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EDITORIAL.

The proposal that a review should be made of New Zealand's requirements in scientific manpower, which the President, Dr. F. G. Soper, put before the University Senate in January, will be widely welcomed. That the problem is not a simple one, is shown by some doubts which have been expressed in Britain, as to the soundness of the contention of the Barlow report, that the Universities must double their output of students in ten years.

An editorial in "Nature" (19/10/46) states that "it must be admitted that, in spite of the work of the Hankey Committee, the Ministry of Labour and National Service has provided no convincing evidence that the professions and industry generally can absorb a much larger number of graduates, and some of the experience of the appointments department is disturbing, particularly the high level of current unemployment among technical specialists in certain occupations." The writer however agrees that "it is reasonable to anticipate an increased and sustained demand for graduates alike for scientific research, in industry and business, in the Government Service and in professional appointments of all kinds at home and overseas." A similar expectation appears reasonable in New Zealand also, since the number of science graduates in recent years has fallen below the demand. If a committee can make even an approximate estimate of future needs, valuable work will have been done. But the task will not end there. Perhaps the most difficult step of all will be to provide ways and means of roughly balancing the supply to the demand, without undue restriction of the right of any individual to enter the ranks of scientific workers if he can attain the necessary educational standard. Planning readily degenerates into restrictive planning. We hope that any committee charged with the estimation of needs will have the danger of the tendency constantly before it. The necessary balancing of supply and demand would be better done through well informed career advisers, than by any limitation of students by regulation.

SCIENTIFIC MANPOWER IN BRITAIN AND IN NEW ZEALAND

F. G. Soper (President).

Among the impressions brought back from England, where I had the privilege of attending in June and July the Royal Society Empire Conference and the Commonwealth Official Science Conference, and of later visiting textile research institutions on behalf of the New Zealand Woollen Mills' Association, was the realist approach that Britain was making to her post war problems. The future was not bright. Britain had realised that on the material side the alternatives she had been fighting for were the retention of two-thirds of what she had, or for complete loss. Having emerged as a victor from these war years Britain faces the future on a two-thirds economy.

But from a full realisation of what was due to science and scientists during the war years, there is a natural anticipatory attitude on the part of the public to the advance that may follow from the application of science to the problems of peace. Such an attitude is common to many countries today as it was to a less degree in the previous post-war period. This realisation of the potentialities of science has created a special problem in the sudden and extensive demand for scientists.

Britain has realised that scientific advance is dependent on the number and the training of scientists available and estimated in the Barlow Report, entitled Scientific Manpower, of May 1946, that 5,000 newly qualified scientists per annum, approximately double the pre-war output, were required at the earliest possible moment. Moreover, the report states that quality is "at least as essential as quantity and the quality of a scientific training depends largely on the standard of the research work upon which it is based. Strong research schools are needed in all university science departments." The report then proceeds to the opinion that the proper training of the first-rate research scientist "cannot be accomplished in much less than the five or six years aready accepted as necessary for the training of a doctor."

The situation in New Zealand is difficult to foresee with confidence, as we have no present estimate of our local need of scientific manpower. The Senate of the University of New Zealand has recently passed a resolution urging the Government to consider the number of such science graduates required over a period of the next ten years. Serious also in New Zealand, is the attraction away from the country, of scientists of experience, due to salary schemes elsewhere which are more

commensurate with the qualifications and training of the scientist and with the importance of his work. An over-all view of these matters is required if New Zealand is to share in the present surge forward of scientific work and technical improvements. The strategy of research with its provision of the right men at the right time is as important in its field as the tactics of research, the methods, techniques and skill of the research worker.

CONFERENCE — 1947

N.Z.I.C. **R.I.C.**

will be held in WELLINGTON, from Tuesday to Friday,
May 20th — 23rd, 1947.

Note that the date is three months earlier than usual and that the Conference is again in Wellington on account of a decision of the Council to make our Combined Conference the "Chemical Section" of the "Royal Society Congress" which is scheduled to be held in Wellington at this time.

The Royal Society proposes to hold Congress at 5-yearly intervals and one stated aim is to review progress in the various branches of Science.

PAPERS FOR CONFERENCE.

The Combined Conference Committee for the N.Z.I.C. and the R.I.C. (N.Z. Section) has been charged with the responsibility of arranging papers for the Chemical Section of the Royal Society Congress. It is most important that at this large gathering of Scientists, the chemists should put on a programme worthy of our Institutes.

ENROLMENT.

An enrolment form has been prepared by the Secretary of Congress and has been widely distributed to University Colleges, Government Departments, etc.

Members of the Institute of Chemistry should use these forms noting their membership of the Institute in the appropriate space.

Information relating to Papers has already been obtained for the Conference of the Combined Institutes of Chemistry, so this section in the enrolment form should be left blank. Members who have not received a form should ask for one from Conference Secretary, P.O. Box 250, Wellington.

COUNCIL MEETING, 30/11/46.

This was the Annual Meeting of Council-in-Person. Delegates for Auckland, Wellington and Otago were present, with Dr. J. K. Dixon as proxy for the Vice-President and Canterbury, Mr. L. H. James by invitation, and Mr. R. G, Bannister, Acting-Registrar.

Decisions taken with regard to the 1947 Conference and the Industrial Essay Prize are reported elsewhere in this issue.

The report of the Editor of the Journal was received, and he was authorised to expand the Journal at his discretion, the extra cost to be met, as far as possible, by additional advertising.

A report was received from Dr. L. H. Briggs on the 1946 Conference of the Australian and New Zealand Association for the Advancement of Science. He stated that, owing to the large number of members of the Australian Institute, meetings are held in groups such as analytical, biochemical, etc.

PERSONAL.

