THE INSTITUTE OF CHEMISTRY OF GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.

1926.

PART I.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER,
Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.
February, 1926.

Publications Committee, 1925-26

T. SLATER PRICE (*Chairman*),

G. G. HENDERSON (*President*),

H. C. L. BLOXAM,

A. J. CHAPMAN,

F. D. CHATTAWAY,

W. M. CUMMING,

LEONARD DOBBIN,

A. VINCENT ELSDEN,

LEWIS EYNON,

W. R. FEARON,

R. H. GREAVES,

A. J. HALE,

C. A. F. HASTILOW,

I. M. HEILBRON,

PATRICK H. KIRKALDY (*Treasurer*).

THOMAS MACARA,

L. G. PAUL,

B. D. PORRITT,

W. D. ROGERS,

FRANK SOUTHERDEN.

Report of the Council

(1925—1926).

To be submitted to the Fellows and Associates of the Institute at the Forty-eighth Annual General Meeting, to be held on Monday, 1st March, 1926.

1. THE ROLL OF THE INSTITUTE.

During the twelve months ending 31st January, 1926, the Council has elected 68 new Fellows, of whom 56 were Associates, 301 new Associates, of whom 109 were Registered Students, and has admitted 151 new Students.

The Council records with regret the death of 20 Fellows and 15 Associates.

Fellows :

HORACE TABBERER BROWN, F.R.S.
JOHN YOUNG BUCHANAN, F.R.S.
SAMUEL HENRY DAVIES.
WILLIAM HENRY DEERING, I.S.O.
WILLIAM JOSEPH DIBDIN.
JAMES GRANT.
THOMAS FARRINGTON.
SAMUEL JACKSON, O.B.E.
FRANCIS ROBERT JAPP, F.R.S.
EDMUND KNECHT.
WILLIAM ROBERT LANG.
ROBERT WALTER ODDY.
WILLIAM JOSIAH PALMER.
CHARLES EMILE SOANE.
DANIEL RANKIN STEUART.
ROBERT LLEWELLYN TAYLOR.
HUBERT LANPHIER TERRY.
LEONARD ELLERTON VLIES.
ARTHUR WILSON.
GEORGE YOUNG.

Associates :

ERNEST LICKISS CLARKSON.
DAVID SOLOMON COHEN.
CHARLES EDWARD FRANCK.
HARRY BULWER HAYLEY.
CHARLES WILLIAM HAROLD HOWSON.
HARRY TYRER JOHNSON.
REGINALD ARTHUR JOYNER.
CHARLES LEONARD MACDONALD.
ERNEST MOORE MUMFORD.
JAMES WILLIAM HENRY PATTISON.
CHARLES ETTY POTTER.
SHYAMAKANT GOVIND SARDESAI.
ALBERT TOMPKIN.
GEORGE MARWOOD WATSON.
HEDLEY GEORGE WATTS.

The resignations of 2 Fellows, 40 Associates, and 39 Students have been accepted, and the names of 9 Students have been removed from the Register, in accordance with the By-laws.

At the date of this Report, the Register contains the names of 1731 Fellows, 3213 Associates, and 806 Students. The number of members has increased by 336, and the number of Students has decreased by 6.

2. THE COUNCIL, COMMITTEES & REPRESENTATIVES.

The Council has held 12 Meetings; the Committees, Boards and Sub-Committees have held 66 Meetings.

Committees and Chairmen.	
Benevolent Fund Committee ..	The Hon. Treasurer.
Finance and House	The Hon. Treasurer.
General Purposes	The President.
Legal and Parliamentary	Prof. Arthur Smithells, C.M.G., F.R.S., V.-P.
Nominations, Examinations and Institutions	The President. Patrick H. Kirkaldy, *Hon. Treasurer, Vice-Chairman.*
Public Appointments	E. R. Bolton, V.-P.
Publications	Dr. T. Slater Price, O.B.E., F.R.S., V.-P.
Joint Advisory Committee with the Board of Education	The President.

In order to reduce the number of meetings, the Lectures and Library Committee has been absorbed in the Publications Committee, and the Special Purposes Committee in the General Purposes Committee.

Mr. Lewis Eynon was elected a Member of Council in the place of Prof. Roberts, who was appointed examiner in the Chemistry of Food and Drugs; and Dr. Frankland Dent was elected District Member of Council for the Overseas Dominions and elsewhere abroad.

The Council has appointed delegates to represent the Institute on various public occasions, and representatives to act on various public and quasi-public bodies:

The President and Officers, with Sir Herbert Jackson, have represented the Institute on a Committee, formed jointly with the Society of Chemical Industry, and the Institute of Metals, to establish a memorial to the late Sir George Beilby.

The Honorary Treasurer has accepted office as Joint Honorary Treasurer with Mr. John Fry of the Sir George Beilby Memorial Fund.

Sir Herbert Jackson, Past President, has represented the Institute on the Committee for the appointment of temporary assistants in the Government Laboratory.

Mr. A. Chaston Chapman, Past President, has represented the President on the Harrison Memorial Prize Committee.

Dr. Robert H. Pickard and Prof. Arthur Smithells, Vice-President, have represented the Institute at a Conference of Teachers in Technical Institutions which has under consideration the relationship of technical education to other branches of education and to industry, and on a Sub-Committee appointed by the Conference to collect evidence bearing on the enquiry.

Mr. F. W. F. Arnaud has represented professional chemical interests before the Advisory Committee of the Ministry of Agriculture and Fisheries on the *Fertilisers and Feeding Stuffs Bill.*

Dr. J. F. Tocher has continued to serve on the Consultative Council of the Scottish Board of Health.

Dr. George McGowan and Mr. S. E. Melling have served as members of a Committee appointed to report on Methods of Sewage Analysis, Ministry of Health.

Mr. Arthur R. Smith represented the Institute at the Congress of Industrial Chemistry and the Chevreul Celebrations held at Paris under the auspices of the Société de Chimie Industrielle.

The President, with Messrs. W. T. Burgess, A. Chaston Chapman, J. T. Dunn, G. Nevill Huntly, G. T. Morgan, G. H. Perry, R. H. Pickard, and E. W. Voelcker, have continued to represent the Institute on the Joint Committee for the Standardisation of Scientific Glassware and Sub-Committees thereof.

Dr. Robert H. Pickard has represented the Institute on the Library Committee of the Chemical Society.

Prof. J. W. Hinchley and Mr. G. Nevill Huntly have represented the Institute on the Committee of the Institution of Civil Engineers, dealing with Heat Engine and Boiler Trials.

The following have served, as representatives of the Institute, on the Committees of the British Engineering Standards Association:—

Prof. C. H. Desch, on the Sectional Committee on Cement, and the Sub-Committee on Slag Cement.

Mr. F. W. Harbord, on the Sectional Committee on Cement, and the Aircraft Sub-Committee on Chemicals.

Dr. James Watson, on the Sub-Committee on Sand-lime Bricks; the Sub-Committee on Clay, Glassware, and Silica Ware; and the Sub-Committee on Slag Cement.

Dr. J. J. Fox, on the Aircraft Sub-Committee on Chemicals.

The Registrar has continued to serve on the Incorporated Society of Headmasters Employment Committee, Ministry of Labour; and on the Committee for the Chemical Section, British Empire Exhibition.

The Registrar attended the Celebration of the Centenary of the discovery of Benzene by Faraday held under the auspices of the Royal Institution, the Chemical Society, the Society of Chemical Industry, and the Association of British Chemical Manufacturers; and the Celebration of the Incorporation by Royal Charter of the Textile Institute. The Registrar has also been appointed as Convener of the Sir George Beilby Memorial Fund Committee.

