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EDITORIAL

DR. W. P. EVANS

The election of Dr. William P. Evans, Professor Emeritus of Canterbury University College and first President of the New Zealand Institute of Chemistry, as the first Honorary Fellow of the Institute, was announced at the July Council Meeting.

Dr. Evans was educated at Nelson College and Canterbury College, being University Senior Scholar in Mathematics and Experimental Science in 1882. In 1885 he graduated M.A. with First Class Honours in Mathematics and Mathematical Physics, and proceeding to Germany, was awarded the Ph.D. degree at Giessen. He taught at Christ's College for the last decade of last century, becoming part-time lecturer in Sound, Light and Heat at Canterbury College in 1901. On the retirement from the chair of chemistry of Professor A. W. Bickerton, in 1903, Dr. Evans succeeded his former teacher, continuing also to teach Sound, Light and Heat until 1906. He occupied this position till 1922, and being himself a first rate experimental worker, developed chemical research in the department. Early in his term of office, the building which housed physical science (known as the "old tin shed") became obviously inadequate, and a new department was opened in 1910 which has done duty for 34 years, till now it is, in its turn, too small to handle the large classes which have become characteristic of science departments in the university colleges.

Of many first class students whom Dr. Evans trained, it is possible to mention only a few. His successor, H. G. Denham, and C. M. Stubbs were both 1851 Exhibition Scholars, and occupied chairs of chemistry, the latter at West China University. F. D. Farrow held university posts at Liverpool and Grahamstown (South Africa), and was later at the Shirley Institute (Cotton Research) at Manchester. D. B. Macleod is Senior Lecturer and Acting-Professor of Physics at Canterbury College. A. O. Ponder was Senior Scholar in Chemistry in 1914 and Rhodes Scholar in 1917, and E. A. Rowe was 1851 Scholar in 1920. Prominent members of the New Zealand Institute of Chemistry who owe their early training to Dr. Evans include the President, Dr. R. O. Page, Mr. H. Rands (Chief Chemist, Wellington Gas Co.), Mr. W. O. R. Gilling (Chief Chemist, Christchurch Gas Co.), Mr. H. V. Rowe (Senior

Science Master, Christchurch B.H.S.), Mr. A. D. Monro (Victoria University College), Dr. H. O. Askew (Cawthron Institute), Mr. L. R. Dunn (Dominion Laboratory) and Mr. F. H. Johnstone (Dominion Compressed Yeast Company).

While Dr. Evans' early research work was of a physico chemical nature, and his students at Canterbury College carried out investigations in physical chemistry, his main published work is on New Zealand coals. For this work he was awarded tho Hector Medal of the N.Z. Institute, of which he became a Fellow in 1930. The citation records that "through many years of study of New Zealand coals in their chemical, physical, botanical and geological relationship, and through the stimulating influence he has exacted upon a large number of chemistry students, (he) has done so much to advance the science of chemistry in New Zealand."

Dr. Evans' activities since his retirement in 1922 have included the Presidency of the Royal Society of New Zealand in 1937-38, and much valuable work as a member of the Senate of the New Zealand University. His work for the Institute is well known to members. As a foundation President, he guided the new organisation through its difficult first years. As one of the Membership Committee from 1934 to 1944, he has influenced the maintenance of professional standards over its first decade.

As we join in congratulating our first Honorary Fellow, and ourselves on the distinction his membership brings to the Institute, it is interesting to recall Dr. Evans's, own words written for the Canterbury College Review in 1910, and referring to the new building he and his students were to occupy; words which we feel may be applied to the other institution, our own organisation of chemists, which he also helped to build. "Work indeed, is easily found, and workers will surely increase in numbers as the years roll on. May those who thus come to swell the ranks, be permitted to find at least some fragment of the true philosophers' stone, for such there is in spite of modern critics. It is simply a compound of labour, perseverance, and genius, and the gold it produces is the gold of true knowledge which neither tarnishes nor fades away."

