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CONFERENCE, 1948

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EDITORIAL

A front page advertisement in that much-appreciated journal, "Chemistry and Industry," states that "owing to the hopeless supply position of glass weighing bottles and their very low quality," the advertisers have produced polystyrene weighing bottles, two-thirds the price of glass, and available for "immediate delivery in large quantities—**but** they soften at 80° C. and they soften in benzene and other aromatic hydrocarbons." This has drawn the sympathetic tear from our American contemporary, "Chemical and Engineering News." The quality of American glassware and the thought put into its design we have frequently admired; glass apparatus that takes twice as long to make, but lasts thrice as long means a net gain of manpower and materials, and a probable saving of money; it also saves the chemist's time and maybe profanity too. The supply position in America is also much better and on these accounts this sympathy may well be appreciated.

The British chemist may also find that Government control of industry and the destination of its products denies to manufacturers of scientific apparatus the priorities that he feels are their due if a far-sighted view is taken of the future of his country, just as members of our Institute may feel a sense of frustration that their purchases of apparatus are subject to a penal impost of 20 per cent. sales tax (which other goods less useful in his eyes do not pay), and also to a somewhat incomprehensible import control, rigorously applied, even to Empire countries. This will appear all the more unfortunate to American eyes.

On the other hand, the British chemist may well take pride in the candour of the advertising and in the ingenuity which can devise a substitute which might even prove superior to the usual article for certain purposes. There is a noticeable trend in America toward the use of machines which require only the turning of a few knobs and the reading of a dial to obtain an analytical result. Wonderful as this is, the thought of a mechanised profession rather chills us, and the exercise of ingenuity exemplified in this case seems to us to be likely to build up a more useful heritage.

SALARY SURVEY

(February, 1948)

J. K. DIXON and J. L. MANDENO.

Editor's Note: This statement is abridged from a comprehensive report submitted to Council It is proposed in a later issue to print the Government, University and Teachers' Scales which were submitted in an appendix to the above report.

Introduction

In the past ten years three salary surveys have been authorised. The first was carried out in 1939, but no record can be found now of the data. In 1944 Dixon and Davies reported to Council on their survey taken in that year, but the statistics were not published. We have, however, had access to their data and part of it is incorporated in Graph I.

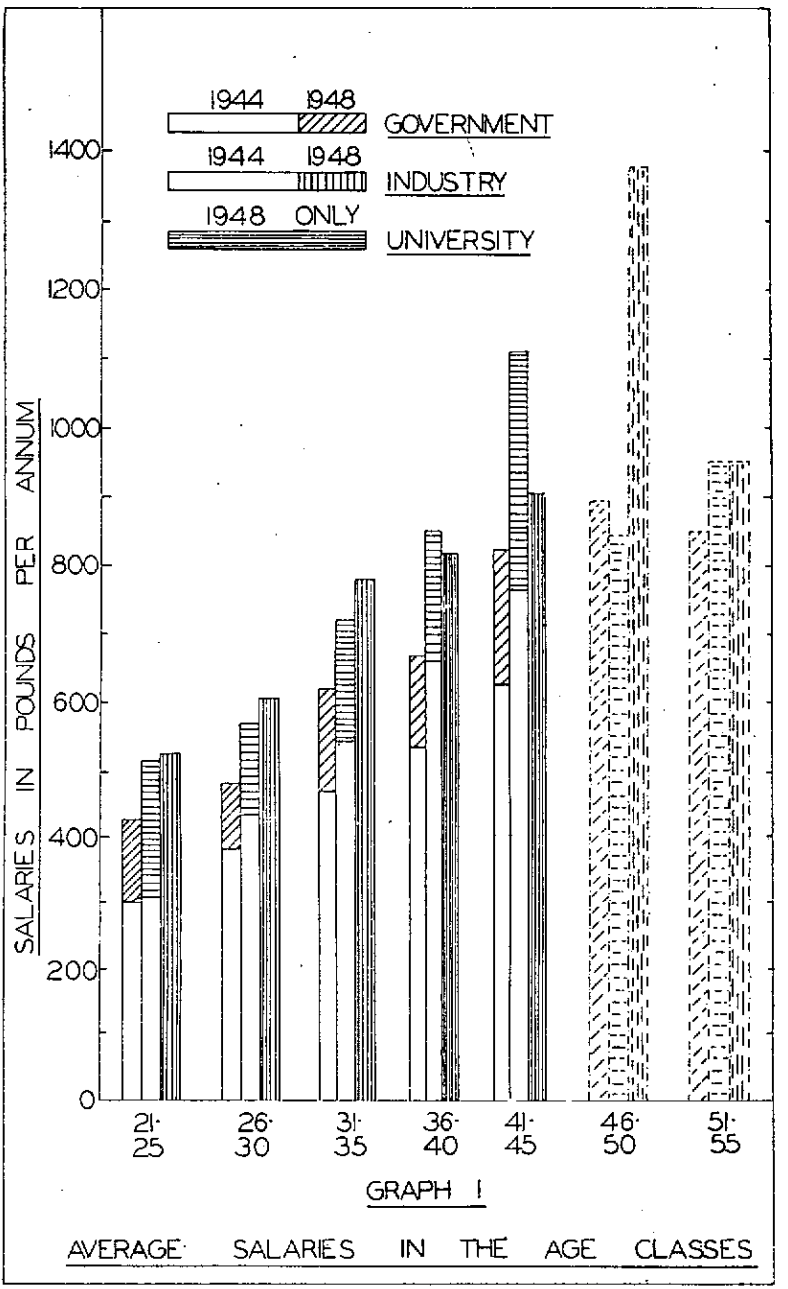
For the 1944 questionnaire it was felt that the questions were rather too searching, with the result that some members did not care to fill them in. The present survey has been conducted in a way that enabled the identity of a member to be concealed. While this has precluded some of the findings of the 1944 survey being followed up (such as conclusion being drawn from a description of the informant's duties) it has resulted in relatively more representative replies being received. The 1944 questionnaire was sent out to chemists on a National Service list, whereas the present survey was confined to Fellows and Associates of the Institute. The questionnaire was sent out in February, 1948, to some 320 members; 210 replies had been received by the end of March, when the figures were analysed.

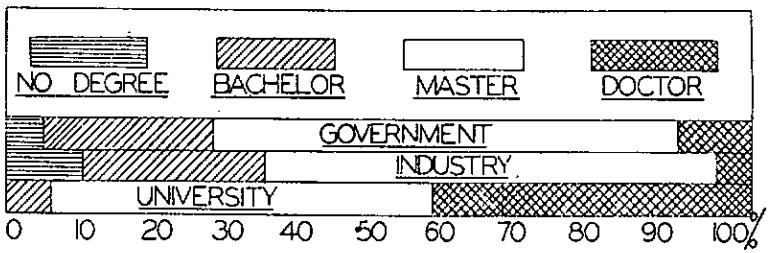
Returns

The distribution of replies is shown in Table I. It will be seen that in a number of groups insufficient replies were received to give reliable data. Since some two-thirds of the members replied it is certain that there will have to be considerable growth in some groups of the profession before significant results can be obtained from them. For Industry and the Public Service replies were adequate for a number of age classes, but were less reliable above 45.

Graph I. shows in the form of a histogram the comparison between Government, Industry and University salaries in 1948 and the upward movement in these salaries from the Government and Industry levels in 1944. Government salaries are higher by £102 to £196 p.a., with the higher increases at the 41-45 age class. Industry salaries are higher by £139 to £240 p.a. Whereas the Government salary increases are lower, if anything, in the lower age classes, Industry salaries have risen by an average of £205 p.a. for the 21-25 age class. This, no doubt, is a reflection of the steps Industry has taken to recruit recently-qualified graduates. Their success is shown by the fact that while only two returns were received from Government members in the 21-25 age class, ten returns were received from the same age class in Industry. In the other age classes the Government salaries appear to lag at least five years behind Industry.

