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R.I.C. — CONFERENCE, 1949 — N.Z.I.C.
AUCKLAND, AUGUST 22nd- 25th

The Committee has now finalised the programme as far as sessions of papers are concerned, and it will be as follows (with the names of the chairmen).

Monday — 2.30-5.30 p.m.—Antibiotics: Dr. T. R. Vernon.
2.30-5.30 p.m.—Silicates, Soils and related materials: Mr. W. Vose.

Tuesday — 9.30-12.30 p.m.—Food Technology: Mr. S. G. Brooker.
9.30-12.30 p.m.—Structural Methods: Professor F. J. Llewellyn.

Wednesday—9.30-12.30 p.m.—Analytical Chemistry: Mr. O. H. Keys.

Thursday — 9.30-12.30 p.m.—Three sessions, including "Determination of Moisture," and "Comparative merits of instruments."
Utilization of N.Z. Mineral Broducts: Mr. G. S. Lambert.
9.30-12.30 p.m.—Biochemistry: Dr. C. R. Barnicoat.

Big news is that a small delegation, consisting of Drs. Rees and Williamson and probably one other will be coming over from the Division of Industrial Chemistry of the Australian C.S.I.R. Dr. Williamson will be speaking on "Physical Orientation of Particles in the Clay-Water System."

Condensed summaries of papers must be in the hands of the Editor by June 25th to ensure publication in the Conference issue of the Journal.

The registration date for the Conference will be Monday, August 1st, but accommodation requirements must be notified by July 4th.

The exhibition of apparatus and books promises to be a real stem-winder, and as for the floor show in the junior lab. . . . !

G. I. CALNAN,
Hon. Secretary.

Dominion Laboratory,
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SIR THOMAS HILL EASTERFIELD

SIR THOMAS HILL EASTERFIELD,

K.B.E., M.A. (Cantab.), Ph.D. (Wurzburg), F.R.I.C., F.R.S.N.Z., F.N.Z.I.C.

Sir Thomas Easterfield, who passed away in Nelson on March 1st, 1949, will long be remembered by New Zealand scientists for his notable contributions towards the development of Chemistry and Science, as a whole, in New Zealand.

Born in 1866, he was educated at Doncaster Grammar School, Yorks, and then proceeded to the Leeds Technical College where he became interested in chemistry and geology. While attending technical classes in Leeds, he was encouraged to apply for a scholarship at Clare College, Cambridge. He was successful in his examination and entered Cambridge University as a Senior Foundation Scholar of Clare College. At Cambridge, he took the science tripos and secured honours in both chemistry and geology.

He then proceeded to the Continent and gained experience at Zurich Polytechnic School, Switzerland, and at Wurzburg University, Germany. At the latter institution, he worked under the famous organic chemist, Emil Fischer, and gained his Ph.D. degree.

Returning to Cambridge in 1888, he was appointed a demonstrator in the University chemical laboratory and also Extension Lecturer of the University. In 1894, he was appointed Lecturer in Pharmaceutical Chemistry and also in the Chemistry of Sanitary Science at Cambridge University. He held these positions until his appointment as one of the Foundation Professors of Victoria College, Wellington.

At Victoria College he held for some years the Chairs of Chemistry and Physics, being relieved of the Chair of Physics in 1909. He held the Chair of Chemistry with great distinction until he resigned in 1919 to take up the Directorship of the Cawthron Institute, Nelson. His notable record as Professor of Chemistry at Victoria College was recognised by the conferment on him of the title Professor Emeritus.

As Foundation Director of the Cawthron Institute he was entrusted with the great responsibility of establishing the Institute and of guiding its policy and work. This required vision, sound judgment and great enthusiam. His scientific qualifications and the personal esteem in which he was held

throughout New Zealand, assisted greatly the early recognition by the general public of the valuable work carried out by the Institute, on behalf of the Primary Producers of New Zealand. He retained the Directorship of the Institute until his retirement at the end of 1933.

His services to New Zealand science were recognised by the conferment of a knighthood in 1938.

Sir Thomas' interest in science was not confined solely to his duties as professor at Victoria College or director of the Cawthron Institute. He was a Life Fellow of the Royal Institute of Chemistry, Great Britain, and served as President of the N.Z. Institute of Chemistry. He took a great interest in industrial chemistry and was engaged in an expert capacity by both private firms and companies.

The Royal Society of New Zealand, likewise, claimed his strong interest. He was a Foundation Member of the New Zealand Institute which at a later stage became the Royal Society of New Zealand. He was awarded the Hector Medal for his researches in organic chemistry and was President of the N.Z. Institute in 1922. He was a member of the Nelson Philosophical Society during the whole period of his residence in Nelson and occupied the position of President for several years. He was keenly interested in the Australian and New Zealand Association for the Advancement of Science and was President of the Chemical Section of the Association at its meeting in 1909.

In a life, notable for many valuable contributions to the development of science, his work as Professor of Chemistry at Victoria College, Wellington, and as Director of the Cawthron Institute, Nelson, was outstanding by virtue of the high standard which he set not only in the teaching of science, but in the conduct of scientific research. As Professor of Chemistry at Victoria College he won early recognition for his wide knowledge of chemistry, his great interest in research and his stimulating lectures. His training as a research chemist and his practical gifts in the laboratory proved invaluable in the organisation of the chemical department at Victoria College and in the practical application of chemistry to the needs of the community.

He took a great interest in every phase of college life and won the esteem and high regard of his students, several of whom now hold important scientific positions in New Zealand and overseas.

At the Cawthron Institute, Sir Thomas was a Member of and Secretary to the Advisory Scientific Commission, appointed by the original trustees of Thomas Cawthron, to report on the best method of giving effect to the testator's wish concerning the establishment of a scientific Institute and Museum. The Advisory Commission recommended that the Institute should be concerned with scientific research relating to primary production in New Zealand. The recommendations of the Advisory Commission were approved by the Trustees and by the Supreme Court, and Sir Thomas was invited to become the first director of the Institute.

The success of the Cawthron Institute in the early years of its establishment was due in large measure to the broad vision of Sir Thomas, his confidence in the value of scientific research and the esteem in which he was held throughout New Zealand. He was instrumental in securing for the initial staff of the Institute highly qualified men in different branches of science.

His enthusiasm and zeal in the application of science to agriculture stimulated the work of his staff and endeared him not only to his staff, but to farmers, orchardists and the community at large. He will be long remembered as one of the great pioneers in the remarkable development which has taken place in New Zealand science over the last fifty years.

—T. RIGG.

DR. E. H. CALLOW

Dr. E. H. Callow, as head of the meat section of the Low Temperature Research Station, Cambridge, arrived in New Zealand on 17th December, 1948, to make an extensive study of meat problems. After about six weeks in the Dominion, he went to Australia, returning to New Zealand about the end of March, finally leaving for England last month. During part of his travels in Australia, I had the good fortune to accompany him and Mr. N. E. Holmes of the British Ministry of Food. In Australia he had many exciting experiences, including a narrow escape from crashing, at Alice Springs, where a small plane fell into an air pocket. Not the least worry was his fear of newspaper reporters. However, he fell at Brisbane, where there appeared in the papers this statement: "Dr. Callow, in refusing to be interviewed, said that the future of the chilled beef industry was in God's hands, not man's."

