools they are teaching courses and do not deal with current research for the specialist. Two are being run in 1975:

1. "Heavy Metals as Environmental Hazards",  
University of Bristol, 28-30 July  
—the course will present a complete review of existing information on the effects of heavy metals in Man's environment.
2. "Enzymes",  
University of Exeter, 30 June-1 July  
Details available soon.

For detailed brochures and application forms, WRITE NOW to Miss M. V. Auguste, Chemical Society, Burlington House, London W1V 0BN, England.

The next:

## INTERNATIONAL SYMPOSIUM ON MICROCHEMICAL TECHNIQUES—1977

will be held at

Davos, Switzerland, 22 to 27 May, 1977

continuing the successful series of similar meetings in Graz, Birmingham and at The Pennsylvania State University.

The organising committee plans to include in the scientific programme the application of microchemical techniques to all disciplines, including trace analysis, environmental studies, clinical and biochemical applications, and special problem areas.

Suggestions for programme topics are welcomed.

Programme details and travel arrangements will be announced at a later date.

For any immediate information please contact:

**Dr. Wolfgang Merz,**  
BASF Aktiengesellschaft,  
Untersuchungslaboratorium, WHU,  
D 6700 Ludwigshafen/Rhein,  
Federal Republic of Germany.

### The Registry

The following were elected on 10/5/74:

#### Honorary Fellowship:

Sir Malcolm Burns and Dr. H. C. Holland were elected as Honorary Fellows.

#### Fellows:

CRAIG, John Thorburn, B.Sc.(Hons.), Ph.D., Chemistry Dept. Victoria University of Wellington (Senior Lecturer).  
LEARY, Gordon James, M.Sc., Ph.D.(Cantuar.), Chemistry Division, D.S.I.R., Gracefield (Scientist).  
MATTINGLEY, Joan Muriel, M.Sc.(Well.), Pathology Dept., Wellington Hospital (Senior Hospital Scientific Officer).  
SWEDLUND, Bernard Eskil, M.Sc., Ph.D.(Lond.), Chemistry Dept., Auckland University (Senior Lecturer).  
PAUL, Ivan KEITH, B.Sc., Aerosol Products Ltd., Auckland (Manufacturing Chemist).  
SIMPSON, Peter Anness, M.Sc.(Auck.), N.Z. Sugar Co. Ltd. Auckland (Shift Chemist).  
WALTERS, Peter, B.Sc., Chemistry Dept., Auckland University (Research Student).

#### Graduate Members Elected as Members:

BOURKE, Bernard John, B.Sc., W. R. Grace N.Z. Ltd., Porirua (Meat Packaging Specialist).  
DIVE, William Ross, M.Sc. (Technical Sales Rep.), Chemac Ltd., Auckland.  
HANNAN, Sharon Frances, M.Sc., Ph.D.(Auck.), Purine Laboratory, Guys Hospital, London (Post Doctoral Fellow).  
TAIT, Crofton Roscoe, B.Sc., B.E.(Mats.Sc.), Fisher' Paykel Ltd., Auckland (Chemical Engineer).

#### Members:

BAKER, Alfred Francis Hayes, M.Sc.(N.Z.), A.R.I.C., Secondary Teachers' College, Christchurch (Lecturer).  
BAILEY, John Michael, B.Sc.(Hons.Wales), Dip.Appl.Sc.(Cantab.), Soil Bureau, D.S.I.R., Lower Hutt (Scientist).  
BERESFORD, Mrs. Rosemary Anne, B.Pharm.(Notts.), M.Sc.(Glasgow), Waitaki Girls' High School, Oamaru (Teacher).  
CARRELL, Robin Wayne, M.B.Ch.B., B.Sc.(Hons.), (Cantuar.), Ph.D.(Cantab.), Pathology Dept., Christchurch Hospital (Head, Biochemistry Dept.).  
FORSS, David Austin, M.Sc., D.Appl.Sc.(Melb.), Invermay Ag.Res.Centre (Scientist).  
FULLERTON, Terry James, M.Sc., Ph.D.(Auck.), Forest Research Institute, Rotorua (Scientist).  
HOVE, Edwin, B.A., M.Sc., Ph.D.(Wisconsin), Applied Biochemistry Division, D.S.I.R., Palmerston North (Scientist).  
HUBBARD, David Portmans, B.Sc.(Hons.), Ph.D.(Sheffield), A.R.I.C., Chemistry Dept., Otago University (Lecturer).  
JACOBSON, Alfred Neil, B.Sc., Wellcome N.Z. Ltd., Auckland Quality Assurance Manager.