In general there is a wider spread of salaries in Industry and the University than in the Government group. This is shown in Tables II. and IV., and is to be expected with the more rigid salary scale in the Government service.


1944 1948
GOVERNMENT
1944 1948
INDUSTRY
1948 ONLY
UNIVERSITY
SALARIES IN POUNDS PER ANNUM
0
200
400
600
800
1000
1200
1400
21· 25
26· 30
31· 35
36· 40
41· 45
46· 50
51· 55
GRAPH 1
AVERAGE SALARIES IN THE AGE CLASSES



GRAPH 2 — ACADEMIC QUALIFICATIONS

In the smaller groups there were insufficient returns to make the data worth analysing. Hence only the range of salaries for all ages is given and is shown in Table II. In each of these groups the salary prospects appear to be comparable at least with the Government rate.

Qualifications

Graph II. shows that the University holds the best academically qualified members. Government chemists are rather better qualified on the whole than those in Industry. In the Government and Industry groups separate figures have been taken out for Doctors, Masters, Bachelors and holders of no degree. No significant difference can be found in the Industrial group, while in the Government group Masters appear to have an average of about £50 p.a. more than Bachelors.

In the same two groups the salary data were taken out for Associates and Fellows. In the Government group the Fellows are in the higher income classes and although their ages are higher than the average of the Associates their salaries are not out of step with the trend of the Associate age salary graph. In the Industry group the Fellows almost form a sub-group apart from Associates, being not only older but receiving substantially higher salaries.

Female Members

A total of eleven replies only were received, making valid comparisons impossible. The five replies from female members in the Government Service indicated that their salaries, especially in the lower age classes, would fit in easily with male salaries. This should be even closer in future, as starting salaries for female graduates have been made the same as for males as from December 1, 1947. This would not have been known at the time of the questionnaire. In the University the rates of pay for males and females are similar and no difference was detectable.

Superannuation

In both the Government Service and the University superannuation is open to all who wish to contribute to it. The average benefits received are equivalent to a £ for £ subsidy on the member's contributions. A flat rate of 5% is therefore assumed as the employer subsidy in these two groups. In Table III. is set out the subsidies paid by employers in Industry. Forty-five per cent. of those furnishing returns from Industry did not

get benefits from a subsidised scheme. For those who did belong to a subsidised scheme the employer contribution varied from 1½% to 12%, with an average figure of 5.5%. The median figure was about 5%, and this was actually received by 32% of those who benefited by employer subsidy.

TABLE I. — DISTRIBUTION OF REPLIES

Group	Male	Female	Total
Industry	75	0	75
Government	63	5	68
University	26	3	29
Local Body	4	0	4
School Teaching	14	2	16
Private Practice	2	0	2
Research Association	6	0	6
Research Institute	2	1	3
Retired	3	0	3
Unclassified*	4	0	4
Total	199	11	210

*Overseas or not employed as a chemist.

TABLE II. — RANGE OF SALARIES AND AGES IN THE GROUPS

Group	Salary Range £	Age Range
Industry	400-over 2000	21-over 65
Government	400-1099	21-55
University	450-1599	21-55
Local Body	550-899	26-40
School Teaching	350-1399	26-65
Private Practice*	over 1000	over 46
Research Association and Research Institute*	350-1099	26-50

*Grouping to avoid giving particulars of individual members.

TABLE III. — SUBSIDY TO SUPERANNUATION OR INSURANCE CONTRIBUTED BY EMPLOYER AS PERCENTAGE OF SALARY

Do not belong to subsidised scheme	1½ to 2½%	3½ to 4%	5%	7½ to 8%	10%	12%	Particulars of scheme not given
34 Members	3	9	13	4	4	1	7

TABLE IV. — HIGHER SALARIES

Group	No. in Group	No. Receiving £1000 or over	% Receiving £1000 or over
Industry	75	14*	19
Government	68	2	3
University**	29	5	17
Others	38	6	16

*Includes 2 over £2000.

**University salaries have since been increased by £25.

RESEARCHES ON FATS AND RELATED CONSTITUENTS BY NEW ZEALAND WORKERS

A REVIEW — PART II.

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Pig Depot Fats

Pig depot fats, unlike those of cattle[17] and sheep*, are appreciably affected by the nature of the fats in the diet. In other parts of the world in almost all cases the pig fats examined have been from animals whose diets have been supplemented with meals containing fats with an iodine value of 100 or more. In New Zealand, however, it is a frequent practice to feed pigs entirely on skim milk. The composition of the fats of such pigs has a special interest, since the dietary fat (I.V. 35-40) is uniform in composition and has an iodine value lower than is usual for a pig depot fat (I.V.50-70). As might therefore be anticipated, the fats of the New Zealand bacon pig are usually hard and of good quality[18].

Barnicoat[19] found, however, that pigs fed whale oil or low grade fish meal in considerable quantity, yielded carcases with soft or rancid fats.

Johns[20] using the fat of pigs of different sexes grown at the same rate, or pigs of the same sex grown at different rates, found that the iodine value of the fat followed inversely the rate of deposition in accordance with the growth rate theory of iodine value of Callow**. He also confirmed Lea's[21] findings that the susceptibility to oxidation of the subcutaneous fat was proportional to the rate of deposition of fat and inversely pro-

*Information concerning sheep is rather indefinite, but to judge from the work of A. N. Wright and Ida Thompson, Trans. N.Z. Instit., 1927, *58*, 279. the titre of tallows from mutton caul and kidney fats varies with the latitude from which the samples are taken. At mean latitude 40° S. the titre is 47.9 and this changes to 44.7 at a mean latitude of 46° S.

**Callow[2] explained the growth rate theory of iodine value as follows: — "Since the fats and oils in the diet are limited in amount, the rate of deposition of the fat may be so great that a considerable proportion of the fat must be synthesised from carbohydrates. This leads to an increase in the saturation of the deposited fat because fat synthesised from carbohydrates is relatively saturated with an iodine number 50 to 60; whereas the fat formed from the oils in the diet is relatively unsaturated, owing to the fact that the oils in the diet usually have an iodine number of over 100."

portional to its iodine value. In this connection Tuck, de la Mare, Shorland and Seelye[22] found with Berkshire pigs fed solely buttermilk during the fattening period, that the susceptibility to oxidation of the fatty tissues, using Lea's peroxide value mehod, arranged in order of decreasing susceptibility was flare > outer back > inner back. The results were variable and not in agreement with the results of Lea and of Johns, who found flare > inner back > outer back. The sampling technique used by Lea and by Johns, as compared with our technique, is more likely to have resulted in a systematic error. Other possible sources of error both in our work and in the work of Lea and of Johns include bacterial and metallic contamination. No correlation between rate of growth of fatty tissue and its susceptibility to oxidation should be regarded as established.

Shorland, Hansen and Hogan[23] determined the iodine value of the back fat of Berkshire pigs under different conditions of feeding, and found that bacon pigs from spring or autumn litters, fattened on skim milk or butter milk alone, generally yielded carcases with firm fats, restriction of the diet having no significant effect on the hardness (iodine value) of the fat. The variations in iodine value along the back fat, however, were consistent with the theory of Callow—that the iodine value is related to the rate of deposition of the fat.

Though on diets tending to produce soft fats (e.g., maize meal), the softening was greater the slower the rate of growth, copra* fed pigs which grew fastest, showed the greatest hardening. This was inconsistent with the growth rate theory, which requires that the assimilation of dietary fat is greatest for the slowest growing animals.

In a later investigation, Shorland and de la Mare[24] submitted the fats used in the course of the previous investigations [c.f. Shorland, Hansen and Hogan (loc.cit)] to detailed ester fractionation.