I need not elaborate on the great assistance which the Low Temperature Research Station has rendered to the food industry, but in passing it may be noted that as far back as 1928,

L.T.R.S. workers, Griffiths, Vickery and Holmes made a thorough survey of the freezing, storage and transport of New Zealand lamb for the New Zealand Meat Producers' Board.

Dr. Callow studied at the University of Birmingham, but was interrupted by World War I, where he saw active service throughout practically the whole period in the poison gas section. On returning to his studies he took up biochemistry, first at Birmingham and later at Cambridge under Gowland Hopkins and Hele, his work being on sulphur metabolism in dogs.

In October, 1922, he joined the staff—then only three—of the L.T.R.S., just six months after its inception. He made a study of the autolysis of cod muscle, and later examined the velocity of ice crystallisation through super-cooled gels. For this work he was awarded the Ph.D. degree.

It is relevant at this stage to recall that the late Sir William Hardy as Superintendent of the L.T.R.S., always preached in connection with food investigation, that the biological nature of the problem must first be understood, "for it cannot be said too often, that both in time and in logic, biology has precedence in the scence and practice of food preservation." This consideration has dominated Dr. Callow's work.

In 1926, Dr. Callow started his long series of investigations on the bacon pig, for which he is so well known. Throughout this work he has been in close touch with Dr. John Hammond of the Cambridge School of Agriculture, who, more than anyone else, has clarified the nature of the growth of farm animals.

More recently, Dr. Callow has studied the general relationship between the fat, protein, and water content of meat animals. At first, he made a statistical investigation, but later, using a more fundamental approach, and discarding the very young and very old animals, he made the amazing generalisation that boneless meat contains 77% of water on a fat-free basis regardless of the kind of animal or breed. I use the word amazing, because many workers both in U.S.A. and here have worked on carcase composition without spotting this vital point. From this simple fact, Dr. Callow has proceeded to develop what he has at times aptly described as the mathematics of meat, which I feel sure will give to meat science on the chemical composition side, a simplification not less important than that given to animal production by Hammond in clarifying the principle of differential growth.

(The above remarks were made by Dr. F. B. Shorland, Chairman of the Wellington Branch, prior to Dr. Callow's delivering a lecture on "Chemistry in the Meat Industry." A summary of this address will be published in a later issue.—Ed.).

ELECTION TO FELLOWSHIP

Mr. J. J. S. Cornes, B.A., B.Sc., has been a popular member of the staff of the Dominion Laboratory, Wellington, for the past 14 years, where he has been working on analytical and research problems connected with minerals and assaying. He has a number of publications to his credit in the Analyst and in the New Zealand Journal of Science and Technology dealing more particularly with the determination of alkalis in Silicates, such as clays feldspars and cements. He has also been responsible for improved fertilizers such as serpentine—superphosphates and artificial fertilizer slags similar to basic slag, but containing potash from greensand.

Mr. W. L. Barr was born in Dunedin in 1906, and graduated with the Dairy Research Institute, Palmerston North, foIated from Otago University with honours in 1928. His first position was with the Dairy Research Institute, Palmerston North, followed by eleven years with the Shell Oil Co. Last year, Mr. Barr took up his present position with New Zealand Forest Products, Penrose, Auckland. He is a foundation member of the Institute, and is a Fellow by exam. of the Royal Institute of Chemistry.

CHEMISTS' EMPLOYMENT COMMITTEE EMPLOYMENT REGISTER

The attention of members is drawn to the services offered by the Employment Register which is maintained jointly by the New Zealand Institute of Chemistry and the New Zealand Section of the Royal Institute of Chemistry of Great Britain and Ireland. This Register is open to Fellows, Associates and Local Members of both Institutes, and chemists desirous of obtaining or changing employment are invited to lodge particulars of their qualifications and training with the Honorary Secretary of the Committee when they will receive particulars of all

vacant positions which are notified to him by representatives of the Committee in all four Branches. Employers requiring chemists are also invited to make their requirements known to the Honorary Secretary, who will place them in touch with suitable applicants drawn from the files of the Register. For the services of the Register a subscription of 10/- per annum is charged to cover expenses, and further details, and application forms for membership may be obtained from the undersigned.

E. S. BORTHWICK,
Hon. Secretary,
P.O. Box 250, Wellington.
Chemists' Employment Committee,

THE CONFERENCE COMMITTEE IN ACTION

—Photo by A.U.C. Photographic Society.

Mr. Fielder, Mr. Ricketts, Mr. Calnan, Professor Llewellyn, Mr. Brooker, Dr. Bloom, Mr. Odell.

THE CONTRIBUTION BY NEW ZEALAND WORKERS TO THE CHEMISTRY OF PLANTS, PART I (Continued)

By J. Melville, Plant Chemistry Laboratory, Palmerston North

POTASSIUM

Potash is the third member of the big three macro-nutrient elements commonly designated by the symbol NPK, and potassic fertilisers are used on a large number of analyses of pasture herbage are available, but although positrials with potash salts have been conducted on New Zealand pastures and large numbers of analyses of pasture herbage are available, but although posttive responses from potash fertilisers have been obtained in certain localities, their place in grassland farming has not been clearly defined.

From trials conducted by Grasslands Division at Palmerston North (described in the previous paper in this series), the following points have emerged:

(1) Under conditions of mowing where herbage is removed, the average potash level in the grass over nearly 3 years is 3.9%, while that of the clover growing in association is 2.9 % (calculated as K_2O).

(2) Under conditions of grazing and return of dung and urine to the pasture the corresponding figures are 4.6% and 3.8%. Since no response to potash fertilisation can be seen in the plots under mowing, it is probable that these figures represent luxury consumption of potash.

(3) Where grass is grown alone, the potash content is markedly lower than when it grows in association with clover. It is believed that this is due, in part at least, to the increase of lower fertility grasses which results from the exclusion of clover from the sward. There is also considerable evidence that, even when potassium is not a limiting factor, poor growth from whatever cause results in lower potash levels.

(4) Within any one treatment there are quite marked seasonal variations in potash levels. The maximum variation over all treatments and seasons is from 2.0 to 5.6% K_2O.

Despite extensive investigations, the part played by potassium in the metabolism of the plant cell is still obscure. Descriptive data on the variation of certain metabolities at various potash levels are available, cellular reactions which will not take place in the absence of potassium ions are known, but as with the previously considered nutrients there are still huge gaps in our knowledge of the functions performed by potassium in the plant.

Potassium has also been a favourite material for investigations of the mechanism of ion transfer from soil colloid to root cell and of interaction between various cationic plant nutrients. The beneficial effect of sodium ion on plants which are grown at sub-optimum levels of potash, the depression of leaf potash levels by heavy sodium fertilisation, the complex interaction between calcium, magnesium and potassium ions are all illustrations of the same phenomenon. These studies all point to the danger of faulty interpretation of manurial trials in which the response of a plant to variation in a single element is required.

