JOURNAL OF THE
NEW ZEALAND INSTITUTE OF CHEMISTRY

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EDITORIAL

When preparing this Journal for publication, it seemed reasonable to reserve this editorial page for some comment on the new salary scale which, it has confidently been expected, would be announced well before the beginning of April. These new scales will be of interest to all members since, although they will have immediate effects for only certain groups of chemists, other salaries may be expected, as in the past, to fall into line. However, despite glib assurances of "no unavoidable delays", we near the end of March with no indication of Government policy. Of course, to quote from the Jubilee issue of last November " . . . we may be within days of writing otherwise"—but we may also be within months or years of a solution of the problem of a satisfactory remuneration for the scientific worker commensurate with that enjoyed in other professions.

Whatever the outcome of the present negotiations, the scientist has certainly enjoyed or endured far more publicity over the past few months than ever before. While we may not always agree that the type of publicity has been entirely desirable, it has taught one important lesson. Whenever a scientist has something to say the press is prepared to report it and the public to read and to discuss it. This is a healthy attitude and one which we should take greater advantage of in future. The concept of the chemist as a "back-room boy" completely out of touch with reality has surely gone now. We can allow too much credit (as we have in the fields of medicine and agriculture) to go to those who apply results rather than to those who develop the ideas. Is not this then the time to give careful consideration to the best way of continuing to publicise the activities of the Institute and the contribution its members are making to the prosperity of the country.

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CHLORINE AS A PLANT NUTRIENT

BY C. M. JOHNSON,

Department of Soils and Plant Nutrition, University of California, Berkeley 4, California.

(Based on an Address Delivered at the Annual Institute of Chemistry Conference, Palmerston North, 1955.)

This paper is based on the findings of the author and his colleagues, T. C. Broyer, A. B. Carlton, and P. R. Stout, that chlorine is a micronutrient element (1). These findings arose from studies originally designed to clarify the status of some of the elements known to be required by animals, but not at that time shown to be plant nutrients. The elements, cobalt, sodium, chlorine and iodine, fall in this category, and of these cobalt was singled out for initial study because of the recognition of its frequent deficiency in animal forage without, however, well authenticated cases of demonstration of its need by the plant itself. Investigations on chlorine really developed from this work on cobalt now to be described in historic sequence.

The work with cobalt involved a special challenge because of the very small amounts believed to be involved. Chemical purification of nutrient salts, starting with analytical reagent grade materials, involved coprecipitation of the cobalt with copper or iron sulphides. As an aid in the detection of amounts of cobalt remaining after this treatment, a known amount of high specific activity radio-cobalt was added to the solutions to be purified. Measurements of the residual radio-activity of cobalt showed that the purified nutrient solutions prepared from these treated solutions contained less than 2×10^{-4} micromoles (0.01 micrograms) of cobalt per litre of nutrient solution.

Tomato plants were grown in a nutrient solution prepared from stock solutions purified in this way and having the following composition in millimoles per litre Ca, 4; Mg, 1; K, 6; NH_4, 2; H_2PO_4, 2; SO_4, 1; and NO_3, 14; with the pH adjusted to a value of 6 at the start of the growing period. With the ratio of ammonium ion to nitrate ion used, the pH remained close to 6 during the growing period. The six recognised micronutrient elements were added, in micromoles per litre as follows: Fe, 86; B, 46; Mn, 9.1; Zn, 0.76; Cu, 0.31; and Mo, 0.10. (The odd values for the amounts added are the result of the conversion of the usual amounts added in parts per million or in parts per billion to the more rational terminology of micromoles per litre). It soon became obvious that the plants were not making normal growth and that they had an abnormal foliar appearance as compared to plants grown on the usual nutrient medium. The possibility that a toxic substance had been inadvertantly introduced into the nutrient solution as the result of the purification procedure was discounted

later. For example, sulphide and copper ions might not have been completely removed during the purification. Auxilliary tests with other cultures and with even larger additions of these and other potentially toxic substances failed to produce these symptoms. Therefore, it seemed likely that the plants were manifesting a lack of some essential nutrient in the highly purified medium. Additions of cobalt in amounts up to 1.7 micromoles (0.1 ppm.) were not effective in restoring normal growth. The cobalt investigations were set aside until satisfactory plants could be grown on the purified medium. Pending further information, the missing factor was named element "X" and work was undertaken to determine its nature.

It was known that a nutrient solution prepared from the usual lot of greenhouse stock solutions, (KNO_3, KH_2PO_4, $Ca(NO_3)_2$, and $MgSO_4$) gave healthy growth. Therefore nutrient solutions were prepared from three of the purified stock solutions with the use of the usual greenhouse solution for the fourth. For comparison tomato plants were grown on both the purified cultures and the stock greenhouse cultures. As before the solutions prepared from the purified salt solutions failed to support healthy growth while those prepared from the complete set of greenhouse salt stocks did. However, when greenhouse stocks of either KNO_3 or KH_2PO_4 were incorporated into nutrient solutions, the growth and appearance of the plants was normal, whereas additions of greenhouse stock salts of either $Ca(NO_3)_2$ or $MgSO_4$ to the purified solutions did not prevent the incidence of the deficiency symptoms.

It was concluded that element "X" was associated with the greenhouse (technical grade) of potassium salts. Most of the potassium salts of commerce are derived from the processing of crude KCl and the number of possible trace constituents is great. An exploratory examination of a number of potassium salts of various grades with use of the flame photometer failed to reveal any differences in the contaminants that were suggestive. This approach was therefore abandoned in favour of direct chemical purification procedures. Later studies led to the possibility that traces of chlorine remained in other potassium salts manufactured from potassium chloride and that chlorine might be contributing to the nutrition of the plants. Recrystallization of a number of potassium salts, including KNO_3 and KCl had revealed that the element "X" remained in the supernatant from the recrystallization of KNO_3 and was absent from the pure crystals of KNO_3 but that it was present in both the supernatant and the crystals of KCl. Thus it was suspected that the analytical grade reagents used in the first experiments were initially low in chloride and that the sulphide coprecipitation to remove cobalt was not necessarily effective in removing the element "X".

Other procedures were adopted to directly remove traces of chloride from the stock solutions for use in experiments for studies of the levels of chloride required for the adequate nutrition of the tomato plant. Two procedures were used in freeing the nutrient salts of chloride contaminants; (1) recrystallization (especially of $(NH_4)_2HPO_4$), or (2) precipitation of halides with $AgNO_3$ followed by removal of excess Ag^+ by coprecipitation by the addition of copper and sulphide. Nutrient solutions prepared from these low halide salts gave very poor growth of plants but growth was normal and foliar symptoms were absent when supplemented with chlorine from a variety of sources, namely; (a) reagent grade potassium chloride, (b) technical grade potassium chloride, (c) recrystallized reagent grade potassium chloride, (d) supernatant from recrystallized potassium chloride, (e) reagent grade calcium chloride, (f) reagent grade magnesium chloride. It was shown that the foliar symptoms and total growth were related to the amount of chlorine supplied and not to the source of chlorine. However, to be certain that the element "X" was not an element that might have similar properties to chlorine and thus might have followed chlorine through all purification procedures, a chlorine salt was prepared by bringing together two gas phases. Nitrogen was bubbled through concentrated reagent grade hydrochloric acid and into glass distilled water. Likewise nitrogen was bubbled through concentrated reagent grade ammonium hydroxide and the ammonia was collected in the hydrochloric acid previously prepared to form a neutral solution of ammonium chloride. The solutions were assayed for chloride content and used as chlorine supplements in growth experiments. In this way it was possible to exclude the possibility that element "X" was a heavy metal or other non-gaseous contaminant. The chlorine from this ammonium chloride solution was quantitatively as effective in preventing the development of foliar symptoms and permitting normal growth as chlorine from any of the other sources.

The first observable symptoms of chlorine deficiency in the tomato plant was a wilting of the tips of the blades. Later there developed a characteristic "bronzed" appearance of the basal and central portion of the blades. The "bronzing" was always restricted to the basal and central portion of the blade and never invaded the wilted tip portion. Associated with the wilting and "bronzing" was a marked reduction in growth of the plant. Chlorine deficient tomato plants failed to set fruit, thus preventing the completion of the life cycle of the plant. Symptoms of the deficiency could be arrested by additions of chlorine to the culture and also could be arrested by the injection of as little as two micrograms of

chlorine into the stem of the plant. Following injections of chlorine into chlorine deficient plants the uninjured portions of the leaves resumed normal growth and development.

The need for chlorine by a number of other plant species has been demonstrated. In addition to tomato, sugar beets, lettuce, cabbage, carrots, alfalfa, and subterranean clover are among the species for which a chlorine requirement has been shown.

