JOURNAL OF THE NEW ZEALAND INSTITUTE OF CHEMISTRY

Vol. 30 No. 5
October 1966

CAWTHRON INSTITUTE
NELSON

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The principal work of the Institute is Research in plant nutrition and disease resistance.

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OR:

The New Zealand High Commissioner,
New Zealand House,
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Applications close at the above two addresses on:

FRIDAY, NOVEMBER 24, 1966

JOURNAL OF THE NEW ZEALAND INSTITUTE OF CHEMISTRY

Vol. 30, No. 5 OCTOBER, 1966

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Published by the New Zealand Institute of Chemistry (Inc.), P.O. Box 250, Wellington.

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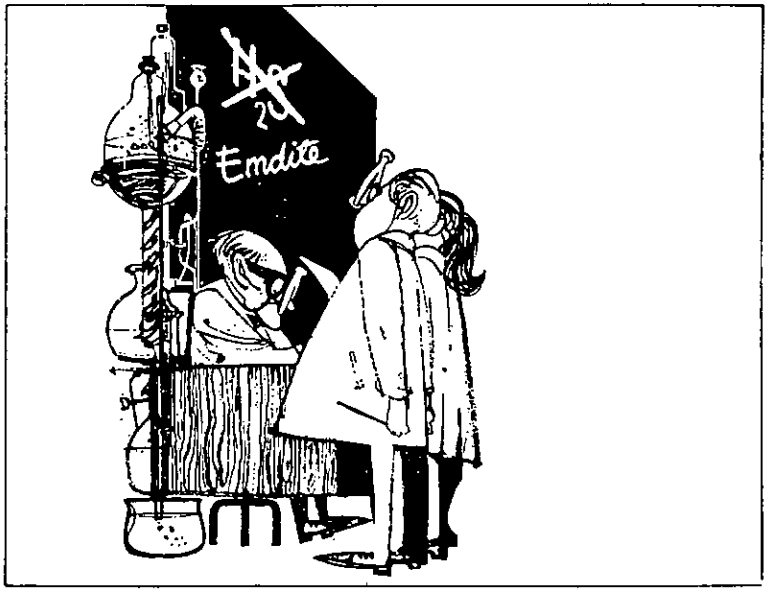

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1. Hart, K.K., Hill, A.G. and Savage, B., J. Roy Inst. Chem., 1964, 418-23 (reprints are available on request)

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JOURNAL OF THE NEW ZEALAND
INSTITUTE OF CHEMISTRY

Vol. 30, No. 5 OCTOBER, 1966

PRESIDENTIAL ADDRESS

THE ROLE OF THE INSTITUTE OF CHEMISTRY

A. T. JOHNS, President

The role of the New Zealand Institute of Chemistry and of its Council, and the type of conference it holds, have been questioned from time to time. Now would seem to be an appropriate time for a stocktaking of the past role of the Institute, its present and possibly its future.

The Institute is now in its 36th year, its first Council meeting having been held in February 1931. It was founded to promote the science and practice of chemistry, to raise the status and to advance the interests of the profession of chemistry and of those engaged therein. Do those words mean quite the same to us today as they meant to the foundation members of the Institute in 1931? I doubt it.

What was the situation as regards science and chemistry in particular at that time? In 1930 there were nine full-time members of staff for *all* the chemistry departments of the four constituent colleges of the University of New Zealand. Organic chemistry, alone of the main branches of the subject, had a specialist teacher in each college; (not that any one of them could confine himself to his speciality). A chemist could keep reasonably abreast of the developments in the whole field of chemistry at that time. Hybrids such as biochemistry were still in their infancy. The University Research Committee was not established until 1946. Biochemistry was not introduced as a B.Sc. unit at Otago until 1940 and as a subject for M.Sc. until 1949. The first graduate in chemical engineering was not capped until 1947.

In the 30's college finances were always totally inadequate for the purchase of research equipment. Dr. Parton commented on

this period: "Research workers were limited to apparatus which could either be bought cheaply or home-made to the best of the investigator's mechanical ability. . . . Research was dictated not by the interest or importance of the questions to be answered but by what could be studied with the wire and string." These were almost the last days of the era of the amateur as far as chemical research is concerned. The term "amateur" is not used in any derogatory sense but rather one of admiration. "Amateur" is taken from the French verb "to love"; literally it means "to have such a marked fondness for a particularly endeavour that one cultivates it eagerly without pursuing it professionally". I feel that though University staff in these early thirties were teachers by profession they were true amateurs in research. Some made notable contributions to science as many other amateurs have done. Newton's work was done as a hobby, professionally he was a government employee. Einstein worked in the Swiss patent office, mathematics was his hobby. Chemical research today has become too expensive for this type of contribution from the non-professional.

As to government research, in 1930 the D.S.I.R. with chemical services concentrated in the Dominion Laboratory, was only four years old. The first Research Association, the Leather Research Association, had just been formed. The Chemical Laboratory of the Department of Agriculture, under Mr. B. C. Aston, carried out all the chemical servicing and research required by the various Divisions of that Department. The Cawthron Institute, founded in Nelson ten years earlier, conducted research work on problems of the Nelson district and on the chemistry of soils of other parts of New Zealand. Certain of our industries were employing chemists but their numbers were few, and their lot relatively poor.

The Institute was founded in 1930 while the country was in the throes of a depression. You entered upon a science course with no assurance that a job awaited you when you graduated. If you wanted to be sure of a livelihood and status you were better advised to train for the medical profession. What was the attitude of society to science and chemistry? Arnold of Rugby, the most famous and influential of public school headmasters had said in the 19th century: "Rather than have physical science the principal theory in my son's mind I would have him think that the sun went around the earth and that the stars were so many spangles set in the bright blue firmament . . . the only thing needed for a Christian and an Englishman is Christian, moral and political philosophy." In the 30's considerable progress had

been made since Arnold's day, but an acquaintance with science was not considered a necessary part of a man's education.

One can see, I hope, from these few remarks that in New Zealand, at least, one had to have a very marked fondness for chemistry to pursue it professionally in the 30's. The men who founded the Institute to promote the science and practice of chemistry and to raise the status of the profession and of those engaged therein had a real task ahead of them.

What has happened to the New Zealand Institute of Chemistry and where does it stand today? I propose to deal with the general classes of members. They have now increased to a total of 860 and are continuing to increase at the rate of approximately 60 per year. The range of their chemical interests is also increasing.

Between 70-80 of our members are secondary school teachers. Branches of the Institute have co-operated with the teaching profession to improve the chemical education of pupils to meet the needs of the future and to attract young people to chemistry as a career. There is nothing altruistic about this, it is enlightened self-interest, trying to help those who will be responsible for the advancement of the profession of chemistry in the coming years and who will provide the next generation of members.

Science has made progress in the battle for a place in education although vestiges of the old prejudices still survive. There has been great activity in the fields of secondary education everywhere to up-date science teaching, particularly in physics, chemistry and biology and to make it available to a wider group and to include those who will not become scientists. Some of the major developments overseas have still to show their full impact on New Zealand. In 1961 the trustees of the Nuffield Foundation set aside £250,000 to develop new science curricula for schools in Britain. The original task was the preparation of courses to begin in 1962 in physics, chemistry and biology for children in the age range 11-16. Now, it is intended to extend these curricula for primary schools and sixth forms. The universities, Royal Institute of Chemistry and Shell International have all collaborated with the chemistry section of these projects.