McGRATH, Dennis Michael, B.Sc., Dip.Ed., M.Ed.(Waikato), Secondary Teachers' College, Auckland (Senior Lecturer).  
MOLAN, Peter Charles, B.Sc.(Hons., Wales), Ph.D.(Liverpool), University of Waikato (Lecturer in Biochemistry).  
O'LEARY, Arthur John, B.Sc., Wellcome N.Z. Ltd., Auckland (Projects Chemist).  
PITT, Michael Arthur, M.Sc., Ph.D.(Well.), Lallaceville Animal Research Station (Scientist).  
RAO, Eajaram Bhavani Sankar, B.Sc.(Calcutta), Kings College, Auckland (Teacher).  
REEVE, John Edward, M.Sc.(Well.), Biochemistry Dept., Victoria University of Wellington (Ph.D., Student).  
REID, Ian, M.Sc.(Well.), Dominion Yeast Co., Christchurch (Manager).  
TURNER, Mrs. Maria Dorothy, B.Sc.(Hons., Liverpool), St. Patrick's College, Silverstream (HOD Biology).  
WHITING, Roger, M.Sc.(Auck.), Chemistry Dept., Auckland University (Temporary Junior Lecturer).

#### Graduate Members:

BAKER, Murray Warren, B.Sc., Nicholas Products Ltd., Auckland, (Control Chemist).  
COOPER, Garth James Smith, B.Sc., 34 Allandale Rd., Auckland 3.  
GRAY, Adrian Barry Newton, B.Sc., Chemistry Dept., Auckland University (M.Sc., Student).  
HEDGES, Robyn Irene, M.Sc., Hutt Valley Drainage Board, Lower Hutt, (Special Projects Officer).  
HUNT, John Sinclair, M.Sc.(Lincoln), Pathology Dept., Christchurch Hospital (Protein Chemist).  
HUNTER, Keith Andrew, B.Sc., Chemistry Dept., Auckland University (Junior Lecturer).  
KELLY, Christopher Barnard, M.Sc., Todd Motors Ltd., Petone, (Industrial Engineer).  
LEE, Mun Hin, M.Sc.(Auck.), Greenlane Hospital, Auckland, (Graduate Technologist).  
McKAY, Raymond Warren, B.Sc., Lockfast Chemicals Ltd., Papatoetoe (Chemist).

#### Deaths:

L. A. James, S. L. Tompsett, D. F. Sandys-Wunsch, Dr. Muriel Bell.

#### Resignations Accepted:

N. J. Musto, L. E. Tucker.

#### Incommunicado:

P. Bannerjee, I. D. Beatson, J. B. Macaskill, C. H. Sissons.

#### Remission of Subscriptions granted:

W. L. Barr, N. O. Bathurst, K. S. Birrell, D. Bradwell, J. D. Kennedy, Miss J. B. Ross, G. E. Rushworth.

#### Reinstated:

J. R. Hunt.

# BRANCH NEWS

## Auckland

The year's activities of the Auckland Branch concluded with the final lecture of the series of Spring Lectures. It was well attended and thoroughly enjoyed by all. Professor Matthews has that remarkable ability to involve his audience in his topic and in simple terms convey the complexity of his topic.

### Chemistry Department, University of Auckland

Dr. J. M. Waters has been promoted to Associate Professor.

Dr. P. D. Woodgate has been promoted to Senior Lecturer.

## Waikato

### University of Waikato

Dr. A. G. Langdon left for Britain at the end of August and will spend nine months sabbatical leave studying diffusion processes with Professor R. M. Barrer, at Imperial College, London.