The amount of chlorine in the tissues of tomato plants suffering from the deficiency disease is quite large compared with the amounts of some other micro-nutrients, being in the order of seven micro-equivalents per gram dry weight (250 ppm.). By contrast molybdenum deficient tomato tissue contains in the order of 1 x 10^{-3} micro-equivalents (0.1 ppm.) or less. If the inadvertant contamination by atmospheric chlorine is at a minimum, concentrations of chlorine of from 0.5 to 1.0 ppm. incorporated into the nutrient solution should meet plant needs for healthy growth. Growing plants may obtain considerable amounts of chlorine from sources other than the nutrient solution or the soil. This has been shown by recovery of several times more chlorine than added to the culture solution when plants were grown in nutrient solutions of known composition. Protection of the plants from atmospheric chlorine contamination by filtering all air entering the greenhouse through activated charcoal, has resulted in much more restricted growth than with plants receiving the same amount of chlorine in the nutrient solution but grown in greenhouses without filtered air.

The ubiquity of chlorine in the atmosphere, probably as aerosols from sea breezes, and in the rain and snow and in all lakes and rivers makes it appear unlikely that severe chlorine deficiencies of plants will appear under natural conditions although there may be some crops with an especially high requirement for chlorine that may benefit by chlorine fertilization under some conditions. With the continued improvements in chemical technology it is important to realize that high quality reagent salts used in the preparation of nutrient solutions for controlled experimentation may not contain sufficient chlorine to support plant growth without chlorine supplements under many conditions. Failure to recognize this fact may give rise to erroneous impressions of increased growth when some cation is added to the nutrient solution if it should be added as a chloride when in reality the response in growth may be due to the chloride increment.

It is suspected that bromine in much higher concentrations can partially substitute for chlorine but cannot replace it completely. The status of bromine and the other halides in plant nutrition is now being studied and will be reported elsewhere.

Quantitative determinations of halides were done by one of two methods, depending on the sample material and the amounts of halide involved. The micro-diffusion method of Conway (2) was useful where the amount of sample was limited (less than 10 micro-equivalents chloride per sample) or where the nature of the sample prevented accurate determination of halide with silver as, for example, in samples of phosphate salts. Plant samples were ashed at 500°C after treatment with freshly prepared low halide calcium oxide as recommended by Piper (4). For expected amounts of halide in excess of 10 micro-equivalents a modification of the potentiometric method of Kolthoff and Kuroda (3) was used. The Conway micro-diffusion method is especially useful where it is desired to determine individual halides in the presence of each other. Suitable choice of oxidant and acid concentrations as described by Conway makes it possible to effect a rather good separation of the halides.

ACKNOWLEDGMENTS.

Acknowledgment is made to the United States Atomic Energy Commission, Division of Biology, for financial support for the experimental work under contract AT 911-1-34. Acknowledgment is also made to the United States Educational Foundation in Australia for a Fulbright Research Scholarship at the Waite Agricultural Research Institute, Adelaide, South Australia, and to the United States Educational Foundation in New Zealand for making it possible to attend a Conference of the New Zealand Institute of Chemistry and the New Zealand Branch of the Royal Institute of Chemistry.

REFERENCES.

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THE NEW PATENTS ACT AND ITS IMPORTANCE FOR CHEMISTS

BY O. F. NAUEN,

Patent Examiner, New Zealand Patent Office, Wellington.

The New Zealand Patents Act of 1953, which came into operation a year ago, has brought considerable changes in the patent practice of the country which are of interest to every inventor.

It was felt, soon after the war, that the Patents Act issued in 1921-22 and augmented by various amending acts, did not give sufficient protection to the inventors, particularly because it did not provide the necessary apparatus for the technical examination and investigation of the novelty of the patent applications.

This want led to the setting up of a Commission which investigated all aspects of the existing Patent Law and its practice. The new Act, which follows closely the British Patents Act of 1949, is based to a considerable extent on the recommendations of the Commission.*

It is not possible to give here even a brief outline of the Act, and only those provisions of particular interest to chemists will be discussed.

However, for those who are not so familiar with patents, the following general matters will be of interest. Any application for a patent has to be accompanied by a provisional or a complete specification. A provisional specification consists of an outline of the invention; this outline may be quite short. The complete specification, which must be filed within one year after the application, must particularly describe the invention and the best way it can be put to use, and must end with a statement of the invention claimed. This statement, called the claims, specifies the essential features of the invention and defines its scope. The protective rights of the inventor are not based on what is contained in the description, but on what is defined in the claims.

In this connection it is emphasised that the drawing up of a patent specification is a difficult matter and entirely different from the preparation of a paper on a scientific or technical subject. It is therefore advisable to do it with the legal advice of a Patent Attorney, because the expense incurred is small compared with the possible financial loss which might occur if the specification does not cover the invention adequately.

*[This report was tabled in 1950 and appears as Appendix to the Journals 1950 H-10A.—Ed.]

The following remarks are therefore not meant to give advice on how to draft a specification, but to show the general trends of the Act and, particularly to those who were familiar with the old Act, the important changes which have taken place.

To start with, the time honoured definition of invention as "any manner of new manufacture", which has its origin in the first British Patent Act, the Statute of Monopolies of 1624, has been widened to include also new methods of testing applicable to the control of manufacture. This means that an analytical method, for instance of paper chromatography, which was not patentable according to the former Act, can now be protected by a patent.

Another innovation of great importance is actually not found in the Act; it is the removal of the provision which was contained in the old Act, that claims for chemical substances as well as for substances used as food or medicine could not be granted unless these claims were restricted to the special procedure described in the specification. Chemical inventors who produce a new substance welcome this change because claims for substances are clearcut, whereas claims for procedures are much more difficult to draft, and there is the dilemma that the claims are either too wide, and invalid for that reason, or not wide enough and therefore giving insufficient protection. On the other hand, the provisions of the old Act fostered competition because an inventor who found perhaps a more economical procedure for a patented substance, could make use of this invention, whereas now the first inventor has a complete monopoly.

However, there are remedies in the Act against the abuse of monopolies. If in the case mentioned above the first inventor is not able to make use of his invention because the process does not pay, and the second inventor can prove that the market is not supplied, the second inventor can ask for a licence for the patent of the first inventor. Such a licence will be granted, provided the second inventor is prepared to grant the first inventor, also, a licence for his patent. In other words, both competitors can start work under the same conditions—theoretically at least.

The Commissioner of Patents may also grant a licence under a patent in respect of medicine, food or curative devices to any person interested. The idea behind this provision is to give the public those essential goods at the lowest prices possible, commensurate with a reasonable reward for the inventor.

Another section of the Act pertaining to chemical inventions provides that a claim to a chemical substance shall not extend to this substance "when found in nature". The future will teach what the implications of this section are; it will depend on the construction given to the definition "when found in nature". For

instance, if a certain hormone or coenzyme is obtained from physiological material where it was bound on protein, it is doubtful whether it can be defined as "found in nature", or as "obtained by a chemical process".

A section of the Act of interest to anybody working in a technical field concerns accepted patent specifications open to public inspection before a patent is granted. Anybody aware of the fact that the invention is anticipated by a prior publication has the right to bring this fact to the notice of the Commissioner, who will investigate it. This is not an opposition and does not involve the informant in any expense or further procedures. This provision has been inserted into the Act because the right to oppose the grant of a patent which, of course, still exists, is now restricted to persons interested, i.e., to those who can prove that they are working in the same field and have invested therein money or labour or both.

Another matter of general interest originates from the legislation on atomic energy, but extends to all inventions. No inventor living in New Zealand has the right to apply for a patent abroad, before he has filed an application in New Zealand, except with the permission of the Commissioner. Contravention of this section of the Act makes a person guilty of an offence punishable even with imprisonment.

In conclusion, attention is drawn to the Patent Office Journal which appears monthly and which contains all publications of the Patent Office with regard to Patents, Designs and Trade Marks. As far as patents are concerned, it contains inter alia the list of applications as they are filed day by day, with the names of the applicants and the titles of the inventions, the accepted applications with abridgements of the complete specifications, and the number of patents granted or refused.

The knowledge that a certain application has been filed, may be a warning to another inventor who has started work in the same field or contemplates doing so; it may be that in consequence he will refrain from continuing this work if he is up against a strong competitor, or that he will take up communication with the first inventor; at any rate, the information will be very valuable to him. The same holds true for the publication of accepted specifications, quite apart from the fact that it gives the possibility of opposing the grant if there is reason to do so. The reading of this Journal is therefore in the interest of every chemist in New Zealand.

THE TWENTY-FIFTH ANNUAL REPORT

(Abridged)

FOR THE YEAR ENDING 31st OCTOBER, 1955.