Having regard to the total weight and nature of the fatty acids in the diet and in the depots of the bacon pig, it appeared probable that most of the palmitic, stearic and oleic acid in the depots originated by synthesis from non-fatty sources. Consistent with the findings of other investigators[25] it appeared that the octadecadienoic acid and C20-unsaturated acids found in the depots were derived entirely from ingested fats. Myristic,

*Cocoanut Oil I.V. 8-10.

and to a much lesser extent lauric acid, when fed in appreciable amounts were found in the depots, while capric acid when fed in similar amounts was not detected in the depots.

Experimental evidence supported the view that dietary linoleic and octadecadienoic acids are assimilated to a greater extent by slow-growing than by fast-growing pigs. Contrary to the predictions of the growth rate theory, dietary lauric and myristic acids, however, appeared in greater proportion in the depots of fast-growing, as compared with slow-growing pigs.

Consideration of the composition of pig depot fats from the point of view of Callow's growth-rate theory shows that the theory appears to explain the iodine values of fats both of groups of animals and of depots of an individual pig. When, however, the fatty acid compositions of the fats are considered, the theory is untenable in respect of the depots of an individual pig. Differences in unsaturation between outer back fat, inner back fat and perinephric fat are essentially determined by differences in the ratio of oleic acid to stearic acid, differences in octadecadienoic acid content being inconsiderable.

It can equally be shown that the growth-rate theory does not explain the results obtained by Hilditch and Pedelty[26] for depot fats of sheep. Differences between different depots both of the pig and of the sheep seem to be characteristic of the species and cannot readily be altered by altering either the quantity or the quality of the diet[27].

In a series of investigations on the nature of the C20-22 unsaturated acids of pig fat, de la Mare and Shorland[28] [29] showed that these acids which were commonly supposed to be highly unsaturated, comprised chiefly $\Delta^{11\ 12}$ eicosenoic 0.5%, together with less than 0.1% each of eicosadienoic, eicosatrienoic and eicosatetraenoic acids. No conclusive evidence was obtained for the presence of C22 unsaturated acids.

$\Delta^{11\ 12}$ eicosenoic acid was hitherto unknown in the animal world and has been reported previously only as a constituent of a wax from the shrub **Simmondsia californica,** where it comprises a major constituent.[30]

Interest in this acid is heightened by the recent work of Boer, Jansen, Kentie and Knol[31], who have shown that $\Delta^{11\ 12}$ octadecenoic (vaccenic) acid present in butterfat has important growth-promoting properties.

De la Mare and Shorland[32] observed that the unsaponifiable matter of back fat from Berkshire pigs fed buttermilk amounting to 0.19% contained cholesterol 0.07%, a mixture of saturated hydrocarbons approximating in composition to hexacosane (0.02%) various pigments and unidentified components.

More detailed examination of the fatty acids led to the detection of capric acid 0.2% and lauric acid 0.2%, together with traces of decenoic acid. Saturated acids of higher molecular weight than stearic were found to the extent of approximately 0.1%, at least half of which was behenic or higher molecular weight homologues.

Sow Milk Fat

De la Mare and Shorland[33] determined for the first time, the component acids of pig's milk obtained by hand milking a Berkshire sow. The lower saturated fatty acids C4-C12 characteristic of cow's milk, were not found, but as compared with pig outer back fat there was present more octadecadienoic acid (14.0% as compared with 5.7%) together with increased proportions of C20-C22 unsaturated acids. As compared with butterfat, sow's milk fat was found to contain more octadecadienoic acid and the assimilation of this acid from the diet of suckling pigs provides a reasonable explanation of the increase in iodine value of pig depot fat from birth until weaning.

BUTTERFAT*

Estimation of Iron and Copper

The study of these elements in butter manufacture is important, since the presence of as little as 0.15 parts per million of copper, or above 1.5 parts per million of iron is likely to give rise to oxidative defects. The main problem in the estimation of these elements is their quantitative extraction into an aqueous solution freed from organic matter. Williams[34] digested butter with nitric acid, and after removal of the fat by benzoline extraction, removed the residual organic matter by digestion with sulphuric acid and sodium nitrate. The iron was measured colorimetrically on the digest with thiocyanate and amyl alcohol, while the copper was estimated by the xanthate or preferably the diethyl-dithio-carbamate method. By use of these methods the amount of contamination due to iron

*The author is indebted to Dr. F. H. McDowall for kindly reading the manuscript and making several suggestions which have increased the accuracy of this section of the review.

and copper was followed during the course of manufacture of butter. McIlroy[35] also used the diethyl-dithio-carbamate method of estimation of copper in milk, but found the solid sodium nitrate used by Williams undesirable because of the high temperature produced. He therefore cleared the sulphuric acid digest by heating with nitric acid until the solution turned brown, when he added hydrogen peroxide to produce a colourless solution. He found this solution or the filtrate from precipitating the milk proteins with trichloracetic acid was equally satisfactory for the estimation of copper. The copper was found to be associated almost entirely with the protein fractions of the milk. Moir and Andrews[36] described a simple procedure in which the iron was extracted from the butterfat with 5% sodium hydrosulphite solution, followed by 20% trichloracetic acid. The copper was extracted with a mixture of hydrochloric acid, hydrogen peroxide and trichloracetic acid. The filtrates were cleared with sodium tungstate and the iron after oxidation was measured colorimetrically, using thiocyanate and amyl alcohol, while for copper sodium diethyl-dithio-carbamate was used. They also described an improved dry ashing procedure for iron, and dry and wet ashing methods for copper, the latter being a modification of the Williams method. The survey showed that 93% of the creamery butters contained under 1.0 parts per million of iron and 64% contained under 0.2 parts per million of copper.

McDowell[37] recently varied the technique for the estimation of iron in butter by digesting the butter or cream first with a few drops of thio-glycollic acid at 100° C. The preliminary heating facilitated the precipitation of the proteins with the trichloracetic acid, enabling the iron to be readily extracted for colorimetric estimation on the filtrate with orthophenanthroline.

For the estimation of copper, McDowell followed closely the method of Moir and Andrews, but omitted the use of hydrogen peroxide which appeared to serve no useful purpose. An interesting feature of McDowell's work was the establishment that the iron and copper in dry butterfat existed largely as minute particles of the metal or possibly of the oxide which could be removed by filtration of the melted butterfat through a No. 50 Whatman filter paper.

Estimation of Salt in Butter

According to McDowall and McDonald[38] the usual factory method for the estimation of salt in butter is sufficiently accurate except for samples near the maximum permissible by the regulations. When the salt content is very near the maximum permitted by the regulations, i.e., 2 per cent., the more accurate acetone method is a useful means of checking. In the acetone method described, 5 g. of butter are dissolved in 15 cc. of acetone, 50 cc. of water are added, together with a small quantity of calcium carbonate (to ensure neutrality), and the solution titrated with silver nitrate, using potassium chromate as indicator.

Oxidation of Butterfat. Surface Defects of Butter

Briggs[39] found that the autoxidation of butterfat at 100° C was hastened by the following catalysts, arranged in order of decreasing activity, sodium vanadate, copper lactate, iron lactate, nickel sulphate. Zinc acetate had a slight retarding action. Ultra-violet light had a strong pro-oxidative effect, while curd possessed an anti-oxidative effect. During the induction period the acid value and iodine value remained unchanged, but there were formed small amounts of peroxide, which could be measured by determination of the peroxide value. During the later stages of the autoxidation, in contrast to the acid value the iodine value could be used as a guide to the absorption of oxygen. Positive Kreis and Fellenberg tests were given only several hours after the commencement of the experiment, as they depend on the presence of aldhyde groups formed in a secondary reaction. Later experiments by Briggs and Thomas[40] showed that stearic acid in the presence of certain catalysts, particularly stearates of cobalt, nickel, manganese, lead and copper, could be oxidised with oxygen at 100° C. From this work it would appear that the tallowy odours associated with oxidised fats may be produced by saturated as well as by unsaturated acids.