The Nuffield Science Teaching Project which now concerns children from 11-18, states, "Education in science is held to be an essential ingredient in a humane education as well as an indispensable foundation for adult life and work in a world in

which science and technology are rapidly increasing in influence. The programmes aim to give children a well grounded understanding of science or a branch of science, not a knowledge of disconnected facts. Even at school it is not too early for young people to think about scientific things in a way that practising scientists do. Thus the objective throughout the Science Teaching Project is to encourage children to think freely and courageously about science. In the long run this will make for better scientists, better technologists, and more liberally educated people."

The implementing of these ideas is still ahead of us and they will have to be considerably modified to suit our educational pattern, but one has only to read the prescription for University Entrance Chemistry to realise that tremendous changes have taken place in New Zealand. One of our Institute members, Professor Vaughan, has played a major part in bringing about these changes.

When we look at university teaching today we find that the full-time lecturing staff in Chemistry Departments in New Zealand has increased to over 90. Awards made to Chemistry Departments by the Research Committee of the Grants Committee totalled almost £50,000 in 1965. No doubt this is not considered nearly enough but together with other sources of funds it represents a very distinct improvement on funds of previous years and should result in the stepping up of original research in the universities. Some of this research will no doubt be reported at Institute meetings.

In considering research and the amount of money available for it, we must consider the great change in the state of chemistry today. It is in the midst of a great renaissance triggered off by the development of instrumentation. Before 1945, laboratory techniques in organic chemistry were little different from those of 1895. Today, electronic equipment of many kinds is essential to the chemical laboratory. Modern methods have revolutionized the determination of molecular structure in both organic and inorganic chemistry. The new empirical knowledge, coupled with advances in theory, has permitted synthesis of a host of important substances such as penicillin and the sterols. Many interesting molecules that do not exist in nature have been synthesised. New instruments have been helpful in other areas such as in reaction kinetics, in the elucidation of very fast reactions and those involving excited molecules. Experi-

ments are being performed that take into account the structure, vibration and rotation of individual molecules.

The impact of chemistry on other fields of science has been tremendous. Advances in solid-state physics and in many phases of earth science are dependent on chemistry. Research in biology and medicine has become increasingly chemical in nature, with biochemistry one of the fastest expanding disciplines. The role of applied chemistry has increased many fold. Nearly every article of commerce is coated, coloured, cleaned, protected, stabilized or otherwise modified by synthetic chemicals. In the U.S.A. it has been estimated that chemistry in some form enters into perhaps half of their gross national product. Chemistry has pervaded every part of our daily life; it is essential to the production of our food, clothing, shelter and health. There is little doubt that the practice of chemistry has flourished. Have chemists then, as a result of this, attained the status they sought for the profession of chemistry?

I believe not, for many of these developments that have become part of our everyday life are taken for granted. Everyone is familiar with the thought that chemistry and physics which made rubber, transistors, synthetic fibres and radio-active matter—producer of the world's biggest explosion—all these are the work of scientists. But these are not the achievements of men in New Zealand and the man in the street does not associate these changes with New Zealand scientists. Have we not heard members of the New Zealand scientific fraternity say that they are not appreciated by the general public? This has been the cry for a long time. Whether we consider that we are appreciated or not, there is little doubt that the amount of financial support for science, whether it be in teaching or pure and applied research, has increased markedly even in New Zealand. Whether it is for the reasons that scientists would consider the right ones is another matter. In fact, I am sure we cannot all be in agreement as to why science *should* be supported. The man interested in basic science may well consider that because of his calling the world owes him a living and the spending of his grants should not be questioned by others, such as administrators.

The young research chemist at the bench is fired with the desire to uncover new concepts in chemistry, to add to the storehouse of the world's knowledge. The world is clear cut, it is black or white. His intellectual interests are almost completely scientific, but narrowed to chemistry, to say organic

chemistry, and still further to a narrow field of organic chemistry. He is a specialist whose intense specialisation may tend to separate him from less dedicated members of his community. He is a necessary part of the complex of chemical research when teams of workers are the order of the day. Dr. Bronk stated in 1949: "I know of no evidence which disproves the thesis that new ideas and concepts are formed within a single mind. Great scientific discoveries will be made by individuals who work without direction from others as surely as will the creation of great music and sculpture and art." However, these days not many of us are in the genius class and it behoves those who can to guide the dedicated young chemist into areas which while not restricting his creativity, are at least more relevant to the national scene than are others.

The pure scientist has a tendency to resent the material approach of the applied scientist, primarily because in his isolation he is not in touch with the rough world of commercial life. As pointed out in a recent article, one of the most remarkable post-war developments in the U.S.A. was the creation and growth of a politically insulated, privileged place for practitioners of basic research. The scientists who built the bomb and radar emerged as the heroes of World War II and had little difficulty in persuading the country, first that the pre-war neglect of fundamental research must not be repeated and second, that basic science to be productive must be self-governing and not directed to particular ends.

There is considerable evidence to suggest that the aura that has surrounded academic basic research and its place in the scheme of things, is starting to be questioned. Edward Teller, a basic research worker of the first order, has spoken out against the elite role that basic research has come to occupy in academic settings. "Throughout our universities the best people are brought up with the idea in mind that pure research is the most wonderful thing, the one thing worthy of attention of the best people."

Again as quoted in *Science*, Surgeon-General William H. Stewart in an address to the American Federation for Clinical Research stated . . . "I believe there is a strong current towards pin-pointing of research effort, giving proportionately stronger encouragement to investigations among the most promising avenues . . . I believe that trends upon which public support of research

depend are indicating an increasing investment in mission-oriented, targeted research."

In the past it was considered that as long as good scientists were recruited and provided with equipment they could best function by being left to come up with ideas in any field they chose. Today, the fields are so enormous and so diverse that it is necessary to see that ideas are sought in desired areas. When the field to work in has been chosen the problem remains as to how much effort can be put into basic, relative to applied research. It would be extremely risky to believe that we can define a universal ratio. This varies widely from one field to another, according to the effort and success that has been achieved in the past. If too much effort is put into basic research and too little into applied, the result will be the discovery of a large number of facts, but the application of only a small fraction of these. If too much effort is put into applied research and too little into basic, there will not be enough basic knowledge on which to base the applied.

Some scientists are driven by a deep desire to add to the store of knowledge, and the challenge of discovery is found to be rewarding whether it has immediate practical value or not. Some are more attracted to applied research and technology. They are not satisfied by the acquisition of knowledge for its own sake but prefer their discoveries to be of immediate practical value. Others after a period of intense activity in a narrow field of basic research widen their horizons and find their rewards in seeing basic research applied to solve practical problems.

Then there are those, a very important group of chemists, whose tasks may appear somewhat mundane to the research man. These are the analysts, the watchdogs who ensure that the quality of our products is maintained. Their role is a very necessary one for the health of our society, for tracking down those who break its rules, and vital to the export trade by which we live. In general, these chemists cannot obtain from their work satisfaction in the form of published papers and resultant acclaim from their fellow scientists. Their reward must come from the knowledge that they are a vital part of our society, and in primary and secondary industry their dedication to the job is essential to our whole economy.

Some chemists undergo the transition from the relatively comfortable, simple pathway of specialisation to the responsibility of director of research, be it a University Professor or Research

Institute Director. From this position the horizons are still wider. The director, pure or applied, must expand his interest into a new phase that demands broader thinking. He must be concerned with the originality, the energy, the perseverance and the quality of his men's work—not his own. He must deal with people—not with compounds and concepts. However, in his position of relative detachment he can discern trends or patterns. If he has the ability to see the forest in spite of the trees, he can often analyze and then synthesize a theory which brings order out of chaos. This may be a major and valuable contribution to science.