Your Council has much pleasure in presenting this, the Jubilee Annual Report for the year ending 31st October, 1955.

MEETINGS OF COUNCIL:

Meetings of Council were held in November, February and May in Wellington and at the Annual Conference at Massey College in August. Also at the Annual Conference a General Meeting of members was held. The Annual Meeting of Council in November and the meeting held during Conference have been officially attended by delegates for some years. Council has decided that Branches should participate more in Institute management and accordingly has made the February and May meetings official meetings of Council-in-person, that is where actual Branch delegates attend with expenses paid.

REGISTRAR AND SECRETARIAL:

Duties of Registrar have been in the capable hands of Mr. V. J. Wilson, of Technical Publications Ltd. Mr. B. G. Stanley, of the Shell Company, who has been Assistant Secretary for about 18 months has been transferred to London. Council appointed Dr. W. E. Harvey, of the Chemistry Department, Victoria University College, to take Mr. Stanley's place. Dr. Harvey has been Treasurer to the Wellington Branch for some years so is no stranger to Institute affairs.

MEMBERSHIP:

New Members: One Fellow, Dr. Addis Smith, Johnsonville, and eighteen Associates were elected during the year. Three members were reinstated.

Resignations: Two married women and five others resigned.

Leave: Leave was granted to seven members, mostly younger members seeking further qualifications abroad.

Obituary: We regret very much to record the death of three members. Two foundation members well known in the Auckland district, Arthur Henry Bowell, formerly Lecturer in Chemistry at Auckland University College, Alfred James Parker, Public Analyst and Consulting Chemist and Samuel John Bennett, Science Master, Otahuhu Technical High School.

SUB-COMMITTEES OF COUNCIL:

Sub-committees submitted reports to the General Meeting held at Conference time at Massey Agricultural College. Brief summaries of the work of these committees are as follows:—

Conference: This committee, of course, moves each year, so that Conference is run entirely by each Branch in turn. This has proved an excellent procedure. It spreads the work of organising Conferences, it makes each Conference a virile affair and it gives members an opportunity to see the chemical work being done in each centre by the members of that Branch. Massey College was an excellent setting for a Conference, a number of members 'lived in', the weather was delightfully spring-like and the Palmerston committee was highly praised for a well organised and smoothly run Conference. As guest speaker we had Dr. C. M. Johnson, of Berkeley University, California, at present on a Fulbright scholarship at Waite Institute, Adelaide. We look forward to next year's Conference at Auckland University College.

Examinations: Otago continues to carry the load of the annual examinations for Laboratory Assistants. This committee has a very exacting job and must maintain continuous contact with examinees over a number of years while they take the various sections of the examination. This year 16 candidates sat a total of 35 papers, including four different optional subjects. Two candidates completed the examination together with the necessary practical work and were awarded the certificate. Another candidate requires only a further year's practical work for completion. A syllabus is now available for applicants wishing to enter the membership of the Institute by examination. Several inquiries have been received but no application has yet been made.

Employment Officer: The system of appointing one Employment Officer has worked very well. Previously a committee with Branch representatives issued regular bulletins relating to jobs offering in the chemical field. Since Chemists were never looking for employment this phase of the work was dropped and our main activity now is answering requests from overseas chemists wishing to come to New Zealand.

Journal: The Journal is now definitely a going concern in Palmerston North with a successful year behind them. Dr. W. A. McGillivray, of Massey Agricultural College, and his Editorial Committee merit the thanks of members for carrying out one of the most important jobs of the Institute—the regular issuing of Institute news to members, Libraries and overseas contributors. Very shortly we are to be presented with a special Jubilee issue of the Journal in commemoration of 25 years of successful Institute activity and for this production we are again grateful to the Editor. The issue will be available for wide circulation.

Membership: Dr. R. Gardner, Professor L. H. Briggs and Mr. W. A. Joiner have checked the qualifications of nineteen new members and recommended that they be admitted as members of the Institute. Once again we have to thank Mr. Joiner for inscribing all membership certificates.

Patents Officer: We are very strongly represented in the Patents Office at present and interesting aspects of the new Patent Act have been submitted to members.

Professional Status: This committee was set up some years ago and undertook to examine and report on the Standards of admission to corporate mmebership of the various Institutes of Chemistry in the Commonwealth. A report was submitted to the General Meeting in Palmerston North in August and findings were set out under the following nine headings:—Place of Birth, Nationality, Place of Residence, Age, Character, Method of Nomination, Basic Training, Experience and Examinations. The aim of the report is to examine the possibility of setting up similar standards of membership in all Commonwealth Institutes of Chemistry so that the Professional Status of a commonwealth chemist will be recognised in all British countries.

Standards Council and Committees: We are well represented on the Standards Council and on all chemical standards committees. Activities on these committees have been somewhat reduced but we retain members on all committees.

Salaries: The salaries committee carried out their fourth salary survey as at June 1st, 1955, and received a record number of replies from 78% of the membership. Data was analysed and set out in table form in a report to the General Meeting of members at Palmerston North in August last. The information has now appeared in the October 1955 issue of the Journal. With the recent drift of our chemists and other scientists

to Australia, Council has taken steps to apprise the Government of the serious situation arising in New Zealand and the need for revising salary rates for scientists.

U.N.E.S.C.O.:

We are represented on the National Commission and on the Scientific Sub-commission for Unesco, but there is not a great deal of interest to New Zealand chemists.

COMMONWEALTH INSTITUTES:

Regular Journal issues are received from all Commonwealth countries and this contact is much appreciated. We are more closely interested in Australian affairs as we are able to co-operate in meetings of A.N.Z.A.A.S. and are able to share overseas visitors.

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

The Australian and New Zealand Association for the Advancement of Science met this year in Melbourne and our Institute was well represented. Dr. Shorland was selected to deliver the Liversidge lecture.

INSTITUTE PRIZES:

The I.C.I. Prize for the best contribution to the development of some branch of chemical science as judged by recent published work was awarded to Mr. R. P. Hansen, of the Fats Research Laboratory, D.S.I.R.

The Morcom Green, Edwards prize for the encouragement of original work by young chemists, particularly in the applied field was awarded to Dr. A. D. Campbell, of the Chemistry Department of the University of Otago.

FINANCE:

The Institute's finances are in a healthy position. About £280 is outstanding in overdue subscriptions, as compared with £350 last year. A satisfactory surplus of income over expenditure will enable further sums to be transferred to the Trust Fund and special reserve accounts.

COMPOUNDED SUBSCRIPTION:

It is now possible for members to apply to Council for the right to pay a compounded subscription in one sum. A table of mulitples has been adopted and the way in which the scheme works is set out fully in the October, 1955 Journal. Subsequent to age 65, members cease to pay subscriptions and virtually become honorary members.

THANKS:

Thanks are due to the large proportion of our membership which serves on large and small committees but perhaps we should note especially the officers of Branch Committees who devote much time to organising local affairs. Recent efforts to obtain a wider variety of lectures have received the support of Council.

In conclusion, we would repeat that this year marks the conclusion of 25 successful years of co-operation between the chemists of New Zealand. If our membership continues to grow and our enthusiasm is maintained there can be no fear for the future of our Society.

For and on behalf of Council,

K. M. GRIFFIN, President.

W. G. HUGHSON, Hon. Gen. Sec. Treas.

THE NEW ZEALAND INSTITUTE OF CHEMISTRY (Inc.)

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st OCTOBER, 1955.

1954 £		£ s d	£ s d
	To Administration Expenses—		
133	Salary Registrar	186 13 4	
78	Travelling Expenses	129 15 0	
76	Printing and Stationery	119 14 6	
31	Honorarium Secretary	31 10 0	
80	Branch Expenses Allowance	60 0 0	
26	Postages and Sundries	49 0 11	
21	Legal Expenses	— — —	
12	Audit Fees	12 12 0	
6	Depreciation	8 4 5	
408	Total		597 10 2
52	To Printing Rule Books		— — —
	To Institute Journal—		
408	Printing and Blocks, Etc.	401 12 2	
18	Postages and Sundries	23 14 2	
21	Honorarium Editor	12 12 0	
442	Total		437 18 4
	To Conference Committee—		
	Deficit 1955	1 6 9	
	Less Share R.I.C. (N.Z. Section)	5 4	
			1 1 5
25	To Provision for Overseas Visitors Travelling Fund		25 0 0
5	To Provision for Taxation		26 5 6

1954 £		£ s d	£ s d
964	By Subscriptions		965 18 0
8	By Interest—		
	Post Office Savings Bank	8 19 0	
17	National Savings	17 0 7	
20	Total		20 19 7
8	By Donations		— — —
9	By Examination Committee Entry Fees, Etc.		12 0 6
17	By Conference Committee: Surplus 1954		— — —
	By Institute Journal:		
44	Subscriptions	51 2 1	
135	Advertising	180 15 10	
179	Total		231 17 11

	To Excess of Income over Expenditure Transferred to				
260	Accumulated Funds	142	15 7		
1192		£1230	11 0	1192	£1230 11 0

The sum "Provision for Taxation" is high because it includes proportion (£9) of previous year's taxation.