The salary survey, the results of which, so far as they can be analysed, are published in this issue, leaves us with little cause for satisfaction. In general the prospects for the chemical profession to continue to attract a reasonably high proportion of the abler members of the growing generation are far from bright. It would not be true to say that the salary level is the only, or even the most important factor, in attracting recruits to a profession such as a scientific one. The sciences exercise a very great pull on intelligent adolescents, and will always do so. Many will be content with a salary less than that which can be earned in other ways, for the sake of following an absorbing and ever expanding field of knowledge. But when that is recognised, the fact remains that the country's scientific workers should, in the country's interest, be rewarded justly for submitting to an exacting and expensive training. The survey seems to us to reveal a situation which cannot be described as just, whether it is in the government service, industry, or teaching. Some of those who are concerned with training chemists, hold that the four year course for the M.Sc. degree must be lengthened to five to cope with the expansion of scientific knowledge. If that comes, the training will be still more expensive.

Dr. H. C. Holland has provided members with a valuable and illuminating comparison in this issue, and we invite members to consider the points he makes and express their views upon them.

On one point we would venture a comment, the export of brains from New Zealand. Some years ago we prepared a record of the M.Sc. graduates in chemistry of Canterbury College for the years 1927-1938. Extension to 1944 is not desirable at present because of the complications introduced by war-time measures and of the temporary loan of chemists to Australia. Of 73 listed, 29 have been abroad for further experience, this number not including some who went to Australia on munitions work, and some who went on Active Service. Of these 29, seven have returned to New Zealand. Against this it should be said that New Zealand has gained by import a number of first rate chemists, as the Institute Membership Roll shows. But if the Canterbury College record is multiplied by four, or even by three, the net loss of chemists is considerable and it is many of the best who have gone. The suggestion put forward in the last sentence of Dr. Holland's letter seems fully justified.

MEETING OF COUNCIL IN PERSON

July 28th, 1944

Dr. R. O. Page presided over the following:— Dr. J. C. Andrews, Mr. B. E. Jackson, Mr. P. White, Dr. E. B. Davies, Mr. F. G. Johnstone, Mr. S. H. Wilson, Dr. J. K. Dixon and Mr. W G. Hughson (Hon. Gen. Sec.)

Industrial Chemical Essay 1943:— 500 copies were printed and distributed to Institute members and to members of the Gas Institute. The Secretary has a small stock for further requirements. Industrial Chemical Essay 1944:— Dr. Page, Dr. Andrews and Dr. Parton were appointed examiners.

Salary Survey:— The Public Service Commissioner is to be asked to consider the raising of the salaries of chemists to a rate more comparable with those overseas and also if he will, at a later date, receive a deputation from the Institute.

First Honorary Fellow of the Institute:— The Council took very great pleasure in electing Dr. W. P. Evans as the first Honorary Fellow of the Institute. Eulogies of his work appear elsewhere.

Medical Advertisements Board:— Approval was given to a further letter to the board drawing attention to a number of advertisements which it was considered should be scrutinised.

Chemists of Foreign Nationality:— All chemists of foreign nationality are now eligible for election to membership in accordance with the Rules.

First Subscription:— As from Nov. 1st, 1944, £1-1-0 shall be paid by all applicants for enrolment as members but if elected during September or October in any year the subscription shall be credited to the following financial year.

Annual Conference:— In view of the improving international position it is to be suggested to the incoming Council that they endeavour to hold an Annual Conference in 1945 for the purpose of facilitating contact between chemists in the Dominion, especially those in isolated laboratories.

Amendments to Rules:— Nine amendments to the Rules were considered, and a full draft of all recent amendments, in readable form, will be circulated to Branch committee members before next meeting. The matter of reprinting the Rules was held over meantime.

List of members with their qualifications:— The reprinting and bringing up to date of this list will be considered at next meeting.

Finance:— This item is to receive an earlier position on the agenda and at each meeting a statement of the balance to date, and of projected expenditure will be considered.

Council decided to endeavour to transfer annually to the Trust Account the sum of £50.