OTHER ELEMENTS

Analytical data are available in the literature for sodium, magnesium, magnesium, aluminium, silicon, sulphur, chlorine, titanium, manganese, iron, cobalt, copper and iodine. Except in the case of the elements considered below

no good purpose would be served by quoting analytical figures, since they do not appear to the reviewer to advance our knowledge either of plant nutrition or plant metabolism.

Magnesium plays a key role in plant metabolism since it is an integral part of the chlorophyll molecule. It is of interest also in animal health since the nutritional disease known as grass staggers can be cured by the injection of magnesium salts. Cunningham at Wallaceville was unable to relate incidence of the disease to a deficiency of magnesium in the herbage ingested, but he has shown that the magnesium level in pasture can be significantly raised by application of magnesium sulphate.

Iron and **cobalt** represent two stages in the attack on a further nutritional disease of stock, viz., bush sickness, which has its counterpart in various other countries. At first it appeared, both from analysis of herbage from affected areas and from the therapeutic value of licks and drenches containing limonite, that the disease was due to iron deficiency. The evidence, however, was by no means conclusive and various investigators were working on the micro-nutrient elements which might accompany iron when Australian investigators announced the beneficial effects of cobalt in the treatment of a similar stock ailment. Within a matter of months, it was shown by workers in Cawthron Institute and Dept. of Agriculture that the administration of cobalt to "bush-sick" animals produced spectacular results, and that by the use of cobalt top-dressings at very low levels pastures could be made safe for grazing animals. It is seldom that a scientific finding is applied so rapidly in practice as was the case with cobalt or that so simple a remedy has produced such spectacular results.

It is noteworthy that on present evidence cobalt has not been shown to be a limiting factor in plant nutrition; cobalt analyses on pasture plants have been performed solely to determine whether or not the animals grazing those plants will suffer from cobalt deficiency. Virtually, the same is true of copper which, although it is known to be an essential part of certain plant enzyme systems, has not been shown to be a limiting factor in the growth of any pasture investigated in this country. On the other hand, Cunningham has shown the value of copper sulphate topdressing on peat pastures as a therapeutic measure for the control of scouring in stock.

ORGANIC CONSTITUENTS

By far the largest number of analyses for organic constituents of pasture plants have been carried out in connection with metabolism trials and such work is being vigorously extended by a team of workers at Ruakura Animal Research Station. The conventional analysis for fat, crude protein, crude fibre, nitrogen free extract, and ash have been in use without material change for many years, and the conversion of these analyses into "units" of animal food has an enormous background of practical experience and successful application. It is widely recognised, however, that the division of feeding stuffs into the arbitrary and very complex constituents enumerated above leads to little increase in our knowledge of plant chemistry, and is of limited value in precise nutritional studies with animals. Many investigators have endeavoured to devise analytical methods which are both suitable for routine analysis of foodstuffs and at the same time would give much more precise information as to chemical entities rather than to quite empirical groups. Considerable advances have been made by Canadian and American workers in separating the fibrous constituents of plants into lignin, cellulose, hemicellulose, etc., and determining their nutritive values. The methods are, however, more time consuming than the conventional ones and animal nutritional workers

appear loathe to put them into practice, largely because of the success which has attended the use of the latter and the enormous body of information which has been built round them.

In New Zealand various workers, notably Lancaster and MacIlroy, have investigated the cell wall constituents of pasture plants as a means of obtaining more precise information on plant constitution and animal nutrition. It is most desirable that this work should be continued. The great majority of analyses which are available, however, relate only to the conventional constituents and certain points of interest emerge from the studies which have been made on New Zealand pastures.

(1) Where, as in much of the South Island, climatic conditions approach those of the dairying countries of Western Europe, pasture herbage shows approximately the same nutritive qualities as have been obtained by European investigators. For a few weeks in spring and early summer, high protein herbage with relatively low fibre content is the rule. The protein: fibre ratio decreases sharply during the summer months, or even during the spring if stock management is such as to allow the pasture plants to mature too quickly. For a brief period in the autumn, the herbage is similar to spring growth, while there is a winter period when growth ceases completely.

(2) In the high production areas of the North Island, conditions for growth of pasture plants are almost optimum and this is reflected in the organic constituents. Except for a brief period in the summer, high protein low-fibre herbage can be obtained in high yield throughout the year, while even during a dry summer it is possible to produce herbage with a protein content of 14 to 16%, and a crude fibre content of 25%.

(3) The work of Woodman in England indicated the necessity for frequent defoliation if nutritive value was to be maintained even during the spring months. Comparable trials on high production pasture in New Zealand show the much greater latitude afforded under our conditions. Thus in a trial at Palmerston North herbage which has reached a length of 10in. to 14in. after a growth period of five to six weeks had an average protein content of 20% and an average crude fibre of 20.5%. The corresponding values on the same pasture at the 6in. and 10in. stage and cut nearly two weeks earlier were 26% and 17% respectively.

(4) Coefficients of digestibility for the two lots of herbage, determined by feeding trials with sheep, were well over 80% for the various organic fractions and showed that considerable flexibility in grazing management is possible.

These characteristics of our high production pastures give a partial explanation of the statement in the previous contribution that "the grasslands of New Zealand almost justify the adjective unique." In the other great dairying countries of the world pasture growth persists for a maximum period of six months, and it is considered necessary, even when pasture growth is at its maximum, to feed concentrates of one kind or another in order to maintain milk production. From the records achieved by New Zealand farmers both with individual cows and in large herds, and with pasture as the sole diet, it is apparent that this conclusion is not of general application. Many New Zealand investigators are of the opinion that if pastures were managed and utilised in other countries on the same principles as are applied here, greater efficiency of production would result.

A WATER-SOLUBLE POLYSACCHARIDE FROM A MIXED PASTURE HERBAGE

McIlroy isolated from a pasture which was predominantly perennial ryegrass a polysaccharide containing galactose and glucose residues. He was

unable to reduce the ash content below 30% and suggests that the material was the calcium salt of a sulphuric ester of a galactan with one or more glucose units in the carbohydrate moiety.

THE CYANOGENETIC GLUCOSIDE OF WHITE CLOVER

The presence in certain white clover strains of a glucoside which yields hydrocyanic acid on hydrolysis was first demonstrated by Mirande in 1912. Doak in 1933, examined a large number of white clover plants from widely different sources and showed that the types which were of greatest agricultural value under New Zealand conditions also yielded the highest amount of HCN. This entirely fortuitous correlation is the basis for the successful scheme of seed certification now in operation by the Department of Agriculture.

The identification of the HCN precursor as the glucoside lotaustralin was made by Finnemore, Cooper and Cobcroft, but their yields were sufficient only to permit of characterisation. In view of the importance of the white clover plant to our pastoral economy and of the possible danger to stock of high glucoside strains, a further investigation was made at Palmerston North. A simple method, involving extraction by ethyl acetate of a clarified and concentrated extract of fresh leaves, was devised and by means of it a stock of about 50g. was readily prepared. It has to be admitted, however, that when this same method was tried some years later by the same workers, only small amounts of glucoside were obtained. No reason can be given for our earlier success, but alternative methods for large scale preparation have been worked out, the description being now in press.