TRUST FUND

FOR THE YEAR ENDED 31st OCTOBER, 1955.

	£	s	d		£	s	d
To Balance Carried Down	879	17	4	By Balance, 1/11/54	786	7	4
				Transfer from General Funds	75	0	0
				Interest—Post Office Savings Bank	10	16	7
				Hutt County Council Loan	7	18	5
	£879	17	4	By Balance, 31/10/55	£879	17	4

BALANCE SHEET AS AT 31st OCTOBER, 1955.

LIABILITIES

1954 £		£ s d	£ s d
61	Subscriptions Paid in Advance		99 10 4
158	Sundry Creditors		219 8 2
150	Provision for Printing		150 0 0
80	Provision for Essay Prize		80 0 0
12	Provision for Overseas Visitors Travelling Fund		80 0 0
25	Provision for Taxation, 1955		16 10 6
	Accumulated Funds—		
	Balance, 1/11/54	1178 12 8	
	Less Transfer to Trust Fund	75 0 0	
		1098 12 8	
	Add Excess of Income over Expenditure	142 15 7	
1178	Balance, 31/10/55		1241 8 8
786	Trust Fund		879 17 4
2390			£2666 9 7

ASSETS

1954 £		£ s d	£ s d
	Cash Balances—		
439	Bank of New Zealand	608 6 7	
8	Petty Cash	4 5 1	
157	Post Office Savings Bank	161 8 10	
604	Total		774 0 6
568	National Savings Account Subscriptions in Arrears	285 11 6	585 7 7
807	*Less* Provision for Overdue Subscriptions	50 0 0	235 11 6
91	Sundry Debtors		151 12 8
	Typewriters—		
	Balance, 1/11/54	29 0 0	
29	Less Depreciation for Year	4 0 0	25 0 0
	Addressograph Plates—		
	Balance, 1/11/54	5 0 0	
	Additions	14 4 5	
		19 4 5	
5	*Less* Depreciation for Year	4 4 5	15 0 0
	Trust Fund Investment—		
786	Post Office Savings Bank	297 8 11	
	Hutt County Council	500 0 0	
	Sundry Debtors	82 18 5	
	Total		879 17 4
2390			£2666 9 7

The sum "Provision for Overseas Visitors' Travelling Fund" represents balance in account after payment of O. M. Johnson's expenses.

The sum "Sundry Debtors" represents amounts outstanding from advertisers and prize donors.

LIST OF PAPERS READ BEFORE BRANCHES 1954-1955.

AUCKLAND:

The Liquid State	Dr. H. Bloom
The Bacteriology of Water	Mr. G. Wallace Mr. D. Willans
The Conservation of Water Supplies	Mr. K. M. Griffin
Sulphuric Acid Practice in Australia	Mr. W. E. Russell
A symposium on Chromatography	Mr. B. R. Davis Mr. R. N. Scelye Dr. H. C. Clark
Modern Paints	Mr. W. E. Childs
The Maintenance of the Chemical Equilibrium of the Body Cell	Mr. F. H. Simms
Plant Nutrition Studies in California	Dr. C. M. Johnson
Adsorption of Detergents on Surfaces	Professor Eyring

WAIKATO:

Fuels and Combustion—Energy and Engines	F. E. Mason
Personalities and Research Stations Overseas	Dr. E. B. Davies
Hormones of the Brain—A Review of the Role of Secretions of the Brain in Mammals	Dr. W. G. Whittlestone
Some Recent Developments in Fat Chemistry with Particular Reference to Monoglycerides	Mr. S. G. Brooker
Spectrophotometry and Some Applications	Dr. D. D. Perrin
Some Aspects of Carotene—Vitamin A Metabolism	Dr. S. Y. Thompson
Problems in the Application of Chemistry to Agricultural Research	Mr. N. T. Clare

MANAWATU:

End Group Analysis of Proteins	Dr. J. L. Mangan
Lactic Oxidase of Mycobacterium	Dr. B. Cousins
Recent Advances in the Chemistry of Natural Products	Prof. L. H. Briggs
The Distribution of Isotopes in Nature	T. A. Rafter
The Biochemical Control of Milk Ejection	Dr. W. G. Whittlestone
Vitamin A Researches at National Institute for Research in Dairying, Reading	Dr. S. Y. Thompson

WELLINGTON:

The Formation of Lava	Dr. P. G. Harris
Hormones Controlling Milk Secretion	Dr. W. G. Whittlestone
Turnover of Minerals in Living Cells	Dr. G. W. Butler
Recent Developments in the Theories of Tannage	Dr. G. W. Vivian
Some Experiments with Isotopic Carbon	Professor Harland G. Wood
Mellor Lecture—Mineralogy and Properties of New Zealand Soil Clays	Mr. M. Fieldes
Corrosion Aspects of the Geothermal Project	Mr. T. Marshall
Current Research at Victoria University College	
Magnetic Measurements on Compounds	Mr. C. D. Mitchell
Extractives of Douglas Fir	Dr. W. E. Harvey
Experiments with Picrotoxinin	Prof. S. N. Slater

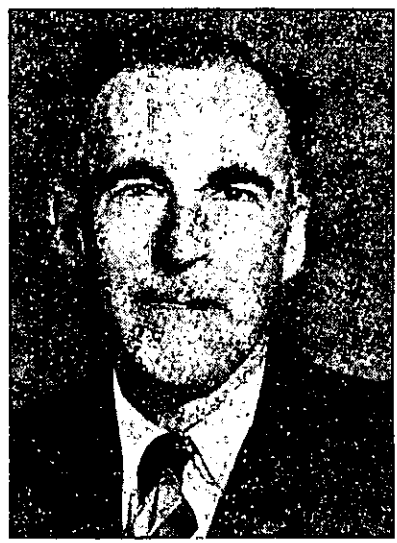
CANTERBURY:

The Future of the Chemist	Mr. M. S. Carrie
Some Aspects of Chemical Biochemistry	Dr. J. T. Murray
How Fast Can a Chemical Reaction Go	Dr. W. S. Metcalf

Biological Nitrogen Fixation	Dr. R. M. Allison
Carbon 14 Work in New Zealand	Mr. T. A. Rafter
Recent Researches on Wool	Prof. J. B. Speakman
Structural and Mechanical Properties of Fibres	Prof. Henry Eyring
OTAGO:	
Chemical Techniques	Dr. Fastier Messrs. Kennedy and Scott
Fundamental Particles	Dr. H. N. Parton
Experiments with Isotopic Carbon	Prof. Harland Wood
Solar Evaporation of Salt	Mr. S. R. Siemon
Hormones of the Brain	Dr. W. G. Whittlestone
Teaching of Chemistry in the Schools	Messrs. J. W. McChesney and J. M. McCready
Research Evening	Miss J. Anderson, Messrs. R. M. Carr, R. McCraw and R. Speden

BRANCH CHAIRMEN

AUCKLAND BRANCH



Mr. W. E. Russell graduated M.Sc. with honours in 1941 from Auckland University College, where he worked under Professor Briggs on alkaloids of the Sophora genus. After a period in the Army he joined the technical staff of the New Zealand Farmers' Fertilizer Company as an Assistant Chemist at the Te Papapa Works. He was appointed Chief Chemist and Acid Plant Superintendent in 1945. In 1950 he went to Australia to gain further experience in the fertilizer industry. He was Production Superintendent for Australian Fertilizers Ltd., Port Kembla, New South Wales, for fours years and returned to New Zealand late in 1954 on appointment as Works Manager of the Te Papapa Works of the N.Z. Farmers' Fertilizer Co.

He was elected an Associate of the Institute in 1943 and served on the Auckland Branch Committee as a member in 1946 and Treasurer in 1947-48-49 and 1950. He resigned in 1950, and was re-elected on his return from Australia in 1954.

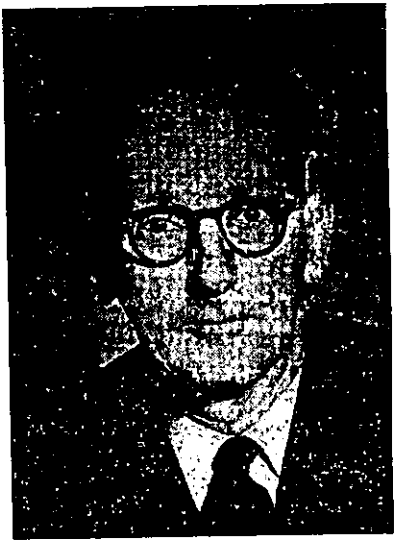
He studied engineering at A.U.C. School of Engineering following his graduation in Chemistry. He was elected a graduate of the Institution of Chemical Engineers, London, in 1944, sat the Associateship examination of the Institution in 1950, and was elected an Associate in that year.