### N.Z. Forest Products Ltd.

Dr. A. F. Wilson, technical superintendent at the Kinleith mill for the last five years, was transferred to Auckland at the beginning of July to take up the position of Deputy Chief Chemist at the company's Penrose headquarters.

### Ruakura Agricultural Research Centre

Dr. W. G. Whittlestone has been elected a Fellow of the Royal Society of New Zealand.

### Branch Meetings

Dr. P. K. Foster, President of the Institute visited the branch in July and gave an address on "Management in Production and Research." Before giving his lecture Dr. Foster discussed the topic of Technician entry into the N.Z.I.C. with Waikato branch members, a majority of whom are not satisfied with the scheme proposed by Council.

Dr. J. H. Watkinson, of the Ruakura Agricultural Research Centre, spoke at the August branch meeting on "Selenium, Soil, Plants and Animals," which is currently a topic of considerable interest in New Zealand where large areas of agricultural soils are inherently deficient in Se.

Dr. R. H. Locker of the Meat Industry Research Institute of New Zealand, Hamilton, spoke at the October branch meeting on "The Need for an Energy Policy in New Zealand." He is broadly interested in conservation and is a director of the Environment Defence Society.

## Polymer Group

Mr. A. C. Kennett, Chemistry Division, D.S.I.R., has forwarded congratulations on behalf of the Polymer Group of the NZIC to Professor P. J. Flory, of Stanford University, California, on his receipt of a Nobel Prize for research into the molecular structure of plastics materials.

## Annual Dinner

A very successful branch dinner was held on 18 October at the Meat Industry Research Institute of New Zealand. A well received after-dinner speech was given by Dr. D. G. Edgar, Director of the Ruakura Animal Research Station.

The September branch meeting was addressed by three graduate students from the University of Waikato. H. L. Baber discussed "The Possibility of Developing a Phosphatic Fertilizer that Cannot be Fixed," T. J. Nisbet talked about "Protein Interaction with Stainless Steel," and A. Bonny described "The Synthesis, Characterisation and Some Chemical Properties of Bis (methylgermyl) Tetracarbonyl iron."

## Chemistry in Action

The annual lectures for pupils from local schools were given in July at the University of Waikato by Dr. R. B. Mann, University of Auckland, who discussed "Environmental Organic Chemical Health Hazards — whose Baby?", and Dr. D. W. Smith, University of Waikato, who talked about the "Inorganic Chemistry of Heavy Metal Pollution."

## New Equipment

The University of Waikato has purchased an ORTEC TEFA Model 6100 Tube Excited Fluorescence Analysis system, with the aid of grants from the University Grants Committee, the Golden Kiwi Fund and the Ministry of Agriculture and Fisheries. This automated energy dispersive x-ray fluorescence analysis system will be used to carry out elemental analyses of rocks, soils, plants and related materials.

The Ruakura Agricultural Research Centre has purchased a Packard N5220 two channel 300 sample automatic gamma spectrometer, principally to set up radioimmunoassays for protein hormones.

## Manawatu

### Massey University

The following promotions have been announced in the Department of Chemistry, Biochemistry and Biophysics:

Dr. I. D. Watson to Reader.

Drs. P. D. Buckley, K. W. Jolley and S. V. Rumball to Senior Lecturer.

Miss M. N. Wilson has left for the University of Reading, England, where she will be spending a year.

Professor R. H. Hodges visited England to investigate the purchase of a mass spectrometer.

Dr. J. C. Hawke attended the Fourth International Symposium on Ruminant Physiology, Sydney Australia.

Dr. B. D. W. Jarvis, Microbiology Department is on leave at the Rowett Research Station, Aberdeen, Scotland.

### Plant Physiology Division, D.S.I.R.

Dr. J. Christelle has recently returned from Michigan State University where he studied the isolation and properties of tobacco leaf phosphoglycolate phosphatase with Dr E. Tolbert for his doctoral thesis. Dr Christelle will continue to work on photosynthetic carbon metabolism.

### Dairy Research Institute

Mr Suet Yamashita of the Minami Nippon Dairy Co-op, Japan, has arrived at the Institute and will be working with Dr. L. K. Creamer on the nature of the casein-casein interactions in the coagulation and syneresis of enzyme-treated milk micelle systems.