The Assistant Secretary has served on the Chemical Trades Advisory Committee and the Chemical Trades Examination Board of the Union of Lancashire and Cheshire Institutes; and has acted as Secretary of the Joint Committee on the Standardisation of Scientific Glassware.

3. FINANCE AND HOUSE COMMITTEE.

The financial statements for the year 1925 are attached (pp. 18-22).

The statement of receipts on the general account shows an increase of £453 2*s*. 4*d*. in the amount of subscriptions, and £45 12*s*. 9*d*. in dividends and interest; the examination and assessment fees however, were less than in 1924 by £138 2*s*. The dividends and interest included a sum of £80 received on account of income from the legacy of the late Sir Alexander Pedler, the capital of which is likely to accrue to the Institute during the present year. In common with the Royal Society, the Chemical Society, and the British Science Guild, the legacy is left to the Institute to "be used by each of these four societies at their discretion for the advancement of science and as far as possible for the advancement of chemical science."

The expenditure for the year is slightly in excess of the normal revenue for the year, but includes a charge in respect of a moiety of the cost of the Register, 1924, and of one-third of the cost of "Official Chemical Appointments" 1924. Economies have been effected in printing and postage.

The donations, amounting to £71, consisted of £50 to the Chemical Section of the British Empire Exhibition, £10 10*s*. to the Building Fund of the Yorkshire Philosophical Society in consideration of the use of the Hall of the Society for the Conference held in July, and £10 10*s*. to the organisers of the Optical Convention, 1926.

On the recommendation of the Committee the Council has made provision for the expenses of Local Sections by allowing a grant not exceeding 2s. 6*d*. for every member resident within the area of each section to defray official expenses, subject to the submission of detailed audited accounts and the adjustment of the grant from year to year according to the amount of the funds unexpended. The Council has also made provision for printing and posting facilities for Local Sections in order that notices of meetings may be issued without imposing an undue burden on the Honorary Secretaries of Sections.

The amount due for investment during 1925 (including entrance fees, life compositions, and the interest on Sir Alexander Pedler's legacy) was £1080 13*s.* The amount actually invested was £1661 5*s.* 3*d.* to which may be added the Redemption Fund Premium, £110 8*s.* 4*d.*, making a total of £1771 13*s.* 7*d.* From this it would appear the sum invested beyond the prescribed amount during 1925 was £691 0*s.* 7*d.*, but against this must be set the reduction in the balance at the bank from £733 2*s.* 7*d.* at the commencement of the year to £470 10*s.* 6*d.* at the close of the year,—a difference of £260 12*s.* 1*d.*

THE FOLLOWING IS AN APPROXIMATE COMPARISON OF THE FINANCIAL RESOURCES OF THE INSTITUTE AT THE CLOSE OF THE YEARS 1924–1925.

	£	s.	d.		£	s.	d.
Balance from 1924	733	2	7	Balance at end of 1925 ..	470	10	6
Value of Investments Dec. 31, 1924 ..	13,599	6	7	Value of Investments at end of 1925	14,812	3	4
Redemption Fund	530	0	0	Redemption Fund	640	8	4
Accounts due to the Institute	61	3	2	Accounts due	140	4	4
	14,923	12	4		16,063	6	6
Less Liabilities	852	19	4	*Less* Liabilities	621	16	4
	14,070	13	0				
Appreciation during 1925 ..	1,370	17	2				
	£15,441	10	2		£15,441	10	2

4. BENEVOLENT FUND COMMITTEE.

The Committee gratefully acknowledges the response made to the special appeal issued in January, 1925.

The accounts for the year 1925 show that the total contributions received on current account amounted to £663 5*s.* 9*d.* compared with £333 11*s.* 11*d.* in 1924; and that the donations to Annuities Account amounted to £130 3*s.* 9*d.* compared with £116 18*s.* 8*d.* in the previous year. The total received for the fund during 1925 was £793 9*s.* 6*d.* compared with £447 10*s.* 7*d.*, in 1924.

The Committee notes with satisfaction that several "group contributions" have been received through Sections and from the staffs of important laboratories.

The Committee has formulated a scheme, which has been approved by the Council, of granting annuities to members who are incapacitated from work. The first annuitant has been elected, and will receive £52 per annum. This will absorb more

than the income available at present from the dividends of the invested capital of the fund. The Committee hopes that Fellows and Associates who can afford to do so will make substantial donations to the Annuity Fund in order that provision may be made for any similar case which may arise.

5. GENERAL PURPOSES COMMITTEE.

The Committee made arrangements for the Conference held at York in July having due regard to the wishes expressed by Local Sections in that connection. The Report of the Conference was published in the JOURNAL AND PROCEEDINGS, Part IV. (pages 211 and 223–260). The Council is indebted to the President, to Mr. H. J. Evans, and to Mr. Fred Scholefield for opening the discussions on that occasion, and also to Mr. H. B. Brown and other members at York for making the local arrangements for the Conference. The resolutions relating to the Regulations were referred to the Nominations, Examinations and Institutions Committee. The resolution regarding the registration of chemists is at present under the consideration of the General Purposes Committee. The resolution with reference to the promotion of further co-operation among chemical societies was carefully considered, but, although the Council is ready to collaborate in any movement of the kind suggested, it feels that the position of the Institute is such that it should not take the definite lead in this matter unless invited to do so by the other bodies concerned.

Representations were made to the Board of Education and to the London County Council on the proposal to close Finsbury Technical College, but although they were received sympathetically the Higher Education Sub-Committee of the London County Council was not prepared to depart from its previous decision to close the College in view of the financial considerations involved.

6. LEGAL AND PARLIAMENTARY COMMITTEE.

The Legal and Parliamentary Committee, acting jointly with the Public Appointments Committee and assisted by Mr. William Honneyman, Honorary Secretary of the Belfast Section, considered and reported on the Pharmacy and Poisons Bill, Northern Ireland, which had been referred to the Council by the Ministry

of Home Affairs. On receiving the Report of the Committees, the Council forwarded certain recommendations to the Ministry, some of which—on matters of administration—were adopted. The Government, however, did not accept the suggestion that the word *chemist* should be restricted to those engaged in the profession of analytical and consulting chemistry, in the application of chemistry to the arts and manufactures and in teaching chemistry.

The Legal and Parliamentary and the Public Appointments Committees also considered and approved the précis of evidence submitted by representatives of the Belfast Section to the Departmental Commission on Local Government Administration in Northern Ireland.

7. NOMINATIONS, EXAMINATIONS AND INSTITUTIONS COMMITTEE.

The Committee has held 15 meetings, and has dealt with 635 applications in addition to many letters of preliminary enquiry.

Several candidates for the Associateship and Fellowship have been interviewed and examined orally by the Committee or by Local Interviewing Committees, to whom the Council is indebted for reports. Associates applying for election to the Fellowship, other than by examination in accordance with the Regulations, have been required to produce evidence of having carried out original research or of having devised processes or inventions or similar records which have been subjected to careful scrutiny and assessment.

The Council acknowledges its indebtedness to the Advisory Committee in India for reports on applications received from that part of the Empire.

A summary of the applications received and considered, with the decisions of the Council thereon, is given below:

Applications for Admission to the Studentship :

Accepted	151
Declined	1
Total	152

Applications for Admission to Examination for Associateship :

Accepted	57

Applications for Election to the Associateship :

Accepted (including those examined)	301
Declined	8
Referred for Examination	23
Total	332

Applications for Admission to Examination for Fellowship :

Accepted	14

Applications from Associates for Election to Fellowship :

Accepted (including those examined)	56
Declined	6
Total	62

Applications from Non-Associates for Election to the Fellowship :

Accepted (including those examined)	12
Declined	6
Total	18

EXAMINATIONS.—Examinations were held in April and September, 1925, and in January, 1926.