WAIKATO BRANCH

Chairman of the Waikato Branch last year, Mr. N. T. Clare, Chief Chemist, Ruakura Animal Research Station, has been re-elected for a further term.

MANAWATU BRANCH

Mr. C. B. Radcliffe was born in Auckland and educated at the Auckland Grammar School and the Auckland University College, holding Junior, Senior and University National Scholarships. After graduating M.Sc. he proceeded to post-graduate research work in collaboration with Dr. W. F. Short working on essential oils of New Zealand native plants and constituents isolated from them. For a period he held the Duffus Lubecki Research Scholarship. He was engaged by I.C.I. to carry out a special investigation on behalf of their associated Company, Kaikohe Developments Ltd., in connection with the establishment of mercury production at their mine near Kaikohe. For a short time he carried out work on cheese ripening at Mr. K. M. Griffin's laboratory in Auckland.



In 1933, Mr. Radcliffe joined the staff of Glaxo Manufacturing Co. Ltd. (later to become Glaxo Laboratories (N.Z.) Ltd.) as Assistant Chemist and he has remained with this Company since that time. He became Chief Chemist and, during the Company's great expansion in the pharmaceutical field, Production Manager of the Pharmaceutical Department. Two years ago he was appointed to take charge of the new Development Division, which now deals with all aspects of plant or product development in connection with all the Glaxo Company's activities—milk processing, pharmaceutical production and fish liver oil processing.

Mr. Radcliffe visited England in 1952 in connection with production and development projects of his Company. He was a member of the old Auckland Chemical Society and is now an Associate of both the New Zealand and the Royal Institutes of Chemistry.

WELLINGTON BRANCH

The new Branch Chairman, Mr. J. A. D. Nash, is a senior scientific officer in the Head Office of the Department of Scientific and Industrial Research. Mr. Nash graduated from Victoria College in 1934, obtaining an M.Sc. degree with second-class honours. Both before and after this date he demonstrated in the Chemistry Department of the College. A year after graduation he joined the staff of Dominion Laboratory where he worked on rocks, minerals, and building materials under Mr. L. R. L. Dunn.

In 1941, Mr. Nash was transferred to the Head Office of the D.S.I.R. for work in the Science Defence Section, remaining there till 1944 when he left to spend two years as Liaison Officer in Melbourne. In 1947 he took up a similar position as Liaison Officer in Washington and was a delegate to the UNESCO Conference held in Mexico City in November of that year.

On returning to New Zealand in 1948, Mr. Nash was appointed to his present position assisting Mr. W. A. Joiner, Deputy Secretary of the D.S.I.R. He is the present representative of the D.S.I.R. on the New Zealand National Commission for UNESCO.

Mr. Nash has already held office in the Institute, having been the Secretary of the Wellington Branch from 1936-40 and the Hon. General Secretary of the N.Z.I.C. from 1941-44.

CANTERBURY BRANCH

Dr. B. R. Penfold, Chairman of the Canterbury Branch, is Lecturer in Chemistry at Canterbury University College. Dr. Penfold received his secondary education at St. Andrew's College, Christchurch and graduated M.Sc. with first-class honours in Chemistry from Canterbury College in 1949 when he joined the staff as assistant lecturer. He then went to the University of Cambridge as a New Zealand University postgraduate scholar in science and did research work in the Cavendish Laboratory for three years, during the last of which he was the British Council scholar for New Zealand. His field of research was X-Ray Crystallography and he determined the crystal structures of glutamine and two pyridine derivatives. For this work he was awarded the Ph.D. degree of the University of Cambridge in 1952. Since returning to his present position in 1952, Dr. Penfold has initiated X-Ray Crystallographic research, so far mainly concerning the crystal structures of simple organic amides. He was elected an Associate of the Institute in 1953.

OTAGO BRANCH

The new Chairman, Dr. F. N. Fastier, is Senior Lecturer in Pharmacology at the Otago University Medical School. He was born in Dunedin and received most of his education there. He began his studies at Otago University in 1937 as holder of the Beverly Entrance Scholarship. Shortly after taking his B.Sc and gaining a Sir George Grey Scholarship, he left the Chemistry Department in order to become research assistant to F. H. Smirk, the newly-appointed Professor of Medicine. He subsequently qualified for an M.Sc. with honours in chemistry and an Oxford D.Phil. in Pharmacology.

Dr. Fastier worked with Professor Smirk until 1948, when the award of a Beit Memorial Fellowship for Medical Research took him to Oxford and, subsequently, to Edinburgh.

Before returning to New Zealand, he took the opportunity afforded by the Fulbright scheme of accepting a teaching post in the U.S.A. for a year.

Since his return, Dr. Fastier has resumed collaboration with Professor Smirk in research in the cardiovascular field, his chief interest being chemical structure in relation to pharmacological activity. When not walking, talking, thinking or drinking, he is likely to be blowing either his flute or his trumpet.

LABORATORY EQUIPMENT.

Provided sufficient material comes to hand, it is proposed to make this page a regular feature of the Journal. Under this heading we invite contributions from members covering brief appraisals of equipment in use in their laboratories, notes on new apparatus, modifications to standard equipment, etc., as well as brief notes on new or special techniques which may be of general interest. Copy should be forwarded to the Editor and the following notes, submitted by Dr. G. W. Butler, who is arranging the page, indicate the type of material visualised.

Photomultiplier Attachment to the Beckman Spectrophotometer.

The blue-sensitive photo-tube in the standard Beckman unit is replaced by a blue-sensitive photomultiplier tube, resulting in a 100-fold increase in sensitivity. A new photo-tube housing is provided and greater precautions are taken to seal the cuvette chamber thoroughly from stray light. A separate battery-box contains additional Burgess dry cells for extending the dark current range. The photomultiplier may be operated at five different sensitivity levels. Balance points are very sharp and reproducible.

This attachment permits the determination of absorption spectra with greater precision or in more dilute solutions. In flame photometry, calcium and magnesium can be determined with facility, as well as sodium and potassium. Further information on the use of this accessory may be obtained from Dr. G. Butler, Grasslands Division.

A useful and simple innovation on the radiometer mains-operated p-H-meter 23 is a 4 watt heater, mounted inside the instrument casing, which is left ON when the instrument is not in use. This ensures that the high-resistance circuit is always dry, since the instrument is maintained at a temperature a few degrees above ambient, and makes for stable operation. Moisture breakdowns in pH-meters are all too prevalent in New Zealand under the high humidities which often obtain.

In laboratories where pipetting of quantities of aqueous solutions ranging from 10 to 200 microlitres is a routine operation, glass Carlsberg constriction micropipettes may be useful. They are described in David Glick's book "Techniques of Histo and Cytochemistry" and may be ordered from E. Petersen, Carlsberg Laboratory, Copenhagen. They are safe pipettes for the transferrence of poisonous or radioactive solutions. Sizes available are 10, 25, 50, 100 and 200 microlitres.

Homogenisation of tissues with the Potter-Elvejhem glass homogeniser has the disadvantage that the preparations contain glass powder. This is avoided by using "Teflon" homogenisers (available through A. H. Thomas) where a piston of "Teflon" (on an aluminum or stainless steel shaft) rotates against a smooth glass surface. These have long life and the shearing forces applied are optimal for most work.

NEWS AND NOTES.

WELLINGTON BRANCH.

Miss A. Camden-Cooke has rejoined the staff of the Dominion Laboratory after spending four years abroad. Miss Camden-Cooke, who was in Europe for some years worked in both Switzerland and Germany.

Members of the Wellington Branch recently heard an address by Dr. F. E. Deatherage, Chairman of the Department of Agricultural Biochemistry, Ohio State University. Dr. Deatherage, who visited New Zealand in connection with his work on the use of antibiotics in meat preservation gave an interesting account of his work and discussed various problems of meat chemistry.

CANTERBURY BRANCH.

Dr. F. J. Llewellyn has arrived in Christchurch from the Chair of Chemistry at Auckland University College to commence his duties as Rector of Canterbury University College. The Canterbury Branch proposed to welcome him at a meeting on 19th March.

Mr. C. J. Halliburton has transferred from Dunedin to the position of Chemist for Commercial Cleaners Ltd., Christchurch.