The following accounts were passed for payment:—

Collection fee of 10/- to each Branch	£2/0/0
Solicitor's fee in connection with starting Trust A/c.	£4/4/0
Typing Industrial Chemical Essay	£1/0/0
Printing 500 copies of Prize Essay	£23/11/0
Printing June Journal	£16/4/0
Cyclostyling notices, minutes, agendas etc.	£13/10/3
Stationery	£2/7/3
Total	£62/16/6

Milk Commission's Report:— The Central Milk Authority has not, as yet, been set up. The letter which it was proposed to forward to them in conection with the qualifications of analysts is being held in the meantime.

Assistant Secretary:— In view of the large increase in the amount of work handled the Council proposes, at next meeting, to discuss the appointment of an assistant Secretary.

Overseas Members:— Council regrets to announce that Mr. H. W. Henderson, an Otago member has been reported missing on air operations.

Photographs of Presidents:— The Secretary has been asked to obtain photographs of all Presidents of the Institute.

Chemical Engineers:— The Secretary has a few copies of (1) Outline of subects special to the training of a chemical engineer, and (2) The training of a chemical engineer. These were handed in by the New Zealand representative, for the Institute of Chemical Engineers, London, Mr. D. F. Sandys-Wunsch, Edendale, Southland.

ELECTION OF ASSOCIATES

At the recent meeting of Council the following were elected as Associates of the Institute:—

Mr. H. S. N. Burton who spent a year with the Christchurch Gas Co. is now with the Challenge Phosphate Co. Otahuhu.

Mr. W. R. Elder was at Maribyrnong, Melbourne, for two and a half years and is now factory manager at the Riccarton Dehydration factory.

Mr. H. S. Gibbs is a pedologist with the Soil Survey Division D.S.I.R., Wellington. He has had wide experience in field work especially in conection with aerodrome construction.

Mr. J. L. Grigg is at present with the Agriculture Dept., Wellington and is chiefly engaged on fertilizer analysis.

Mr. A. S. Hogg who has had a wide teaching experience is now acting-principal of the Thames High School.

Mr. J. T. Holloway, after completing a year of post-graduate research at the University of Otago spent a year in the Dept. of Plant Physiology, Imperial College of Science, London. He is now engaged as research chemist to the N.Z. Paper Mills Ltd.

Mr. G. S. Holmes, after a period as student assistant in the Chemistry Dept. Canterbury College, is now chief chemist to Barnett Glass Perdriau Rubber Co. of N.Z. Ltd.

Mr. R. S. Jones was awarded a Senior Scholarship in Chemistry in 1934. For four years he taught in secondary schools and has now taken up a position as work's chemist with N.Z. Insulators Ltd., Temuka.

Mr. R. C. Lawry spent some months on the checking and testing of civilian gas-masks. He is now assistant lecturer in chemistry at Canterbury College.

Mr. I. D. Morton after a year at Victoria College as demonstrator has taken a position as research chemist, Dairy Research Institute Palmerston North.

Miss E. D. Swanberg, after a few years of secondary school teaching has taken a position as assistant chemist, Waitemata Breweries, Otahuhu.

Mr. D. A. Tait graduated from Auckland University College and is now engaged in the testing of petroleum products with the Shell Co. of N.Z. Ltd., Wellington.

Mr. J. M. C. Tingey, had gained much experience in relation to paint, before taking up his present work on radio-active painting material at the Dominion Physical Laboratory, Petone.

Mr. W. S. Wick has for the past five years been senior science master at the Greymouth Technical High School.

Miss E. Rowe, who was elected an Associate at the previous meeting of Council is assistant chemist to the Dominion Compressed Yeast Co. Christchurch.

We extend to the above a very hearty welcome into the membership of the Institute and trust that, where possible, they will take an active interest in local Institute affairs.

SALARY QUESTIONNAIRE

A Wellington sub-committee consisting of Dr. Davies, Mr. Freeman and Dr. Dixon have analysed the replies received to the questionnaire and have supplied a full report to Council. Copies of this report have been circulated to Branch Committees and any member requiring more information than it is possible to put in the Journal are advised to consult Branch Secretaries.

The average age for starting professional work is about 22½ years in N.Z. If this is borne in mind it is possible to compare the diagrams given below with that given in a previous issue of the Journal where suggested minimum salaries for Australia were reduced to New Zealand terms. The replies were too few from other than Government or Industry to justify any detailed analysis.