It is regretted that Mr. Hugh Palmer is not yet able to resume duty. Our thanks are due to Mr. Bannister who is Acting-Registrar.

OFFICERS
for the year commencing, 1st November, 1946.

President, Professor F. G. Soper; Vice-President, Dr. J. K. Dixon; Hon. Gen. Sec-Treasurer, W. G. Hughson; Registrar, H. K. Palmer or R. G. Bannister (Acting); Auckland Delegate, R. H. J. Stansfield; Wellington Delegate, J. L. Mandeno; Canterbury Delegate, F. H. G. Johnstone; Otago Delegate, Dr. S. N. Slater; Past President, Dr. J. C. Andrews; Editor of Journal, Dr. H. N. Parton.

ELECTION OF ASSOCIATES.

A welcome is extended to the following Associates recently elected members of the Institute:

G. W. Broughton, B.Sc., is a graduate of Canterbury College. He spent four years of the war at Maribyrnong and is now

works chemist with McLeod Bros. Ltd., Dunedin.

F. G. B. Brown, B.Sc., is Assistant Chemist to Dairy Products Ltd., Edendale. He spent a year with R.N.Z. Navy and has worked for Kempthorne & Prossers, Dunedin, and Exide Batteries, Lower Hutt.

R. P. Hansen, B.Sc., was with the Agriculture Department before the war. After five years with the forces and three as a prisoner of war in Germany, he is now at the Fats Research Laboratory, D.S.I.R., Wellington.

D. E. Hogg, B.Sc., of the Galloway Laboratory, Hamilton, was for four years with the Forces in the Middle East.

D. E. Grenville, M.Sc., has been Chemist to S. W. Peterson and Co., Wellington, since 1940.

J. K. Johannesson, M.Sc., A.R.I.C. after six years with the Soil Bureau, recently left to become Analyst to the Wellington City Council.

T. J. McKee, B.Sc., is Technical Adviser and Managing Director of Lime and Marble Ltd., and Fruitgrowers Chemical Co., Mapua, Nelson.

Miss M. E. Malcolm, B.Sc., Dip.Ed., after 18 months teaching Science at the Napier Girls' High School, joined the Dominion Laboratory Library Staff, Wellington, and is now Librarian.

G. J. Sutton, A.A.C.I, resigned from the Institute when he left for Australia in 1941. He is still in Sydney, at the Technical College, and at his request was recently re-elected to membership.

A. J. Thomas, B.Sc., is Industrial Chemist to the Shell Oil Co., Wellington. He has had a long period of Laboratory experience with this Company.

E. W. Wright, M.Sc., is now Assistant Biochemist at the Animal Research Station, Wallaceville, after four years' service with the Armed Forces.

WANTED TO BUY.—Laboratory Ball Mill, Porcelain, good condition, 2 to 5 gallon capacity, with or without motor. Full details, price to D. McClure, Amalgamated Brick and Pipe Co. Ltd., New Lynn, Auckland.

INDUSTRIAL CHEMICAL ESSAY PRIZE COMPETITION.

At the November meeting of Council the question of revising the regulations governing the Industrial Chemical Essay Prize Competition was discussed.

It was decided to postpone basic alterations for a year, to continue the competition this year (1947) and to give wide publicity to the fact that the term "Industrial Chemistry" is to be interpreted broadly. The regulations say that the Essay may deal with a single industry or with a group of industries, or with **any consideration affecting chemical industry as a whole in New Zealand.**

We wish to emphasise this latter phrase and urge members and local members to send in their entries. (There is no age restriction). The essay should be sent to the Hon. General Secretary, P.O. Box 250, Wellington, **before June 30th, 1947.** It should be restricted to from 6,000 to 8,000 words and should be submitted in a form suitable for publication. A reasonably high standard of literary work and particularly of clarity of expression will be required.

The value of the prize will be £10, to be spent on books or instruments to the satisfaction of Council.

A copy of the regulations governing the competition may be obtained from your Branch Secretary, or from the undersigned.

W. G. HUGHSON,
Hon. General Secretary,
P.O. Box 250,
Wellington, C.1.

LABORATORY ASSISTANTS' CERTIFICATE.

The Laboratory Assistants' Certificate was introduced by the Institute to provide an incentive for laboratory assistants, who have not the opportunity to obtain higher qualifications, to study the theoretical background of the operations which they carry out in their work. It is believed that this will extend the usefulness of laboratory assistants to the chemists with whom they are working and also facilitate exchange of assistants from one laboratory to another wherever this may be necessary.

In 1945 recognition was given to the Laboratory Assistants' Certificate by the Public Service Commissioner, and it

is hoped that private employers will also recognise the Certificate as a qualification for their chemical laboratory assistants.

At the first examinations for the Certificate, held in 1945, three candidates (Messrs. F. Bishop, J. G. Fraser, and W. T. Eggleston) were awarded passes, while two other candidates took a section of the examination. Last year the Council set up a sub-committee to handle the examinations and other matters relating to the Certificate, and this sub-committee, which consists of members of the Wellington Branch, took over just before the 1946 examinations. A pass was completed by one candidate (Mr. L. C. Blakemore) last year, and three other candidates sat in various subjects.

Recently the Examinations Committee has been collecting and redrafting the regulations for the award of the Certificate and has drawn up a syllabus for each subject which will give candidates, tutors and examiners a better definition of the scope of the examination. Copies of the rules and syllabus will be made available to Branch Secretaries as soon as possible.

The subjects necessary for a pass consist of Theoretical Chemistry, Practical Chemistry, Elementary Physics and Elementary Calculations (all compulsory subjects), and one optional subject to be chosen from the following:—Glassblowing, Woodwork, Metalwork, Mechanical Drawing, Photography and Care and Management of Small Animals. Before a Certificate is awarded, candidates must have completed three years experience in a laboratory under the control of a chemist approved by the Institute, but they may sit the examinations in the period during which they are obtaining their practical experience. Entries for the examinations, which are held in November, close in July. Enquiries may be sent to the General Secretary of the Institute or to the Secretary of the Examinations Committee, Mr. N. T. Clare, Animal Research Station, Wallaceville, Wellington.