Mummery[41] found that in addition to the precautions mentioned by Schibsted[42] for his fat aldehyde test a low temperature storage 4-5° C. of the reagent was necessary. As an alternative, Mummery suggested that the rosaniline hydrochloride solution may be stored at room temperature, and the solution prepared before use by the addition of the more convenient sodium metabisulphite in place of sulphur dioxide.

Barnicoat[43] showed that the "primrose" colour defect which has been reported by graders in England as occurring in New Zealand butter, was traceable to a surface desiccation which alters the structure and appearance of butter. Another defect, "toppiness," was found to be associated with an increase in fataldehyde vales to 0.88, as compared with a value of 0.2 or less for fresh butter. "Toppiness" is a surface flavour of the tallowy type associated with all oxidised fats, but as it may be masked by other flavours derived from the wood or wrapping paper, it is somewhat difficult to define. The suggested cure for these troubles was the use of an effective sealing wrapping impermeable to moisture.

Barnicoat[44] has shown that butter kept in tins under reduced pressure is usually preferred to butter kept in boxes after both have been stored from three to six months at 14° F. The improvement cannot be ascribed to absence of air, as the tins leaked during storage, but rather to the effect of collapse of the sides of the tin when initially evacuated in producing a closely-fitting wrapper, which tended to delay surface changes. Packing in tins was found to act as perfect protection against outside taints. Experiments on the chilling[45] of butter (at 32° F.) showed that butter stored for about 14 weeks at this temperature suffered a slight deterioration, but not a serious loss in quality. After storage for 21 weeks there was a marked deterioration in quality, as compared with butter held in frozen storage. Most surface defects were considered to develop before and after frozen storage. Barnicoat[46] considers that the wrapping paper should be highly impermeable to water, water vapour, light and taints. It should have an inner surface which will knit closely against the surface of the butter. The bursting strength should be high and the paper should expand very little in moist atmosphere. It should not be a good supporter of mould growth. Metal foils waxed to parchment were the only papers which complied in a satisfactory manner with these requirements.

McDowall[47] has reported that a parchfoil wrapper, which consisted of aluminium foil sandwiched between two parchment sheets, prevented development of both primrose colour and of timber taint in butter. Sealing of butter with pliofilm, a rubber base wrapper, prevented the development of primrose colour, but after six months the timber taint appeared when the butters were packed in **Pinus radiata** boxes.

The question of suitable material for butter boxes has been considered by various workers[48]. Spraying with casein-formaldehyde proved satisfactory in the case of rimu, but for **Pinus radiata** and tawa the timber taint, although reduced, could not be eliminated in this way. For lining, aluminium foil waxed to thin parchment seemed to offer a superior and economic method as compared with the use of parchment papers which permitted the development of off-flavour and primrose colour.

Barnicoat[49] found that the average rate of deterioration of well-made sweet cream butter, as measured by decrease in grade score for flavour, was directly related to both time and temperature. In a study of the oxidation of the fat of butter during cold storage, Wiley[50] found that the grade of butter was inversely related to the degree of oxidation of the fat as measured by Schibsted's "fat aldehyde" value. For butter from cream pasteurised at 200° F. this value was increased by ripening the cream. Salting also increased the oxidation under these circumstances, but hardly affected the value for sweet cream butter. There is considered to be present in the ripened pasteurised cream a fat oxidising enzyme whose activity is increased by salt and by a low pH.

Barnicoat and Palmer[51] from a study of the chemistry of incipient oxidation defects in butter, concluded that the results obtained were consistent with the theory that the off-flavours are due to initial oxidation of the fat-globule lecithoprotein membrane on which catalysts are absorbed. Further oxidation may either destroy the off-flavours or spread to the triglycerides, when the oxidative defects can be detected chemically.

Treatment of Cream for Butter Manufacture

McDowall and co-workers[52-56] have made an exhaustive and critical study of the neutralisation of cream for butter making. Details of colorimetric methods for pH determinations in cream, butter and buttermilk, by use of either a standard buffer solution or the Lovibond comparitor are given. In connection with the estimation of titratable acidity in cream, they stress the need for fixing the phenolphthalein end point by use of an adequate and fixed amount of indicator, together with an appropriate rosaniline acetate colour standard.

The carbon dioxide content of factory supplies of cream varied from 1.7 to 24.7 volumes per cent. There was a general but not regular correspondence between acidity and carbon dioxide content of the cream and between carbon dioxide content and grade of cream.

In the addition of sodium bicarbonate for the neutralisation of cream, it was shown that there may be losses of carbon dioxide, which cause the apparent total reduction of acidity due to bicarbonate to be greater than theoretical. In the neutralisation of cream to low acidity (less than 0.05%) it was found that the preliminary acidity determination and the calculation of the amount of sodium bicarbonate required great care, since dependence on the check of the acidity of the pasteurised cream would lead to over-neutralisation.

To take account of the fact that the theoretical amount of lactic acid, viz., 1.07lb. neutralised by 1lb. of sodium bicarbonate is too low, the Valentine factor of 1.2lb. of lactic acid per lb. of Na_2CO_3 may be used for low acid creams, but for high acid creams this factor is too high. A chart[56] was therefore constructed, showing the amount of sodium bicarbonate needed for neutralisation under varying conditions of acidity.

It was found that butter from creams neutralised to low acidities, showed a strong soda flavour, as compared with fresh cream butter. It was concluded that there was no advantage from the point of view of the keeping quality of the butter, to neutralise to very low acidity, and the manufacture of butter with pH 6.7-7.0 was recommended as the safest course. Two interesting anomalies were noted:—

(a) Soda flavour may sometimes be found in butters of low pH (6.0-6.8) and even in butters which have not been treated with neutralisers at all.

(b) Soda flavours were quite frequently not noted in butters of high pH (7.0-8.3).

Wiley[57] found that the correlation between pH and titratable acidity of butter and the cream from which it was made permits the use of the acidity values obtained for butter as an indication of the acidity of the cream at churning, and the possibility of butter deterioration in cold storage due to excessive acidity.

Experiments by Riddet, et al.[58] showed that although not completely effective the vacreator was remarkably efficient in removing clover taint and bacterial taints from cream. There

was no suggestion that the vacreator process as compared with the flash pasteurisation process in any way spoilt the highest quality cream. Any small differences between the two processes were favourable toward the vacreator produced butter.

Control of Moisture Content of Butter

McDowall[59] has shown that the practice of calculation of the water to be added to unfinished butter on the basis of the straight percentage method, is inaccurate, as it is not based on the weight of the finished butter. The correct calculation is most conveniently made by the formula—

$$(100-A)\ Q = (D-A)\ B.$$

Where Q = quantity to be added

D = desired moisture content

A = actual moisture content

B = estimated amount of butter in churn.

Butterfat Losses

Udy[60] has indicated that for the purpose of assessing butterfat losses in buttermilk, allowance must be made for the fact that water is added to cream in the factory either as rinse water from cans and factory equipment or as breakwater during churning operations. As much as 7.1 tons of butterfat per 1000 tons of butter may be lost in the buttermilk. Udy[61] subsequently found that the most important contributing factor to these losses was the agitation of the hot cream resulting in a reduction of the size of the fat globules.

The amount of total solids (TS) and the fat content (F) in the buttermilk may be used as the basis for calculating the butterfat losses. The amount of added water in the buttermilk is given by $[8.8 - (TS - F)] \frac{100}{8.8}$ while the fat in the buttermilk free from added water is equal to $\frac{8.8}{TS-F}$. McDowall[62] in this connection has found the percentage solids-not-fat of buttermilk, calculated from the density determination and fat content using Richmond's rule, to be applicable on the average, though not in individual cases. For practical purposes the presumptive value of 8.8% solids-not-fat in the undiluted serum

was found satisfactory. The use of the vacreator was found to increase the loss of butterfat by 0.3% of the fat received, as compared with flash treatment.