What of the vice-chancellors, deans, directors, government administrators? Traditionally it has not been quite respectable for scientists to aspire to such positions. The lecturer or associate professor who is good in his field usually thinks of a professorship as the top rung of his ladder, while the research scientist seldom sets his sights higher than the director of a group or a research institute. There appears to be a process of immunisation against administrative responsibilities, during the training and early working life of the young graduate, who strongly identifies himself with his calling and its immediate aims. This is all to the good. However, the only kind of leadership that is encouraged is that of superior performance in his scientific field. Entry into what would be regarded as the major leadership roles in society is not seriously considered. We appear to want to be able to stand apart and criticise the administrator or advise him, without our being willing to accept the responsibilities of his post.

Scientists who have an aptitude for administration should be encouraged to take on high responsibilities, rather than looked upon with suspicion. Leaders of our profession have a very significant role to play in moulding the state of mind of society. This role is necessary, as the processes of government are not systems of rational order, but are a complicated, tension-filled balancing of forces—in which the products of a scientist's creation can have tremendous consequences.

The Institute was founded primarily as a professional body which acknowledged that its first duty was to promote the collective interests of professional chemists. The interests of our chemists are extremely wide. We have members interested in secondary and tertiary education, in basic research, in applied research, in servicing and those concerned with the administration of science in its many forms. Can the N.Z.I.C. continue to interest

all these people? Many scientific societies and associations which cater for special interests of certain of our members have been formed. At the present time in Palmerston North the Institute of Agricultural Science is meeting. It has among its membership a number of our Fellows and Associates who are attending that meeting rather than this. Their president this year is a past president of N.Z.I.C. There are others in which chemists have a stake, which serve their special branch of chemistry and its application to a particular activity or industry. We should not consider these as competing with the activities of the Institute, but rather as extending the influence of chemistry into other disciplines and fields of scientific endeavour.

Concern has been expressed that whereas 50 per cent of our total membership attended the 1950 conference only 16 per cent did in 1965. Max Carrie, incoming president, has pointed out that only 6 per cent of industry members attended in 1965 as against 33 per cent in 1950. He believes that this is due to university members progressively taking over the programme and presenting papers that are highly specialized and of interest to a limited audience. The composition of the programme varies from year to year, but if this tendency were to continue we could become an organization in which mainly university staff were interested. Other members would be catered for by societies covering their own special fields. This development would be most undesirable for the following reasons:

Firstly, there is a great need for an organisation in which all levels of chemistry are represented so that an appreciation of the many viewpoints can be obtained. Those whose interest is pure research and those whose field is technology must respect each other. We must realise that the choice of field has been made on the basis of personal preference and that neither is superior. We must have an effective technical symbiosis between the theorist and the technologist for the future of creative science. As I have mentioned earlier, science and with it chemistry, is judged by its end products and there are signs that there may be a swing away from support of basic research to that which is, as the Americans say, strongly "mission oriented". Trends have a habit of behaving like a pendulum, swinging well past the desirable midpoint before returning. People in government, industry and universities must understand that they owe a debt of gratitude to *both* the basic scientist and the technologist for the fruits that they are enjoying. This understanding will, I hope, ensure a fair distribution of effort in, and support for, both fields.

Some years ago I read an article by Lord Rothchild, a zoologist of distinction, who for many years had been chairman of the Agricultural Research Council of Great Britain. In this he stated that scientists should not be administered by anyone who had not washed a testtube within the last two years. This is of course not literally possible but the inference is clear. There is the very real danger of administrators of science who were trained as scientists rapidly becoming out of touch with their colleagues at the bench. An Institute such as ours allows a very real and personal contact between the active scientists and those who have a hand in moulding government policy.

Besides obtaining better understanding and interchange of knowledge of each other's particular fields, between our members, specialist groups naturally wish to communicate at the specialist level. As specialisation grows and the language of specialist fields become more unintelligible to others this desire will increase. A lecture on any specialist topic is becoming less and less likely to be understood by most members at either a branch meeting or a conference. In countries with a larger scientific community this has led to setting up of separate specialist societies such as the Biochemical Society, Society for Analytical Chemistry, Oil and Colour Chemists' Association. On the other hand this desire for specialist groups is being met by the Chemical Society by the formation of specialist groups within the Society. It is intended that a Discussion Group will be formed whenever it is the wish of 25 or more Fellows to do so in a particular subject and it can be shown the formation of such a group will further the objects of the Society. It is stated that "since part of the activities of a group may be outside the boundaries of chemistry, provision will, in appropriate cases, be made for those who are not Fellows of the Society into membership of a group". It was announced at the end of last year that Carbohydrate Chemistry, Molecular-Beam Kinetics and Mössbauer Spectroscopy groups were under way.

We therefore have the alternative in the N.Z.I.C. of fragmenting into further scientific societies or of encouraging specialist groups within our own Institute. I favour this latter course. These groups should not be formed by the N.Z.I.C. Council. Instead, every encouragement should be given to the members to form such groups. It is then fairly upon those who criticize the Institute to do something for themselves. These could meet at the time of our annual conference. I would then envisage the annual

conference consisting of general review papers, intelligible to the majority of members, and specialist papers in the specialist groups. This may not seem any different from our present conference which is a most commendable effort by the local conference committee. However, at present the conference programme is entirely organised by a local branch of the Institute. I would suggest that a specialist group should have a chairman (with or without a committee) who would organise the sectional programme be it for biochemistry, physical organic or inorganic chemistry, soil chemistry, industrial chemistry, chemistry in education or even administration of science. Sectional committees could be asked to provide general review papers for the general sessions of the conference. In this way I feel that it would be up to the sectional interests to see that they catered for their own members, while the remainder of the conference allowed interchange of ideas between those of diverse interests. Sectional social functions as well as those of the whole conference could add to the occasion.

At the branch level we are, in general, too few in numbers to allow for specialist groups and we will have to be content to confine members to lectures from specialists in language which is intelligible to the whole membership. This interpretation of specialist data in a form intelligible to the non-specialist can be a chastening experience which a number of our members have attempted but have not always achieved.

In my visits to branches this year I was most heartened by their many activities in many directions, but in some cases the efforts are centred around a few enthusiasts. Others feel that the Institute has little for them except a few more letters after their name to add to their status. A sectional specialist interest as well as a broader interest may help to bring these more effectively into the fold.

One further task which awaits us after modernising our Institute and keeping its function under constant review is the continual raising of the status of chemists. We must show ourselves worthy of our desired status by our actions and by co-operating with other disciplines for the recognition of science as a whole. The distinct divisions between the major scientific disciplines have become blurred and in many of the most rapidly advancing interdisciplinary fields chemistry is playing a major, sometimes minor, role. We can no longer believe that a parochial attitude will advance the cause of chemistry above that of other disciplines.

The public has little acquaintance with the personalities and lives of chemists and we can best gain recognition in conjunction with science as a whole. Many of you will not agree with this, if you still maintain that the N.Z.I.C. should not have become an adhering body of the Royal Society of New Zealand. However, I feel that we should be looking outward as well as inward. By combining with other disciplines within the Royal Society we can advance the cause of science as a whole while at the same time promoting the interests of the profession of chemistry. Firstly we must enjoy a sympathetic understanding between the pure and applied, the teacher and administrator within our own discipline. Secondly we need a sympathetic rapport with other disciplines. Only then will we be qualified to secure an accepted role in overall education, as one of the moulders of public opinion. We must realise that science which was almost a private affair in the days when the Institute was founded has now become a public concern. We must take our interests from the ivory tower to the public arena and demonstrate responsibility in all areas. Our performance on this wide canvas will determine the status of chemists.