The Institute has honoured Dr. H. R. Whitehead and Dr. F. H. McDowell by naming the first floor area the "Whitehead Wing" and the corresponding ground floor area the "McDowell

Wing." Drs. Whitehead and McDowell took up their duties as Chief Bacteriologist and Chief Chemist respectively at the Institute in 1928. Along with the late Professor W. Riddet they laid the foundations on which the Institute has built over the years. In particular they established the pattern of close liaison between the scientist and the practical men in the field.

Dr. W. A. McGillivray, Director and Dr. W. B. Sanderson, Supervisor of Applied Research, will be attending the International Dairy Congress and the annual meeting of the International Dairy Federation at Delhi, India.

Dr. N. J. Walker has recently returned from a year of study leave spent at the National Institute for Research in Dairying, in Reading, England. He examined the steam volatile constituents from casein to elucidate the compounds responsible for the casein off-flavours that develop after prolonged storage.

Dr. R. C. Lawrence has recently returned from a trip to Canada, the United States and Europe. He attended two symposia, one in Utah, the other in The Netherlands, which were related to the role of starter bacteria in cheese manufacture and ripening.

Dr. A. W. Jarvis has recently had the Ph.D. degree conferred on her and has accompanied her husband to Scotland on study leave. Her thesis was concerned with the bacterial production and control of extra-cellular proteins.

Mr. K. Turner, a recent graduate from the Department of Biochemistry, University of Auckland, has joined the Biochemistry Section of the Fundamental Research Division. He will be working under Dr. T. D. Thomas on carbohydrate metabolism of lactic streptococci.

## Wellington

### DSIR—Chemistry Division

Dr. C. N. S. McLachlan, of the Chemical Engineers recently spent 10 days in Singapore assisting in the creation of artificial top soils using sterile sewerage sludge. Following this Dr McLachlan attended the I.W.S. Conference at Geelong; while in Australia he also visited the Sugar Research Institute at Mackay in Queensland.

Mr. R. N. Anderson has joined the Water Laboratory. He has a B.Sc. from the University of California and previously worked for the U.S. Department of Agriculture on utilization of agricultural waste products. At Chemistry Division his main interests are development of analytical methods for water constituents.

### DSIR—Institute of Nuclear Sciences

Recent appointments to the staff include Dr. P. B. Roberts from Britain, who is setting up a bacteriology laboratory for studies on radiation biology, and Mr. A. A. Gugelmann from the University of Bern, who is studying hydrological problems by means of tritium and other isotopes.

Dr. C. J. D. Adams spent six months in Britain recently, principally at Leeds University, using Rb-Sr methods for dating New Zealand rocks.

I.N.S. members who attended the Institute of Chemistry Conference in Auckland included Dr. T. A. Rafter, who chaired a public meeting of the National Committee for Chemistry to discuss the role of IUPAC in New Zealand; Dr. J. R. Hulston, Dr. N. E. Whitehead and Dr. G. L. Lyon.

### D.S.I.R.—Soil Bureau

Dr. R. B. Miller and Mr. N. Wells have returned after attending the 10th International Congress of Soil Science in Moscow, and visiting scientific institutions abroad.

Dr. R. J. Furkert has been elected Treasurer of the N.Z. Society of Soil Science, Dr. C. W. Childs has been elected to the N.Z.S.S.S. Council, and also appointed Editor of "Soil News," the Society's Newsletter.

Dr. L. F. Molloy has been awarded a Senior Fellowship at the East-West Centre, Hawaii, from January-May, 1975. He will be doing research and lecturing on "Cultural Aspects of Environmental Problems."

Mr. A. J. Metson has been elected a Fellow of the N.Z. Institute of Agricultural Science. He has also been awarded the N.Z. Society of Soil Science President's Invitation Lecture.

**Victoria University of Wellington—  
Chemistry Department**

Dr. B. Halton and Dr. G. R. Burns leave at the end of the teaching year for sabbatical leaves to be spent, respectively, at the University of Reading and Bristol.

**Canterbury**

**Princess Margaret Hospital**

Mrs. Jan Ross has left the Medical Unit. Mr. S. Lun has taken over the aldosterone secretion studies which are being carried out as part of the adrenal transplant work with Professor E. A. Espliner.