1. Government (attached). 2. Industry (attached).
3. University: from 21—30 salaries range from £300—£450 31—40, £450—£675; 40 upwards, £650—£1000.
4. Secondary School Teaching: From 31—40 salaries range from £350—£550; 40 upwards, £342—£565. Fairly generous marriage allowances are included, where applicable, in the above salaries.
5. Hospitals: From 19—34 salaries range from £95—£550. (Very few returns).
6. Private practice, research in private institutions: From 19—45 salaries range from £95—£700. (Very few returns

Note: Members of Branch Committees may note that the figures given here differ slightly from that contained in the report to the Council. The present data is to be regarded as official because the committee has included the data from latecomers as well as re-examining allowances and bonuses granted to some members in the light of special conditions.

Age	£0 to £150	£151 to £200	£201 to £250	£251 to £300	£301 to £350	£351 to £400	£401 to £450	£451 to £500	£501 to £550	£551 to £600	£601 to £700	£701 to £800	£801 to £900	£901 to £1000	Average
Up to 20 (I)	1														£125
(G)	4														£114
21—23 (I)			3	3	4	1									£290
(G)			2	9	4										£279
24—26 (I)			1	4	1	4		1			1				£366
(G)				3	6										£307
27—29 (I)				1	2	1	1	3			1				£432
(G)					5	3	1	1							£372
30—32 (I)					1	2	3			1	1	2	1		£554
(G)					2	4	2	4	1		1				£432
33—35 (I)						1	1			1					£462
(G)						1	3	7	1	1					£479
36—38 (I)						1	2	1		1	1	1			£524
(G)						3		2		4	2				£521
39—41 (I)							1			2	1		1		£628
(G)								1	1	1					£517
42—44 (I)									1					1	£760
(G)											1	2	2		£789
45—47 (I)													1		£850
(G)										2	1	1			£634
48—50 (I)								1	1						£525
(G)											1				£615
51—53 (I)						2		1		1	1			1	£579
(G)												1			£750
Over 53 (I)												1			£702
(G)											1			1	£820

(I) Industry. (G) Government.

Christchurch,
8th August, 1944

The Editor,

Dear Sir,

One of the stated aims of the New Zealand Institute of Chemistry is "to raise the status and advance the interests of the profession of chemistry and of those engaged therein."

From the recent salary survey, the results of which are published elsewhere in this Journal, it is apparent that the Council of the Institute must continue its efforts to improve the standard of remuneration received for scientific work in the Dominion. In recent years valuable work has been done in establishing higher salaries for science graduates entering the employment of the Government, but even now the rates are about £100 p.a. below the minimum salaries suggested by the Committee of the Australian Institute of Chemistry. The Australian figures were based on salaries paid in Government Departments, public utilities and industrial undertakings. When the New Zealand returns, summarised in the age-salary diagrams, are calculated as average salaries for the various age groups and the results compared with those obtained by the Royal Institute of Chemistry of Great Britian in a salary survey conducted in 1942 the N.Z. and G.B. averages are very similiar up to age 35, but above that age the N.Z. figures compare very unfavourably.

Age Group	Average Salary in £N.Z.	Age Group	Average Salary in £Stg.
Up to 20	116		
21—26	317	21—25	323
27—29	405	25—30	397
30—35	487	30—35	506
36—41	542	35—40	615
42—44	638	40—45	741
45—50	650	45—50	820
51—53	579	50—60	936
		Over 60	1014

The figures for the Royal Institute are from 5366 returns representing 85% of membership in Great Britian but the New Zealand group appears to exclude University staffs and school teachers.