MR. R. L. ANDREW. F.R.I.C. F.N.Z.I.C.

The reirement of Mr. R. L. Andrew marks the termination of forty years service in the Dominion Laboratory. Mr. Andrew joined the Public Service towards the end of 1906 and was appointed to the Laboratory early in 1907. Upon the retirement of Mr. W. Donovan in 1941, he was appointed Director of the Dominion Laboratory and Dominion Analyst.

The Dominion Laboratory is noted for the high standard of its work in its own particular sphere and it is owing to the labours and influence of such men as Mr. Andrew that this reputation has been earned. Moreover, the Laboratory has come to play an increasing part in the scientific life of the community during the latter half of Mr. Andrew's period of service and he has witnessed its growth from a small institution with a staff of three or four to the present large organization with a staff of over eighty.

Mr. Andrew has always held that sound analytical technique is the basis of all good chemical work and his practice of this principle has been demonstrated in his own work whether purely analytical or investigatory. His chief interest has been Public Health and the examination of food. The value of his work on milk is widely recognised and his outstanding work on the determination of iodine in relation to the incideme of goitre is well known. He has to his credit a number of publication on these and other subjects.

In addition to his purely scientific work he has given valuable public service in a consultative capacity. He has worked in close association with the Department of Health, particularly in the drafting of the Regulations under the Sale of Food and Drugs Act and has been a Member of the Medical Advertisements Board.

He has been Chairman of the Committee responsible for the survey of New Zealand's coal resources and a member of the Standards Institute.

Mr. Andrew has always been keenly interested in the affairs of the Institute of Chemistry of which he is an original member. He was elected a Fellow in 1934 and served on the Council as proxy for the Canterbury Branch for a number of years. He has been a Fellow of the Royal Institute of Chemistry since 1929 and was Chairman of the New Zealand Branch from 1938 to 1940.

Perhaps of equal importance with his work is the influence that Mr. Andrew has had on those who have been privileged to work with him and on the profession of chemistry in this country.

We take this opportunity of wishing Mr. Andrew many years of good health and happiness.

PHILIP WHITE Esq., M.C. B.Sc. Hon, (Lond,) A.R.C.S. F.R.I.C. F.N.Z.I.C.

Mr. Philip White is retiring in April from his post as Director of the Leather and Shoe Research Association and intends to return to England to live. Mr. White has been active both in his official duties and in his interest in the welfare of chemists and it is fitting that we should place on record an appreciation of his efforts for the community.

Mr. White graduated from the Royal College of Science with B.Sc. Hon. (Lond.) in 1915. There he had as contemporaries Ingold, Sugden and Kon. In May 1915, he was commissioned in the Royal Artillery. When the war ended he held the rank of Major, had been mentioned in dispatches and had received the award of the Military Cross.

On leaving the army he was appointed Chief Assistant Chemist to Barrow, Hepburn and Gale, the largest tanners in England at that time. In 1924 he was promoted works manager. At this period, Mr. Neville Wright of Auckland was a member of the staff of the same firm.

In 1929 Mr. White was made Director of the New Zealand Leather Research Association, the first co-operative trade research association to be formed in New Zealand. His efforts were so successful that in 1931 Pelt Research was added and in 1937 the Shoe Manufacturers came into the Association. The Leather and Shoe Research Association has set a precedent in New Zealand in co-operative research and has demonstrated that a scientist integrating pooled information formerly kept secret and progressing from there can do much to raise the level of performance in the industry. It is interesting therefore to review some of Mr. White's successes.

When Mr. White arrived in New Zealand the science of leather manufacture was relatively young, and aided by his training as a chemist and his works experience, he was able to translate successfully chemical control into regularity of output and maintenance of quality of products, an achievement sometimes more difficult than the original laboratory investigation. He has specialised chiefly on the physical qualities of leather and has shown how they are affected by the chemical and physical processes of tanning. Papers that have been published by Mr. White and his colleague Mr. Caughley on such topics as "The effects of water soluble material on sole leather," "The tightness of grain in upper leather," "The factors affecting rigidity of shoe leather" are much in demand

overseas and emphasise what Mr. White, along with Dr. Page and others, have done to establish a world wide reputation for leather research in N.Z.

In conjunction with the British Leather Manufacturers' Research Association, Mr. White has carried out over a number of years, research into the curing of hides and the processing of pelts, leading to marked improvements in these products. In shoe research, during th difficult war years, he was able to introduce acceptable substitute materials, like adhesives, to keep the industry going, and, of recent years, he has turned his attention to lighting of factories, resulting in better work and increased output with less eyestrain to the workers.

Mr. White's post has kept him constantly on the move in N.Z. and has enabled him to keep in contact with many chemists outside his own immediate interests. From 1934-43 he was the energetic secretary of the New Zealand Section of the Royal Institute of Chemistry of Great Britain and Ireland, and in 1943-45, its Chairman. From 1940-45 he was in regular attendance at New Zealand Institute of Chemistry Council Meetings as proxy for the Auckland delegate and was an original member of the Joint Employment Committee of the Two Institutes. At all times he has been approachable and helpful and his services have been freely at the disposal of his fellow chemists.

The New Zealand section of the Royal Institute and the Wellington Branch of the New Zealand Institute, of which he was a member, intend honouring Mr. White at a function in Wellington in April but members at large will join in expressing gratitude to Mr. White for what he has done for the public in general and chemists in particular and wish him good health with happiness when he returns to his homeland.