The Commercial Production of Dry Butterfat

Barnicoat[63] attempted to make from butter a dry butterfat, having the properties of ghee, which is used in India. The dried butterfat prepared by direct methods, including boiling, centrifuging and vacuum evaporation, proved moderately acceptable despite its yellow colour, softer texture and absence of real ghee flavour. The bleaching of butterfat with absorbents tended to impart off-flavour and induce tallowiness.

McDowall, Dolby, Beatson and O'Dea[64] described the preparation of dry butterfat by centrifugal separation from butter and gave an account of the plant installed at the King's Wharf, Auckland, for the Internal Marketing Division. The two-unit plant described, working 120 hours per week, had a capacity of 10,000 tons of butterfat per annum. The alternative procedures for producing dry butterfat, including the open pan evaporation method, vacuum pan drying, were shown to be too slow and generally unsuitable, while preparation by centrifuging cream was not considered practicable. The butterfat produced by centrifugal separation of melted butter was free from toffee flavour and contained 0.02 to 0.04 per cent. water and was relatively free from metallic contamination. The keeping quality of the fat was excellent, and no vitamin A was lost in processing.

Diacetyl in Butter

Van Niel, Kluyver and Derx[65] have shown that the flavour and aroma of butter is due, at least in part, to the presence of 2-4 parts per million of diacetyl.

Investigations in New Zealand in this connection were commenced by Barnicoat[66] in 1935 with the development of a reliable technique for the estimation of diacetyl and for acetyl methyl carbinol (acetoin) which is also present in butter and on exposure to air is converted to diacetyl. The method developed comprised the removal of the diacetyl by steam distillation and its conversion to dimethyl glyoxime by reduction with hydroxylamine and precipitation as a nickel salt. The precipitate was dissolved in chloroform and measured colorimetrically against suitable standards. For the estimation of diacetyl as distinct from acetoin, it was found neces-

sary to exclude air by distillation in the presence of carbon dioxide. It was found that butter held in cold storage for three months had only one part per million of diacetyl. Most of the carbinol and diacetyl was regarded as being added with the starter to the cream, rather than developed during the customary mild ripening process.

Subsequent studies[67] showed that 0.05, 0.3-0.4 and 1.5 parts per million of diacetyl were present respectively in sweet cream "mild starter" and "high acid" butter. The diacetyl content was not found to alter appreciably during 3½ months' storage at 14° F.

Cox and Wiley[68] improved the technique for diacetyl determination by incorporating a rectifying column for concentrating the diacetyl in the first 10 cc.'s of the steam distillation. They found that the colorimetric method involving the use of p-diamino-benzidine hydrochloride[69] gave results in approximate agreement with the nickel salt method and was much more convenient and rapid to use.

Wiley, Cox and Whitehead[70] in a series of butter-making experiments, in which the cream was held overnight with starter at 7° C., found starters which were lacking in aroma imparted as much "brightness" to butter as did starters which possessed a high aroma. The brightness in flavour of butter correlated well with the diacetyl content of the butter and of the cream from which it was made, but not with the diacetyl content of the starter. The results indicated that at low temperatures diacetyl formation took place without corresponding acid production.

Land Cress Taint

A taint formerly described as "burnt" or "scorched" sometimes appears in butter. It is not apparent in cold cream, but appears only in the heated product. It is not normally removable by vacreator treatment. The cause of this taint is now associated with the consumption of land cress (**Coronopus didymus**), which occurs in young pasture and in bare patches in established pasture. McDowall, Morton and McDowell[71] described tests for detecting land cress taint in cream—an important matter, since the presence of a small quantity of cress-tainted cream can taint a very large volume of good cream.

Chemical investigations[72] showed that land cress, like garden cress, contained a benzy mustard-oil glucoside. Steam distillation of the uncrushed and of the comminuted plant yielded respectively 0.022 per cent. and 0.037 per cent. of

benzyl cyanide. Alcoholic extraction of the glucoside, followed by its separation as insoluble silver salt, and decomposition of this with sodium thiosulphate, gave 0.029 per cent. of oil, which was almost pure benzyl isothiocyanate. Little difference was found in the isothiocyanate contents of plants collected at different seasons of the year**. Ripened garden cress **(Lepidium sativum)** seeds yielded 0.064 and 0.03 per cent. respectively of benzyl isothiocyanate.

**Feeding experiments[73] suggest that the taint passes through the milk after ingestion of the cress, reaches a high intensity within two hours and may still be present after 17 hours if the amount ingested is very high. Under normal grazing conditions withholding from grazing of cress for four hours before milking enables the cow to clear most of the taint.

Texture of Butter

Valentine[74] considers that the rate of cooling of cream has more influence on the resulting butter than the temperature to which the cream is cooled. Rapid cooling resulted in a texture which was not of the most attractive type, much of the butter being hard and flinty, while butter from the cream which had been more slowly cooled, had a texture which was soft, silky and pliable, and which was attractive.

Sargent[75] described an extrusion apparatus consisting of tube with a sharp-edged orifice, through which the butter to be tested was extruded by compressed air. Comparison of the extrusion pressures showed that the butter made from the slowly-cooled cream, which was regarded as more spreadable than the butter from the more rapidly-cooled cream, had generally a lower extrusion pressure. It appeared that a difference of 3lb. per square inch in the extrusion pressure at 50° F. could be detected in terms of spreadability, though the difference must be of the order of 6lb. or over, to be readily observed.

Dolby[76] in a series of studies on the rheology of butter, described methods for determining the hardness of butter, using cylinders of butter loaded under constant over-all weight, and also by cutting tests with weighted wires. The rate of cutting was found to vary as a power (n) of the load. The hardness measured by the wire (sectilometer) method decreased more or less linearly with rising temperature as did (n). In agreement with previous workers, Dolby found that of the various factors studied, only one—the rate of cooling of the cream—affected the hardness of the butter appreciably.

Chemical Composition of Butterfat

Working over a period of four complete seasons with nine representative dairy factories throughout New Zealand, Cox and McDowall[77] have determined the iodine value, softening point, Reichert value and saponification value on monthly samples of butterfats. The variations were such that they followed the same trends in different districts, approximating very closely the same values during the same month in any given year. The iodine values, for example, fell to a minimum during November-December and rose to a maximum in June. It is generally observed in fats that with decreasing iodine values there is an increase in hardness. The lowest softening point in October almost coincident with the lowest iodine value, therefore presents an interesting feature. The observations made by Cox and McDowall on the seasonal variations in the composition of butterfat are almost certainly the most fundamental and clearly defined that have been made. Their work provides a firm basis for the detailed studies of the seasonal variations in fatty acid composition and glyceride structure which are now being made by the Fats Research Laboratory in association with the Dairy Research Institute.

Vitamin A and D Content

Malcolm and Pope[78] in 1929, using biological methods, determined the seasonal variations in the vitamin A and D content of butters from Mangorei and Lepperton districts in Taranaki, during the months of February, April, May, June and July, and showed that the later butters were equal to or richer in vitamin A than the earlier butters.

The butters, as a whole, were found to be rich in vitamin D, but there was a distinct falling off in potency toward the end of the lactation period—May, June and July. The reason for this is not clear. They advanced the hypothesis that the fat lost in buttermilk and skimmed milk was richer in sterols than in the separated butter. The "lost" fats were lost to a greater extent as the lactation period of the cow drew to an end. Subsequent work[79] however showed that although the concentrations of cholesterol were much greater in buttermilk fats than in butterfat (1.275-1.650%, as compared with 0.218-0.251%), there was no suggestion that the vitamin D content followed that of the cholesterol. Comparisons between milk, cream, butter and buttermilk revealed no loss of vitamin D potency after separating and churning.