RADIO CHEMIST

WELLINGTON HOSPITAL BOARD

Applications are invited for the position of Radiochemist at Wellington Hospital from Radiochemists or persons with sufficient background to be trained for the position. The qualification of Bachelor of Science or higher is required.

The appointee will be required to take over the chemical and biochemical work done with radioisotopes and will be expected to work with medical staff in the application of existing methods and to initiate new techniques. The staff particularly concerned will be in the Radiotherapy Department, the Metabolic Unit and the Biochemistry Department. Other specialist departments will also be contributing.

The principal duties will be in connection with the Radiotherapy Department in a new and well equipped laboratory with automatic detection and counting equipment and also in any Department at the Hospital where radiochemistry is a problem. A full range of medium and long-lived radioisotopes, both beta and gamma emitters, is used. With the advent of scanning equipment a programme of radioisotopic labelling will be undertaken. Work in progress at the moment involves the application of liquid scintillation spectrometry to medical problems. The appointee will be given the opportunity to further the use and application of radioisotopes in various departments at the Hospital and may be required, under direction, to assist in the training of student radiographers.

The salary for the position will be within the scales £1,065-£1,315 or £1,370-£1,520 per annum according to qualifications and experience. The actual scale and commencing rate will be subject to approval by the Director-General of Health.

Intending applicants should obtain a schedule of conditions of appointment from the Secretary.

Applications giving full particulars of age, qualifications and experience, together with copies only of at least two recent testimonials and an indication of the earliest date upon which duties could be undertaken should be addressed to . . .

THE SECRETARY,
WELLINGTON HOSPITAL BOARD
Private Bag Wellington Hospital Wellington

CAWTHRON INSTITUTE

NELSON

Applications are invited for the following senior positions on the Institute staff:

(a) **Soil Research Chemist**

(b) **Plant Histologist**

Duties:

(a) **Soil Research Chemist**—Chiefly basic studies on selected soil problems, on which work the Institute has been engaged for over forty years; also general supervision of soil laboratory chemical analysis for major and minor soil constituents, and their adaptation to routine methods, including "quick" tests and autoanalysis. A range of modern apparatus is available, including flame spectrophotometer with atomic absorption attachment; IR and UV recording spectrophotometers; gas chromatograph; β radiation counter.

Qualifications desired: A higher degree in chemistry and, preferably, practical experience with soils.

(b) **Plant Histologist**—Microscopical and histological comparison of healthy and diseased plant tissues with a view to detecting infection at the very earliest stages; and, in co-operation with biochemists working on disease resistance problems in plants, development of histochemical methods of differentiation of metabolic activities in the host-pathogen complex. A Leitz "Ortholux" microscope, good microtomes and general histological equipment are available for initiating this work.

Qualifications desired: Higher degree in botany, preferably with chemical background and some experience in plant histology.

Salaries: Up to £2,005 p.a. initially, according to qualifications, with opportunities for advancement. (In general, Institute salaries follow N.Z. Public Service scales.) Superannuation: National Provident Fund (subsidized by Cawthron Institute Trust Board), interchangeable with N.Z. Public Service and many other schemes.

Travelling: Fares for appointee and his wife and family, if married, will be paid, together with reasonable incidental expenses. For further information please write to

THE DIRECTOR,
CAWTHRON INSTITUTE,
P.O. BOX 175 NELSON

with whom applications close on Friday, December 2, 1966.

The New Zealand Institute of Chemistry (Inc.)

THIRTY-SIXTH ANNUAL REPORT

for the Year Ending July 31, 1966

Officers for the Year

President: Dr. A. T. Johns. First Vice-President: M. S. Carrie. Second Vice-President: Dr. D. R. Llewellyn. Delegates: Auckland, Dr. G. A. Nicholls; Waikato, N. H. Law; Manawatu, Dr. W. A. McGillivray; Wellington, Professor J. F. Duncan; Canterbury, T. A. Mitchell; Otago, Dr. J. C. Dacre. Immediate Past President: Professor S. R. Siemon. Editor of Journal: Miss J. M. Mattingley. Registrar: D. J. Hogan. Honorary Librarian: S. G. Brooker. Auditor: J. W. Shanahan. Acting Hon. General Secretary: W. G. Hughson. General Secretary (on leave): Dr. W. E. Harvey.

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Sub-committees

Standing Committee of Council: Dr. A. T. Johns, Professor J. F. Duncan and W. G. Hughson. Membership Committee: Professor R. D. Batt, Dr. W. A. McGillivray and Dr. J. C. Andrews. Examinations Committee: Professor A. L. Odell (Chairman), M. A. Long (Secretary).

Membership

Election of Honorary Fellows

In August 1965 Council elected the following to Honorary Fellowship: Professor J. Packer, Dr. F. G. Soper, W. A. Joiner and P. R. Parr—all past Presidents.

New Year Honour

Mr. Tasman Joseph McKee, Managing Director of Lime and Marble Ltd., Mapua, was honoured with the award of O.B.E. We are happy to share the honour.

Obituary

We regret having to record the death of the following members: Dr. Lawrence Frederick Addis-Smith, Johnsonville, Wellington; Mr. Ronald Newall Woodward, Institute of Nuclear Sciences, Lower Hutt; Miss Nesta Madeline Woods, 23 Orbell Street, Dunedin.

Resignations

Mr. Wynn Arbuthnot Snell, Eltham. Mr. Edmond Alexander Justice, Papanui, Christchurch.

Current Membership

During the past year membership of the Institute has changed as follows:

Associates elected to Fellowship	6
New Fellows	1
New Associates	67
Resignations	2
Deaths	3

Consolidated membership figures for the last three years are as follows:

	1964	1965	1966
Auckland	155	170	182
Waikato	38	44	47
Manawatu	73	87	100
Wellington	197	215	229
Canterbury	105	109	120
Otago	83	94	91
Overseas	70	78	91
Total	721	797	860

Institute Prizes

Prizes for 1965 were awarded as follows: I.C.I. Prize, Dr. I. K. Walker; Morcom Green and Edwards Prize, Dr. D. E. Wright; Chemical Essay Prize, Dr. M. R. Grimmett.

Conference 1965

This was held in Otago in August 1965 and was most successful. The surplus of £32 12s. 2d. was transferred to the Overseas Visitors' Travelling Fund.

Future Conferences

The general organisation of Conferences was fully discussed by branches and by Council during the year and it was decided to appoint a forward planning Conference Committee of Council to suggest special Conferences at suitable intervals and with suitable themes. Such Conferences will be organized several years ahead and papers will be pre-printed and pre-circulated. The first of such Conferences will be planned for Dunedin 1969.

A.N.Z.A.A.S.

A.N.Z.A.A.S. comes to New Zealand once in a while and Christchurch, January 24, 1968, has been chosen as the next occasion.

Salary Survey

The results have been clearly set out in the February 1966 issue of the Journal and our thanks are again due to the Convener of the Committee, Dr. R. B. Miller, and his assistants.

Finance

The Balance Sheet shows a deficit of £516 compared with a surplus of £189 in the preceding year, an adverse change of £705. The principal factors causing this were (1) an increase in administration expenses, stationery etc. of £130, (2) the free distribution of *Chemistry in Action* at £159, and (3) a rise in the nett cost of the Journal of £395. The Institute is still in a very sound financial position but deficits such as this year's cannot be carried for long and it is clear that consideration must now be given either to a drastic restriction of expenditure, especially on the Journal, or to an increase in subscription. The subscription was last increased in 1951.

Technicians' Certification Authority

This Authority is now well under way and has a number of executive committees. The Institute is well represented on the Executive Committee for Science by three members although we have but one official representative, A. L. Odell. Professor Odell is also on the Authority as the representative of the Vice-Chancellors' Committee.