Mr. R. W. Cawley has resigned from the Wheat Research Institute to take up the position of Assistant Factory Manager for T. J. Edmonds Ltd., Christchurch.

Mr. J. T. Gould, a biochemistry graduate of the University of Otago, has been appointed Assistant Chemist at Wheat Research Institute.

Dr. M. T. Christenson has returned to the Chemistry Department, Canterbury University College, as Lecturer in Physical Chemistry after spending two years at Oxford working on spectroscopy under H. W. Thompson.

OBITUARY.

It is with regret that we record the death on 7th February of Mr. F. H. V. Fielder, F.N.Z.I.C. At the time of his death, Mr. Fielder was Chief Chemist and acid plant Superintendent for the Challenge Phosphate Company and he had had some 37 years active experience in fertiliser production and the application of science in agriculture.

He joined Mr. B. C. Aston's laboratory (Department of Agriculture) in 1918, and in 1919 transferred to Kempthorne Prosser Ltd., and after a period in their Drug Department moved to Westfield as chemist in charge of the laboratory. In 1924 Wright Stephenson and Co. Ltd., set up the works at Otahuhu (now Challenge Phosphate Co. Ltd.) to manufacture superphosphate. Mr. Fielder joined the company as Chief Chemist and later held also the post of acid plant superintendent.

In 1923, while with Kempthorne Prosser Ltd., he completed his B.Sc. degree and during his lifetime was a keen supporter of Chemical Institutes, both the Royal Institute and the N.Z. Institute of Chemistry. He was a Life Fellow of the Royal Institute of Chemistry and was Chairman of the N.Z. section in 1936/37. He was one of those who attended the meeting at Professor F. P. Worley's home when in 1925 it was decided to form the Auckland Chemical Society. As a Fellow of the N.Z. Institute of Chemistry he served the Auckland Branch in many ways and at the time of his death was a member of the Professional Status Sub-Committee of Council.—P. R. Parr.

LETTER TO THE EDITOR.

The Editor,
Journal of the N.Z.I.C.

Sir,—Two articles on the subject of chemistry in schools have been published recently in the Journal, by P. O. Veale and L. J. Searle respectively, and it is noteworthy that both writers agree on the "deterioration in practical work on chemistry in the schools." Veale makes constructive suggestions for "core science" with reference to the need of a new syllabus related to the world of food, detergents, insecticides etc.; he also supports improvements in the agricultural course to teach the fundamentals of fertilisers, trace elements and sterilisers. Searle gives figures to show that "only in the Auckland Province has chemistry retained its place as the most important school science at fifth form level; elsewhere it has largely been abandoned."

No suggestions have been advanced explaining a state of affairs that results in a shortage of science teachers and newly-graduated chemists. It is not the intention of the writer to comment on the actual teaching of chemistry in post primary schools but to discuss one reason why science (including chemistry) is not more popular.

In a survey of pupils entering post primary schools it is found that they fall naturally into three divisions; those who have decided on a vocation, those who are undecided but have several vocations in mind and those who have no ideas on the subject. With the pupils in the first category this letter is not concerned as the pathway is relatively clear, but the remainder constitute a problem that needs a psychological approach. It should be noted that in the post primary school the career teacher usually holds an arts degree and being more interested naturally in the academic course, allows this fact to influence his advice proportionately. The same problem is faced by the authorities in the armed forces and they have adopted a system for helping recruits to select satisfactory pursuits for subsequent civilian life. after demobilisation from the regular military service. Recruits who are hesitant in choosing a spare-time occupation are not all sent into the woodworking shop.

The career teacher holds a most important position in relation to the pupil and an improvement should be made with regard to the interviewing of pupils. Instances are known where no time is allowed in the school curriculum for interviews; these have to be held before or after school and are sometimes difficult to arrange, with the result that the pupil may have to wait for a week or may fail to put in an appearance. The school time-table should be so arranged that the career teacher is free from class work at a specified hour on at least one day a week.

In this activity it would be beneficial for the career teacher to collaborate with another teacher; the holder of an arts degree would, at the close of an interview, arrange with the pupil to have a talk with the science teacher. Alternatively, if the career teacher were the holder of a science degree, he would arrange for the pupil to consult one of the senior teachers possessing an arts degree. In this way the pupil would approach the view-point of future work from different angles that should assist the formation of a suitable and satisfactory decision.

The problem outlined is probably only one of several that need to be considered but the remedy lies in the realisation that the position of career teacher cannot be filled successfully without a knowledge of psychology and a greater measure of assistance and co-operation on the part of the parents.

W. R. MUMMERY.

N.Z.I.C. AND R.I.C.

Joint Conference — August, 1956.

Professor L. H. BRIGGS, Conference Chairman.

Conference preparations are going ahead very smoothly and the committee hopes that by now a large proportion of the members of the two Institutes will have completed the enrolment form and forwarded it to the Conference Secretary. If this matter has slipped your memory, please attend to it as soon as possible.

Plans for the Conference programme are well advanced and at the time of writing the planned symposia on 'Instrumentation in the factory and in the laboratory' and on 'Wood and its products' have become realities, and the committee is working on other symposia. Professor W. L. Dunkley, of the University of California, Fulbright scholar, at present at the Fats Research Laboratory in Wellington, will be present at the Conference and the committee has high hopes that other visitors will be present from overseas.

The scheme of excursions is taking shape and local excursions are planned to institutions and industries in the Auckland area on two afternoons during Conference. Details of these will be published at a later date. The proposed post-conference excursion has now developed to a number of alternatives. It is planned to cover one or more of the following: the Tasman Pulp and Paper Mill at Kawerau or the N.Z. Forest Pulp

and Paper Mill at Kinleith, Rotorua thermal area, the Forestry Research Institute at Whakarewarewa, and possibly the Wairakei geothermal area. Details of the several alternatives have already been published in the first Conference circular. Members intending to participate in this post-conference activity should indicate their preference promptly so that tentative bookings can be made.

A.N.Z.A.A.S. MEETING, JANUARY, 1957.

The thirty-second meeting of the Australian and New Zealand Association for the Advancement of Science will be held in Dunedin from 16th to 23rd January, 1957. It is now 18 years since an A.N.Z.A.A.S. meeting was held in New Zealand (Auckland, 1937) and it is expected that up to 1500 scientists, architects, engineers and others will attend the Dunedin meeting.

Sections of A.N.Z.A.A.S. are as follows:—

a. Astronomy, Mathematics, and Physics (including Optometry).
b. Chemistry.
c. Geology.
d. Zoology.
e. History.
f. Anthropology.
g. Economics, Statistics, and Social Science.
h. Engineering and Architecture.
i. Microbiology, Epidemiology, and Preventive Medicine. Nutrition — Sub-section.
j. Education, Psychology, and Philosophy.
k. Agriculture and Forestry.
l. Veterinary Science.
m. Botany.
n. Physiology and Biochemistry.
o. Pharmaceutical Science.
p. Geography.

Secretaries of these Sections for the Dunedin meeting have now been appointed and further information may be obtained from them or from the Acting Local Secretary:

Mr. J. B. Mackie,
School of Mines and Metallurgy,
Otago University,
P.O. Box 56,
Dunedin.

Details of the proposed programme for Section B (Chemistry) have been published in the February issue of the Journal. Many members will also be interested in Section N (Physiology and Biochemistry). The following list of subjects has so far been suggested to form the basis of symposia in this section:—

1. Synaptic Mechanisms.
2. Brain and Mind.
3. Blood Pressure Regulation.
4. Nitrogen Fixation (in conjunction with Microbiology (I), Agriculture and Forestry (K) and Botany (M).
5. The Use of C14 in Chemistry and Biochemistry (in conjunction with Chemistry (B)).
6. Fat Metabolism.
7. Phosphorus Metabolism.

8. Hormonal Control.
9. The Biochemistry of Trace Elements.
10. Carbohydrate Metabolism with special reference to bacteria.
11. Medicinal Chemistry (in conjunction with Chemistry (B)).
12. The Biochemistry of the Mycobacteria and Actinomyces (in conjunction with Microbiology (I)).
13. Nucleic Acid Metabolism.
14. Ruminant Metabolism (in conjunction with Microbiology (I)).

It is proposed that the meeting should consist mainly of symposia but time will also be available for contributors outside the topics finally selected for the symposia.

The Secretaries for Section N are:—

Physiology: Dr. L. G. Brock.
Biochemistry: Dr. R. D. Batt,
Medical School,
Otago University,
Dunedin.

COUNCIL MINUTES.

ABRIDGED MINUTES OF A MEETING OF COUNCIL-IN-PERSON HELD AT DOMINION LABORATORY, WELLINGTON, ON THURSDAY, 23rd FEBRUARY, 1956.