SUMMARY OF RESULTS.

	EXAMINED.	PASSED.
Associateship :		
(Present Regulations)		
General Chemistry ..	78	35
(Previous Regulations)		
Branch (*d*) Organic Chemistry ..	1	0
Branch (*e*) Chemistry (and Microscopy) of Foods and Drugs	1	1
Fellowship :		
Branch A. Inorganic Chemistry ..	3	2
Branch B. Physical Chemistry ..	3	1
Branch D. Agricultural Chemistry ..	1	1
Branch E. Chemistry (and Microscopy) of Foods and Drugs	12	5
Chemical Technology ..	1	1
Special Examination in Oils and Fats	1	0
	101	46

The thanks of the Council have been accorded to the Fellows who have acted as additional examiners or assisted the Board of Examiners, to the Assessors who have examined the papers

received from Associates applying for the Fellowship, and also to the following authorities for the use of laboratory and other accommodation: The Royal Technical College, Glasgow; The Technical College, Hull; The City Analyst, Liverpool; The College of Technology, Manchester; Natal University College; The Royal College of Science and the Royal School of Mines, London; and The University, Sheffield.

The Polytechnic, Regent Street, London, has been added to the list of Institutions recognised for the training of candidates for the examinations of the Institute.

The Committee has considered the views expressed at the Conference on "The place of Applied Chemistry in the training of chemists," held in January, and at the Conference held at York, in July, so far as they concerned the Regulations for the training and admission of candidates for the membership of the Institute. The Committee has recommended to the Council such modifications of the Regulations as were deemed desirable, and has under consideration the question of making provision for the admission as Associates of candidates who have long experience and high responsibility as chemists, but have not fulfilled the present requirements as to training.

MELDOLA MEDAL.—The Meldola Medal for 1925 has been awarded to Henry Phillips, D.Sc. (Lond.), A.I.C., and will be presented at the Annual General Meeting.

8. PUBLICATIONS COMMITTEE.

The duties of the Publications Committee now embrace those formerly entrusted to the Lectures and Library Committee.

The JOURNAL AND PROCEEDINGS has been published in six parts.

The Report of the Annual General Meeting and the President's address were published in Part II., which also included an article on Professional Designatory Letters by Mr. G. P. Cammiade. The Report of the Publications Committee on a Memorandum on Government Scientific Publications—received from the Science Advisory Committee of the Joint Research and Information Department of the Trades Union Congress and Labour Party—was published in Part III.; the Report of the Conference held at York in July appeared in Part IV.; an abstract of the Annual Report of the Department of Scientific and Industrial

Research, in Part V.; and an interesting note on the Code of Ethics adopted in the American Institute of Chemists, in Part VI.

In addition to the Proceedings of the Council and abstracts of Reports on Examinations, the Journal has also included records of the meetings of the Local Sections, with abstracts of many of the papers read before them.

The Report of the Conference held in January on the place of applied chemistry in the training of chemists was published in May. Mr. Marlow's notes on Contracts of Service were also published in the same month.

The Committee hopes to make arrangements for a lecture to be given by Mr. E. J. MacGillivray in March on "Copyright"—with special reference to the rights of authors of technical papers read before Scientific Societies, and of monographs and text-books on scientific subjects.

The thanks of the Council are again accorded to the Chemical Society for allowing the members and students of the Institute to continue the use of the Library of the Society, towards the maintenance of which a further contribution of £250 has been made from the general funds of the Institute.

The Committee is greatly indebted to authors and publishers who have kindly presented copies of books to the Library during the year, and also to Mr. John Sanderson for the presentation of Journals, and Mr. John Wilson (of North Harrow), for the use of his copies of the *Berichte*.

9. PUBLIC APPOINTMENTS COMMITTEE.

Reference has already been made to the co-operation of the Public Appointments Committee with the Legal and Parliamentary Committee on matters relating to Northern Ireland.

The Public Appointments Committee has also advised the Council on the proceedings of authorities relating to official chemical appointments at home and in the Overseas Dominions, and representations have been made where considered desirable.

On the recommendation of the Committee, representatives of the Institute, mainly members of the Committee, conferred with representatives of the Ministry of Agriculture and Fisheries on the draft schedules to the proposed Fertilisers and Feeding Stuffs Bill, prepared by the Advisory Committee of the Ministry, and submitted many observations and criticisms thereon, for which the Council received the thanks of the Advisory Committee.

The Public Appointments Committee has considered the question of the fees allowed to professional chemists for attendance in Courts of Law for the purpose of giving evidence. The Council is indebted to Sir Archibald Bodkin, the Director of Public Prosecutions, for a statement on the subject, of which an abstract was published in JOURNAL, Part V., 1925 (p. 279).

It will be remembered that the Ministry of Health was approached by the Council in December, 1923, with regard to the desirability of the Institute being represented on the Advisory Committee concerned with the preparation of regulations under the proposed Therapeutics Substances Act, which refers to the manufacture, sale and importation of vaccines, sera and other therapeutic substances. Clause 4 of the Act which was passed during 1925 provides for the representation of several institutions, including the Institute, on the Advisory Committee, but the Council has not yet been asked to appoint a representative.

A Memorandum forwarded to the Royal Commission on National Health Insurance, on behalf of public analysts who are entrusted with the analysis of prescribed medicines under the Sale of Food and Drugs Acts, was also published in Part V.

10. NATIONAL CERTIFICATES IN CHEMISTRY.

An abstract of the Report of the Assessors on Examinations for National Certificates in England and Wales, 1925, was published in the JOURNAL, Part IV., p. 261.

The first Examinations for National Certificates have been held in conjunction with the Scottish Education Department.

The arrangements with the Ministry of Education for Northern Ireland for the adoption of a similar scheme have been completed, and it is probable that the first examination will be held during 1926.

11. LOCAL SECTIONS.

The Council notes with satisfaction the continued activity of the Local Sections.

The President has attended meetings at Birmingham, Edinburgh, Glasgow, Liverpool, and Manchester; the Registrar has visited the Belfast, Birmingham, Dublin, Edinburgh, Glasgow, Huddersfield, and Leeds Sections. Mr. Marlow, before his resignation from the position of Assistant Secretary, visited

Belfast and Dublin, and his successor, Mr. R. L. Collett, has visited the Manchester Section.

The Students' Association, London, in which the London and South-Eastern Counties Section takes a special interest, has provided lectures, debates and social functions. The Association is indebted to many companies and firms who have allowed its members to visit works and have kindly entertained them.

12. HONORARY CORRESPONDING SECRETARIES.

The thanks of the Council are accorded to the Honorary Corresponding Secretaries for the help which they have kindly given to the Council and Officers of the Institute during the year.