Unfortunately there is, in New Zealand, a reluctance to pay adequately for professional skill and services on a full time basis and apparently especially so for scientific work, as the salaries paid to N.Z.I.C. members are low in comparison with those paid to accountants and lawyers in the Public Trust and Land and Income Tax Department. During the last few years there has been much talk about retaining the best brains in the country but if there is to continue a considerable disparity in salary levels between N.Z. and Overseas it is obvious that we shall continue to lose many of our ablest graduates. The figures quoted above show the position compared with Great

Britian and recent observers have reported that N.Z. salaries compare unfavourably with Australian ones. The opportunities offering in Great Britian are even more apparent when the salary comparisons are shown as percentage of total number in the various salary groups as follows:

	Great Britain		New Zealand
Salary Group	Fellows	Associates	
Below £250 p.a.	0.16%	1.50%	3.4%
250—500 p.a.	13.86%	53.93%	65.9%
500—1000 p.a.	52.15%	37.28%	30.7%
1000—1600 p.a.	22.12%	5.10%	—
Over 1600 p.a.	11.66%	2.17%	—

This table shows thta in N.Z. two-thirds of the chemists are in the 250 - 500 p.a. group, and that we have no representatives in the two most highly paid groups which include considerable numbers in Great Britian.

Another fact which emerges from these returns is the small number of chemists over 40 years of age, pointing to an average replacement rate of about one person per year for the next twenty years. Any increase in the number of people in the

Age Group	No. of Chemists
0—20	5
21—29	61
30—41	68
42—53	18

profession will have to find employment through expansion of industry and Government Scientific Services. At the present time there is a popular misconception about the prospects of employment in scientific work judging by the large numbers of students taking science courses in the University Colleges and there is a possibility that a surplus of science graduates will have a depressing effect on salary levels. The Council should make some of the above facts about salaries and prospects of employment available to Rehabilitation & Vocational Guidance Officers and others interested and also prosecute a vigorous campaign for a better financial recognition of scientific work among Manufacturers, Scientific Departments and Members of Parliament.

Yours faithfully,
H. C. Holland

SAFETY

Council has recently considered the facts relating to the death of a young chemist as the result of a solvent explosion and fire. It has been recommended that the attention of members be drawn to necessary safety precautions in a series of short articles.

INFLAMMABLE LIQUIDS — LABORATORY FIRES

M. L. Stewart

Fire precautions are of importance to all chemical laboratories but where inflammable liquids are in daily use the provision of adequate fire fighting equipment is of vital importance. Considering the nature of materials handled the number of serious laboratory fires are extremely few but it would be surprising if small laboratory fires did not occur from time to time. With the necessary facilities available a small fire can be quickly controlled but if through lack of these facilities or panic the fire is not brought under immediate control there is every chance of a major conflagration.

In extinguishing a laboratory fire it is desirable that the damage done to surrounding equipment shall be reduced to a minimum and this requirement, together with the special nature of fires resulting from inflammable solvents, presents certain difficulties.

The methods available for controlling fires generally are discussed below together with the disadvantages attaching to each method.

(1) Application of Water:

Although this is effective with alcohol, acetone and other water soluble substances it is not satisfactory where water immiscible solvents, such as benzol and petroleum ether etc., are involved. Also the application of a water jet at high pressure is liable to bring about a spread of the fire by the breakage of nearby glass containers holding other inflammable liquids. This objection also applies to the use of automatic sprinklers which are sometimes part of the general fire protection installed in certain buildings. Where electrical equipment, such as hot plates are in use electrical shocks may be sustained by the operator directing the water jet unless it is possible to switch off all electrical apparatus.

(2) Smothering with Blanket or Sand:

The disposition of laboratory apparatus and its peculiar shape and size would, in many cases, prevent the effective use of a blanket to smother a small fire and for the same reason it may not always be possible to apply sand directly to the seat of the fire. The provision of a blanket, however, is desirable as this offers an effective method of extinguishing burning clothing in the event of an operator becoming splashed with the burning liquid.

(3) Covering wih a Foam Film:

The "foamite" type of extinguisher using carbon dioxide foam is very effective but as the foam is delivered under pressure from a jet there is a danger of spreading the fire as mentioned in (1) above. This type of extinguisher when once set in action is completely emptied although the fire may be extinguished within a few seconds. There is also the possibility of damage to nearby apparatus from the foam and it is also somewhat messy. However, it is desirable that at least one 2 gallon extinguisher of this type should be available as a reserve, should the fire assume large proportions.