Finnemore and co-workers considered that the cyanogenetic glucoside of white clover consisted of lotaustralin which is built up from one molecule each of glucose, methyl ethyl ketone and HCN. Work at Palmerston North indicated that Lotaustralin is accompanied by about 20% of linamarin, the lower homoloque in which methyl ethyl ketone is replaced by acetone. Other investigations at the same time were directed towards the glucoside-glucosidase system in leaves, the preparation of an active glucosidase from linseed and the conditions governing the quantitative estimation of HCN in leaf tissue. Perhaps the most interesting biochemical observation related to the extraordinary rapidity with which free HCN appears in clover leaves after detachment from the plant. Although no appreciable amount of free HCN can be demonstrated in intact leaves, between 15 and 25% of the combined HCN is liberated within 15 minutes of cutting the leaves. Complete hydrolysis of the remaining glucoside is achieved only after cytolysis and incubation with enzyme for a period of some hours. The explanation of this phenomenon can be no more than speculation in our present state of knowledge of leaf metabolism.

Our knowledge on the plant side was considerably advanced by Corkill's studies of the inheritance of glucoside and glucosidase. He found plants from natural populations which contained glucoside but no enzyme, enzyme without glucoside, both glucoside and enzyme and neither constituent. From progeny tests, he showed that the presence and absence of glucoside and glucosidase are governed by a different part of genes for each constituent. The presence of each is dominant. This forms an interesting parallel in the plant world to the important and more recent work of Beadle, Tatum and others on genetic control of specific enzymes in **Neurospora.**

To complete the picture it remained only to determine the fate of the glucoside when ingested by the animal, and this work has been carried out by Coop and Blakeley at Lincoln College during the past three years. The rate of hydrolysis of the glucoside in the rumen, its gross toxicity, mechanism of detoxication and other aspects are described in a series of three papers which

are now in press. English workers have again made the suggestion that bloat in dairy cattle is related to the glucoside content of white clover, and although New Zealand experience is against this hypothesis, it is certain that further work will be done on the problem during the next few years.

THE ALKALOIDS OF RYEGRASS

On the hypothesis that facial eczema, a serious stock disease of nutritional origin, is caused by ingestion of perennial ryegrass growing under certain environmental conditions, intensive studies were made of this plant following the 1938 outbreak. An important result was the independent discovery by chemists in Wellington and Palmerston North of basic nitrogenous materials with alkaloidal properties. The best characterised of these alkaloidal materials has been named perloline and over 50g of purified hydrochloride were prepared, primarily for sheep feeding and injection experiments. The result of the animal experiments were disappointing in that perloline caused none of the symptoms, or degenerative changes in the liver, characteristic of facial eczema.

The original work pointed to the formula $C_{40}H_{34}O_7N_4.2HCl$ for perloline hydrochloride although in a recent study Metcalf came to the conclusion, on the basis of absorption spectra of the free base and the hydrochloride, that the formula should be halved. He postulates the alternatives of $C_{20}H_{18}N_2O_4$ (HCl) or $(C_{20}H_{18}N_2O_3)$ 2 (HCl) 2 (H_2O). The most striking property of the alkaloid is the marked green fluorescence of solutions of the free base in alcohol and chloroform, which allows detection at concentrations as low as 0.2 micrograms per ml. This property is the basis of a quantitative method of estimation.

Using the formula $C_{40}H_{34}O_7N_4$ perloline contains four methoxy groups and an alcoholic hydroxyl group. All four nitrogen atoms are probably tertiary, two of them being reactive in salt formation. A variety of derivatives and salts of perloline have been prepared, but the basic structure of the alkaloid is still quite unknown.

Both groups of investigators considered in their original reports that perloline was accompanied by other alkaloids in smaller concentrations, but with increasing knowledge of the behaviour of perloline under the conditions used for extraction from leaf tissue the problem is one which requires reinvestigation. The presence of at least one other base in perennial ryegrass is, however, established, viz., a volatile material with the relatively simple formula C_6H_7N. Attempts by the Wellington group to show identity of the base with one or other of the picolines were unsuccessful.

Perloline has been detected in very few species of the plant kingdom. Of eighty-five species representing forty genera of the **Gramineae**, together with some from **Cyparaceae** and **Juncaceae**, only four contained perloline in easily detectable concentrations, while only one, perennial ryegrass, has been studied in detail. Much work has been done on the influence of environmental conditions on perloline levels in the ryegrass leaf, but beyond the observation that concentrations are generally higher in rapidly growing grass, no direct correlation between concentration and environment has been established. This, however, understates the case. The alkaloid content varies markedly from day to day and this variation has been the chief obstacle in large-scale preparations. It is questionable whether any alkaloid can be regarded as an end product of nitrogen metabolism in the plant, a view which was widely held at one time; the variation of perloline over short intervals of time can only be explained on the basis that it is not an end product of metabolism.

The investigation is at an unsatisfactory stage, and every phase of the problem requires more work. The most important contribution would be the determination of molecular structure, followed by a full pharmacological investigation. With that information, but not before, it should be possible to determine perloline precursors, its breakdown products and the mechanisms whereby these transformations take place within the plant.

OTHER PLANTS OF AGRICULTURAL IMPORTANCE

Fruit Trees: With Atkinson's demonstration in 1935 that "corky pit" in apples was entirely controlled by injection of boric acid, extensive investigations of boron deficiency, first in orchards and later in other farm crops, was undertaken by Cawthron Institute and Department of Scientific and Industrial Research. Large numbers of boron determinations have been made on plant tissues, and the correlation between boron concentration in the tissue and incidence of the disease is so good that tissue analysis can be used successfully as a diagnostic procedure.

Magnesium deficiency in apple trees has been shown by investigators at Cawthron Institute to be the prime cause of premature leaf drop. In this case, however, analysis of selected plant tissues do not necessarily give a clear indication of probable response to magnesium applications, due apparently to the interaction between magnesium and the other cationic nutrients, calcium and potassium. As with boron deficiency, very satisfactory control methods are now in operation.

Tobacco: The Cawthron Institute has for some years been investigating the composition of tobacco leaf both in relation to mineral constituents and to the changes in certain organic fractions which take place during flue curing. Much of our fundamental information on the metabolism of plant cells has come from a study of detached leaves under a variety of culture and drying conditions, and these studies, which are primarily intended to give greater control over the curing process, will undoubtedly add to our knowledge of fundamental plant biochemistry. Publications to date are of a preliminary nature and deal with changes in certain soluble carbohydrates and with the breakdown of leaf protein to soluble nitrogenous compounds.

Rape: This forage crop is of considerable importance on arable land in the South Island and investigation at Lincoln and Palmerston North have given data for the conventional organic fractions. Metabolism trials have also been carried out and give factual data for the known high fattening value of the crop.

New Zealand Flax (Phormium Tenax): Apart from forest trees, **Phormium tenax** is practically the only indigenous plant on which an industry is based. The fibre has found a fairly wide variety of uses and present demand considerably exceeds the supply. Brandt was the first worker to investigate the carbohydrate constituents of the fibre by modern methods, and this work has been recently extended by MacIlroy. Further fundamental work of this type is essential if a fuller and more efficient utilisation of phormium fibre is to be achieved.