AUCKLAND BRANCH

At the Branch meeting on October 8th, 1946, the speaker was Mr. M. Fieldes on X-Ray Crystallography. Mr. Fieldes dealt with the discovery and early history of X-rays, and their later application by Laue to the determination of crystal structure. He gave many details of present-day apparatus used in this work, and of the important results achieved.

The Annual General Meeting was held on November 12th. Mr. R. H. Stansfield was elected Chairman, Mr. S. G, Brooker

Secretary-Treasurer, and Messrs B. E. Jackson and G. S. Lambert to the committee, with Messrs W. E. Russell and G. Stace.

The branch recorded its appreciation of the work of Professor Worley in the formation of the Auckland Chemical Society and of the Institute, hoping that he might enjoy a long period of leisure, and that he may continue to display the same interest in the Institute as in the past.

The evening wound up with a "Brains Trust," the Brains being Dr. Phil. O'Cladeen (Dr. Briggs), Dr. Fert E. Liezer (Dr Andrews), Mr. Athol Alcohol (Mr. Griffen), Mr. Gus O. Leen (Mr. Stevens), and Dr. Faze Rule (Dr Robinson).

OFFICERS, 1946-47.

Chairman, R. H. J. Stansfield; Secretary-Treasurer, S. G. Brooker; Committee, W. E. Russell, G. W. Stace, B. E. Jackson, G. S. Lambert; Auditor, A. J. Parker.

PROFESSOR F. P. WORLEY, D.Sc.

The retirement of Professor F. P. Worley brings to a close a long association with Auckland University College. His early work was done as a student of the college under Professor F. D. Brown, and he published observations in the Journal of the Chemical Society in 1905 which confirmed the combination of bromine with potassium bromide in solution. At the City and Guilds College, London, he worked with Professor H. E. Armstrong, contributing to the series of papers on solution chemistry in which the ionic theory was subjected to vigorous criticism. On his appointment to the chair of Chemistry at Auckland in 1914, he continued his interest in this field, publishing among other papers, work on the hydrolysis of sodium cyanide and the mutarotation of glucose (with J. C. Andrews). His research interests were always broad, and his publications were not confined to the field of solutions. Another of Professor Worley's interests was in the use of scientific methods in legal problems, and he was of great assistance to the police in a number of cases, including at least one cause celebre.

Professor Worley was largely instrumental in founding the Auckland Chemical Society in 1925, and the Auckland Branch of the Institute six years later. He was President of the Institute in 1936-37 and is one of those senior members who laid the foundations for its subsequent growth. Members will join in wishing him many happy years in his retirement.

WELLINGTON BRANCH.

In July, a combined meeting with the Wellington Branch of the Royal Society was addressed by Mr. Bradley Dewey, President of the American Chemical Society, and Dr. K. Compton, President of the Massachusetts Institute of Technology, who were passing through N.Z. on their return to America from taking part in the atomic bomb observations at Bikini Atoll.

The August Meeting was a combined meeting with the Physics Section of the Royal Society, and was addressed by Mr. S. J. Lambourne on the subject of "Science in the School Curriculum."

After tracing the development of the Secondary School system in New Zealand, following the establishment of Christ's College in 1851, Mr. Lambourne said that by 1900 there was an increasing public demand for an extension of post-primary education to all sections of the community, resulting in the introduction of the free place system in 1902. The secondary school curriculum remained largely academic in a natural desire to link up with the University through the matriculation examination, but unfortunately this examination, originally intended to demonstrate a pupil's fitness for further study at the University, became regarded by the business community as indicating that a prospective employee had received a satisfactory education at a secondary school.

It soon became obvious that the matriculation examination was no longer fulfilling the purpose for which it was designed, and as the success of a school was largely measured by the number of passes it obtained, nearly 90% of its time had to be devoted to those subjects which enable its pupils to obtain a pass. In recent years, less than 10% of those entering a post-

primary school have continued on to the University, and of these only about one third have obtained a Bachelor's degree; thus the whole work of the secondary schools was centered around and was designed for the 3% who would eventually take a degree, leaving the remaining 97% to follow on as best they could.

In 1942 a Consultative Committee was appointed to review the whole position, and last year their recommendations were largely brought into effect—courses were widened so that pupils should receive a generous and well-balanced education, and up to Form V all pupils now receive a common core of English, Social Studies, General Science, Elementary Mathematics, Music, Arts and Crafts and Physical Education. Outside of this core is a wide range of optional subjects sufficient to enable any child to work for the School Certificate along the lines of his special abilities and interests. After a pupil has obtained his School Certificate, he will be posted to the Sixth Form from where he will study for the University Entrance Examination.

In the past there have been numerous complaints about the teaching of science, and it must be admitted that much of the criticism was justified—there was a lack of appreciation of the value attached to the teaching of the scientific method; teachers were often employed without possessing sufficient background or training in science subjects; University examiners complained that candidates possessed very little understanding and merely reproduced facts from memory; the science teacher has his lessons so organised that there is no freedom for the pupils to follow up their own interests—and so on.

It would seem that the only way to raise the standard of science teaching in post-primary schools is to make sure that only men and women of very definite ability are taken into the profession; they must be given time not only for adequate preparation, but also opportunities to exchange ideas with other members of their calling.

In the new science prescriptions, every child must study General Science, and its scope is illustrated by the following brief outline:

The Earth and the Solar System

An outline of Geological Time

The broad geological features of the pupil's immediate environment.

Elementary Chemistry and Physics of the pupil's home environment.

The soil and the atmosphere as supporters of life.

A simple study of living things.

An elementary study of reproduction in plants and animals including man.

An outline of human physiology to correlate closely with the programme in physical education.

An elementary study of nutrition.

The methods and achievements of science and their more obvious effects upon the human community.