PRESENT:

Dr. M. M. Burns, President (in the Chair); W. E. Russell (Auckland Delegate); C. B. Radcliffe (Manawatu Delegate); J. A. D. Nash (Wellington Delegate); Dr. R. M. Allison (Canterbury Delegate); Prof. H. N. Parton (Otago Delegate); W. G. Hughson, General Secretary, and Dr. W. E. Harvey, Assistant General Secretary. Mr. V. J. Wilson was present for part of the meeting. Apologies were received from W. A. Joiner (Vice-President) and N. T. Clare (Waikato Delegate).

IN MEMORIAM:

Members of Council observed silence in memory of the late Mr. F. H. V. Fielder.

CONFERENCE, 1956:

Mr. Russell presented a brief review of progress to date. A circular will be sent to all members of the Institute early in March and a general notice regarding the Conference has appeared in the February issue of the Journal. It appears likely that there will be two overseas visitors giving addresses.

EXAMINATIONS COMMITTEE:

Council approved of the change in secretaryship of the Examinations Committee from Mr. C. R. Edmond to Dr. A. D. Campbell who held office before his trip to England.

The results of the L.A.C. Examinations for 1956 were received and approved. *Resolved*: THAT Miss J. L. Jerrome, Govt. Analyst's Laboratory, Auckland, be awarded the Laboratory Assistant's Certificate.

The Examinations Committee has made some suggestions regarding additional subjects for the L.A.C. and it was *Resolved*: THAT the suggestions re optional subjects be referred to branches for consideration.

PROFESSIONAL STATUS COMMITTEE:

Resolved: THAT the Secretary write to the R.I.C. again requesting their comments on the report. The Auckland Branch Committee was requested to suggest a nomination to the Professional Status Committee to replace the late Mr. Fielder.

JOURNAL:

A report on the Journal was received from the Editor briefly outlining plans for forthcoming issues. To date the Jubilee Issue has not been distributed to schools and after some discussion as to whether or not the Institute should charge the schools for their copies it was *Resolved* THAT Mr. Nash be empowered to negotiate with the Department of Education to arrange for the distribution of the Jubilee Issue to schools, and to recover from the Department a sum not exceeding 2/- per copy (the cost of production) plus distribution costs.

QUALIFICATION FOR ASSOCIATESHIP:

It was agreed that the member who raised the question regarding the standard required in Biochemistry to qualify for Associateship under Rule 8.1.1 should be asked to prepare a case for submission to Council.

SALARIES:

No further developments have taken place.

APPLICATION FOR MEMBERSHIP:

The Institute having adopted the policy of asking applicants for the Associateship or Fellowship to submit the names of referees, some discussion took place as to the most convenient way of handling applications, and as to the type of persons who would be acceptable to the Institute as referees.

Resolved: THAT not all referees need necessarily be members of the Institute. With the passing of this motion it follows that some changes to the Rules will be required, and it appeared desirable that some enquiries should be made to see how bodies with similar entrance requirements process their applications. It was therefore *Resolved*: THAT Mr. W. A. Joiner and the Assistant General Secretary be constituted a sub-committee to look into this matter and and report at a later meeting.

AMENDMENT TO RULES:

Resolved: THAT Rule 21.8 be amended by adding the following clause "21.8.7: Any Branch may raise funds by special subscriptions from the members constituting such Branch, and such funds shall be at the absolute disposal of that Branch."

CHEMISTRY IN SCHOOLS:

A letter was received from Mr. Mummery drawing attention to "the complacency with which the subject of chemistry in schools is being treated by our present Council." In view of the fact that, since Mr. Mummery submitted his original communication, the Post-primary teachers' bursaries have been introduced, the A.N.Z.A.A.S. meeting will probably include a discussion on chemical education, the February issue of the Journal includes a number of articles on the teaching of chemistry in schools and universities, and that the Manawatu Branch has offered to provide any assistance that may be required in schools in that district, Council decided to take no further action in the meantime. It is however still concerned with the overall problem and will keep an eye on the position.

FINANCIAL:

The Registrar, Mr. V. J. Wilson, was present during the consideration of financial matters.

The Balance Sheet and Income and Expenditure Account for the past financial year were briefly discussed and it was *Resolved*: THAT Council notes with concern the large sum of subscriptions in arrears and considers that although this sum in part represents subscriptions due from members overseas and late paid subscriptions, it would be in the best interests of the Institute if cash could be forwarded to the Registrar as soon after receipt as possible. *Resolved*: THAT the accounts as presented be approved subject to the addition of suitable annotation dealing with "sundry debtors" and the provisions for overseas visitors and for taxation.

REGISTRAR:

The sub-committee set up to consider possible arrangements for handling the financial and secretarial business of the Institute reported briefly on its findings, and it was *Resolved*: THAT Mr. V. J. Wilson be appointed Registrar as from 1/1/56 at a fee of £250 per annum. This fee will cover the cost of all secretarial work, duplicating, etc., including the cost of materials other than the Institute's printed letterheads, envelopes, receipt books, etc. The cost of these latter items together with postage will be charged to the Institute.

MEMBERSHIP OF COMMITTEES:

Resolved: THAT the Institute adopts as a general principle the policy of rotation of membership of committees.

MEMBERSHIP:

The following were elected Associates on the recommendation of the Membership Committee:—

WILSON, Kenneth William, B.Sc., Kaurilands Road, Titirangi.

LOE, John Anthony, M.Sc., N.Z. Forest Products Ltd., P.O. Box 14, Tokoroa.

PATCHETT, Graham Andrew, B.Sc., 15 Rona Street, Eastbourne.

RUDDENKLAU, Miss Margaret Ethel, B.Sc., Dominion Laboratory, Wellington.

RADFORD, Peter John, B.Sc., Flat 1, 17 Salisbury Street, Christchurch.

Resignations: Resignations from the Institute were accepted with regret from the following:—

D. J. Fraser (Wellington).

R. M. Grigg (Christchurch).

Leave: Mr. W. A. Joiner (Vice-President) was granted leave of absence from Council during the period of his tour overseas and Council extended to Mr. Joiner best wishes for a pleasant and profitable trip.

Professor W. P. Evans: Council noted with pleasure the honour bestowed on Professor Evans in the New Year Honours List, and extended congratulations and best wishes to him.

THE EASTERFIELD MEDAL — 1956.

Applications are again invited for the Easterfield Medal. This medal, provided by THE ROYAL INSTITUTE OF CHEMISTRY, is an award in honour of the late SIR THOMAS HILL EASTERFIELD, K.B.E., M.A. (Cantab.), Ph.D. (Wurzburg), F.R.S.N.Z., F.N.Z.I.C. (Hon.), who was well known for the distinguished contributions he made to the advancement of chemistry, and will be remembered particularly for the inspiration and encouragement he gave his students during the many years he was Professor of Chemistry at Victoria University College and for his infectious enthusiasm for chemical research.

Awards of the Easterfield Medal are made by the Committee of the New Zealand Section of the Royal Institute of Chemistry, on the recommendation of a Selection Committee consisting of the Chairman of the New Zealand Section of the Royal Institute of Chemistry (convenor) and the President of the New Zealand Institute of Chemistry, together with a Professor of Chemistry of the University of New Zealand whom they shall invite to act with them. The Selection Committee will have the right to co-opt any suitable person in an advisory capacity.

Conditions of award have been published in the Journal (J.N.Z.I.C. 18, 65, 1954) and applications by or on behalf of candidates for the award must be sent to the Hon. Secretary of the New Zealand Section of the Royal Institute of Chemistry so as to reach him *not later than 30th April 1956*, and must be fully supported by all relevant papers (either published or unpublished), which will in due course be returned to the candidates.

Address: Hon. Secretary,
New Zealand Section, Royal Institute of Chemistry,
C/o The Shell Company of New Zealand Ltd.,
P.O. Box 2091,
Wellington, C.I.

BOOK REVIEWS.

AN INTRODUCTION TO CHEMISTRY, by Howard L. Ritter. Published by John Wiley & Sons, Inc., New York, 1955. 649 pages. Price 6.50 dollars.

So many texts on elementary or "freshman" chemistry have appeared recently that, as the author of this book remarks in the preface, a decent respect for their competence must impel any new author to explain his reason for adding still another. But this is not "just another text" for it does show a distinct departure from traditional presentation. In particular the emphasis is on the understanding of chemistry rather than on the detailing of chemical fact. As far as possible the development of the subject avoids formal mathematics. An attempt is made to present chemistry as a cultural study rather than rushing the student, on the one hand, into detailed "practical" applications or on the other hand, confusing him with complicated theory made unnecessarily difficult by the mathematics on which it is based.