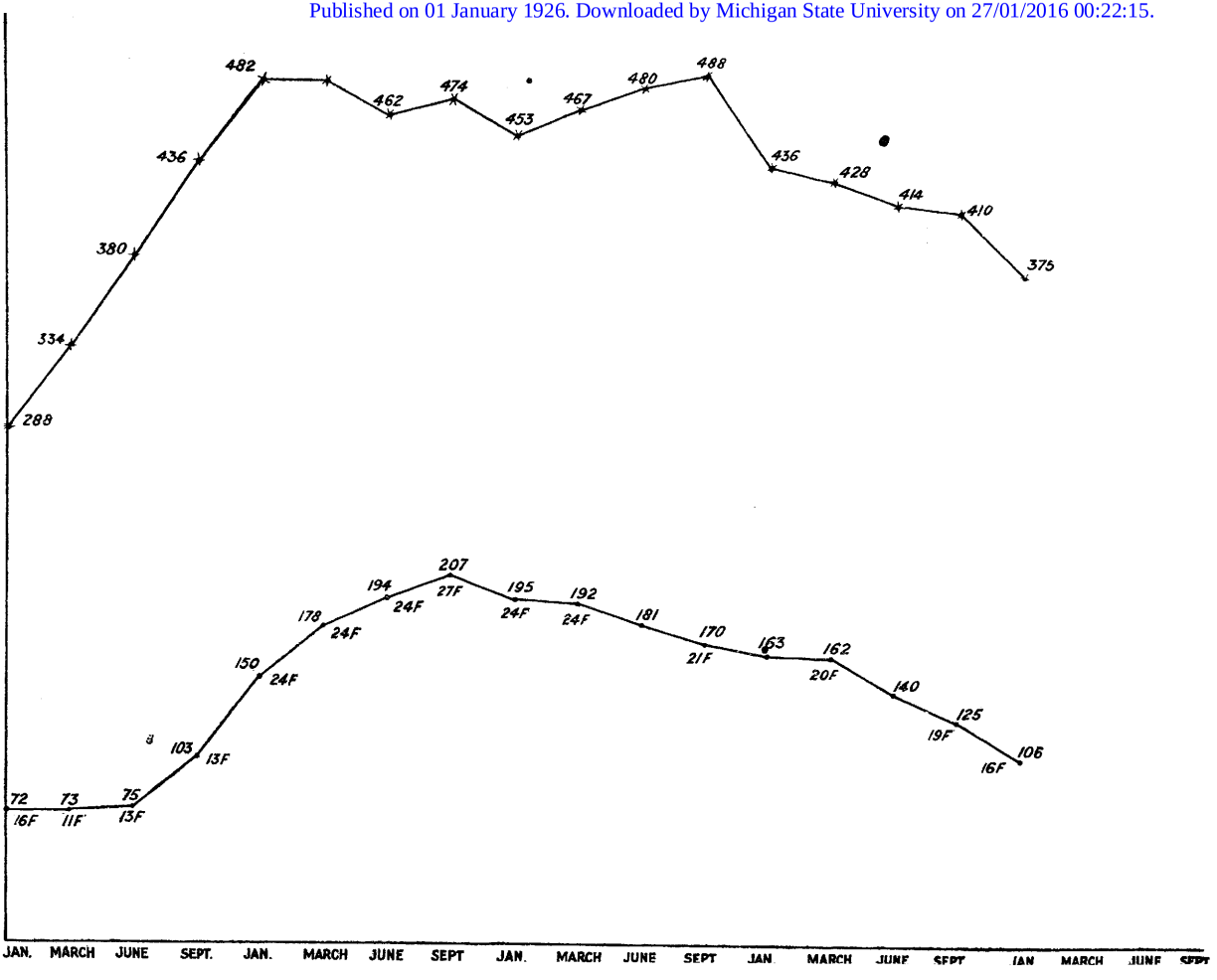
Dr. John McCrae, on resigning from the position of Honorary Corresponding Secretary for the Transvaal, has received the thanks of the Council for the valuable service which he has rendered the Institute in that capacity.

13. APPOINTMENTS REGISTER.

The number of members without appointment at the date of this report is 16 Fellows and 90 Associates, compared with 20 Fellows and 163 Associates at the corresponding date in 1925. Notwithstanding the increase in membership, the Appointments Register has been used by fewer members. The number of appointments available for chemists appears to be increasing. The Council will be glad if Fellows and Associates will continue to inform the Registrar of suitable vacancies.

The accompanying curves illustrate the state of the Appointments Register since January, 1922, at which date the period of trade depression began to have a marked effect on the employment of chemists. The upper curve shows the total numbers of Fellows and Associates on the Appointments Register at any date, including both those definitely out of employment and those wishing to obtain better positions.

The lower curve shows the total numbers of Fellows and Associates actually out of employment, the figures below the curve indicating the numbers of Fellows. These numbers may not be strictly accurate, as they only include those who have definitely informed the Institute that they are out of employment; there may be others who have taken positions not strictly connected with chemical work.



The following table gives the numbers out of employment in percentages of the total membership:

	Total Membership.	*Unemployed.*
January, 1922	3641	1·9 per cent.
,, 1923	4062	3·69 ,,
,, 1924	4399	4·43 ,,
,, 1925	4708	3·30 ,,
,, 1926	4943	2·14 ,,

It will be seen that there has been a decided improvement since the worst period, at the beginning of 1924.

14. SIR GEORGE BEILBY MEMORIAL FUND.

In order to establish a memorial to Sir George Beilby, an appeal has been issued, jointly by the Institute, the Society of Chemical Industry, and the Institute of Metals, for contributions towards a fund, from which, at intervals to be determined by the administrators, substantial awards will be made to mark appreciation of records of distinguished work in science. The awards will be made with particular regard to the special interests of Sir George Beilby—applied chemistry, chemical engineering, and metallurgy.

The amount received and promised for this Fund to date is £1487 18*s.* 0*d.*

The Fund will be administered by a Joint Committee appointed by the Councils of the three Bodies concerned.

30, Russell Square,
London, W.C.1.
29*th January*, 1926.

REPORT OF AUDITORS.

We hereby report that we have examined the books and accounts of the Institute of Chemistry for the year ended 31st December, 1925, and have compared with the vouchers the entries therein, and certify that the following statements are correct as shown by the books. Certificates from the Bank of England and the Westminster Bank, Ltd., for investments held by them respectively for the Institute at the above date have been produced.

CHAS. T. ABELL } *Hon. Auditors,*
A. G. FRANCIS } 1925–1926.

DAVID HENDERSON,
Chartered Accountant.

11*th January*, 1926.

THE INSTITUTE OF CHEMISTRY OF GREAT BRITAIN AND IRELAND.

Founded 1887. *Incorporated by Royal Charter, 1885.*

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDED 31ST DECEMBER, 1925.

GENERAL ACCOUNT

1924.	RECEIPTS.	£ s. d.	£ s. d.
	Subscriptions—		
2,523 3 0	Fellows'	2,552 11 0	
4,407 19 11	Associates'	4,860 9 3	
411 5 0	Students'	382 10 0	
			7,795 10 3
	Dividends and Interest—		
	(£637 19 5) Gross	686 0 11	
	(£91 15 1) Less Tax	94 3 10	
546 4 4			591 17 1
31 17 4	Sale of Publications		15 3 8
22 5 6	Sundry Receipts		7 8 5
481 18 0	Hire of Laboratories and Rooms		569 3 6
942 13 0	Examination and Assessment Fees		804 11 0
315 14 6	Appointments Register		262 15 6
168 15 0	Advertisements in Journal		106 18 0
51 11 2	Balance of Library Fund Account, 1923		—
9,903 6 9			10,153 7 5
	Balance at 31st December, 1924	733 2 7	
	Plus Moiety of Register, 1925	270 11 1	
	and Two-thirds of "O.C.A.," 1925 and 1926	424 2 10	
419 8 8			1,427 16 6
	Funds for Investment—		
1,034 5 0	Entrance Fees	891 9 0	
127 1 0	Life Compositions	109 4 0	
	Interest on Legacy of Sir A. Pedler	80 0 0	
			1,080 13 0
1,000 0 0	Bequest of the late Edward Riley		—
	Fees on applications in abeyance—		
109 4 0	Fellowship	84 0 0	
93 9 0	Associateship	97 2 6	
			181 2 6
24 3 0	Fees Retained		30 9 0
£12,710 17 5			£12,873 8 5