Overseas Visitors

Professor F. A. Cotton of M.I.T., Massachusetts, U.S.A., was in New Zealand from July 10 to July 28, 1966. He spent a period with each of our branches, and with D.S.I.R. and the universities, and also saw a good deal of New Zealand. He expressed himself

as very pleased with arrangements made for him and members appreciated seminars and lectures given.

Sir Ewart Jones of Oxford will be with us next March (1967). We would also thank the university for co-operating with the Institute in arranging for meetings with other visiting scientists, e.g. Professors R. N. Woodward, N. N. Greenwood, J. S. Anderson and R. D. Brown.

Instrument Survey

This has been an interesting piece of work conducted by members of the Institute and particularly by the co-ordinator, A. H. Horn, of Lincoln. Members who participated will have received a printed list of the whereabouts of equipment in laboratories throughout New Zealand.

Committees of Council

These are numerous as will be seen from the list of officers and representatives of the Institute on the first page of this report. It is hoped that time will allow some of these representatives to tell us a little of their work at the Annual General Meeting.

Institute Journal

We have again to thank Miss Joan Mattingley, Editor, and a vast array of helpers and branch representatives, not forgetting our Advertising Manager, Miss Annette Dollimore, for the services rendered by the Journal. Miss Mattingley reports as follows:

For the last seven issues the Journal has come out on time and a good working relationship exists with the printer. The original agreement was for an issue of forty pages, which was based on the previous issues. However, branch editors have been active and there has been a plentiful supply of copy so that each issue has more nearly approximated sixty pages. Some articles have come from overseas (two from Australia and one from Britain) which is a satisfactory development. But with increased size, costs have increased. Despite much effort on the part of the Advertising Manager, Miss Dollimore, the amount of advertising has not increased in proportion to the increased size of the Journal, and in consequence actual costs to the Institute have increased. The acquiring of a Uniform Audit of Circulations Certificate from the Association of N.Z. Advertisers has put the Journal on a far better footing for getting more advertising, but the fundamental defect in the Journal for realising this is its

small size of page. It costs advertisers a considerable amount of money to have their advertising blocks reduced in size to fit our pages. If the page size were increased to an approximation of the new international page size (similar to quarto) as other New Zealand journals have done, it is probable that our Journal would be a far more attractive proposition to advertisers and that it would have a more "professional" look when placed alongside overseas productions.

An annual meeting of branch editors has been instigated at Conference time and has helped to secure their involvement in the production of a more useful Journal for members.

Royal Society of New Zealand

Miss Mattingley has been our delegate to the Royal Society. She reports on developments over the year:

The Standing Committee of the Council of the Royal Society on which I am the N.Z.I.C. representative, met monthly to deal with the Society's domestic affairs and national and international responsibilities, while the full Council met half-yearly. The Institute of Chemistry representative attended all meetings except one. Up till December 1965 much of the work concerned the re-drafting of the rules and regulations in preparation for the reconstitution of the Royal Society by a new Act of Parliament. The new Act came into force in January 1966.

The new Member Bodies' Committee met for the first time in June and discussed at length what its functions are and how they could best be carried out. A need for greater understanding and co-operation between the various member bodies was found, and a start was made by each representative giving a resume of his Institute; types of membership, aims, problems etc. This was of infinite value to all present.

This committee elected two representatives to the Fellows Council. These were Professor I. J. Cunningham and Miss J. Mattingley. The Institute thus has its representative on the Fellows Council.

At a subsequent meeting of the Standing Committee of the Fellows Council an additional representative from the Institute of Chemistry, Professor J. Vaughan, was approved for the Member Bodies' Committee. This was in accordance with the rules governing the number of members represented.

The Member Bodies' Committee has a lively future and the Institute should be able to contribute and to gain much from being a part of it.

Importation of Publications

Bulk importations of the Royal Institute of Chemistry's *Education in Chemistry* and *Monographs for Teachers* have continued and a bulk order for *Interpretation of Organic Spectra* has been placed. The friendly co-operation of the R.I.C. in these matters is gratefully acknowledged.

General Secretary on Leave

We hope the General Secretary, Dr. W. E. Harvey, and family, have had a good year in U.S.A. and elsewhere on sabbatical leave. He hopes to return about the end of the year.

Officers for the Coming Year

Subject to confirmation by Council the following will hold office for the coming year:

President: M. S. Carrie of Belfast, Christchurch. First Vice-President: Dr. D. R. Llewellyn, University of Waikato. Second Vice-President: Professor J. Vaughan, University of Canterbury. General Secretary: Dr. W. E. Harvey. Acting General Secretary: W. G. Hughson.

For and on behalf of Council:

A. T. JOHNS, PRESIDENT.

W. G. HUGHSON, ACTING GENERAL SECRETARY.

MEMBERS PLEASE NOTE

Nuclear Magnetic Resonance for Organic Chemists, edited by D. W. MATHIESON.

The above book is to be published jointly by the Royal Institute of Chemistry and Academic Press Inc., at 65s. It is being offered to R.I.C. and N.Z.I.C. members at the special price of 49s. The chapters which comprise this book were a series of lectures at a summer school organised by the Royal Institute of Chemistry. The course, run specifically for organic chemists, was primarily concerned with the interpretation of NMR spectra in terms of molecular structure. Correlation tables and conversion tables are printed as an appendix. Examples of spectra for analysis are given together with answers.

Orders, accompanied by a remittance for £2 9s., should be sent to the Registrar, N.Z.I.C., before the end of October.

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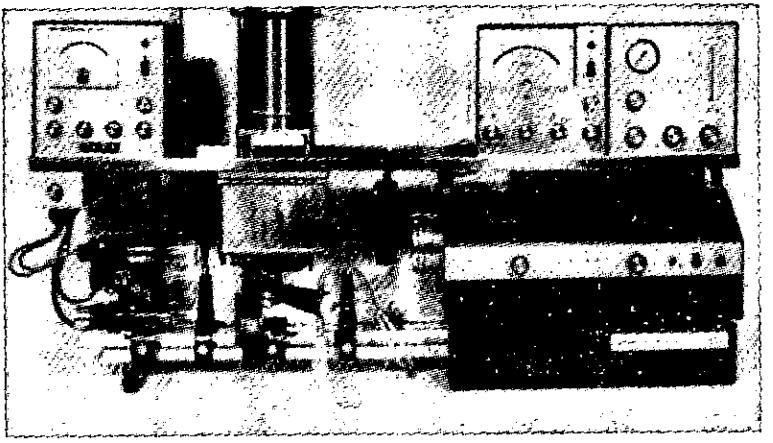