**DSIR**

Mrs. M. J. Cretney has joined the staff of Chemistry Division. Previously she worked in the Department of Toxicology at Christchurch Hospital.

**University of Canterbury**

Dr Robert Maclagan has been promoted to senior lecturer.

Visiting lecturers for 1975, will be Dr. Karen Erikson, a biological organic chemist, on leave from Clark University Massachusetts, and Mr. John Mills, a science master at Christs College. Mr. R. Jansen this year's visiting lecturer has been appointed senior science master at Middleton Grange School.

Professor L. F. Phillips is on 14 months leave based at Balliol College, Oxford, where he holds a visiting fellowship. Professor Phillips was recently awarded a D.Sc. from Cambridge University.

In September an extension studies course "Analysis by Atomic Absorption Spectroscopy" was conducted by Professor C. J. Wilkens and Dr. H. J. K. Powell.

**Tasman Vaccine Laboratory**

Mr. C. L. H. Stonyer, Chief Chemist, of Tasman Vaccine Laboratories, is now Production Manager of Chemical and Nutrition Departments. He has been succeeded as Chief Chemist by Mr. Michael Bond, who joined the company a short time ago, after some world-wide experiences of industrial chemistry.

This year's Erskine Fellow, Professor H. I. Schiff from York University, Canada, was visiting the department in August and September. He gave several seminars and lectures to the Honours II class on the photochemistry of small molecules.

University Stage III courses have been reorganised to allow for different interests of graduates at this level. Four courses each of a half unit will be available: Analysis and Methods, Natural and Synthetic Methods, Matter and Energy, and Structure and Reactivity. Any two of these courses will form the basis of a Stage III unit.

Visiting research workers on leave in the department include Professor Russel Grimes of the University of Virginia, Dr. A. Zalkin of the Lawrence Radiation Laboratories at Berkeley, and Professor Marvin Gold of the California State University, Chico.

**Lincoln College**

Professor T. W. Walker and Dr. Alistair Campbell of the soil science department attended the 10th International Congress of Soil Science in Moscow in August. Dr. Campbell presented a paper on "The Effect of Red Beech on Clay Mineral Genesis." He also took three months refresher leave and travelled extensively in Russia, Scandinavia, Germany and the United Kingdom studying the effects of forest on soil genesis.

**Overseas News**

**Personal**

Dr. Barbara Levien of the Dept. of Physical and Inorganic Chemistry, University of New England, N.S.W., spent the long university vacation on special leave in the U.K. at the Open University of Great Britain. As well as gathering information on the working and contents of Home Experimental Kits, she joined a team developing course ST 294, a half-credit second level course for science and technology students. This course is of the chemistry necessary for the production of PVC—Dr. Levien writes that it was turning out to be solubility product, e.m.f., thermodynamics and kinetics, with the PVC story linking them.

Mr. D. A. Morrison is teaching chemistry in the School of Technology, Algonquin College of Applied Arts and

Technology, Ottawa. The Dept. of Chemical and Biochemical Technologies has 12 teachers. Typically a teacher has a timetable of up to 20 hours per week; a laboratory class rarely exceeds 20 students. The academic year is of two 15 week semesters. For historical reasons Ontario has chosen the full-time, daytime, Community College route for job training of technicians (2 year programmes) and technologists (3 years). Their best diplomates are readily accepted into 2nd year University programmes.

Institute members passing through Canada are welcome to contact Mr. Morrison and to visit the College.

Another New Zealander in that same department is Dr. J. M. Zander, from Wellington.

## BOOK REVIEW

### "DEVELOPMENTS IN PVC TECHNOLOGY"

edited by J. H. L. Henson and A. Whelan.

Applied Science Publishers Ltd. £4.50.

Possibly there is little to say about a book where the object has been to collect and publish ten papers given at a Symposium (the symposium was organised by the National College of Rubber Technology and held in London in 1973).

Nevertheless, a review of recent developments in polyvinyl chloride technology and the discussion which followed the papers is of interest to all concerned with the industry. It is, for example, particularly relevant to New Zealand at present contemplating the manufacture of PVC at Whangarei.