In addition to Core Science a pupil may elect to take one or more pure sciences which he will study for the School Certificate examination; there are eleven pure and applied sciences from which to choose. The syllabus for each of these subjects has been designed to give the pupil an intelligent understanding of everyday processes; for example, in chemistry, industrial operations are stressed, such as the manufacture and uses of fertilisers, glass, cement, soap, etc.

The chief difference between the prescriptions for the School Certificate and the University Entrance examinations is that the former reflects the outlook of the educated layman and endeavours to give him an intelligent understanding and appreciation of the accomplishments of science, whereas the latter sets out to train the academic or technical specialist.

At the September Meeting, Mr. T. A. Rafter discussed, "The Analytical Chemistry of the Rarer and Radio Active Elements."

The lecture was taken in four sections. The first briefly indicated the position of the rarer elements in the periodic classification of the elements, and the fundamental principles underlying the classification; the application of which, has enabled investigations in the isolation and identification of these elements. The lecturer discussed the proposed position of the radio active elements Nos. 90-94, as members of an Actinide Series as visualised by G. T. Seaborg, the discoverer of elements 95 and 96 and one of the discoverers of plutonium.

Section two introduced the analytical principles involved in an ordinary rock analysis, with particular reference to the

pH. precipitation series, the solubility tables and the significance of these as applied to analysis. Several mineral analyses were discussed; e.g. urano-thorite and monazite and the unusual ratios of elements present as compared to a rock emphasised.

In section three Mr. Rafter discussed the chemistry involved in the analysis of a N.Z. monazite, estimated to contain as impurities zircon, ilmenite and cassiterite. The opening up of such an association of minerals presented most unusual difficulties and one method was discussed involving removal of cassiterite by hydrogen reduction and solution in dilute hydrochloric acid, followed by hydrofluoric acid decomposition for the separation of the rare earths. Many pitfalls were mentioned, such as the difficulties encountered in the R_2O_3 group precipitation, the oxalate separation for the rare earths, the isolation of uranium and the endless trouble experienced in the purification of precipitates.

Section four outlined the introduction and application of tannin into analytical chemistry with special reference to the work of W. R. Schoeller. Many analytical points in technique and procedure experienced in the isolation of earth acid elements from the N.Z. monazite were discussed.

At the November meeting, Mr. B. E. Swedlund, under the heading "Current Researches at Victoria University College" summarised the results obtained from kinetic studies in the College Laboratory under the direction of Professor P. W. Robertson. The work carried out over the last fifteen years now presents a fairly comprehensive theory as to the mechanism of halogen addition to ethylenic compounds and halogenation of aromatic compounds.

The typical reaction found for bromine and iodine in the concentration range M/20 to M/80 is a third order electrophilic process postulated to proceed via the intermediate A,X_2 (Robertson, de la Mare and Johnston, J.C.S. 1943, 276). Chlorine in acetic acid (the solvent most studied) gives second order kinetics, $A + Cl_2 = ACl + Cl. =$ Products, and a similar ionic reaction for bromine and iodine replaces the third order process on dilution, or increase of temperature, or addition of water to acetic acid (Robertson et alia, J.C.S. 1937,335; 1939, 1509,1515; 1943,279.)

An intermediate, ABr_4, involving a five membered ring containing two carbon atoms and three halogens stabilised

by resonance, is suggested to explain orders higher than three found in acetic acid at higher concentrations (M/5 to M/20). Similar intermediate compounds may explain catalysis by iodine, and of bromine and chlorine addition and substitution reactions in non-polar solvents; work is being continued on this angle.

Halogen substituted ethylenes and propylenes show marked catalysis by HBr and LiCl for bromine addition, and mechanisms involving nucleophilic attack by HBr_3 and Cl- are proposed (Swedlund and Robertson, J.C.S. 1945, 131). Systems containing the linkage C=C—C=O are also liable to nucleophilic attack in the presence of acids, HBr, and electron attracting substituents (Robertson et alia J.C.S. 1945, 129,888, 891). A variety of mechanisms have been realised with benzalacetophenone and methyl and nitro derivatives including electrophilic or nucleophilic attack depending on conditions (Rothbaum and Robertson—to be published).

Future work is to include alkyl ethylenes and cyclic ethylenic compounds and investigation of the light catalysed reactions.

OFFICERS, 1946-47.

Chairman, S. J. Lambourne; Secretary-Treasurer, J. L. Mandeno; Committee, N. T. Clare, J. N. Sutherland, N. P. Alcorn J. M. C. Tingey; Auditor, G. A. Lawrence.

Mr. S. J. Lambourne, the Wellington Branch Chairman for 1947 received his Secondary education at the Napier Boys' High School, from whence he entered the Wellington Teachers' Training College, gaining a third year extension to specialise in the teaching of science. He graduated M.Sc. in Chemistry from Victoria University College in 1935 and gained his Dip.Ed. in 1944. In 1931 he was appointed to the staff of Rongotai College and now occupies the position of Head of the Science Dept. Leave of absence from Rongotai College was obtained in 1934 to travel overseas, during which time schools and chemical factories were visited in England and on the Continent and in the U.S.A.

His present activities include the Chairmanship of the N.Z.I.C. Examination Sub-Committee, and of the Wellington Science Teachers Association; he is also a member of the Special Committee appointed by the Education Board to report on the design of School Laboratories.

PERSONAL.

When Dr. J. C. Smith, Lecturer in Organic Chemistry at Oxford University was in Wellington recently, he was entertained to luncheon by Hon. Sec. of the Institute, Mr. Hughson, the Branch Chairman, Mr. Mandeno, the Hon. Sec. of the Royal Inst. Chem., Dr. Dixon, and Mr. Brandt of the Dominion Laboratory.