Crawford, Perry and Zilva[80] at the Lister Institute, London, using as criteria the growth response of rats deprived of vitamin A for the assay of this vitamin and the degree of calcification of the bone judged by its ash content of rats deprived of phosphorus and vitamin D for the assay of vitamin D, studied samples of butter used by Malcolm and Pope and generally confirmed their results. The vitamin A content was found to approach that of the best butters available from other sources, and no notable differences were found in vitamin content as between butters from Jersey and from mixed herds. Neutralisation of acid creams before churning as well as cold storage up to periods of two years (at 9-13° F.) was not found to be detrimental to the vitamin A content of the butter. The general confirmation that the vitamin D content of New Zealand butterfat is definitely lower in the winter than the summer is of distinct interest, and would be of some importance except for the fact that butter is not an important source of this vitamin.

Morgan and Pritchard[81] also indicated that New Zealand butter is relatively rich in vitamin A, but the first systematic work on the subject was carried out by Barnicoat[82], using butters from Waikato and Manawatu districts during the 1935-36 season. This investigator isolated the unsaponifiable matter and determined the carotene content from the yellow colour of the chloroform solution and the vitamin A content, using the antimony trichloride method in association with the Lovibond tintometer. The values so obtained were converted unto Mug/g. using as standards for carotene, dilute solutions of carotene in chloroform, as well as a standard 0.1% $K_2Cr_2O_7$ solution and for vitamin A, spectrophotometrically standardised concentrates. For the conversion to international units per gram, the following factors were used: carotene I.U./g. = Mug/g. x 1.67; vitamin A I.U./g. = Mug/g. x 3.2.

The results showed that the total vitamin A activity measured on the butterfat was fairly high: 33 — 53 I.U./g., average 43 I.U./g., as compared with 11-36, average 25 I.U./g. for European butterfats studied by Morgan and Pritchard[81].

In New Zealand the minimum values were found in late summer (February), when the pasture normally tends to dry up, while the peak values occurred in late winter and spring. These effects were apparently not related to stage of lactation, since spring and autumn calvers returned similar values. These variations in vitamin A potency with season are in the opposite direction to the variations recorded in the literature for Europe and America, and the difference is no doubt due to the practice of winter stall feeding in these countries.

In general agreement with the results of other workers that the total vitamin A activity of butterfats from different breeds is similar, the more deeply-coloured Jersey butterfat was found to be only slightly richer in total vitamin A potency than Friesian butterfat. The contents of carotene and vitamin A in colostrum were found to be very high, but reached normal value within four or five days after parturition. A survey of the vitamin A content of butter from various factories throughout New Zealand is being carried out by the Dairy Research Institute. During the 1943-44 season it was found that a minimum vitamin A content was reached over the months of December, January and February, and a maximum in July and August[84]. The work is being continued[85] and it may be confidently expected that in due course there will be published a full and comprehensive survey.

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AUSTRALIAN AND NEW ZEALAND ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

HOBART MEETING —— JANUARY 12-19, 1949.

In order to ensure a successful meeting in Hobart of A.N.Z.A.A.S. and of Section B—Chemistry—in particular, the secretaries are anxious to hear as early as possible of all persons contemplating being present on that occasion. Accommodation in Hobart during January is strictly limited and an early reservation is necessary on this account.

In Section B—Chemistry—meetings, symposia are being planned on the following subjects:—Chemical Education, Chemical Kinetics, Modern Techniques in Analytical Chemistry, Minerals Utilisation, Electrochemistry and Applications, Drugs, Natural and Synthetic.

Anyone wishing to submit papers to the meeting on these subjects or on any other chemical topics (including biochemistry and chemical engineering) are asked to communicate with the section secretaries at the earliest opportunity. Excursions of interest will be included in the programme and a comprehensive tour of Tasmania has been planned for the week preceding the meeting.

Address correspondence to Chemistry Department, University of Tasmania, Box 647C, Hobart.—G. C. Israel, F. H. C. Kelly, Joint Secretaries, Section B (Chemistry).

OFFICIAL ANNOUNCEMENTS

The New Zealand Institute of Chemistry assumes no responsibility for statements appearing in this Journal.

The Editor invites submission of manuscripts suitable for publication in the Journal. The most useful material includes reviews with particular reference to New Zealand Chemistry and Industry, or modifications of apparatus, hints on analytical and research methods, and reviews of books.

Members are asked to support our advertisers, whose support makes the Journal possible. Advertising rates are available from the Business Manager.

COMPETITION FOR BOOK-PLATE DESIGN

We are advised by the hon. general secretary that the closing date for this competition, for which a prize of £5 is offered, has been extended to September 30th. Application should be made to him for conditions governing the award.

CONFERENCE, 1948

AUGUST 25-27th. DUNEDIN.

Programme

Arrangements are being made to meet visitors from the north on their arrival at the railway station on the evening of the 24th August and transport them to their hotels. Conference will begin with a welcome to the visitors at a function to be held in the Allen Hall of the University at eight o'clock that evening. The Presidents of the Institutes have invited Hon. T. H. McCombs, Minister of Education and Minister of Scientific and Industrial Research, to be present and officially open the Conference.

All formal sessions of the Conference will be held in the Chemistry Department of the University. The mornings of Wednesday, Thursday and Friday will be devoted to symposia, details of which appear below. On Wednesday afternoon general meetings of the Institutes will be held, and at 8 p.m. the Presidents, Dr. J. K. Dixon and Mr. W. A. Joiner, will deliver their addresses, the titles being "Soil Chemistry and the Farmer" and "Chemistry and the Manufacturer," respectively.

Thursday afternoon and evening and Friday afternoon will be available for informal discussions and for seeing the exhibition of equipment, materials and books, laboratories and industrial plants. Conference will conclude with a dinner (subscription 12/6—dress informal), to be held on Friday evening at the University Club, which should be a highlight of the 1948 meeting. A brief toast list and items from some of Dunedin's best artists should ensure a most enjoyable evening. The wives of members are cordially invited to attend.

For those who wish to see something of the scenic attraction of Otago and Southland after the Conference a three-day tour has been arranged, leaving Dunedin on Saturday, 28th, for Queenstown and returning on Monday, 30th, after visiting Invercargill. The cost inclusive of fares, meals and accommodation will be about £6 per head.

Papers For Conference

On Wednesday morning two symposia of general interest will be held. The first from 9-10.30 is under the chairmanship of Dr. R. Gardner and deals with "History of Chemistry in Otago," speakers being Mr. W. V. Heazlewood and Mr. J. S. Dennison. At 11 a.m., following the tea break, Associate Professor H. N. Parton will initiate from the chair discussion on "The Education of the Chemist." Among the contributors will be Mr. A. D. Munro, on the University point of view, and Dr. F. B. Shorland on the research workers' needs.

Thursday morning two symposia will be held concurrently. One will present three papers, between 9 and 10.30 a.m., on recent work on "Specific Chemical Effects on Enzymes," performed at the Medical School. Associate Professor N. L. Edson will be in the chair and will open the session with "The Use of Selective Inhibitors in the Study of Bacterial Metabolism." Mr. R. A. Wyndham will discuss "Inhibition of Xanthine Oxidase by Uric Acid" and Dr. W. V. Macfarlane, co-author with Professor J. C. Eccles, will present "Inhibition of Choline Esterase at the Neuromuscular Junction." "Distillation" will occupy the whole morning. According to present plans Messrs. S. R. Siemon and G. Maskill-Smith will treat general and industrial aspects of the subject after an introduction by the chairman, Dr. F. B. Shorland. Papers on the application of distillation to the study of fats and essential oils will be presented by Messrs. R. P. Hansen and R. D. Batt, followed by an account of Molecular Distillation by Dr. Shorland.