1924.	EXPENDITURE.	£ s. d.	£ s. d.
	Printing, Stationery, Office Books, etc.—		
524 13 8	Journal, Part VI., 1924; Parts I-V., 1925	520 5 5	
405 7 8	Other Printing, Stationery, etc.	379 5 10	
			899 11 3
	Postage—		
200 9 8	Journal	185 19 7	
477 18 7	Ordinary	413 17 5	
			599 17 0
270 11 2	Register (Moiety)		270 11 1
300 0 0	Rent		300 0 0
212 1 6	Official Chemical Appointments (One-third)		212 1 5
487 3 4	Rates and Taxes		512 14 11
114 9 5	Insurance		101 16 6
172 17 4	Repairs, House and Furnishing		306 3 2
3,900 15 3	Salaries, Wages and Gratuities		4,109 3 3
62 11 0	Advertisements		85 4 3
365 3 6	Gas, Water, Light and Fuel		350 1 8
28 5 4	Telephone		26 1 0
595 0 6	Examiners, Assessors and Assistants (Fees and Expenses)		542 10 10
136 7 3	Apparatus and Materials		250 11 11
353 12 1	Library (including £250 to Chemical Society)		275 1 0
217 7 0	Local Sections		453 5 11
75 0 0	Donations		71 0 0
41 3 3	Miscellaneous		62 14 3
120 0 1	Officers' Travelling Expenses, Fares, etc.		249 16 11
26 5 0	Auditor's Honorarium		26 5 0
55 6 0	Lectures and Lantern Slides		84 11 6
	Legal Expenses (1922-25)		56 13 7
97 10 11	Members of Council Travelling Expenses		158 6 1
119 8 9	Staff Assurance		163 13 4
9,359 8 3			10,167 15 10
321 12 1	Repairs and House (1924 account)		85 17 11
119 3 0	Conferences		113 4 2
31 10 0	Application Fees returned on 1924 account		19 8 6
110 8 4	Redemption Fund Premium		110 8 4
	Purchase of Stock—		
	£500 L.M.S. Railway 5% Redeemable Pref. 1955	503 0 0	
	£1,500 3½% Conversion Stock	1,158 5 3	
1,167 14 9			1,661 5 3
73 4 6	Office Equipment		32 16 6
100 0 0	Special Honorarium		
733 2 7	Balance at 31st December, 1925	470 10 6	
270 11 1	*Plus* Moiety of Register, 1925		
424 2 10	One-third of "O.C.A.," 1926	212 1 5	
			682 11 11
£12,710 17 5			£12,873 8 5

STATEMENT OF ASSETS AND LIABILITIES, 31st Dec., 1925.

1924.				£	s.	d.
733	*2*	*7*	Balance	470	10	6
3,060	*0*	*0*	£3,000 Victoria 5% Inscribed Stock, 1935-45 ..	2,970	0	0
960	*0*	*0*	£1,000 New Zealand 4% Inscribed Stock, 1929 ..	960	0	0
567	*0*	*0*	£700 Canada 3½% Registered Stock, 1930-50 ..	560	0	0
402	*10*	*0*	£500 Metropolitan 3% Consolidated Stock ..	395	0	0
265	*0*	*0*	£500 Great Western Railway 2½% Debenture Stock	250	0	0
			*£500 London Midland & Scottish Railway 5% Redeemable Preference Stock, 1955	460	0	0
939	*4*	*1*	£1,145 7s. 6d. London Midland & Scottish Railway 4% Preference Stock ..	824	13	4
4,060	*0*	*0*	£4,000 5% War Loan, 1929-47 Inscribed Stock ..	4,010	0	0
518	*15*	*0*	£500 War Savings Certificates	525	0	0
1,055	*0*	*0*	£1,000 National War Bonds, 1929, Series 4	1,045	0	0
1,771	*17*	*6*	†£3,750 Conversion 3½% Stock	2,812	10	0
61	*3*	*2*	Sundry Accounts due ..	140	4	4
530	*0*	*0*	§Redemption Fund ..	640	8	4
£14,923	*12*	*4*		£16,063	6	6

1924.				£	s.	d.
			Subscriptions received in advance—			
54	*12*	*0*	Fellows' 57 4 6			
69	*17*	*0*	Associates' 92 13 3			
0	*15*	*0*	Students' 5 0 0			
				154	17	9
202	*13*	*0*	Applications in abeyance ..	181	2	6
81	*18*	*0*	Fees retained (1924-25) ..	112	7	0
75	*0*	*0*	Rent outstanding ..	75	0	0
74	*9*	*11*	Accounts rendered and due	98	9	1
			Accounts outstanding, estimated at 31st December, 1924, including repairs			
80	*0*	*0*	and alterations, 1923 ..	—		
			Members of Council travelling Expenses Fund, amount unexpended (*now merged in the General Account*)	—		
213	*14*	*5*				
			Excess of Assets over Liabilities as at 31st December, 1925 ..	15,441	10	2
£14,923	*12*	*4*		£16,063	6	6

• New Holding. Cost £503 0*s.* 0*d.* † Holding increased by £1,500 0*s.* 0*d.* Cost £1,158 5*s.* 3*d.* § To realise £50,000 in March, 2010.

The Statement above does not include the value of the lease and premises of the Institute, Furniture, Library, Apparatus, etc.

The above investments have been valued at market prices at close of business on 31st Dec., 1925.

BENEVOLENT FUND ACCOUNT, for the year ended 31st Dec., 1925.

Current Account.

	£	s.	d.		£	s.	d.
Balance at 31st Dec., 1924	103	2	7	Grants	283	15	0
Subscriptions to 31st Dec., 1925	508	17	3	Printing, etc.	21	1	6
Annual Subscriptions to 31st Dec., 1925 ..	154	8	6	Balance of Loans (see below)	45	10	0
				Balance at 31st Dec., 1925 .. 411 11 10			
				In hand 4 10 0			
					416	1	10
	£766	8	4		£766	8	4

Loans Account.

	£	s.	d.		£	s.	d.
Loans repaid to 31st Dec., 1925	21	10	0	Loans	67	0	0
Dr. balance deducted from Current Account	45	10	0				
	£67	0	0		£67	0	0

Annuities Capital Account.

	£	s.	d.		£	s.	d.
Donations to 31st Dec., 1925	130	3	9	Dr. Balance at 31st Dec., 1924	90	1	0
Dividends and Interest	48	0	6	Annuity paid	13	0	0
Repayment of Income Tax	2	5	0	Balance at 31st Dec., 1925	77	8	3
	£180	9	3		£180	9	3

STATEMENT OF ASSETS AND LIABILITIES, 31st Dec., 1925.

Current Account.

Assets.	£	s.	d.	Liabilities.	£	s.	d.
Balances at Bank—							
Current	16	1	10	Printing for 1925 Pamphlet	21	3	0
Deposit	400	0	0	Excess of Assets over Liabilities	394	18	10
	£416	1	10		£416	1	10

Loans Account.

Assets.	£	s.	d.	Liabilities.	£	s.	d.
Loans (1918-1925)	442	0	0	Loans repaid to 31st Dec., 1925	66	0	0
				Loans outstanding	376	0	0
	£442	0	0		£442	0	0

Annuities Capital Account.

Assets.	£	s.	d.	Liabilities.	£	s.	d.
*£533 19s. 10d. India 5½% 1932 at 100	533	19	10	Excess of Assets over Liabilities	820	8	1
†£200 Nat. War Bonds, Series 4, 1929, at 104½	209	0	0				
Balance at Bank, Current	77	8	3				
	£820	8	1		£820	8	1

* Cost: £500.

† Cost: £215 7s. 8d.