Both papers in the 'Pattern of Usage of PVC' and 'Preparation and Properties of Mass PVC' are perhaps too brief but nevertheless offer concise reviews of the present state of the Art.

There does appear to be some advance in research work on lubricants and their incorporation into PVC given in the paper on 'Lubricants for PVC' by G. M. Gale of the Rubber and Plastics Research Association of Great Britain.

In the paper on plasticisers, stabilisers and other additives there is an attempt to put into perspective the toxicity of organisation stabilisers and the present requirements of some National Authorities. Of interest to chemists in this paper is a comparative degradation of two of the stabilisers as followed by infra-red analysis.

The final papers are devoted to "Dry Blend Extrusion, PVC Bottle Production on Blow Moulding Machines, the Extrusion of Liquid Foams and the Injection Moulding of PVC". In general these papers are concerned with mechanical and physical considerations in the manufacture of PVC articles. There is little of interest to the chemist except for some comments on corrosion as a result of the degradation of PVC in the presence of metals.

The booklet contains an index which is both good and bad, e.g. odd words which occur in questions and answers are indexed whereas corrosion which occurs in the main text is not!

The publication as a whole is good reading for PVC technologists but is of doubtful value for chemists who are not directly associated with the industry. At £4.50 the book may be somewhat overpriced.

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**SECOND NEW ZEALAND ENERGY CONFERENCE  
UNIVERSITY OF CANTERBURY, CHRISTCHURCH,  
NEW ZEALAND**

May 22 to 24, 1975

**PURPOSE AND SCOPE**

The First New Zealand Energy Conference was held at the University of Auckland from May 23 to 25, 1974. It was aimed "at defining the nature and range of problems of energy production and utilization that cannot be ignored." The Conference discussed electrical generation patterns in New Zealand; possible continuing sources of power; environmental impacts of nuclear power, fossil fuel reserves and a wide range of related topics.

At the conclusion of the Conference, the opinion was widely expressed that a second conference should be held as soon as possible. The Faculty of Engineering at the University of Canterbury had already contemplated organising such a conference. The purpose of the Second Energy Conference is now to give an overall view of the energy situation and in particular, to examine how, by modification and co-operation, it can be improved.

**THEMES**

It is intended that the Second Conference will consider a co-ordinated energy policy for New Zealand, with emphasis on four basic topics:

- (1) **ENERGY USED FOR TRANSPORT**—one of the most urgent problems.
- (2) **ENERGY NOT USED FOR TRANSPORT**—its production, use and in particular, the impact of nuclear power.
- (3) **RAW MATERIALS** and their relationship to energy supply—should New Zealand fossil fuels and agricultural products be used as fuels or as feed-stock?
- (4) **CONTINUOUS ENERGY RESOURCES.** New Zealand is favourably placed to produce power by wind, sun and water. What is the future potential?

The Secretary,  
Second N.Z. Energy Conference,  
Dept. of Chemical Engineering,  
University of Canterbury,  
Christchurch, New Zealand.

**Royal Society of New  
Zealand Award**

Cary G. Mellow, of Hamilton Boys' High School, Hamilton, has been awarded an R.S.N.Z. Merit Certificate in the 1974 Centennial Awards for Secondary Schools for his project "Absorption and Assimilation of Nitrogen in Green Plants."

He has chosen membership of the N.Z.I.C. as part of his award and thus becomes a local member of the Waikato Branch for three years. He will work in the long vacation at Plant Physiology, D.S.I.R., Palmerston North.

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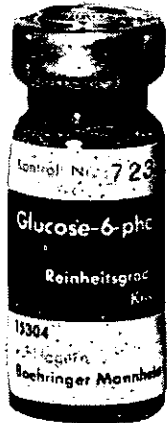
**Automatic Control and  
Instrumentation Society**

P.O. Box 4120, Christchurch.

To keep abreast of latest trends in automatic controls and instrumentation one should keep in mind "Automation '75," the 7th Biennial Conference of the Automatic Control and Instrumentation Society, to be held in Christchurch at the University of Canterbury, May 21-23 inclusive.