Friday morning the two symposia on "Physico-chemical Topics" and "The Constitution of Some New Zealand Plant Products" are under the chairmanship of Professor F. G. Soper and Associate Professor L. H. Briggs respectively. Papers and their authors are: "The Use of Radio-active Phosphorus as a Tracer," Dr. K. Strzemienski; "Applications of the Hill Electrometer Circuit," Mr. A. R. Caverhill; "Solubility of Gases," Associate Professor H. N. Parton and Mr. J. T. Law; "Crystal Structure," Professor F. J. Llewellyn; "Substitution Around the Nitrogen Atom," Professor F. G. Soper, in the former, and there will be contributions from Auckland University College, Otago University and Dominion Laboratory in the latter.

Enrolment

An enrolment form is enclosed and all are urged to return same by July 17th, enclosing £1 registration fee. This will ensure the early posting of, the advance copies of summaries of papers, your Conference badge for admission to the sessions, a guide book describing Dunedin and showing the location of the University, and particulars of your hotel accommodation, which will be allotted strictly in order of receipt of registration. Conference hotels are Wain's, City, Grand, Law Courts, Excelsior and Criterion.

BOOK REVIEWS

"The Systematic Identification of Organic Compounds," R. L. Shriner and R. C. Fuson, third edition, 1948, pp. 370, New York, John Wiley and Sons; London, Chapman and Hall; 4 dollars.

This book was first introduced by the authors in 1935, and is based on the course arranged by them for students at the University of Illinois. Now in its third edition, it has obviously had a good reception in America and deserves to be better known in this country. Books on qualitative organic analysis in English are few. There is Clarke's "Handbook of Organic Analysis"; of Huntress and Mulliken's "Identification of Pure Organic Compounds," only the first volume is available in the latest edition. Hickinbottom's "Reactions of Organic Compounds" is not strictly a book on analysis, but contains an account of the usual identification reactions and tables of melting and boiling points, derivatives, etc.

The book under review is thoroughly up to date and contains references up to 1947. Compared with the previous edition, it has 58 more pages and a new chapter on interpretation of analytical data. As a system of analysis, the most significant feature is the division of compounds into eight solubility classes as a key point in their identification. The success of the book must be the best guide to the usefulness of such a criterion, but in most cases it will hardly fail to yield information of value, and has been thoroughly worked out by the authors. After determination of physical properties, and qualitative analysis for the elements, these solubility tests are applied and the student then proceeds to the application of classification tests for significant chemical groups, and finally to the preparation of derivatives. These last two sections seem to the reviewer to be particularly well done. In each case the theory of the reaction involved is fully discussed and then practical details are outlined, followed by references to recent original literature. Extensive tables of compounds and their derivatives are given; the compounds are listed in the various classes in order of their melting or boiling points, and the index gives this figure, as well as the page of the table for easy reference.

There is a useful but not exhaustive chapter on separation of mixtures, where only those methods that "take cognizance of the chemical character of the compounds to be separated" are discussed. The book is intended for the student and has numerous questions and problems designed to thoroughly test his understanding. The general text is also punctuated with questions; the practising chemist may find this a little irritating; nevertheless, the book should prove a most useful addition to his shelves.

LABORATORY ASSISTANT'S CERTIFICATE

Candidates are reminded that entries for this examination should be forwarded to the General Secretary, P.O. Box 250, Wellington, not later than 31st July. Entries accompanied by a late fee of 10/- may be accepted up until 31st August.

TEXT BOOKS—

The following text books contain material suitable for this examination, but candidates are advised to follow the syllabus and use supplementary text books wherever necessary.

Inorganic Chemistry, Higher School Certificate Chemistry, Holmyard (Dent and Sons).

Organic Chemistry, Introduction to Organic Chemistry, Baker (Dent and Sons).

Elementary Physics, Junior Physics, Allanson (Edward Arnold) or School Physics, Pearce (Bell).

Elementary Calculations, Introductory Mathematics, Lowry and Hayden (Longmans Green).

Logarithms Trigonometry and Statistics, Whitcombe's Supplementary Mathematics, Driver.

Copies of the new detailed Laboratory Asst's. Exam. Syllabus are available from the general secretary.

PERSONAL NOTES

Mr. M. Fieldes, M.Sc., A.N.Z.I.C., who is at present technical adviser to Messrs. Watson Victor, Ltd., Wellington, has been appointed Physical Chemist to the Soil Research Bureau, D.S.I.R., and will take up his duties there in July.

Mr. N. T. Clare, F.N.Z.I.C., Chief Biochemist, Ruakura Animal Research Station, is at present in America on the final stage of his tour abroad.

Mr. R. H. Stokes, until recently of the Auckland Branch, delivered his Meldola lecture at the rooms of the Chemical Society, Burlington House, Piccadilly, on January 16th, before the Institute of Chemistry, taking as his subject "The Role of Ion-solvent Interactions in the Theory of Strong Electrolytes." At the conclusion of the address the Meldola Medal was presented.

Mr. E. D. Pain, A.N.Z.I.C., has resigned from Messrs H. W. Lawrence and Son, Johnsonville, and is now on the staff of the Wellington Technical College.

Dr. H. N. Parton, our distinguished predecessor, has been appointed Dean of the Faculty of Science at Canterbury College. Prof. Parton is proceeding overseas at the end of the year on sabbatical leave.

Dr. H. O. Askew, of the Cawthron Institute, Nelson, has been in the Wellington Hospital undergoing an operation and now is well on the way to recovery.

NEW JOURNALS

When the established journals are so handicapped in Britain with paper restrictions, it is rather surprising to find a new publication as well got up as the monthly "Research" being started. Commencing in October last, it aims to cover the whole field of science. Its editorial board is very heavy tonnage; under the chairmanship of Sir John Anderson, M.P., F.R.S., it includes Sir Charles Darwin, director of the N.P.L., Sir Wallace Akers, director of research, I.C.I., Sir Alfred Egerton, Professor of Chemical Technology, Imperial College, Sir Alex. Fleming, Sir Edward Salisbury, director of Kew Gardens, and Professor R. S. Hutton. The editor is D. R. Rexworthy. It contains mainly review articles, but also a short supplement of original contributions. The object of "Research," as stated by Sir Charles Darwin, is to maintain closer contact between workers in various fields, and to link together the progress of scientific thought and its applications. Time alone will show how far these objects can be achieved.

We have received a copy of "Acta Chemica Scandinavica," which commenced publication last year under the auspices of the chemical societies of Denmark, Finland, Norway and Sweden. The first issue contains fifteen original papers, twelve being in English and the remainder in German. French is the only other language to be used. It is issued ten times a year and a volume of about 1200 pages is planned. The editor-in-chief is Prof. Karl Myrback, Biokemiska Institutet, Stockholm, and the general appearance is a credit to the printing house of Frenckellin, of Helsinki. The subscription price is 40 Danish crowns (plus postage), which may be sent to Einar Munksgaard, Norregade 6, Copenhagen.

ITEMS FROM THE MINUTES OF THE MEETING OF THE COUNCIL, NEW ZEALAND INSTITUTE OF CHEMISTRY, held at Wellington on 12th February, 1948.

Dr. Dixon, President, was in the chair and extended a welcome to the new Vice-President, Prof. Packer, of Canterbury.

It was decided that the examinations committee be given permission to sell copies of the papers for the Lab. Asst's. Exam. at 1/- per copy.

After receiving the report of the examiners, it was decided that no award of the Industrial Essay Prize be made for 1947. The Essay Competition will next be held in 1950, when the prize will be £25. It was decided to thank Imperial Chemical Industries (N.Z.), Ltd., for their offer of a prize of £25, and in accepting the offer, Council suggested that the award be made to the member of the Institute who has contributed most to the development of chemical science, judged by the research work published or accepted for publication during the five years immediately preceding the date of the award.