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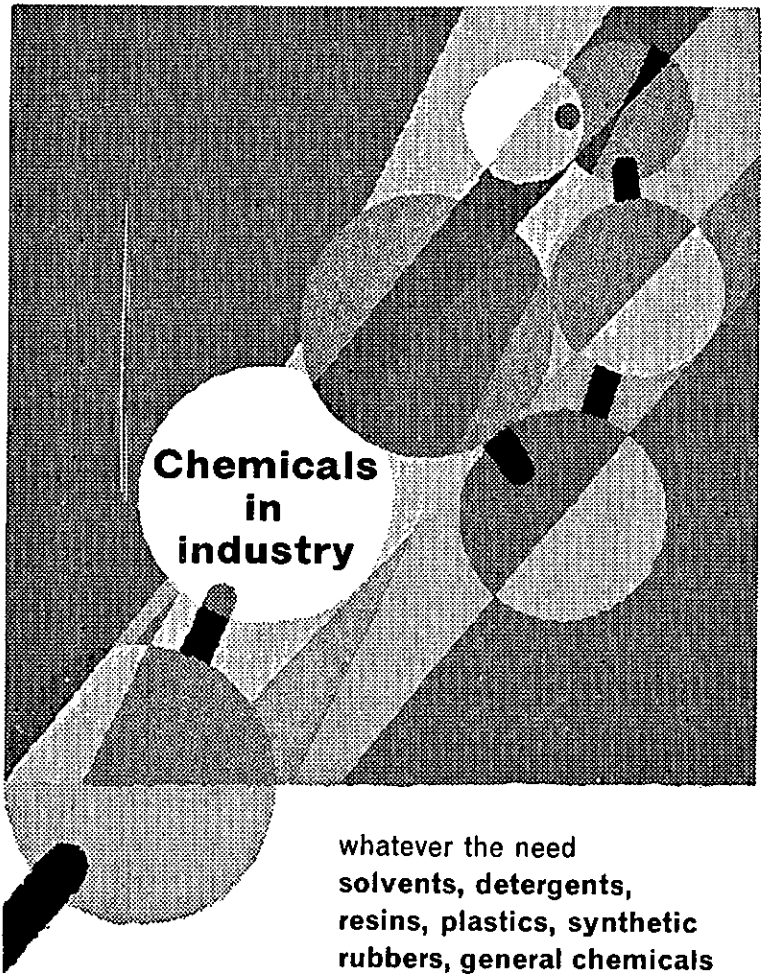

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OBITUARY

JOSEPH KEITH DIXON

M.Sc., Ph.D. (Lond.), D.I.C., F.R.I.C., F.N.Z.I.C., F.R.S.N.Z.

Dr. Dixon, born and educated in Christchurch, was appointed lecturer in chemistry at Otago University in 1929. After a short time he went to work with Dr. Grange and Dr. Taylor on a soil survey in the Mairoa district. In 1930 he returned to Otago as John Edmond Research Fellow, and developed laboratory methods of determining the lime requirement of soils. He then went to London at his own expense to study for a Ph.D. at Imperial College, and was awarded his doctorate in Agricultural Chemistry and his D.I.C. in 1933.

He returned to New Zealand in 1933 at a time when there were no jobs. Sir Theodore Rigg found him a temporary position at Cawthron Institute. Professor Inglis in Dunedin fell ill and Dr. Dixon returned to Dunedin to supervise the Honours students and to lecture Stage III in Physical and Inorganic Chemistry. He seemed set for a successful academic career when Sir Theodore Rigg and Dr. Grange asked him to take charge of the chemical work for the soil surveys that were to be started after the uncertainties of the depression years. As there was no soil survey laboratory, facilities were to be made available at the Cawthron. Dr. Dixon found the call of the soil too strong, and accepted the position.

For several years he worked with others on "Morton Mains disease" and discovered that Southland limestones have appreciable amounts of cobalt, sufficient to raise pasture and lamb liver levels. Then, as soil surveys rapidly extended, he turned more to soil chemistry itself, publishing papers on cation-exchange properties, soluble salts and available plant nutrients of soils, and analytical methods. In 1940 he transferred to Wellington to take charge of the new Soil Chemistry Laboratory as Chief Chemist, Soil Survey Division. In 1952 when Dr. Taylor was appointed Director, Dr. Dixon was appointed Assistant Director.

In 1962 Dr. Dixon was Vice-President of the International Soil Conference held in New Zealand. He served also as Deputy Chairman of the Organising Committee and Chairman of the Tours Committee. Early in 1963 he was appointed Director of the Soil Bureau, and represented New Zealand at the International Soil Congress in Budapest.

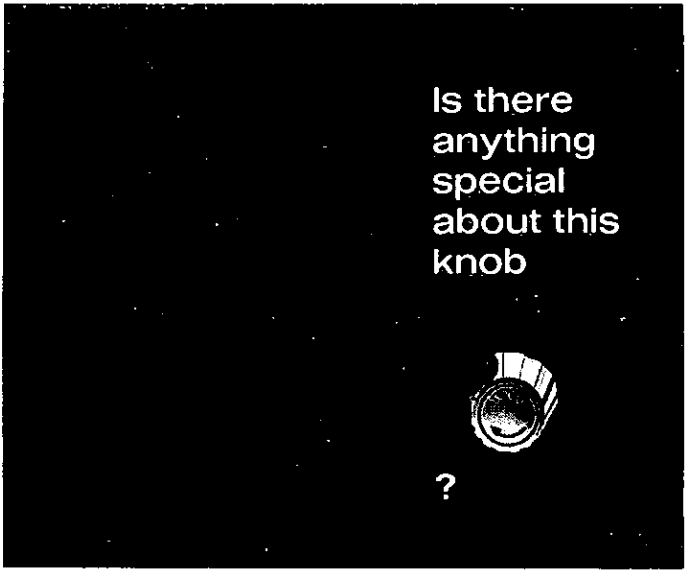
For the Institute of Chemistry, Dr. Dixon had been Wellington Branch Chairman, Member of Council and its Standing Committee. He was elected a Fellow in 1941 and President 1948-49. He was largely responsible for the original Laboratory Assistants' Certificate scheme and for "overseas parcels dispatch" after the war. He was involved in the organising of the first salary survey.

He was on the Royal Society Council for many years, was elected a Fellow of the Royal Society in 1961 and its President 1960-62. He was a Foundation Member and Council Member of both the New Zealand Society of Soil Science and the New Zealand Institute of Agricultural Science. He was President of the former 1956-58 and of the latter at the time of his death.

He was a long-term member of the Management and Technical Committee of the New Zealand Fertiliser Manufacturers' Association, and of the Interdepartmental Committee on the Utilisation of Organic Wastes. He played an important part in the publication of four comprehensive reports in the period 1948 to 1965.

He was also for several years an Honorary Lecturer at Massey College.

He died suddenly at his home on July 30, 1966.



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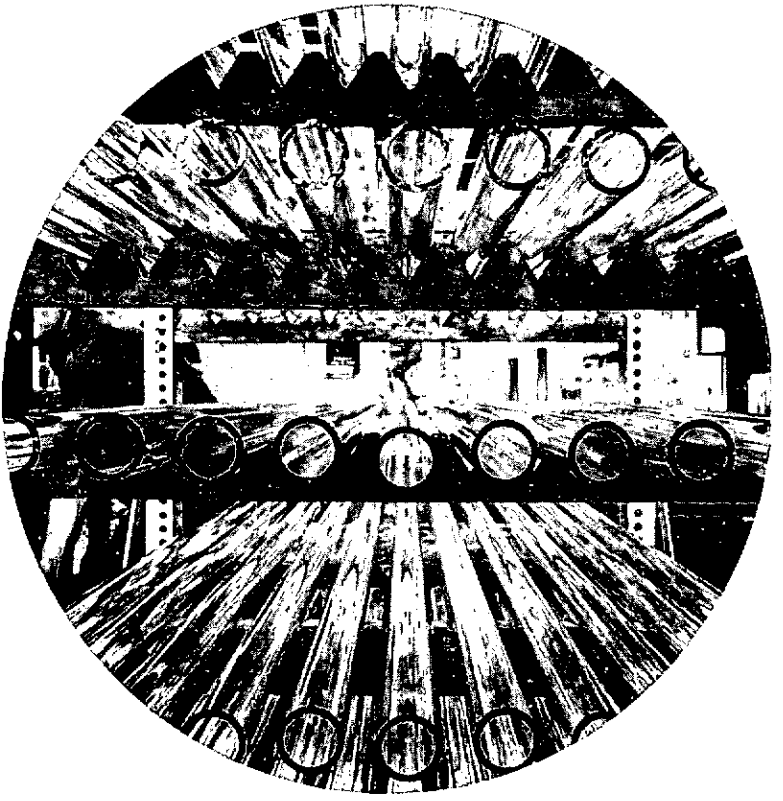

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THE REGISTRY

(Elected August 15, 1966)

FELLOWS

GOLDING, Raymond Marshall, M.Sc., Ph.D. (Cantab.), Chemistry Division, D.S.I.R., Gracefield (Scientist).