(4) Carbon Dioxide Snow:

The application of carbon dioxide snow is a very effective and safe method of extinguishing small fires but in general carbon dioxide snow is not readily available. Small cylinders fitted with a sprinkler to deliver carbon dioxide snow have been described in overseas publications but it is doubtful whether they are generally available in this country.

(5) Carbon-tetrachloride (or methyl bromide) vapours:

The "Pyrene" type of extinguisher, employing carbon tetrachloride (or methyl bromide), offers a very effective method of extinguishing small fires resulting from inflammable solvents. The extinguisher is handy to operate and the strength of the jet can be controlled by hand and the liquid directed on to the seat of the fire. Usually only a few strokes of the pump are required to provide sufficient of the liquid to extinguish a fire attacked in the early stages.

Carbon tetrachloride, however, suffers one great objection in that if the liquid comes in contact with hot metal surfaces, for example electric hot plates, there is the danger of carbonyl chloride vapours being formed and these are extremely poisonous. In certain cases carbonyl chloride may also be formed by chemical reaction with the inflammable solvent. However, if the room is vacated immediately the fire is extinguished, and thoroughly ventilated by opening doors and windows, carbon tetrachloride may be considered as a safe and effective method of extinguishing small laboratory fires.

All fire extinguishers should be situated in readily available positions and should be inspected at regular intervals. They should be refilled or topped up immediately after use and before being replaced in their permanent positions.

The use of electric hot plates in laboratories has become general of latter years. It should, however, be realised that the average domestic hot plate is not flame proof and that such hot plates although in general safer than a naked flame are not without danger when handling inflammable liquids. Indeed they can be more dangerous than a naked flame since they engender a false sense of security. It is important to switch off such a hot plate before handling inflammable liquids in their vicinity. It should also be realised that a very hot electrical hot plate, even though switched off, can ignite inflammable liquids by spontaneous ignition if these are allowed to come in contact with the hot surface.

For the distillation, etc., of inflammable liquids boiling below 100°C. the safest method is to use a water bath heated by an immersion heater of enclosed coil type: For high boiling point solvents flame proof hot plates of the enclosed coil type are available and their use would reduce very considerably the risk of laboratory fires.

It should also be realised that inflammable liquids are capable of forming explosive mixtures with air under certain conditions and that an empty container which has previously held an inflammable liquid can be considerably more dangerous than the same container when full of liquid.

(To be continued.)

BRANCH NOTES

AUCKLAND BRANCH

DISTILLATION

Mr. M. D. Sutherland, M.Sc.
Dominion Laboratory. 18th May, 1944

Mr. Sutherland's interesting talk covered many aspects of the subject, both theoretical and practical. By the use of numerous diagrams and curves he was able to make clear to the members of his audience many of the more difficultly understood aspects of the subject and, although not entirely eliminating the theoretical and mathematical problems, he kept them to a minimum and devoted most of his time to their explanation and practical significance.

He began by explaining the liquid-vapour component curves, how they are arrived at by the use of the equilibrium still, and how they are used to determine the conditions of operation of a fractionating column to give a desired degree of separation of two components or vice versa. He also touched on several other aspects of distillation such as the constant boiling point mixtures of alcohols with water and HCl with water, industrial fractionating columns, both of the batch type and continuous operation, and fractional distillation as an analytical tool.

At the conclusion of his talk Mr. Sutherland gave a practical demonstration of the effect of the reflux ratio on the efficiency of separation of two components, in this case C_6H_6 and CCl_4, by a fractionating column.

Mr. J. Ricketts, who has been working on munitions in Adelaide for the last three years, is now back in Auckland and is at present working for Dominion Breweries Limited, Otahuhu.

Two other Auckland members whom we have not seen for some time were present at the last Branch meeting. They were Sgt. I. S. Hunt and A.C./1 A. G. Frieberg. Both are still in the services but are now stationed nearer home than formerly.