PLANT GROWTH REGULATING SUBSTANCES

Although the idea of phytohormones is relatively old, it is only within the last twenty years that ideas have been given factual background by the isolation of a number of chemical compounds with quite remarkable properties of regulating growth. The field is particularly active at the present time, due to the enormous economic importance of the hormone weedkillers which are destined to play an important part in world agriculture.

New Zealand's contribution in this field is confined to testing new products under New Zealand conditions, but Doak has published two papers on the effect of hormone treatment on the changes in carbohydrate and nitrogenous constituents of cuttings of **Forsythia** and **Rhododendron.** He found that hormone treatment resulted in a gradual accumulation of sugars in the lower inch of the cutting, but that large increases in amino and amide nitrogen occurred. He concluded that the chief effect of treatment was to accelerate the rate and intensity of normal changes in the metabolism of the cutting.

In concluding this section of the series I am conscious that the survey I have made deals only sketchily with the large number of plant tissue analyses which have been reported by New Zealanders. I have, however, endeavoured to mention all investigations which lead to a better understanding of plant nutrition and metabolism, and I have tried to show that in every aspect of the problem further fundamental work is required before advances can be made in the applied field.

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TOBACCO

H. O. Askew and others: Cawthron Institute Annual Reports from 1944.

MINUTES OF A MEETING OF THE COUNCIL OF THE NEW ZEALAND INSTITUTE OF CHEMISTRY, HELD IN THE COUNCIL ROOM OF THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH, WELLINGTON, ON SATURDAY, MARCH 5th, 1949, at 10 a.m.

1. **PRESENT:** Professor J. Packer, President (in the Chair); Dr. J. Melville, Vice-President; Mr. B. E. Jackson, Auckland proxy; Mr. J. L. Mandeno, Wellington delegate; Mr. F. H. G. Johnstone, Canterbury Delegate; Mr. L. H. James, Otago proxy; Mr. H. K. Palmer, Registrar; Mr. W. G. Hughson, Hon. General Secretary-Treasurer.

2. **APOLOGIES, ETC.:** Apologies and proxy notifications were received from Mr. S. G. Brooker, Auckland delegate, and Mr. O. H. Keys, Otago deelgate.

3. **MINUTES:** The Minutes of the previous meeting, held on November 20th, 1948, were taken as read and confirmed. (Pages M.497-M.505).

4. **SIR THOMAS EASTERFIELD:** Before commencing the business of the day, the President referred to the loss which the Institute has sustained in the recent death of one of its Honorary Fellows, Sir Thomas Hill Easterfield. Sir Thomas was the second President of the Institute, and was recently honoured with the award of Honorary Fellowship. The President read a letter of sympathy which had been forwarded to Lady Easterfield and family, and the Council stood as a mark of respect.

5. **VICE-PRESIDENT:** Professor Packer extended a warm welcome to Dr. J. Melville, F.N.Z.I.C., Director of the Plant Chemistry Laboratory, Palmerston North, who was attending his first meeting as Vice-President.

6.1 **CONFERENCE, 1949:** The Secretary reported that the Auckland Committee had arrangements well in hand and were forwarding copies of the minutes of meetings to Branches to keep them advised on progress. Council requested that copies be also sent to the President, Vice-President, Registrar, and Hon. Gen. Secretary.

6.3 **EIGHTH PACIFIC SCIENCE CONGRESS:** It is not the province of the Pacific Science Council to dictate the organisation of Congresses. This is left to the Organising Committee of the particular country concerned.

Our recommendation, "THAT future Congresses include a Division of Physical Sciences, or failing that, a Division of Chemistry," has therefore been forwarded on to the Organising Committee set up by the National Research Council of the Philippines.

RESOLVED: Wellington, Vice-President: THAT a statement, setting out as far as possible the pros and cons of the case, relating to the suggestion that a separate Division for the Physical Sciences or for Chemistry be formed at future Pacific Science Congresses, be prepared and forwarded to Canada, Australia, America and the Philippines.

7. **EMPLOYMENT COMMITTEE:** Branches have now appointed further representatives so that in each Centre there are three members representing respectively University, Government, Industry, viz., Auckland: Professor F. J. Llewellyn, Mr. K. M. Griffin, Mr. P. R. Parr; Wellington, Mr. B. E. Swedlund, Mr. G. M. Smith, Mr F Morgan; Canterbury, Mr. S. R. Siemon, Mr. L. Wilkinson, Mr. F. H. G. Johnstone; Otago, Professor F. G. Soper, Mr. O. H. Keys, Mr. H. G. Woolman

The other two matters on the agenda A147/3.2, were held over to next meeting.

8.1. **EXAMINATIONS COMMITTEE:** Mr. James said that Otago had signified its willingness to take over the Examinations Committee.

RESOLVED, President, Wellington: THAT Otago be asked to nominate an Examinations Committee on the same basis as the Wellington Committee, and that it be asked to take over the work after the November, 1949, examinations.

8.3 **STANDARD OF EXAMINATION:** The Committee reported that it was satisfied with the standard of the Laboratory Assistants' Examination and considered it served the purpose for which it was introduced. It comprises the equivalent of four years' secondary school in Chemistry and two years' secondary school in other subjects.

RESOLVED, Wellington, Auckland: THAT the attention of the Committee be drawn to the fact that girls are very satisfactory as Laboratory Technicians, but have difficulty with the Optional or Art subjects and that the Committee be asked to consider the policy of asking a candidate to nominate an optional subject, e.g., elementary Bacteriology, Typewriting, Cataloguing and Librarianship, Foreign Language translating, Electronic Gadgeteering, etc.

8.4 **APPLICATION TO SIT ASSOCIATE EXAMINATION: Regulation 1:** An application to sit the Associate Examination was received, detailed application to be handed to the Examinations Committee.

RESOLVED, Vice-President, Wellington: THAT the Examinations Committee be asked to consider the standard of the present examination for the Associateship (Regulation 1) and the possible need for amendments.

9.1 **JOURNAL:** Reports from Mr. Brooker, the Editor, including minutes of meetings of the Journal Committee, were submitted to Council and main items discussed.

RESOLVED: President, Auckland: THAT the Journal Report be received and advertising rates approved and that the Editor be asked to give publicity to the rates, viz., Advertising Rates for small advertisements shall be 1d a word for subscribers and 2d a word for non-subscribers, with a minimum charge of 2/6 and 4/- respectively.

9.2 **ADDRESSOGRAPH:** The Journal Committee is considering an Addressograph for Journal purposes, and has offered to print sets of envelopes for Branches or for Council officers at a nominal fee (approximately 2/- per 100).

9.3 **BINDING JOURNALS:**

RESOLVED: Wellington, Canterbury: THAT the Editor be authorised to have two sets of our Journals bound, including Essays, at a cost not exceeding £8/15/- for both sets; the Editor to decide on format, etc.