It is with regret that the death is recorded of Mr. G. T. Aitken, a recently elected member of the Branch.

Sympathy in his illness is extended to Mr. S. B. Bowyer, who is at present a patient in the Pukeora Sanatorium.

The Branch is proud to have upon its membership roll all three Hon. Fellows of the Institute, Dr. W. P. Evans, Mr. W. Donovan, and Prof. T. Easterfield, the election of the two last named being announced at Conference.

In his lecture to the September Meeting, Mr. Rafter referred to the outstanding analytical work carried out by Mr. F. T. Seeleye, Chief Chemist at the Dominion Laboratory, Wellington who has recently officially retired. Fortunately his great love for the precise work involved in rock and mineral analyses still makes him a constant worker of the Laboratory.

CANTERBURY BRANCH.

A student evening was held in September, and three brief reports were given on research work carried out at Canterbury College. Mr. K. F. Lorking described work on alkyl derivatives of silicon halides. Mr. E. B. Cutler spoke on acetone compounds of galactose diethyl mercaptal, and Mr. J. D. Monigatti discussed the synthesis and structure of the trityl derivatives of fructose.

A highly successful meeting in October was addressed by Professor J. C. Eccles of the Otago Medical School, many visitors from the medical profession helping to provide a large audience. The subject was "Chemical Transmission in the Nervous System," and the speaker developed his problem from a simple descriptive introduction up to recent investigations in his own laboratory. The impulse in a nerve fibre takes the form of a wave of negative potential of one-two thousandth of a second duration. The immediate problem is what occurs when the impulse reaches a junction between the nerve and a muscle, or one nerve and another. The phenomena at the junction include a delay in the transmission of the impulse, irreversibility of the process and the liberation of acetyl choline. The action of acetyl choline is a depolarisation and the effect can be inhibited by curare at the junctional region only.

Acetyl choline has been identified at the neuromuscular junction in considerable quantity. Its action is localised to motor end plates of nerves, though recently traces of it have been found after the passage of impulses along nerve trunks. The chemical theory of intercellar transmission postulates the liberation of acetyl choline by an electrical impulse and the rapid destruction of the ester by cholinesterase which is known to be in high concentration at the nerve muscle junction. When an impulse passes a synapse (where nerve cells are associated but not structurally connected) there is a double decay of the depolarisation of the membrane. This shows a rapid phase, about 1/50 seconds, and a delayed phase of about 2 seconds duration. The slow process is thought to be associated with acetyl choline, but there is still doubt concerning the rapid process, which may be essentially electrical. The chemical theory is unsatisfactory as a description of the happenings in the initial 1/1000 seconds, when transmission occurs. Further observations adding to the difficulty of the purely chemical theory have come from the study of preparations treated with eserine and saturated with acetyl choline. Professor Eccles felt that the known time course of events at nerve junctions is best described in electrical terms.

OFFICERS, 1946-47.

Chairman, A. F. R. Adams; Secretary-Treasurer, F. H. G. Johnstone; Committee, Miss M. P. Bartrum, L. H. Bird, H. V. Rowe, Dr. C. J. Wilkins; Auditor, G. D. Law.

Mr. A. F. Adams, Chairman for 1947, is a product of Christchurch Boys' High School and Canterbury College, from which he graduated M.Sc. in 1938. He spent some years in the Munitions Supply Laboratories in Melbourne, working in the explosives section on the testing of raw materials, intermediate and finished products for conformity to service requirements. Before the war, his work at Lincoln College was concerned with animal nutrition, but he is now on soil chemistry.

PERSONAL.

Mr. C. G. W. Mason, an original member of the branch has recently transferred to Wellington. During his career with the Christchurch Gas Co. Mr. Mason established for himself an important place among Canterbury's Industrial Chemists. He contributed largely to the Branch's activities as Committee Member, Secretary and Chairman, and his successful entry in the first industrial essay competition showed his deep interest in the branch of chemistry he had made his own, and his capacity to analyse its problems. A farewell function was held before Mr. Mason left Christchurch, and he takes to his new post the best wishes of all members.

The Branch Prize for Chemistry (Stage II) at Canterbury College was won by Mr. P. J. T. King.

OTAGO BRANCH.

"Current Research in the Chemistry Department of the University" was the subject for the September Meeting.

Miss F. B. Hunt made a study of the reactions occuring when N-chloroacetanilide is hydrolysed in the presence of phenols. In aqueous unbuffered solutions phenol and p-cresol are stable to N-chloroacelanilide. showing the inactivity of unionised phenol. In buffered alkaline solutions however they, with seven other phenols, were shown to react. In the case of o,-m,- & p-nitrophenols and O-chlorophenol it was shown that the

phenoxide ion was the active agent, and the unionised phenols did not react. A mechanism for the rate of decay of N-chloroacetanilide in the presence of phenols was established. The velocity constants for direct reaction were obtained for the nitrophenols. The hydrolysis constant of N.chloroacetanilide was measured.

Mr. R. D. Batt discussed the essential oil of Libocedrus Bidwillii. The oil has now been completely fractionated. Four sesquiterpenes boiling within 10°C were obtained together with two liquids in the sesquiterpene alcohol range. A solid m.p.56 has been isolated from the tarry residue remaining from the fractionation. Micro-analysis figures give an empirical formula for this compound of C_5H_{10}. It is saturated indicating it is a solid paraffin.

The largest sesquiterpene fraction has been further investigated. It gives no crystalline derivatives. Conjugation has been shown by an absorption spectrograph. The compound has two double bonds indicating a bicyclic sesquiterpene. On oxidation acetone and a high boiling liquid have been obtained. Dehydrogenation with sulphur gave cadalene.

Mr. J. W. McChesney had investigated karakin and hiptagenic acid and Mr. P. L. Chappell had made a comparative study of the rates of reaction of chlorine and chlorine monoxide with anisole.