WELLINGTON BRANCH

The Monthly Meeting of the Wellington Branch of the New Zealand Institute of Chemistry was held at Victoria College on Tuesday, May 23rd, 1944. Dr. Lynch addressed a large meeting on the "Duties of the Expert Witness." He began with an historical survey of Forensic medicine including both compensation and criminal cases. In 1904 work of vital importance was done in connection with blood groups and hairs. In 1920 Sydney Smith made an important contribution with the work he did on firearms and projectiles. The precipitant test for blood is now clear cut and simple; although the separation into blood groups is not simple if the blood is old and dried. The famous case of Oscar Slater would have been very much easier to solve if blood tests had been available in those days. The greatest difficulty of the Expert Witness is to avoid bias. He should pause to consider that there might be something in what the other side says or that he himself might be wrong. This would help to avoid the large number of cases in which there is a conflict of medical opinion. In the well known trial of Crippen the identification of the body depended largely on a scar on the abdomen. One medical man swore that it was a scar, another swore the mark was caused by a fold in the skin. The exhibit was passed round the jury; but they decided the case on other evidence. The body of Mrs. Patience when discovered had been so well preserved that the medical man was able to trace marks of ropes and sacks and so deduce the cause of death. Similarly in the case of Mrs. Doakin marks on the body showed the cause of death many months later. Slaked lime assisted the preservation here.

Another witness may only tell what he himself has observed and his evidence must be given in the presence of the accused. The Expert Witness can quote literature, draw deductions, make inferences, come to conclusions. He can usually be detected when he arrives at court because he carries two armfuls of books ! There are a number of phrases to be avoided, for example "definitely" when the opposite is meant. The Expert Witness must also be able to convey his meaning to the jury; otherwise he has failed in his duty. Dr. Lynch's account of difficulties to be faced should be of considerable assistance to any chemist present who ever has to give Expert Witness.

PERSONAL NOTES

Mr. N. A. Marris of the Department of Scientific and Industrial Research and a Fellow of this Institute has been appointed to the position of Scientific Liaison Officer for the Department at Washington. On behalf of the New Zealand and Australian Governments he will be particularly interested in food problems.

Mr. J. A. D. Nash who has been Honorary Secretary of the Council of the Institute since December, 1940 is now in Australia as Scientific Liaison Officer for the D.S.I.R. He is stationed at Melbourne and is working in close collaboration with C.S.I.R.

Mr. C. W. Brandt of the Dominion Laboratory is now in the United States where he is studying recent developments in plastics on behalf of the D.S.I.R. He will be stationed principally at Forest Products Laboratory, Madison but will also visit other institutes in U.S.A. and Canada.

Mr. J. L. Mandeno of the Dominion Laboratory is at present in England studying recent trends in building research and development, ceramics and other allied subjects. He will be stationed for the greater part of his time at the Building Research Station, Watford but will also visit Forest Products Laboratory at Princes Risborough and the Paint Research Station at Teddington.

CANTERBURY BRANCH.

The Chairman's Address by Mr. W. L. M. Dearsley was entitled "SYNTHETIC MEAT FROM YEAST"

There have been various reports in the newspapers recently of a startling new high protein food made from yeast, in particular from Torula utilis or Foodyeast. One is led to believe that here at last is a cheap nutrient food whose advent will, if it does not displace meat, at least give the latter a considerable amount of competition. The invention and development of this new food has been by implication laid at the door of the scientists of the United Nations.

Actually Torula utilis, which is not true yeast at all, was developed entirely by the Germans in 1916-1917, when faced with dire food shortages, and was called by them "Futterhefe" or Foodyeast. It gave them a rich source of protein; other similar microorganisms they utilized similarly on a large scale for the production of carbohydrates (glycogen), glycerol and fats. Since those days the technique and efficiency of industrial fermentation has been enormously advanced, so that the manufacture of Foodyeast with present-day methods offers much greater economic possibilities.

Very recently, however, Dr. Thaysen of England has produced by special culturing, an improved variety of Torula utilis for the purpose in view, where the cell is diploid instead of the usual haploid, resulting in an almost double increase of cell size. Working on cross-fertilization of the acrospores, Dr. Lindegren, in the U.S.A., has developed very specialized types of true yeasts, all particularly adapted for Foodyeast purposes.