MALCOLM, Geoffrey Norman, M.Sc., Ph.D. (Manc.), Chemistry Department, Otago University (Senior Lecturer).

RICHARDS, Nolan Earle, M.Sc., Ph.D., Reynolds Metals Co., Sheffield, Ala., U.S.A. (Director, Basic Research).

WHITTLESTONE, Walter George, D.Sc., Ruakura Agricultural Research Institute, Hamilton (Scientist).

ASSOCIATES

BUCHANAN, Mrs. Hilaire, B.Sc.(Hons.)(Otago), Medical School, Dunedin (Research Assistant).

CHILDS, Cyril Walter, B.Sc. (Hons.) (Otago), Chemistry Department, Otago University (Ph.D. Student).

CUNNINGHAME, Robert George, M.Sc., Chemistry Department, Otago University (Lecturer).

EASTEAL, Allan James, M.Sc., Ph.D. (Tasmania), A.R.A.C.I., Chemistry Department, Auckland University (Lecturer).

HARRISON, Miss Barbara Mary, B.Sc., Health Department, Auckland (Chemist).

HEYWORTH, Rex Malcolm, M.Sc., Dip.Ed., Burnside High School, Christchurch (Senior Chemistry Master).

HULSTON, John Richards, M.Sc., Ph.D. (McMaster), Institute of Nuclear Science, Lower Hutt (Scientist).

KEELEY, Graeme Montague, B.Sc., Canterbury Frozen Meat Co. Ltd., Christchurch (Chemist).

KENNEDY, Lawrence David, B.Sc. (Hons.) (Otago), Medical School, Dunedin (Research Assistant).

KORNER, Brian Peter, M.Sc., Fibremakers (N.Z.) Ltd., Auckland (Technical Officer).

JARMAN, Nicholas Elsdon, B.Sc., Alliance Freezing Co. Ltd., Invercargill (Chief Chemist).

McMILLAN, Murray Allan, B.Sc., Burnside High School, Christchurch (Assistant Master).

STEVENS, Kerry Francis, B.Sc., I.C.I. (N.Z.) Ltd., Lower Hutt (Analytical Chemist).

TATE, Kevin Russel, M.Sc. (Victoria), Chemistry Department, Victoria University, Wellington (Junior Lecturer).

TAYLOR, Michael John, M.A., D.Phil. (Oxon.), Chemistry Department, Auckland University (Lecturer).

THAWLEY, Alan Ralph, M.Sc. (Canterbury), Cawthron Institute, Nelson (Hopkins Research Fellow).

WELLS, Ronald James, B.Sc. (Hons.) (Lond.), Unilever (N.Z.) Ltd., Petone (Industrial Chemist).

WHITFIELD, Thomas, British Paints (N.Z.) Ltd., Auckland (Technical Director).

BRANCH NOTES

Wellington

Mr. H. J. Wood retired from the Chemistry Division, D.S.I.R., last May after 40 years service with the department. Dr. M. Kingsford, formerly tutor in Pharmaceutical Chemistry at the Pharmacy College, Petone, has succeeded Mr. Wood as head of the Food and Drugs Section.

Dr. D. J. Brasch and Dr. B. R. Thomas attended the Fourth International I.U.P.A.C. Symposium on the Chemistry of Natural Products, held in Stockholm. Dr. Brasch subsequently presented a paper on wood hemicelluloses at the American Chemical Society's Annual Meeting in New York.

Dr. J. K. Martin, who has been awarded a Senior Post-doctoral Associateship in Exobiology by the National Academy of Sciences and the National Research Council, will work at N.A.S.A.'s laboratories, Mosset Field, California.

Mr. R. Wells is visiting England, Europe, U.S.S.R., India and Malayasia to collect information on atomic absorption, x-ray fluorescence and mass spectrography. He is due back at Soil Bureau in October.

A Cobalt 60, 154 kilocurie sterilisation plant has been installed at the Tasman Vaccine Laboratory, Upper Hutt by Atomic Energy of Canada Ltd. The plant, to be used for the gamma sterilisation of medical dressings and supplies, will be under the control of Mr. J. O'Kane.

Chemistry Division, D.S.I.R., recently installed a direct-reading, air-path spectrograph to be used for analytical work. Their nuclear magnetic resonance spectrometer has been equipped with a Time Averaging Computer (C.A.T.), which will give a tenfold increase in sensitivity. A variable frequency unit has also been incorporated into the instruments to allow a controlled sweep of the radio frequency as well as the magnetic field. These two additions make this n.m.r. spectrometer one of the most advanced instruments in the world.

The D.S.I.R. mounted a display at the New Zealand Trade Fair held in Wellington in May. Exhibits included: the development of the iron and steel industry; research into wood pulping; detection of preservation and colouring materials in food; the determination of blood-alcohol levels; and an account of the work being done at P.A.C.R.A. Although there were difficulties in arranging the many displays in the allotted space, it is felt that this was a valuable means of bringing the work of the D.S.I.R. before the public.

Dr. J. W. Tomlinson will arrive in August to take up his new post as Professor of Physical Chemistry at Victoria University.

Professor J. F. Duncan recently attended a Solid State Chemistry Symposium in Perth organised by the University of Western Australia. Subsequently he visited Bombay to give a series of lectures at a Summer School on the Mössbauer Effect in Chemistry and the Solid State at the invitation of the Tata Institute of Fundamental Research.

Dr. R. G. Burns has been awarded a post-doctoral research fellowship to study far infra-red spectra at the University of Reading.

Mr. J. Bailey has been awarded an 1851 Exhibition Overseas Scholarship and a Scholarship for University College, Oxford, where he will work under Professor Coulson.

Recent new apparatus at Victoria University includes a MS-10 Mass Spectrograph for Solid State studies and an x-ray generator with single crystal cameras and a powder diffractometer.

During July, the Wellington branch were hosts to several distinguished overseas chemists, Professor F. A. Cotton, Professor N. N. Greenwood and Dr. L. A. Woodward. Professor J. S. Anderson gave the Mellor Lecture for 1966 entitled "Pursuit, promotion and profit in research".

SEVENTH INTERNATIONAL CONGRESS OF BIOCHEMISTRY

Tokyo, August 19-25, 1967

This congress is being organised by the Science Council of Japan under the auspices of the International Union of Biochemistry. The Organising Committee has asked the Royal Society of New Zealand to advise them as to the extent of probable New Zealand attendance. Would those who intend going to this congress please advise: Mr. G. W. Markham, Executive Officer, Royal Society of New Zealand, P.O. Box 196, Wellington.

Copies of information about this congress are available from Mr. Markham.

BOOK REVIEWS

The Biochemistry of the Nucleic Acids, by J. N. DAVIDSON. Methuen & Co. Ltd., London. Fourth Edition, 1960. 288 pages. Price 25s.

All biochemical texts suffer to some extent the fate of rapid obsolescence, and one on the biochemistry of nucleic acids will be outdated perhaps more rapidly than most. The book under review cannot be said to have escaped this fate, although it has been revised several times since it first appeared in 1950.