Mr. W. V. Heazlewood had investigated the essential oil of Pittosporum Eugenioides, which grows in moderate abundance up the Leith Valley, Dunedin, and which proves to be quite typical of the family Pittosporaceae in that it contained a large percentage of paraffins. The presence of n-nonane in this oil is most interesting and indicates that our knowledge of the origin of components in essential oils is very meagre. The fact that the tree grows in New Zealand would account for the presence of diterpenes. The very low yield of the oil (0.069%) is not characteristic for yields vary with the environment and season. By using the modified Lecky and Ewell fractionating column, and other microfractionating columns the following constituents were isolated (a) Paraffins - n-nonane 60%, solids m.p. 44.50 (0.09%), m.p. 56-57° (0.12%), m.p. 62-63° (0.36%), (b) Terpenes - Sabinene 5.13%, d-limonene 7.6% (c) Unidentified sesquiterpenes 6.26%, (d) Liquid diterpenes 4.0% (e) alcohols-unidentified 0.42%, Glycol m.p. 78° 0.02% (f) Aldehyde 4.8% (g) Unknown oxygenated derivative b.p. 173°/760 m.m. 2.7% (h) Esters—lower fatty ester 0.14% (i) Unknown solid m.p. 58° trace (j) Loss etc. 8.39%.

OFFICERS, 1946-47.

Chairman, O. H. Keys; Secretary-Treasurer, T. H. Kennedy; Committee, Dr. S. N. Slater, Dr. R. Gardner, F. N. Fastier, D. A. Dick.

BOOK REVIEWS.

CRYSTAL CHEMISTRY.

Since the discovery of X-Ray diffraction the study of atomic arrangement in solids has entered three stages. In the first place the theoretical basis of diffraction was developed and experimental methods for structure analysis were evolved. Next, much information concerning structures of diverse types of substances was accumulated. In the third stage attention has been directed towards the interpretation of this experimental material, attempting correlation of structures with atomic properties and theories of valence, and with the physical properties of the crystals themselves. It is this last aspect of crystal structure which is termed crystal chemistry.

The subject continues to develop and the fundamental approach it affords to many practical problems attracts attention widely. Brief notices of a selection of the books available in English in this field may be of interest to New Zealand chemists.

CRYSTAL CHEMISTRY by O. Hassel; English Edition translated by R. C. Evans. Heinemann, London, 1935. xi+94pp.

This little book, the German edition of which appeared in 1933, was the first in the field and is essentially a short exposition of the principles developed by V. M. Goldschmidt during the preceding decade. After discussing atomic and ionic dimensions, and polarisation, there follows a selection of material on the structures of elements and compounds.

The author chooses to be a reporter rather than a commentator, and presents all too brief a treatment of so fascinating a subject.

THE ATOMIC STRUCTURE OF MINERALS by W. L. BRAGG. Cornell Univ. Press, Ithaca, N.Y., 1937. xiii+292pp.

This text falls into two distinct portions. The first 40 pages treat of crystal symmetry, methods of X-ray analysis and general structural principles, thus affording an introduction to the descriptions of mineral structures given in part II. Almost all the important structures determined prior to 1937 are included, and about half the space is devoted to the silicates. The physicist author skilfully addresses himself to mineralogists and chemists alike.

The book contains unusually clear diagrams, and photographs of models inspire the reader to construct some for himself.

CRYSTAL CHEMISTRY by C. W. Stillwell. McGraw-Hill, New York, 1938. x+431pp.

Dr. Stillwell set himself the task of writing a book "which presents a general picture of the subject in simple form, useful as a text or as a point of departure for more thorough study of the subject" and has well succeeded. The first chapter contains a balanced survey of the elementary principles of his subject and serves to integrate the entire text. Succeeding chapters develop these principles and apply them in the systematic discussion of structures. For a book of its size it is perhaps overloaded with detailed information; but the author has earned the gratitude of both students and teachers for his contribution towards systematising the presentation of data of inorganic chemistry.

INTRODUCTION TO CRYSTAL CHEMISTRY by R. C. Evans. Cambridge Univ. Press, 1939. xi+381pp.

In its scope this work is similar to that of Stillwell. It differs in placing greater emphasis on fundamental chemical theory and often refers to structures only as required to illustrate the discussion. To make such a presentation possible two early chapters are devoted to atomic, valence and lattice theory.

In the opinion of the reviewer the section on metals and alloy systems is amongst the most valuable, but all material is judiciously selected and is presented with the skill of an experienced teacher.

THE STRUCTURE OF METALS AND ALLOYS by W. Hume-Rothery. Institute of Metals, London. 3rd (revised)

reprint 1944. 137pp. (First published 1936.).

This monograph opens with chapters on electronic theory in relation to metals, crystal structures of the elements and atomic radii. Thereafter it presents current views on the interpretation of equilibria in alloy systems, the author's own very important contributions to this field of study enabling him to present an authoritative and characteristic viewpoint. Though the work is primarily addressed to metallurgists the approach is essentially academic and contains much of fundamental interest to the chemist and physicist. Valuable lists of references are appended to each chapter.

STRUCTURAL INORGANIC CHEMISTRY by A. F. Wells Oxford Univ. Press, 1945. viii+590pp.

Inorganic chemistry has not yet developed sufficiently to permit the newer knowledge of structure to be fully integrated with the older knowledge of chemical reactivity. Until that becomes possible there is need for separate approaches to these aspects of the subject. Conventional text books of inorganic chemistry are numerous, but no complementary volume emphasising structural aspects of the subject has been available until Dr. Wells undertook this far more difficult treatment.