10. **STANDARDS INSTITUTE OF NEW ZEALAND:**

RESOLVED: Wellington, Otago: THAT Mr. G. A. Lawrence be renominated for a further period of two years as our representative on the Standards Council, and that his name be accordingly forwarded to the Minister, Department of Industries and Commerce.

RESOLVED: Wellington, Canterbury: THAT, when Dr. L. F. Story has completed enrolment as a member, he be approached to represent the Institute on the Textile Committee of the Standards Institute.

14. **FOOD PARCELS:** Dr. Dixon forwarded a report stating that there were 24 names on our list this year. Auckland had given 6, Wellington 11, Canterbury 4, and Otago 3.

Auckland and Wellington did their own dispatching, and on 11/10/48, sets were sent from Canterbury and Otago.

With the grant from the Conference funds, a set of 24 parcels was forwarded on 3/12/48, and with a special vote from the R.I.C. (N.Z. Section), another set of 24 was forwarded on 21/1/49. Dr. Dixon finally suggested that

Branches consider whether they could manage one more set before closing down for this year. Money required would be: Auckland, £3/19/6; Wellington, £7/5/9; Canterbury, £2/13/-; Otago, £1/19/9d.

18. **U.N.E.S.C.O.**

RESOLVED: Vice-President, Wellington: THAT the name of Miss M. E. Malcolm, Librarian, Dominion Laboratory, be forwarded to the Secretary of Unesco as a possible New Zealand representative at the International Conference on Science Abstracting to be held in Paris from 20th to 25th June, 1949.

RESOLVED: Wellington, Canterbury: THAT we advise the U.N.E.S.O. secretary, and Mr. J. A. D. Nash, our representative on U.N.E.S.C.O. Committees, that we are willing to co-operate with other scientific organisations in setting up discussion groups to consider the subject "Food and People," and that we obtain what literature is available from U.N.E.S.C.O. and distribute it to branches for publicity purposes.

NOTE:—Literature should also be forwarded to the Conference Committee for consideration.

19. **RULES:**

RESOLVED: President, Otago: THAT the new R.I.C. rule for the election of Fellows as set out on A.149/9 (R.I.C. Journal for August, 1948, pp. 240-241), be discussed by the Membership Committee at the period of the August Conference and reported on subsequently to Council.

20. **COMMITTEE OF PROFESSIONAL STATUS:** Proceeding.

21. **CONTRACTS OF SERVICE AND SUPERANNUATION:** Wellington reported that a Committee had been set up, consisting of: Dr. J. K. Dixon (Convenor), Mr. G. A. Lawrence, Mr. R. C. Bell, and Mr. C. G. W. Mason.

A report from Dr. Dixon set out information which had already been obtained from the R.I.C. and elsewhere. A further meeting is proposed for April.

Report received.

22. **NEWSLETTER:** Reply awaited from the Publications Committee of the Society of Chemical Industry.

23. **PATENTS:**

RESOLVED: Otago, Canterbury: THAT the Wellington Branch be asked to set up a small committee on Patents and that this committee peruse the Patent Office Journal and refer applications for chemical patents to specialists who will report back to said committee.

24. **MEMBERSHIP:** Mr. I. A. Wilkinson (Associate), was granted leave with remission of subscription while engaged on further studies at Birmingham. Mr. G. J. Sutton (Associate), New South Wales, tendered his resignation. This was accepted with regret.

25. **LIFE SUBSCRIPTION:** (See A.151-152).

RESOLVED: President, Auckland: THAT further consideration be deferred until it is shown that a demand for Life Membership exists.

26. **COMBINED SUBSCRIPTIONS WITH OTHER BODIES:** Otago Branch setting up Committee and proceeding.

27. **BOOKPLATE:** Acting on suggestions from Mr. Joiner and Professor Packer, it was decided to ask Mr. McGlashan of Canterbury College, to take our Bookplate draft along to the Caxton Press to discuss type of print.

It was decided to obtain 100 copes of the Bookplate.

28. **ASSISTANT SECRETARY:** Proceeding.

29. **POOR RELATIONS:** This was the title of the Editorial of February 10th,

1949, in "New Zealand Engineering," copies of which were distributed for the information of Council. The Editorial discusses the relations between Engineering societies, the public and kindred professional societies, e.g., scientific societies.

30. **DATE OF NEXT MEETING:** This was tentatively arranged for FRIDAY, MAY 20th, 1949, at 10 a.m.

Associates elected at the Meeting of Council on March 5th were:—

HARTMAN, LEOPOLD: Mr. Hartman graduated in 1927 with the degree of Chemical Engineer from the Polytechnical University of Lwow and has since been admitted Ad Euendem State mto the University of New Zealand with a standing equivalent of B.Sc. After being associated with the Soap and Oil industries and being in private practice in Poland, Mr. Hartman has held positions in New Zealand with McLeod Bros., Ltd., and Lewis Berger & Sons Ltd. He is now a Chemist in the Fats Research Laboratory, D.S.I.R., Wellington.

RAINNIE, GRAEME FRASER, B.Sc. (Adelaide), A.A.C.I.: After carrying out research work on the extraction of naturally occurring alkaloids, and on gelatine and glue, Mr. Rainnie was appointed Chief Chemist to the Davis Gelatine (N.Z.), Ltd., Christchurch. He now holds the position of Production Manager with the same company.

STEDMAN, BRIAN MAURICE, M.Sc.: After graduation, Mr. Stedman joined the Shell Co. of N.Z. Ltd., but later left to take up the position of Assistant Chemist to N.Z. Refrigerating Co., Ltd., Islington, Christchurch.

TAYLOR, ROBERT LESLIE, M.Sc.: Mr. Taylor served with the Navy during the War, and on his return completed his M.Sc. degree. After six months as research chemist with the Fruitgrowers' Chemical Co., Nelson, he left for South Africa with Mrs. Taylor (nee Weeber).

INSTITUTE WELCOMES OVERSEAS GUESTS

A luncheon arranged by the Canterbury Branch in honour of overseas chemists attending the Seventh Pacific Science Congress was held in Christchurch on February 21st. The guests were Sir Norman Haworth, F.R.S. (attending the congress as representative of the Royal Society), Professor G. W. Robinson (professor of Agricultural Chemistry at Bangor, and leader of the United Kingdom delegation to the congress), Dr. N. M. Carter (Fisheries Research Board of Canada, Vancouver), Dr. W. H. Cook (Chief of the Division of Applied Biology, N.R.C., Ottawa), Dr. J. T. Tully (Pacific Oceanographical Group, Nanaimo, Vancouver Island), and Professor T. G. Thompson (Professor of Analytical Chemistry and Director of the Oceanographical Laboratories, University of Washington, Seattle).

Our president (Professor J. Packer), in welcoming the guests, explained that the gathering was representative of the Institute as a whole since members from all branches who were in Christchurch for the congress were present. The president referred briefly to the beginnings, growth and status of the N.Z.I.C. and asked the guests to convey greetings to the sister Institutes of their own countries. Professor Packer's remarks on the difficulty of finding the chemists attending the congress (since most of them had appeared under disguises), evoked interesting responses from the guests. It was abundantly clear that they were all chemists at heart and that the varied pursuits and organisations with which they had become associated, reflected the traditional versatility of the chemist.