LETTERS TO THE EDITOR

[We publish in this issue two statements giving views on the method of working of the Council and the government of the Institute. In comparison with other bodies, the ordinary member does not have a great part in the direction of the Institute's affairs, apart from Branch Annual Meetings and General Meetings at the Conferences, both of which can be very valuable. Other matters are left to the Branch Committees and the Council. Few questions are raised on the doings of either; we would like to feel that this was due to an overwhelming confidence in the members of these bodies, but sometimes we have our doubts. Mr. Griffin's statement raises the general issue that Council may go against the wishes of the branches and the majority of the members, while Mr. Mandeno defends the ability of the Institute officers to delegate their powers, a question which has been discussed at Council meetings on several occasions. Both the issues are of some importance to all our members, and we invite correspondence—not necessarily for publication—from any or all of them. Whether the writers support the present way of things or call for reform, the effect can be salutary in making the Institute, acting through its Council, an even more active body than it is at present.]

Dominion Laboratory,
Wellington, 7/5/48.

Sir,—In discussing the case for the President, Vice-President and Hon. General Secretary being permitted to appoint proxies to represent them at Council meetings, these persons are for convenience referred to as the officers of the Council.

When it is suggested that the officers of the Council should not be permitted to appoint proxies, it seems that only one more step is required to deny them the right to a vote, even when they are present in person at Council meetings. This latter situation would be absurd and is probably without precedent in any democratically governed body.

It does, however, raise the question of voting strengths of branches on Council. This is a separate issue, but related to the present discussion, and the only point that can be made here is that there may be some point in branch representation on Council being proportional to branch membership. If officers of Council are to be denied a vote, this latter question must be seriously considered.

As far as the proxy question is concerned the following are the main points that have to be considered:—

(1) The officers are elected by the whole Institute. Each branch forwards its nominations for the three positions to the Hon. General Secretary before the Annual Meeting of the Council. At that meeting only the delegates from the branches vote. In this way the officers are elected to represent the views of the Institute as a whole. Delegates represent only the views of their own branches.

(2) Delegates, if unable to attend Council meetings, are able to appoint proxies. It must be noted that a proxy is not appointed by a branch, or even by a branch committee; he is appointed by the branch delegate personally, and receives his instructions, generally in writing, from that delegate.

(3) If delegates only are to be permitted to appoint proxies, it surely means that the officers of the Council, who are senior and experienced men, both professionally and in the management of the Institute's affairs, are given a status on the Council lower than that of branch delegates. It denies an officer a vote should he be unable to attend a meeting, and is quite inconsistent with the spirit of the rules.

(4) It will be argued that under the present arrangement a motion supported by three branches can be lost if the fourth branch is supported by the three officers. It must be remembered that, theoretically, the officers are not expressing personal views, but are expressing what they consider to be the probable view of the majority of the members of the Institute. However, should the number of branches increase to say six, and this is by no means impossible, the above situation would rarely arise. When it is suggested that the officers can out-vote the majority of the branches as indicated above, it is assumed that the three officers will always vote the same way. This is by no means a valid assumption.

(5) If the officers of the Council are not permitted to appoint proxies, the Council is weakened at any meeting by the absence of an officer. The President, by the rules, has his proxy in the Vice-President. The Vice-President and the Hon. General Secretary should also be able to appoint proxies.

(6) The officers of the Council are men whom the membership respects and in whom they have confidence. Otherwise they would not be elected to their positions. Surely they can be trusted to carry out the affairs of the Institute in a proper manner.

—J. L. MANDENO.

29 Ridings Road, Remuera, S.E.2.

10th May, 1948.

Sir,—At the Council Meeting held on 21st May, 1947, an historic division took place and a motion supported by the majority of the branches—Auckland, Dunedin and Canterbury —was lost because Wellington, the President, the Vice-President and the Hon. General Secretary voted against it.

The Auckland branch, as the descendant of the Auckland Chemical Society, which took the initiative in forming the Institute, was very alarmed that the principles on which the Institute was founded should be so casually violated, and at its Annual Meeting on 28th October, 1947, passed the following resolution: "That the delegate bring the matter before the next meeting of Council with a view to ensuring either (a) that the wishes of the majority of the branches or (b) the wishes of the majority of the members should be carried out."

It was felt that the Council was the proper body to decide how the right of the branches to control the Institute should be restored.

The principles involved have been clearly placed before the Council by the Auckland delegate at two meetings and the Council has not only refused to act but has, from the record in the minutes, shown great confusion of thought, if not deliberate evasion of the issue.

The resolution of the Council limiting the presidency to one year in order to honour more chemists, with the adoption of a courtesy rotation whereby each branch in turn is asked to nominate the vice-president; has made the President a figurehead who cannot possibly know the wishes of members as do delegates, who have to account to monthly meetings of members.

The President has thus no knowledge as well as no constitutional right to vote against the majority of the branches and since he cannot dismiss his delegates, his only remedy in matters on which he holds strong opinions against his delegates is to tender his resignation.

The officers of the Institute are unable or unwilling to face this position and I fear that unless members of the Institute combine to take strong action to force the issue we will see the Institute revert to a number of local societies.

—K. M. GRIFFIN.

Dominion Laboratory,

Wellington, C.1. 3/5/48.

Dear Sir,—On page 23 of the last issue of the Journal (Vol. XII., No. 1) appears an account of the career of Mr. George Gilbert, who was recently elected an honorary life member of the Otago Branch. It is stated that this is believed to be the first occasion on which any of the branches has elected an honorary life member.

Mr. Andrew Izatt had been an Associate of the Institute for some years, but after his retirement in 1940, his resignation from the Institute was tendered to a branch committee meeting held on 18/6/41. At a commiittee meeting held on 3/9/41, Mr. Izatt was "elected an honorary member of the Wellington Branch with the same rights and privileges as a local member." This means, in fact, that Mr. Izatt is an honorary life member of the Wellington Branch, the slight difference in terms used being of no significance.

Mr. G. A. Lawrence has kindly given me the following information about Mr. Izatt's career: "Mr. Andrew Izatt commenced his career in the laboratory of Messrs. Tatlock and Thompson, of Glasgow, Scotland, where subsequently he was taken on to the staff as an assistant chemist. During his studentship Mr. Izatt took chemistry at Glasgow Technical College, where the late Professor Henderson was at that time head of the chemistry department. On severing his connection with Messrs. Tatlock and Thompson, Mr. Izatt was appointed chief chemist to the Shorts Iron Company, where he remained for about twenty years. In 1923 he came to New Zealand and not long after his arrival linked up with H. W. Lawrence and Son, where he remained until his retirement in 1940." Mr. Izatt's present address is Woodland Road, Johnsonville. —

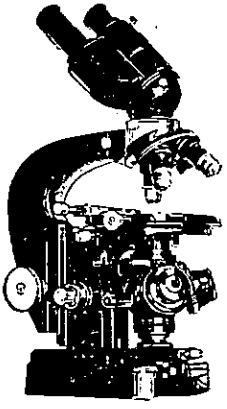
J. L. MANDENO, Hon. Secretary, Wellington Branch.

New Associate: Reginald Alexander Durham, M.Sc., Chemist, to Messrs. Stevenson and Howell (N.Z.), Ltd., Wellington.

Errata: In the March issue, p. 25. "Warren L. Badger" should read "Walter L. Badger."

Ancestors of an Industry

The Biblical exhortation to "praise famous men and our fathers that begat us" is one which Britain may well take to heart, especially in the field of the Sciences. She has ever been too ready to acquiesce in the claims of other nations to lead the world in scientific resource and invention, when history reveals that Britons stand second to none among the world's scientific pathfinders and pioneers. It is with the object of demonstrating that Britain has always been in the van of scientific progress that this series of announcements, under the title "Ancestors of an Industry", has been prepared. It will tell the story from Robert of Chester, the English monk who in 1144 opened the door of Eastern chemical knowledge to Western Europe, up through the centuries to Sir William Bragg and Lord Rutherford, whose researches in the present century led to the liberation of atomic energy. These announcements will, it is hoped, serve to give the people of the British Empire a new sense of the richness of their heritage, and nations overseas some idea of the debt the world owes to British scientists and chemists.



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