He has divided his book into two parts. The first is a general survey of concepts of chemical structure and methods for structure determination, with emphasis on those applicable to the solid state. In this section the level of treatment is unfortunately so uneven as to embarrass the student and irritate the more mature reader. The approach seems rather inadequately connected with the second (and larger) part of the book.

Here we are presented with a systematic review of the structural chemistry of the more important classes of chemical compounds, those of the non-metals usually receiving fuller treatment than those of the metals. This is a section which is at once stimulating and full of interest, and valuable as a reference source.

C.J.W.

A Comprehension Text Book of Theoretical Chemistry for Leaving Certificate Pass Students: by L. H. Simmons B.Sc. Hons., A.A.C.I.

New Zealand schools have largely remained content with English chemistry texts, with undoubtedly satisfactory results.

We understand that this has been true, in the main, of Australia too. Mr. Simmons' book is a welcome indication that home produced texts may be expected across the Tasman, probably with increasing frequency. This text is designed for an examination of the standard of the Junior University Scholarship of New Zealand. It is clear and accurate in treatment and notably original in method. Numbered spaces are left in the text, in which key statements are to be entered. Students are expected to prepare for a lesson by making a list of proposed entries. On checking the lists in class, difficulties are immediately found and the lesson devoted to dealing with them. Experimental demonstrations, and historical and background material are also given in class. Correct answers are finally inserted in the text. We believe that the author is well justified in claiming that a large syllabus can be adequately covered by his method in a limited time without throwing an unfair burden on the student.

Of equal interest to his method, is his selection of material. Professor Eric Ashby, who has lately vacated the Chair of Botany at Sydney for a similar post in Manchester, says of it in his foreword "(the author's) point was that the sort of chemistry taught at school should be so fundamental that even a Professor of Botany might be expected to know it; whereas a good deal of school chemistry is in fact so unimportant that a Professor of Botany can get on quite well without it." Mr. Simmons' decisions as to the topics which can be safely left out of a text book which aims at comprehension instead of comprehensiveness, seem to us entirely admirable. More positively, chapters on general methods of preparation of chlorides, nitrates, carbonates, sulphates and sulphides, on metallic corrosion, and on the action of heat on nitrates and carbonates, provide sound correlation of material which is often scattered. The physical chemistry is treated in a clear modern way. The electronic theory of valency is introduced but not overstressed. This is highly desirable in a theory which still requires considerable critical discussion.

In all the author is to be congratulated on his contribution to the teaching of Chemistry.

H.N.P.

The Institute as a whole is not responsible for statements and opinions appearing in this Journal.

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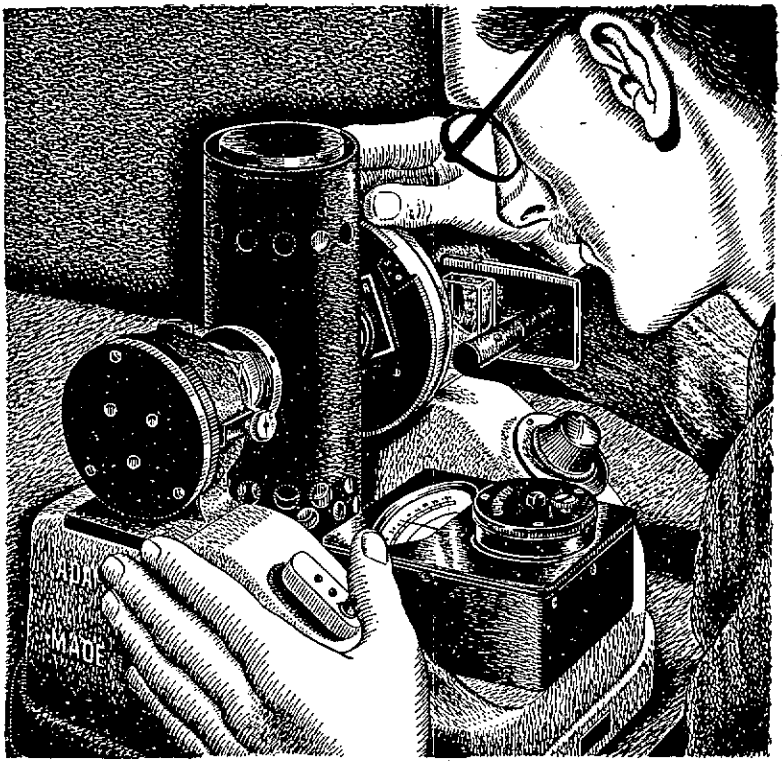
The address of the Hon. Secretary is P.O. Box 250, Wellington.

R.O.Y.G.B.I.V.



Red, orange, yellow, green, blue, indigo, violet; these are the colours of the rainbow which Newton flashed from the bevelled edge of a mirror when he made his famous researches on light. Since then, the study of colour has travelled a long road. It has become a methodical and precise branch of physics which the chemist is exploiting. It demands instruments of precision, such as the absorptiometer illustrated above. This is employed to measure with exactitude the intensity of the colour of a solution. For example, it may be desired to follow closely the rate at which a fabric is being dyed under given conditions. This can be done by withdrawing samples of the dyeing liquor at suitable intervals of time and measuring the intensity of their colour. The absorptiometer is admirable for the purpose. In the centre, a source of light throws out beams on either side. These pass through adjustable apertures and strike photo-electric cells. A sample of the dye liquor is placed in front of one cell and the aperture in front of the other cell is adjusted until the two cells give exactly equal readings. The sample is then removed and the readings of the two cells are again brought to equality by adjusting the aperture on the first cell. The degree of adjustment that must be made on this aperture is a measure of the intensity of the colour of the sample of dye liquor, and from this the rate of dyeing can be estimated. Just as British chemists discovered synthetic dyes, so they are today taking the lead in developments in the physical measurement of colour.

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