Proceedings of the Council.

DECEMBER, 1925—JANUARY, 1926.

Nomination of the Council, 1926-1927.—The balloting list for the election of the Officers, Council and Censors at the Annual General Meeting on the 1st March has been prepared and issued to the Fellows and Associates. Members who desire to vote are required to return their voting papers to the Secretary so that they be received at the Institute not later than 4.30 p.m. on Saturday, 27th February.

Messrs. Harley F. Knight and J. H. Lane have been appointed Scrutineers for this election.

Publicity.—The Council has appointed the Registrar to represent the Institute at a Conference arranged by the British Association for the Advancement of Science and the British Science Guild, to consider the possibility or desirability of establishing a news service for science, under the guidance of scientific organisations.

The Conference was held on 11th February, when it was decided to appoint a Committee to prepare an estimate as to the cost of establishing and maintaining such a news service, and the revenue likely to be available from endowment or payment for contributions.

Congress of Chemists.—The Council has agreed to co-operate with the Society of Chemical Industry in organising a Congress of Chemists to be held in London during the week commencing 19th July, and has appointed the President to act as the representative of the Institute in this matter, and Professor Arthur Smithells to act in the absence of the President.

Feeding Stuffs.—Mr. F. W. F. Arnaud has been appointed to serve as representative of the Institute on an Unofficial Committee of chemical experts to secure an agreed process for the determination of the percentage of fibre in feeding stuffs,

in view of the proposed new Fertilisers and Feeding Stuffs Bill which, if passed, will require prescription of a method for such determination.

Registration.—The Council has received a statement on "The registration of chemists," prepared by the Manchester and Liverpool Sections of the Institute, which will be considered at the meeting of Council to be held at the close of this month.

Milk.—Mr. E. M. Hawkins has been appointed to represent the Institute at a meeting convened by the National Clean Milk Society in order to make arrangements for a Conference to consider the actual condition of the National Milk Supply and what steps should be taken in order to bring about any improvement that may be deemed necessary.

The Optical Convention, 1926.—The third Optical Convention is to be held at the Imperial College of Science and Technology during the week of 12th to 17th April, 1926, inclusive; and "Particulars of Membership" of the Convention are now being generally issued.

The programme includes an address by the President,—Sir Frank Dyson, F.R.S., Astronomer Royal; meetings for the reading and discussion of a large number of papers on optical subjects which have been promised; and a series of lectures of a popular character.

A volume of Proceedings and a Catalogue of the Exhibition will be published.

The Exhibition is to be in three sections, including, (1) Exhibits of an experimental or research character, (2) Instruments of historic interest, and (3) The commercial section, including exhibits by British manufacturing firms in all branches of the Optical trade.

A special entertainments section is being arranged with the co-operation of Captain Clive Maskelyne of St. George's Hall, and of the Director and students of the Royal Academy of Dramatic Art, in which dramatic performances, incorporating various interesting optical illusions, are being specially composed for presentation at the Convention.

Enquiries should be addressed to the Secretary, The Optical Convention (1926), 1 Lowther Gardens, Exhibition Road, London, S.W. 7.

Local Sections.

Belfast and District.—At the meeting of the Section held on the 28th October, following the Annual General Meeting, a resolution was passed requesting the Council to consider the feasibility of reducing the annual subscription of members.

In the general discussion, reference was made to the relation between the cost of living and salaries, compared with pre-war times, and to the remission of certain fees by other Societies. The view was emphasised that a decrease in subscription would result in an increased inflow of members, which would counterbalance the effect of reducing the subscriptions, apart from the desirability of bringing all qualified chemists into the Institute.

At the same meeting, and also on the 16th December, the Section discussed the relations of Local Sections to headquarters. The Chairman, Mr. A. Percy Hoskins, in introducing the discussion, dealt mainly with the functions of District Members of Council. Dr. Gibson proposed, and Dr. Cashmore seconded a motion to the effect that District Members of Council for districts which have legal and parliamentary institutions distinct from the Imperial Parliament should be elected members of the Legal and Parliamentary Committee.*

The Chairman, Mr. Bainbridge, and Mr. Totton took part in the discussion of the motion which was carried *nem. con.*

Dr. Gibson then proposed, and Mr. Totton seconded, a motion to the effect that sub-committees of certain of the Committees,—such as the Nominations, Examinations and Institutions Committee and the Public Appointments Committee—should be appointed to visit important centres in order to investigate applications for membership, and questions such as are usually considered by the Public Appointments Committee, and to make recommendations to the main Committees which could generally be attended only by London members. It was

*NOTE.—It has been the practice of the Council to accede to the request of any Member of Council to serve on any Committee.

suggested that the business of the main Committees might thereby be accelerated, since a quorum might easily be got together in such districts to deal with local cases and matters. It was held that District Members of Council were best able to afford information with regard to provincial chemists applying for membership.

Mr. Honneyman suggested that the Nominations, Examinations and Institutions Committee, upon receiving an application for membership, should apply as a matter of regular procedure to the Committee of the Local Section, in whose area the applicant resided, for a report on the application, before coming to a decision. He moved that the mention of that Committee be deleted from the motion. This amendment was seconded by Mr. Bainbridge and adopted.

Dr. Gibson then proposed, and Mr. Brierley seconded, a motion to the effect that the Council should hold special meetings to review the position of each district, that the Council should as far as possible instruct District Members of Council on the policy to be pursued on business brought forward, and authorise them to appoint such local deputations as might be necessary.

The resolution was carried by the casting vote of the Chairman.

Dr. Gibson proposed, and Mr. Bainbridge seconded,—"That the whole of the expenses of Members of Council attending meetings should be defrayed by the Council, according to a scale to be drawn up."

Mr. Honneyman said that he observed there was a surplus in the sum allocated by the Council to travelling expenses of members of Council. He believed that only railway fares were paid by the Institute, but he had no definite information. The proposal would be only fair to members of Council residing at a distance from London.

The resolution was carried unanimously.

At the meeting held on the 16th December, Dr. Gibson opened a discussion on chemical publications.

Dr. Gibson said that the question of Chemical Publications was one of the most pressing problems to be solved. The problem was to bring about an efficient and uniform system of dealing with chemical publications without interfering with the freedom and individuality of the various societies. The majority of readers were industrial chemists who used publications as sources of information, and who wanted to be able to

obtain with rapidity all the up-to-date information available on a certain point. They wanted as little duplication as possible and they wanted good abstracts suitable for filing; they also wanted this service as cheaply as possible. At the moment there did not appear to be much hope of complete amalgamation of societies, which was one way in which the desired end could be achieved, but he had an alternative suggestion.

Let all the existing societies which publish journals and as many more as may spring up in the future retain their separate existence and let them continue all their individual characteristics so dear to them. Let there be, however, one chemical body, preferably an impartial one and a non-publishing one—why not the Institute?—to act as a clearing house. The procedure would be something like this: *A* writes a paper which he wants to publish. He sends it to the clearing house, accompanied by a fee, say 5*s*. and a statement that he wants it submitted to a certain Society, say the Chemical Society. The paper is manifolded (for example) to the extent of 200 copies. A copy is sent to each of a number of centres at which chemists congregate,—Universities, Local Sections, etc.—and copies are sent to the Society which the author has selected. Whatever the result of the referee's decision the author gets his views published to the extent of the 200 copies. He thought this was only fair. It would also be an excellent plan if the author were always required to send in with his paper a summary of a definite length. This would also be duplicated and sent to all the centres and to the abstracts bureau with the original paper. This would make new information available to all chemists with the minimum loss of time. This was a point of great importance to the industrial chemist, and at times might be of almost priceless value to him. He had often seen papers published months after their receipt by a society that had then been quite useless to him, but which would have been very useful and have saved him valuable time if he had seen them soon after they were written. The author would be able also to read his paper at one at least of the 200 centres and useful discussion would ensue. Only a small fraction of papers was now read by authors,—a thoroughly bad thing for all concerned. Naturally, if possible, an author wanted to read his paper at the rooms of the Society which he hoped would publish it, or failing that, at a local centre where the members of that society met. The various

Societies receiving their papers from the clearing house could spend longer in scrutinising them and could be more severe in selection. This plan for immediate dissemination of papers would obviate the necessity of such frequent publication of journals, which could then be conveniently published bound, either quarterly or half yearly. This would save much postage to the societies and expense to the members.