Foodyeast can only be economically be produced where the necessary Raw Materials are cheap. Molasses is generally the cheapest material, but, in the case of Torula, sulphite liquors from papermills can be utilized, for this organism has the additional power of fermenting wood-sugars. Thus the centres of production would be places such as the East or West Indies, Sweden, etc., where indeed such plants are envisaged or are already in operation. It is estimated that the selling price of Foodyeast would be about 6d a lb; which, on a basis of protein-content only, makes it less than one third the price of meat.

The actual Foodyeast when made has a high amount of protein, around 50%, compared with 20-25% for meat. It has a high Vitamin B Complex content, whereas meat, excepting pork has a very low content. For instance its B_1 content may be up to 100 micrograms per gram against one or two for meat. Physiologically, meat, among other substances, contains the valuable compounds creatine and creatinine; yeast does not. On the other hand yeast contains in quantity the equally valuable substance glutathione; meat does not. By treatment during its growth yeast has the great advantage that it can be made to be the carrier, in the correct assimilable form of many necessary trace substances, assessory food factors, vitamins, etc., in high concentration. In flavour meat scores more heavily though, largely owing to its greater glutamic acid content. Foodyeast has been made up into soup, meat-loaf, cheese-sticks, even pie! The addition of 5% to a large loaf should be equivalent to 2 eggs or ¼lb. steak. It is a foodstuff requiring little or no mastication and is easily digested.

Foodyeast, weight for weight, is obviously a superior food, from the nutritive standpoint, to meat—and is appreciably superior. Notwithstanding this, however, Foodyeast would appear to have only a specialized use in the future. It would be confined to emergency small bulk rations, hospital diets, soups, fancy snacks, and be used largely for general food fortification. In this way a definite but limited scope in its use is seen. It is hard, in fact impossible, to imagine man foregoing to any extent the delight of chewing and masticating the bulky and tasteful food known as meat!

OTAGO BRANCH.

At the April meeting of the Otago Branch, Dr. Slater gave the presidential address on Chromatographical Analysis.

He described the method as being essentially a variant of the familiar method of decolouring solutions with animal charcoal in adsorbent earths, in which the solution is allowed to flow down an upright cylindrical column of the adsorbent.

With a suitable solvent and adsorbent, each pigment is adsorbed in a more or less distinct layer. This is essentially the method used by Tswitt to separate the colouring matters of green leaves. The percolation finished, the still-moist column is pushed out of the tube and cut into various sections with a knife. The colouring matters are then extracted with suitable solvent. Striking features of this case are its simplicity and efficiency.

Several practical points must be noted. The adsorbent is usually a white inert solid, e.g. sugar, talc, Al_2O_3, $CaCO_3$—commonly Al_2O_3 conforming to certain physical standards.

The packing of the column must be done with the greatest care so as to achieve just that lightness of packing which will allow the solute to pass through at a reasonable rate without cracks and channels developing. These would defeat the purpose of the column which is to bring the solution into contract with every particle.

Choice of solvent is made by experiment; frequently a benzene-petroleum ether mixture is used. Another point is the development of zones. While, after percolation, one zone usually verges into the next, further quantities of solvent poured down the column usually sharpen the divisions between zones.

Chromatographic analysis may be extended to colourless substances. Often these fluoresce in ultra-violet light. Again, a colour-forming group may be introduced and later removed e.g. di-nitro-phenyl hydrozones formed from ketones. A third artifice is the "brush method." Here the column, removed from the cylinder, is brushed with a suitable reagent to make visible the chromatogram.

Applications:

One application is the isolation of traces of colouring matter, e.g. the yellow urinary pigment uropterin (conc. 1 in 10^6). Homogeneity may be tested chromatographically. Allied to this is the chromatographic establishment of the identity of the two substances. If a solution of the two is percolated, the formation of the two zones indicates non-identity.

Chromatographic Analysis has been successful in many branches of technology. One of the first applications was in examining tannin extracts. Adulteration of wines or pharmaceutical products may be detected. In the vitamin field, A may be worked up on $Ca(OH)_2$ applying the brush technique to the Caw-Price reactions; in the case of B, the diazo reaction is similarly employed.

It is interesting that chromatography has been used in the chemical investigation of pencillin.

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

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