PERSONAL AND GENERAL

Mr. M. L. McGlashan, of Christchurch, has been awarded the first Arthur Sims Empire Scholarship in New Zealand. This is one of a series given to British universities for research, particularly in physics, chemistry, mathematics and medicine. In New Zealand the fund is administered by the Canterbury University College Council.

Mr. McGlashan came from Greymouth to Canterbury College in 1942. He graduated bachelor of science in 1944 and took the master of science degree in 1945 with first-class honours in chemistry. From 1946 to 1948 he was a junior lecturer in chemistry at the college, and this year he was appointed lecturer. At the close of the present university session he intends to go to the University of Reading in England to study thermodynamics for two years under Professor E. A. Guggenheim.

Mr. McGlashan was elected an Associate last year and is the Canterbury Branch Sub-editor.

Mr. J. L. Mandeno, Secretary of the Wellington Branch, has left the Dominion Laboratory, Wellington, to take up the position of Technical Superintendent at Pinchin, Johnson & Co. (N.Z.), Paint Manufacturers.

Miss M. Malcolm, Librarian at the Dominion Laboratory, and Wellington Branch Sub-editor, has left for England on leave.

Mr. R. B. Miller, of the Soil Bureau, 54 Molesworth St., Wellington, N.I., is the new Wellington Sub-editor, and we wish him good hunting.

The Editor wishes to report that, following the lead of Dr. Shorland, he now has two geometrical isomers. These are, however, both trans, but differ in optical activity.

Several members of the Auckland Branch gathered at the Farmers' Trading Co. for lunch recently, where the guest speaker was Dr. E. H. Callow of the Low Temperature Research Station, Cambridge, England. Dr. Callow spoke on "Chemistry in the Meat Industry" in a most interesting fashion, and it is hoped that this will be a forerunner of many similar functions.

A very interesting item from "The South African Industrial Chemist," which we are now receiving in exchange for our Journal, reports that Mr. James Gray, who founded the South African Chemical Institute in 1912, has wound up his business as an Analytical and Consulting Chemist at the same time as he relinquished office as Mayor of Johannesburg, South Africa's largest city. A photograph shows Mr. Gray to possess that combination of benevolence and strength of mind we expect of a chemist. We wonder if any others of our profession have been so honoured.

We are indebted to the staff of the Dominion Laboratory, Wellington, for a number of abstracts which will be published in this and succeeding issues The opinion of readers on this feature will be appreciated.

A case of considerable interest to chemists, occurred in England last January. A Dr. Marshall, employed by Low Temperature Carbonisation Ltd., as a research chemist, and on the firm's superannuation scheme, became a director of another concern dealing with paints, enamels, etc. It was claimed by him that the work in connection with this latter business could be done in his spare time and did not conflict with his work for his employers, but they disputed this. Dr. Marshall was given a month's notice of dismissal, and claimed damages for wrongful dismissal, and for dismissal without three months' notice or the equivalent in salary. Mr. Justice Jones entered judgment for Marshall on both accounts. The established practice for chemists was three months' notice. (From the "Oil and Colour Trades Journal.")

Dr. I. J. Cunningham, Wallaceville, has left for England, via U.S.A., to attend the International Veterinary Conference.

Dr. V. Armstrong, Fuel Technologist in the Chemical Engineering Section, Dominion Laboratory, is to be New Zealand's Scientific Liaison Officer in Washington for the next five years.

Prof. G. W. Robinson, F.R.S., Professor of Agricultural Chemistry in the University College of North Wales, Bangor, and leader of the British Delegation to the Seventh Pacific Science Congress, addressed the Wellington Branch on March 10th, taking as his subject, "Some Aspects of Soil Science."

The Wellington Branch is to be congratulated on organising a useful refresher course in analytical methods. After three general lectures, there will be six specialised lectures and demonstrations in the newer techniques.

Mr. F. J. T. Grigg, Dominion Analyst and Director of the Dominion Laboratory, left New Zealand last month on a trip overseas.

Mr. I. S. Hunt, late of the Dominion Laboratory, Wellington, is now chief metallurgist to the Metal Smelting and Refining Co., Auckland.

BOOKS RECEIVED

SEMI-MICRO QUALITATIVE ANALYSIS. By Nicholas D. Cheronis, Chicago City College, and John B. Entrikin, Centenary College of Lousiana, pp. 498, 1947: Constable and Co., London, 25/-.

Micro-methods are becoming more and more important because of their saving of time, reagents and bench space, and because they can yield results on very small samples. They do, however, demand a degree of manual dexterity that comes natural only to a few, and takes others time to learn; some indeed cannot adapt themselves to its requirements. The compromise of the semi-micro should appeal to all analysts, and in the branch of qualitative organic, such a book as this will be found extremely useful. It contains over 80 pages of details of semi-micro technique. Not a great deal of apparatus is required, and most of it can be made with a little glass-blowing. This section is followed by 110 pages of preliminary tests and reactions, 134 pages on the preparation of derivatives, short chapters on mixtures and chromatographic analysis, and 130 pages of tables.

Though intended as a text-book, only seven pages are devoted to problems, the rest being given to descriptive matter, so that the book becomes quite a comprehensive handbook on organic analysis, quite apart from the semi-micro aspect. It is therefore, useful to the practising chemist as well as the student. The various tests are illustrated by actual examples, rather than general directions, with a note of yields, and a good deal of useful detail. These examples require from one-fiftieth to two-fifths of the amounts required in macro-methods.

There are some weak points. The paper is not sufficiently opaque, so that the print shows through. On page 153, the final product should surely be p-bromophenol and not bromobenzene, and on page 268 the formula for phthalyl chloride is incorrect. Nevertheless, this is a very good 25/- worth.

ORGANIC SYNTHESES, VOL. 28. H. R. Snyder, Editor-in-chief. 121pp. New York: John Wiley and Sons; London: Chapman and Hall, 1948. 2.50 dollars.

This book, produced in the usual excellent style, contains 37 preparations. In contrast to the previous issue, there are no procedures involving hydrogenation, but several employing the Friedel-Crafts reaction. A new technique introduces the use of Dowtherm A (diphenyl and diphenyl oxide), as a medium for a reaction at ca. 250°C in the preparation of 4, 7-dichloroquinoline. A valuable suggestion has been made by M.S. Kharasch that the time is ripe for a review of the whole policy in regard to this series, and that the advisory board might consider dealing with representative compounds in particular groups, rather than any that may be submitted. This does not imply any criticism of the series.

CRYSTALS AND X-RAYS. By Kathleen Londsdale. G. Bell & Sons, Ltd., London, 1948. 190 pp. 138 figs. 13 plates. 21/-.

This is a comprehensive book in that it deals with nearly all the varied aspects of X-ray crystallographic technique, crystal chemistry, crystal texture, and extra structural studies such as divergent beam diffraction and the production of diffuse spots. But it is in no sense a text book: it serves as the author intends, to titivate the reader's appetite and to lead him to the study of more detailed treatises. Mrs. Londsdale states in her preface that the book is based on a series of public lectures and is not intended for the advanced student. Nevertheless, her selection of material, the adequate references to the literature, and the very clear illustrations all combine to produce a volume which is easy to read and of unusual value to anyone who is interested in the physical sciences as well as to the specialist crystallographer.