Coming to the question of Abstracts, he had a suggestion to make which in his opinion would greatly enhance their usefulness.

He would publish abstracts on the left hand pages of the Journal, the opposite right hand pages being given up to advertisements. Advertisers would find these spaces valuable; they could get their advertisements in a position so that they would be read by the particular type of chemist to whom they desired to appeal. The abstracts should be of standard width to fit index cards. The busy chemist could then blue pencil those abstracts which were useful to him and they could be cut out later by the office boy, affixed to cards, and filed. Usually only a portion of the abstracts published were useful to a chemist in his particular line, and this suggestion would make these easily available, and would not make the journals any less useful for general reference. The present system precluded any such cutting out. In conclusion, he was glad to observe that some attempt was being made to improve matters, but very much remained to be done to make chemical publications cheap and efficient as they should be.

A lively discussion followed.

The Chairman thanked Dr. Gibson for his paper which introduced several novel suggestions which, if they were adopted, would prove of very great value to chemists.

Birmingham and Midlands.—A concert and social evening, arranged jointly with the Local Section of the British Association of Chemists, took place on the 3rd February at the Queen's Hotel, Birmingham. A varied musical and dramatic programme was enjoyed by over 100 members and friends. Mr. A. W. Knapp presided, and Dr. W. Wardlaw, in proposing a vote of thanks to the Chairman, acknowledged the work of Mr. A. W. Knapp and Mr. J. R. Johnson in making arrangements for the entertainment.

On 6th February, the annual dinner was held at the Engineer's Club, under the auspices of the Local Sections of the Institute and the Society of Chemical Industry. Nearly 100 chemists and guests were present. Prof. A. R. Ling, Chairman of the Local Section of the Institute, presided, and among the guests were Mr. W. J. U. Woolcock, President of the Society of Chemical Industry, and Mr. R. L. Collett, Assistant Secretary of the Institute. The toast of the Society of Chemical Industry, proposed by Sir Richard Threlfall, was acknowledged by Mr. Woolcock; that of the Institute was proposed by Prof. W. N. Haworth.

Prof. Haworth referred to the high standard of attainment required by the Institute for admission to membership, and eulogised its ideals as helping to make chemistry a great factor in the life of the nation. Chemistry was a great cultural study, and he deprecated any cutting down of the teaching of the fundamentals of the science. He was glad to see that the Institute recognised this, and would not admit to the Associateship those holding degrees in applied chemistry unless they could produce definite evidence of a competent knowledge of pure chemistry.

Mr. Collett, replying on behalf of the Institute, said that Prof. Henderson, the President, wished him to express his disappointment at not being able to be present. The Institute claimed that its members were entitled to be treated as professional men because of their qualifications and because they were pledged to conform to a certain standard of professional decorum. The Institute regarded itself as primarily charged with the welfare of the personnel on which both pure chemistry and chemical industry depended. The Appointments Register was becoming generally recognised as the best medium by which employers could obtain the services of chemists, and he was glad to be able to say that the number unemployed had decreased to about half that it was at the worst time, viz. at the beginning of 1924, in spite of the fact that the membership had increased. The total roll now included nearly 5000 members. He was glad to be present at the dinner which provided an opportunity for chemists of all kinds to meet one another under delightful conditions.

The toast of "The Guests," proposed by the Chairman, was acknowledged by Dr. W. E. Sumpner (Principal of the Municipal Technical School).

Dr. G. T. Morgan proposed the toast of "The Chairman," and also of "The Honorary Secretaries," to which Prof. Ling and Messrs. C. J. House and George King replied.

Bristol and South-Western Counties.—The fifth meeting of the session was held jointly with the Bristol Section of the Society of Chemical Industry on the 7th January in the Chemical Department of Bristol University. Sir Ernest Cook presided over a large attendance, and a paper, which was illustrated by lantern slides, was given by Mr. Stanley Robson on "The Contact Process for the Manufacture of Sulphuric Acid."

After referring to the early history of the contact process, Mr. Robson mentioned that the first factory to work it on a large scale was the Badische Anilin und Soda Fabrik. Many other processes arose as rivals to the Badische process. A number of these were described and illustrated. It was thought originally that the development of the contact process would immediately oust the old-established chamber process; but this had not proved to be the case, except where the manufacture of concentrated acid or oleum was concerned. The development of engineering science had, however, made it possible to work with considerably greater mechanical efficiency, which would inevitably lead to more extensive use of the contact process. Modern contact plants, moreover, were able to manufacture acid from metallurgical fumes which hitherto had not been capable of treatment. The chamber system was inherently unable to deal with cold and wet gases, and was at a disadvantage with regard to weak and dust-laden gases. There would undoubtedly be an increasing amount of acid made from such waste gases, and this could only be satisfactorily carried out by the contact process.

Messrs. Lewis, Littlefield and others participated in the discussion which followed.

A hearty vote of thanks was accorded Mr. Robson on the proposition of the Chairman, seconded by Mr. George Gray.

Irish Free State.—Prof. W. E. Adeney presided at a meeting of the Section, held on 3rd February, when Mr. J. J. Sheehan read a paper on "Chemical Control in the Beet Sugar Industry."

Mr. Sheehan, who had gained his experience of the industry by work in the control laboratory of a "10,000 ton factory" in the United States, described, with the aid of lantern slides, the

stages in the production of sugar from beet:—Sampling of beets as delivered by the farmers, mechanical weighing and conveying, slicing, diffusion battery extraction, liming and carbonation, filter pressing, concentration in multiple evaporators, centrifuging and drying of the sugar crystals.

The personnel of the chemical control laboratory consisted of ten chemists working in three shifts of eight hours each, work being carried on night and day, and seven days a week, over a campaign of one hundred days. The number of laboratory control tests carried through in the campaign was about 21,700. To achieve such efficiency in control, labour and time-saving devices had been installed in the laboratory to an almost incredible degree. Reagents in bottles were practically obsolete,—supplies of all necessary solutions, distilled water, and water at 20° F. being on tap at each working bench. Each chemist had the services of a boy for cleaning apparatus and running messages. Should a laboratory test show that some process in the factory was working unsatisfactorily the chemist immediately pulled a string which caused a bell to ring over the particular plant at fault; the bell continued to ring until the foreman in charge had rectified the trouble, and a subsequent test showed the process to be proceeding normally. Referring to the cultivation of beets in Ireland, Mr. Sheehan said that tests carried out in the State Laboratory on some 330 experimental plots under the direction of the Department of Lands and Agriculture showed a sugar content of from 16·8 to 17·4 per cent. Complete returns, however, were not yet available.

In America the farmers were paid on the weight of the beets supplied and were given a bonus if the average sugar content exceeded 15 per cent.

A hearty vote of thanks to Mr. Sheehan was followed by an interesting discussion on the future possibilities of the Industry in Ireland. Mr. Sheehan having replied to all the questions asked, the meeting terminated.