There are many aspects of nucleic acid chemistry which are basic, and these are usefully and competently dealt with in this book. Subjects such as the pathways of nucleotide biosynthesis, the mode of combination of nucleotide in the nucleic acids RNA and DNA, and the methods of chemical and enzymatic degradation of these nucleic acids, are covered in a concise and clear fashion.

The most vital interest in nucleic acid is, however, concerned with the role of these compounds in the various steps of synthesis of specific proteins, and in the way in which these steps are controlled. Although sections of the book, added in later revisions, give a broad outline of the most widely accepted basic steps, the major part of the text betrays the early date at which it was written in statements such as "RNA exists in the cell only in combination with protein as nucleoprotein", and "It appears that in bacteria, RNA and to a lesser extent DNA play an essential part in protein synthesis, but the manner in which they do so is uncertain". The sophistication of modern molecular biology dates these remarks rather severely.

The reader, then, will not find an up to the minute summary of the present state of knowledge of the roles of DNA and RNA in control of cellular biosyntheses. He will, however, find a valuable introduction to the chemistry, rather than the biochemistry, of nucleic acids. No book of this size could hope to cover this latter subject, and in fact by frequent reference to review articles, this one makes it plain that it does not claim to do so. It is a convenient summary of basic facts, and gives at least an introduction to the current complexity which is the biochemistry of the nucleic acids.

J. W. LYTTELTON

□

"fluorescence and phosphorescence" Principles and Applications, by DAVID M. HERCULES, Ed., Interscience, N.Y., London, Sydney. 258 pages, $A12.

One sometimes finds books on spectrum analysis tucked between sodium and strontium on the analysis shelf. I made the same error in expecting that this book would be a vade mecum for an analyst seeking the theory and practical details that he needs in order to use fluorimetry and phosphorimetry for his purpose. It is not that sort of book.

It is a series of eight essays by nine authors about fluorescence and phosphorescence spectra. Measurement and the phenomena that interfere with measurement are discussed; the general layout of commercial instruments is described, there is an essay on the connection with structure in organic compounds, of necessity descriptive rather than predictive in character, and a similar one on metal chelates. The final essay on polarisation contains a very clear account of the basic theory. There is also much interesting speculation.

The book is small. It does not and could not have the encyclopaedic character of P. Pringsheim's *Fluorescence and Phosphorescence,* of 1949. For example, bone, calcium, immunology, selenium, for all of which there are applications with interesting theory, are not in the index. Only liquid and glassy systems are dealt with. Nevertheless between its covers I found a remarkable amount of interesting information that was new to me, and I commend it to all interested in photochemistry as a stimulant but not as a source book. The style is usually clear and attractive, the layout, printing, and paper are good, the cover ordinary, and the price high.

W. S. METCALF

□

Light Sensitive Systems, by JAROMIR KOSAR. John Wiley & Sons Inc., N.Y., 1965. 473 pages, New Zealand price 135s.

This book is more correctly described by its subtitle: *Chemistry and Applications of Non-silver Halide Photographic Processes.* It is the first in a new Wiley series in photographic science and technology and the graphic arts. The stated aim of the author is to provide a book to cover more than a century of work on the photochemistry of non-silver halide systems, the results of which had hitherto been restricted to scattered items in journals and patents. In the main, the author has concentrated on work since 1945 but some historical developments are included in order to provide a more or less complete background. Extensive references to the relevant literature up to 1964 are given.

The organisation of the book is essentially a division into inorganic and organic processes. The first three chapters, apart from an introductory section on general photochemistry, deal with light sensitive inorganic compounds and their application to photography, while the remaining six chapters are concerned with organic systems. Subjects covered in these latter chapters include photopolymerization processes, diazotype processes, the application of diazo and azido compounds in presensitized printing plates, photochemical formation and destruction of dyes and thermography.

For the chemist used to thinking of photography only in terms of conventional silver halide emulsions this book will provide interesting (and enlightening) reading. For the chemist interested in the application of non-conventional photographic methods it should prove an excellent source reference. Very full subject and author indexing and the organisation of subject matter into essentially complete topics are an additional aid.

Throughout, the author has presented his material clearly and in an easily readable form. The quality of both paper and printing is good and the binding adequate. Unfortunately the cost of the book is high so that it will not find its way onto very many private bookshelves.

W. C. TENNENT

□

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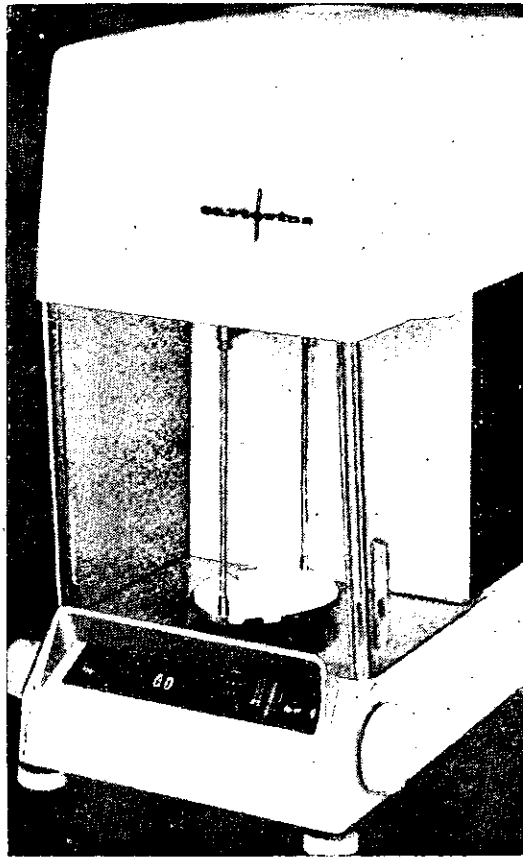

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scale division	100 mg	10 mg	10 mg
reading to (micrometer)	1 mg	0.1 mg	0.1 mg
precision (std. deviation)	0.3 mg	0.05 mg	0.05 mg
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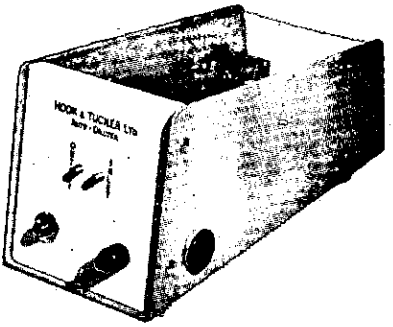

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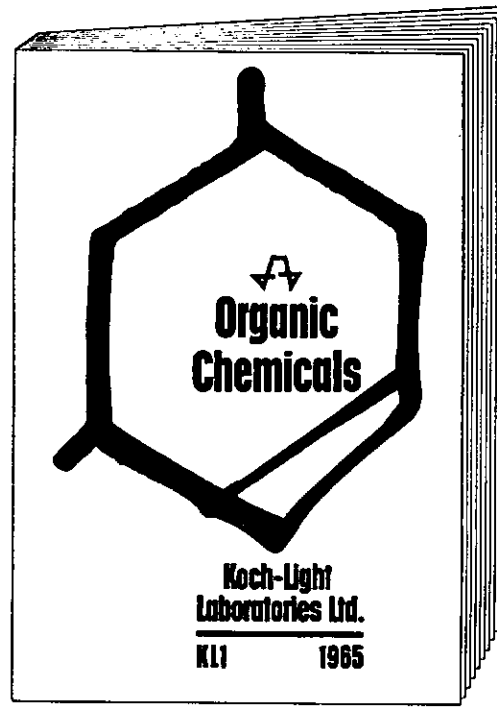

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