—F.J.L.

THE BASIS OF CHEMOTHERAPY. By Thomas S. Work and Elizebeth Work. p.p. 435, 1948: London & Edinburgh: Oliver & Boyd Ltd. Obtainable from Messrs. MacMillan & Co., Ltd., London, 26/-.

This book points out that chemotherapy combines the knowledge of many different fields of science. It achieves the correlation of all these sciences in the role they have played in modern chemotherapy, and it is evident that wide scope still remains for the chemist, biochemist and microbiologist.

The authors have given a bare outline of the natural requirements and metabolism of the cell before passing on to the actual mode of action of modern drugs. Although there are still many missing links in the elucidation of drug antagonism and resistance, such facts which are known the authors explain by principles derived from physical and organic chemistry and biochemistry and illustrate their points by good clear diagrams.

The book provides a foundation to the study of Chemotherapy and should be most useful to the biochemist and microbiologist and fascinate the chemist.

VACUUM MANIPULATION OF VOLATILE COMPOUNDS. By R. T. Sanderson, p.p. 162, 1948. New York: John Wiley and Sons; London: Chapman and Hall, 3.00 dollars.

Most books on vacuum technique deal with distillation in vacuo at temperatures above normal and the attendant apparatus: this book carries on where the others leave off, and its purpose is best seen from a survey of the chapter headings: Materials of construction and operation; Glassblowing; Producing a high vacuum; Measuring pressure; Low temperatures; Valves; Introducing in and removing from the vacuum system; Measuring volume; Measuring pressure; Condensation traps and fractionation; Miscellaneous suggestions and methods (Determination of molecular weights and vapour densities, melting point, drying liquid ammonia, preparation of weighed samples of sodium,

hydrolysis and oxidation of compounds in vacuo); practice in high vacuum technique: a general high vacuum apparatus; Future developments.

Appendices give data for various gases for vapour pressure thermometers, reference tables for thermocouples, melting point, boiling point and vapour pressure data for a number of pure compounds.

The book undoubtedly enters a new field and collects much useful information, scattered through the literature, in a handy and readable form. It would have been improved by deleting the chapter on glass-blowing (the longest in the book) and devoting the space to topics less well covered in other literature.

THE THEORY AND PRACTICE OF METAL DEGREASING IN AQUEOUS MEDIA

P. D. LIDDIARD, CHEMISTRY & INDUSTRY, 1948, No. 28, 435

The relative merits of aqueous cleaning and solvent degreasing methods are compared. The absorption of solvent on the metallic surface after solvent degreasing, preventing the wetting by aqueous solution, particularly acid, suggests that solution degreasing should be complementary to solvent degreasing in many engineering processes.

The use of multiphase cleaners is advocated to precede the normal alkali cleaning solution, the former being for the removal of gross contamination and the later for final cleaning, including the removal of solvent residues.

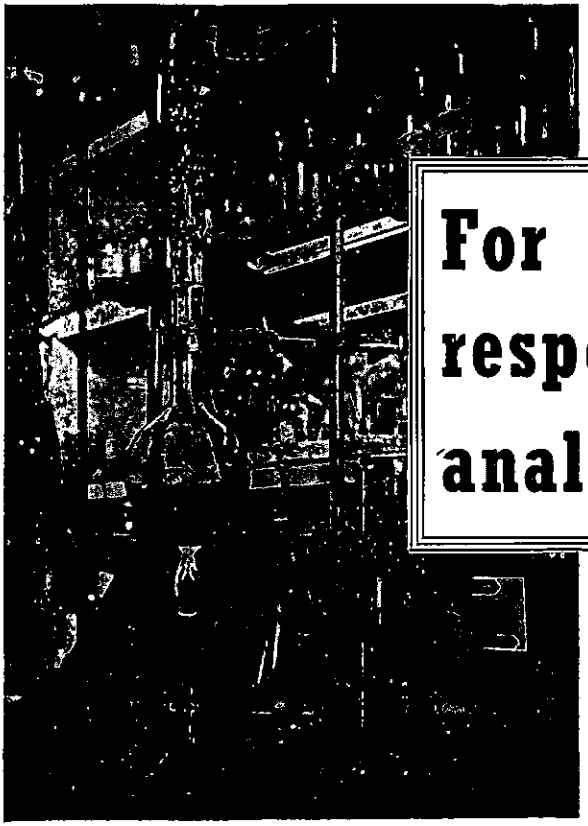
Attention has been given to the process of wetting, although far more is needed to be known of the true detergent sequence before revolutionary changes will be seen. Greater speed in cleaning is obtained nowadays by the use of pressure spraying methods. A description of one of these fast cleaning processes is given.

A REFLECTED LIGHT MELTING POINT APPARATUS

JOURNAL OF PHARMACY AND PHARMACOLOGY, 1949, No. 1, 64

The utilisation of the high conductivity of copper in gas-heated and electrically-heated copper blocks has enabled melting points to be determined over wide temperature ranges without fumes and corrosion.

The disadvantages of blocks, namely, the lack of illumination of the sample, has been overcome by a modification developed in the laboratories of May & Baker Ltd., and now made available commercially by Townson & Mercer, Ltd. Two horizontal holes are drilled in the block to converge on the thermometer bulb. The sample is arranged immediately in front of the bulb and illuminated through one of the horizontal tubes by a shaded 6-volt bulb. The surface of the bulb aids in reflecting the light through and around the sample which is viewed by means of a lens adjusted at the other horizontal hole. This gives an extremely clear view of the behaviour of even a single crystal without eye strain. Apparatus is available commercially and is known as "Type 2." Embodied with it are certain electrical refinements and certain features for easy handling and adjusting.



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Michael Faraday's

fame rests on those of his researches which laid the foundations of electrical engineering. Less known, but almost equally important are his achievements as a chemist. He found out how to liquefy chlorine and certain other gases, isolated hexachloroethane, an important industrial solvent, and prepared the naphthalene sulphonic acids which are used in textile dyeing. His most important chemical work, however, was the discovery of benzene, a colourless liquid which forms the starting point for manufacturing practically all synthetic dyes, as well as aspirin, saccharin and many substances used in medicine. This discovery laid the foundation upon which another British chemist, Sir William H. Perkin, was able to build the modern synthetic dyestuffs industry.

Faraday was born at Newington Butts, London, in 1791. He came of poor parents who apprenticed him to a bookbinder at the age of thirteen, his early scientific education being obtained by reading the books brought in for binding. A customer gave him a ticket for Davy's chemical lectures at the Royal Institution where Faraday obtained employment as a laboratory assistant in 1813. By 1825 he had become Director of the Laboratory and eight years later was appointed first Fullerian Professor of Chemistry, a post he retained until his death in 1867. Faraday's chemical researches were of immense importance, the isolation of benzene alone having proved of great value to mankind all over the world.