The conference will include the usual large trade exhibition, and over 30 papers will be presented by leaders in their field invited from industry research and service companies here in New Zealand and Australia.

# analytical bio chemistry

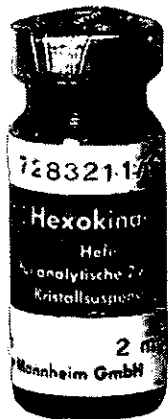
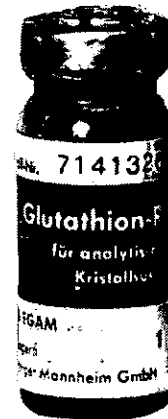


For the solution of a variety of considerably complex questions, many analytical methods are employed by the biochemist. An almost classical method of analytical biochemistry came into existence from biochemistry itself, viz. the enzymatic analysis.

Enzymatic analysis means determination of metabolite concentration with the aid of enzymes, measurement of activities and study of the characteristics of enzymes in vivo and in vitro, and analysis of the control and regulatory functions within the cell and in organ metabolism.

# 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.



# clinical chemistry

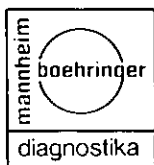
This program is noted for its search for ever more specific and predictable test methods for medical research and routine diagnosis while adhering to the rising requirements for precision and accuracy of laboratory data. On the other hand, such a program must also take into consideration the requirements for simplification and rationalization. The ideal requirement is

reached when simplification of actual labour allows, at the same time, for an increase in precision.

Our program for clinical chemistry offers numerous examples of this ideal.

# food analysis

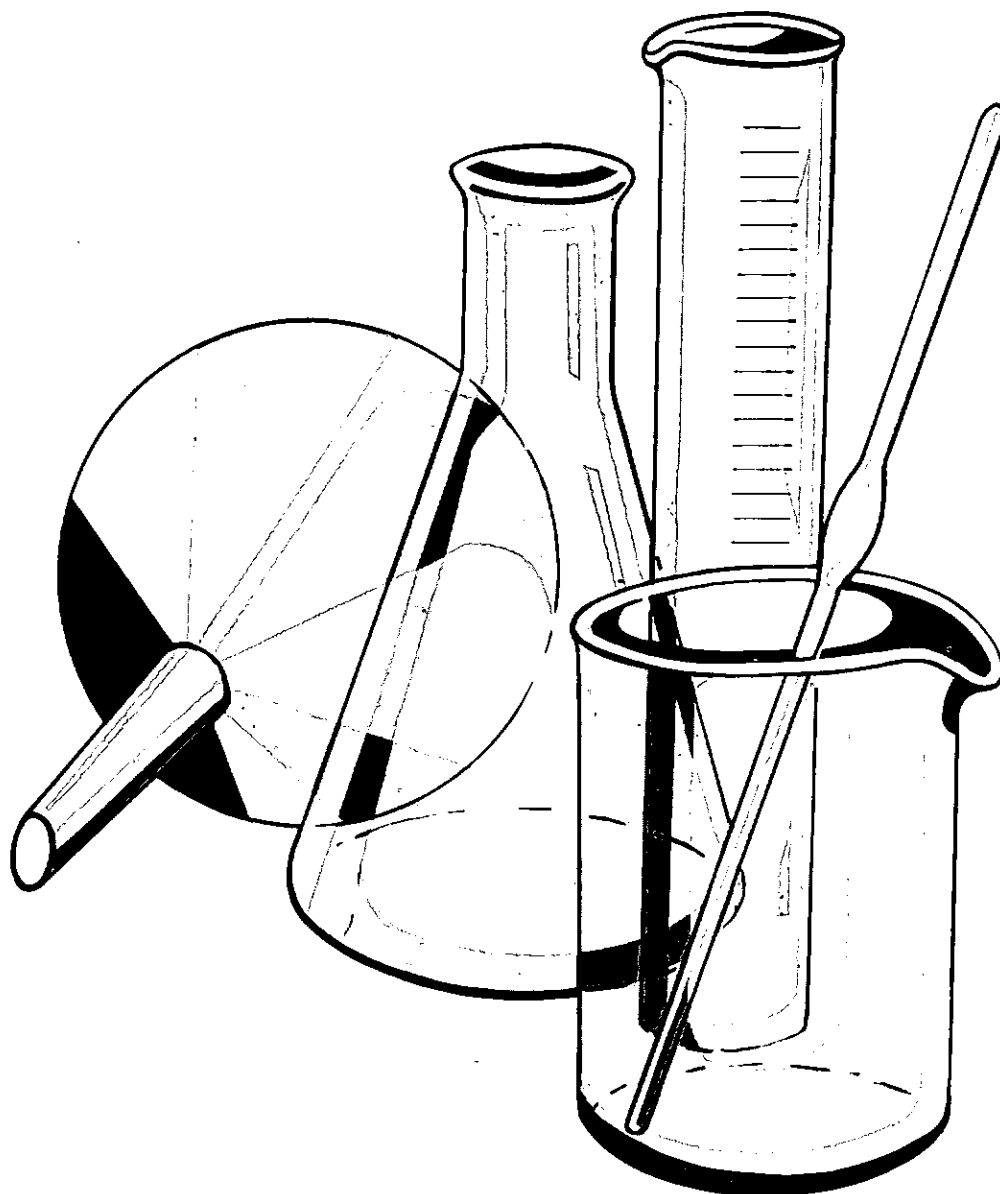
The first knowledge of biochemical processes, of the role enzymes play in them and the first experiences with enzymatic analytical methods were gained with foods. Analyses with the aid of enzymes have many advantages in food analysis: enzymatic methods are fast, safe and reproducible. The measurement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