In many cases the student is led to predict what will happen rather than being presented with a statement of what happens under a particular set of circumstances. The author has the happy knack of discovering chemistry with the student and strives to stimulate in the student the same "happy fascination of discovery" which he himself enjoyed and is still enjoying.

The book assumes no prior knowledge of chemistry and is intended as a one-year course at the "freshman" level. It is well and clearly written and could be strongly recommended as an introductory textbook.

AN INTRODUCTORY LABORATORY COURSE IN CHEMISTRY, by Howard L. Ritter, Published by John Wiley & Sons, Inc., New York, 1955. 119 pages. Price 2.50 dollars.

This laboratory course is designed for use by "freshman" students in conjunction with the "Introduction to Chemistry" reviewed above. Geared to the textbook, the manual also introduces many special features of its own and the planning of the course, the ideals expressed in the preface, and the detailed instructions given for each experiment demand our admiration and demonstrate Professor Ritter's enthusiasm for, and sincere interest in, the teaching of introductory chemistry. In particular, his desire to present "large chunks of information" rather than a series of chopped up experiments, in which the larger significance of why he is doing the experiment is lost on the student, is worthy of note.

While, however, we may all agree with the aims and ideals expressed in the preface, there will always be differences of opinion about what should be included in a practical course. To the reviewer some of the experiments seem over simplified while others seem too complicated and time consuming for the results they achieve. Greater attention to some aspects of solution chemistry would seem desirable and the value of detailed datum sheets for the recording of results is questionable.

It is unlikely that other teachers will find this manual entirely to their satisfaction, any more than Ritter, as he states in the preface, has himself been satisfied with existing manuals. But individual experiments will be of value and the general approach is a stimulating one.

ORGANIC SYNTHESES, Vol. 35, Edited by T. L. Cairns. Published by John Wiley & Sons, Inc., New York, 1955.

"Organic Syntheses" is a well established series of annual publications giving satisfactory methods for the preparation of organic chemicals. Most of the procedures described lead to compounds which are of general interest but are not available from commercial sources, or alternatively illustrate synthetic methods of importance. The present volume gives the usual style of detailed description for the preparation of 86 compounds of widely differing types, and all organic chemists engaged in synthetic work should find in the volume something of interest to them. The index covers Vols. 30-35 thus including all the material not described in Collective Volumes 1-3. —W.E.H.

PRINCIPLES OF BIOCHEMISTRY, by Abraham White, Philip Handler, Emil L. Smith, and DeWitt Stetten, Jnr. Published by McGraw-Hill Book Company, Inc., New York and London, 1954. 1117 pages. Price 112/6.

Four authors, all currently teachers of biochemistry and each well known in his own particular research field, have combined to produce this comprehensive text. The 50 chapters fall logically into the following parts; I, Chemical Composition of Cells; II, Catalysis; III, Metabolism; IV, Body Fuids; V, Biochemistry of Specialised Tissues; VI, Biochemistry of Endocrine Glands; VII, Nutrition. About one-third of the book is devoted to the dynamic aspects of biochemistry. These sections cover difficult material in a most lucid manner and are perhaps the best sections in the book although the whole text is extremely well written.

One interesting and pleasing departure from general practice in biochemical texts, is that although little or no formal training in physical

chemistry is assumed, the usual introductory section on physical-chemical principles is omitted and instead the necessary discussion of physical-chemistry is presented within the framework of the text. The authors point out, very logically, that it has been their experience that "the interest of the student is much greater when particular chemical concepts are illustrated with a biological or biochemical principle close at hand." Most teachers of biochemistry will support this fusing of physical-chemistry with biochemistry rather than its being taught as a separate discipline as is so often the case now. The classical chapter on digestion has also been omitted and the material integrated with chapters dealing with the metabolism of foodstuffs.

To suggest, as is stated in the preface, that the book is intended for medical students is to belie its scope for it would be impossible for any preclinical student, in the time available, to comprehend all the material covered. It will however serve a useful purpose for the more advanced student, for teachers of biochemistry and for the chemist who desires more than a brief introduction to the subject. —W.A.McG.

SMALL-ANGLE SCATTERING OF X-RAYS, by A. Guinet, G. Fournet & C. Walker (trans.). Published by John Wiley & Sons, Inc., New York, 1955. 268 pages. Price 7.50 dollars.

This monograph is a lucid exposition of a little-known research field. Following a brief presentation of the phenomenon of small-angle scattering, the authors develop the general theory of scattering by particles subject to various restrictions. The necessary experimental equipment and techniques are described and the methods of interpretation of the scatter patterns which can be used to draw conclusions about the nature of the scatterer are fully discussed. Finally applications of the method of the determination of the dimensions of colloidal particles, catalysts, polymers and large molecules such as proteins and viruses are given. The text is a very readable translation from the French and is well annotated; it is followed by an exemplary bibliography. —G.W.B.

NUCLEAR AND RADIOCHEMISTRY, by Gerhardt Friedlander & Joseph W. Kennedy. Published by John Wiley & Sons, Inc., New York, 1955. 468 pages. Price 7.50 dollars.

An expanded version of "Introduction to Radiochemistry" (1949), this book can be recommended as being of interest to students at the Stage III or Honours level and to chemists who are using, or contemplating the use of, tracers as an ancillary technique in their research. The "basic facts" of radioactivity are presented in seven chapters in a descriptive fashion, each chapter being concluded by a series of exercises and reference list. Four chapters are devoted to the detection and measurement of radiation, statistical considerations involved in such measurement, and to chemical techniques and applications. Finally there is a chapter dealing with nuclear reactors and bombs and another in which cosmic and geochemical considerations are very briefly set out. Forty-two pages are given to seven appendices containing a useful compilation of nuclear data and constants.

This book fulfils the authors' object of providing an introduction to the field for "lay" chemists; it is also a handy "pocket" reference text.

—G.W.B.

HOUBEN-WEYL: METHODEN DER ORGANISCHEN CHEMIE, 4th, fully revised edition, Edited by Eugen Mueller. Vol. III Physical Methods. Part 2: Electrical, optical, magnetic and acoustic methods. 1078 pages. 1955 DM. 186. Vol. IX, Sulphur, Selenium and Tellurium compounds. Published by Georg Thieme Verlag Stuttgart, Germany, 1955. 1337 pages. Price DM. 208.

These volumes command respect because of their comprehensive coverage, lavish printing and binding. They are written almost entirely by German chemists or German expatriates and are another indication that chemistry in Germany has regained its pre-war importance. Vol. IX is the most comprehensive volume on the preparation and reactions of organic compounds of sulphur now available, while the section of three hundred pages on the derivatives of selenium and tellurium should be extremely valuable in a field where reviews are rare, or non-existent. Vol. IIIA covers a number of subjects on which separate monographs are available in many cases, but the information given here should be enough for all but the specialist. Our only regret is that the high cost of these volumes puts them beyond the resources of individual buyers. —S.G.B.

CHEMICAL PROPERTIES OF ORGANIC COMPOUNDS, AN INTRODUCTION, by Elliot N. Marvell and Albert V. Logan. Published by Wiley & Sons, New York, 1955. 326 pages. Price 4.75 dollars.

In this text the main emphasis appears to be the presentation of information in an easy-to-remember form and in this the authors have been particularly successful. The idea of a study of "functional groupings" has been stressed and reactions have been chosen to illustrate principles and to reduce the burden on the student's memory. At the same time the modifying role of the framework to which the functional groupings are attached is not overlooked. The text is obviously not intended for students who are advancing chemistry but, giving an excellent overall picture of the subject, would appear ideal for our "intermediate" students. The subject is divided into three sections. Part I deals with aliphatic compounds and Part 2 with aromatics. In this section chapters dealing with Insecticides and Herbicides and with Synthetis Polymers seem worthy of mention. The third part, dealing with biological compounds, represents something of an innovation in an introductory organic text, but its inclusion, leading up to an indication of the metabolism of carbohydrates, lipids and proteins, gives considerable point and meaning to the outline of their organic structures.

—W.A.McG.

LABORATORY OUTLINES AND NOTEBOOK FOR ORGANIC CHEMISTRY, by C. E. Boord, W. R. Brode and R. G. Bossert. Published by John Wiley & Sons, Inc., New York, 1955. 314 pages. Price 3.90 dollars.

This third edition of the already well known manual follows the general pattern of previous editions. Experimental details have been improved, the questions for many of the exercises have been revised and a number of new experiments have been added. These new exercises are as follows: chromatographic separation; the preparation of acetone by the oxidation of isopropyl alcohol; the preparation and properties of n-propylamine; the preparation of p-tert-amyl phenol (Friedel-Crafts reaction); stabilised diazonium salts and diazo-printing papers. The Appendix has also been extended to include a number of useful tables, etc.

—W.A.McG.