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**PRELIMINARY INFORMATION**  
**on the**  
**XIII NEW ZEALAND SCIENCE CONGRESS**

For this Congress the Organising Committee has decided to abandon the traditional type of Section organisation in favour of five major Themes which will be presented on an interdisciplinary basis with as much appeal to the public as possible. These have been especially selected for their importance to New Zealand's future development. The Themes are:

- (1) Planning for the year 2000
- (2) Antarctica
- (3) Marine resources of the New Zealand Region
- (4) Innovation and Evaluation in Education
- (5) Current research in New Zealand

It is intended that the Themes will run concurrently through the Congress, although it is expected that areas of common interest will be dealt with in joint sessions. In the middle of the Congress week there will be a day of excursions, both whole-day and half-day, and longer post-Congress tours will be arranged to cater for a variety of interests (scientific, tourist) if sufficient support is forthcoming. Consideration is being given to having a day for "Science and Youth" while the mid-week excursions are taking place, to offer something for school pupils.

Several key speakers will give public addresses related to the Themes and some time will be available for Member Body group meetings and/or social functions. Monday morning will probably be set aside for Congress registration, morning tea and the opening function. Scientific and Educational firms are invited to participate in a Trade Exhibition.

A Second Notice containing more detailed information will be issued later to those who request it on the enclosed pre-paid Postcard. PLEASE COMPLETE AND RETURN THE POSTCARD AS SOON AS POSSIBLE — this requires the minimum of effort! We cannot plan the Congress efficiently without this preliminary information.

Ray Offen  
**Congress Secretary**

**Chairman of the Congress**

Professor J.A.R. Miles CBE, FRSNZ  
Department of Microbiology  
University of Otago

**Organising Committee**

Professor J.B. Mackie (Chairman)  
Dr. R.J. Offen (Secretary)  
Dr. D.W. Featherston (Assistant Secretary)

Mr W.J. Brockie, Mr J.T. Darby, Mr K.R. Dawber,  
Mr A.L. Hogg, Dr. T.R. Hopkins, Professor J.I. Hubbard,  
Mr I.C. McKellar, Associate Professor A.F. Mark,  
Associate Professor K.E. Westerskov.

**Organising Member Body**

The Otago Branch of the Royal Society of  
New Zealand

President: Mr J.T. Darby  
Assistant Director  
Otago Museum

Secretary: Mr W.J. Brockie  
Geography Department  
University of Otago

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**FIRST NOTICE**

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SCIENCE CONGRESS**

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Dr. Ray Offen  
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