Leeds Area.—The annual meeting of the Section was held in the Great Northern Hotel, Leeds, on 12th January,—Prof. J. W. Cobb in the chair.

Messrs. H. B. Brown, H. J. Hodsman, A. Taylor, and J. T. Thomson were elected to fill vacancies on the Committee; Messrs. J. Firth and A. Clucas were elected Hon. Auditors, and Dr. R. B. Forster was re-elected Hon. Secretary.

Dr. Forster then addressed the meeting on "The Evolution of the Chemist and his Position in Industry." He showed that it was erroneous to say that *Chemistry* was the child of *Pharmacy*. He traced the evolution of the science from Egypt to Athens, and from there to Constantinople, whence it spread into Arabia. It was the founding of the Arab Caliphate in Cordova in the eighth century that firmly established the science in Europe From the Caliphate at Cordova sprang the Spanish Universities of Cordova, Seville and Toledo, which were visited by dilettanti philosophers from England, France and Germany: by this means the sphere of activity was extended to these countries.

In the fifteenth century two schools of thought sprang up, viz. the Iatro-Chemists, headed by Paracelsus, who wished to restrict the study of the science to the preparation of medicines; and the other, headed by Agricola, whose object was to advance the science both for its own sake and with a view to its application in industries. From the latter school arose such men as Boyle, Mayow, Stahl, Willis, Boerhaave, Black, Priestley, Cavendish, and Lavoisier.

Lavoisier might be described as a research chemist, works chemist and administrator. Dr. Forster contrasted the treatment meted out to Lavoisier and his brother philosophers by Robespierre, in 1794, with the attitude of Frederick William III, King of Prussia, to men of science a few years later. Lavoisier and 27 other members of the famous "Fermiers-généraux" were condemned to death by Coffinhal, who remarked "La République n'a pas besoin des savants"; whereas Frederick William, after Prussia had been laid waste by Napoleon, founded the University of Berlin and said "mann müsse, was der Staat an physischen Kräften verloren, durch geistige zu ersetzen suchen." A comparison of the chemical industries of France and Germany 100 years later supplied the best answer as to which was the better policy: "The Republic has no need for philosophers" or "What the State has lost in brawn we must make good in brains."

Dealing with the position of the chemist in industry, Dr. Forster said that Robert Boyle's dictum "Experiment must precede deduction" translated into modern English was "Research must precede manufacture": therein lay the secret of the German success. The Universities were the nurseries for research; without them there could be no research: therefore no manufacture, no industry and no position for the chemist

in industry. That was the position to which we were drifting in 1914. Since the war, conditions had changed for the better and a great many firms who did not employ chemists in pre-war days did so now, but, he was sorry to say, very much in the same sense as they employed book-keepers: they were expected to keep things running; whereas the chief function of the chemist should be to improve existing processes and if possible invent new ones.

In his opinion, the administrative posts in the chemical industry should, whenever possible, be held by chemists, because it was quite impossible for a man without a good knowledge of chemistry to understand the problems of a chemical works. In support of this argument he mentioned a number of chemical firms which were successful only so long as they were controlled by chemists. It has been argued that if the manager of a chemical works was a purely commercial man, he could call in experts to advise him on technical points; but was it not easier for the chemist to understand the formalities of commerce than for the commercial man to understand the technicalities of science? Why not reverse the conditions, put the chemist in the position of Managing Director and let him call in external aid when he needs it? Although it was desirable to fill as many as possible of the administrative posts with chemists, every chemist was not necessarily a good administrator; but this type of man might be none the less valuable to his firm and therefore he should be able to attain as high a position and as large a salary in the laboratory, as his brother chemist did as an administrator. What did we find? The best men in the laboratory endeavoured to get into the administrative posts, the main reason being that the latter carried higher salaries. This was not as it ought to be. The better a man was in the laboratory or works, the more the reason that he should stay there, and he would do so if he were offered sufficient inducement. It was the men that were not so suited to the laboratory that should be moved, not up, but down to the administrative posts.

In other words, it should not be necessary for a chemist to forsake his own calling to obtain a lucrative position.

Liverpool.—A "Liverpool Chemistry Dinner" was held at the Midland Adelphi Hotel on 19th December last, under the auspices of the Liverpool Sections of the Institute of

Chemistry, the Society of Chemical Industry and the British Association of Chemists.

Prof. W. H. Roberts, Chairman of the Liverpool Section of the Society of Chemical Industry, presided over a large gathering. The guests included the Lady Mayoress and the Presidents of the three organisations; the Lord Mayor was prevented by illness from attending.

The toast of "The City of Liverpool" was proposed by Mr. W. J. Uglow Woolcock, C.B.E., President of the Society of Chemical Industry, and acknowledged by Alderman W. Muirhead, J.P., Chairman of the Liverpool Health Committee. The toast of "Our Guests" was proposed by the Chairman and acknowledged by Prof. G. G. Henderson, President of the Institute, and by Mr. C. S. Garland, President of the British Association of Chemists.

The remainder of the evening was devoted to dancing.

London and South-Eastern Counties—Mr. C. S. Garland, Chairman of the London Section of the Society of Chemical Industry, presided at a joint meeting of the Sections of the Institute and the Society on the 7th December, when Mr. W. J. U. Woolcock gave an address upon "Five Years of Progress in the Fine Chemical Industry."

He said that the development of the industry was hampered by flooding the country with foreign fine chemicals prior to the passing of the Safeguarding of Industries Act. Latterly, the disturbing factors were the longer working hours and lower wages paid to the workmen of foreign competitors and the depreciation, first of the German and later of the French exchange. He gave, however, the following evidence of substantial progress. Whereas in 1913 eleven firms in the industry had made 69,945 cwt. of fine chemicals, in 1924 eighteen firms had made 215,240 cwt. In 1913 four firms exported 17,851 cwt., and in 1924 eleven firms had exported 33,154. The value of the fine chemicals made in 1913 was £874,381; in 1924, £2,598,357. The value of imports had risen from £188,384 in 1913 to £570,675 in 1924. These figures related only to the chemicals in List H, published by the Association of British Chemical Manufacturers; and the real position as regards employment could not be shown owing to the fact that very few firms were wholly engaged in the manufacture of chemicals included in List H. The total number of workpeople engaged by fourteen firms manufacturing chemicals

in List H was 1394 in 1913, and 2975 in 1924—not including office staff, packers, and those engaged in distribution. Six additional firms had taken up the manufacture of these chemicals, and the number of workpeople had been increased to 3130.

The capital invested in thirteen firms in 1913 was £936,917; but these firms had increased their capital to £2,388,750 in 1924, i.e. an increase of 156 per cent. With the addition of six new firms the amount had been still further increased to £2,536,762. The number of individual substances now in List H which comprised the schedule to Part I. of the Safeguarding of Industries Act was 4969, which could be compared with 1334 substances made by sixteen British manufacturers in 1913. The Association of British Chemical Manufacturers published in 1922 a list of 1497 substances in List H made by British manufacturers, and in 1924 the number had increased to 2364.

In comparison with British production, the following figures for foreign production were given: In 1911, Kahlbaum's English List contained 2466 of the substances in List H, and in 1925, Kahlbaum's English List contained 503 of the substances in List H. Kahlbaum stated that the chemicals not mentioned in his 1925 List would be prepared, provided the purchaser agreed to take the whole quantity made at the price charged and provided the firm was in a position to procure the needed raw materials. British manufacturers would accept the same conditions. British firms now made 781 substances not included in Kahlbaum's List for 1911, and contemplated the production of 19 more. Another essential factor was that of price. Between 1920 and 1925 there had been price reductions varying from 15 to 55 per cent., while 569 commodities had actually been priced, and these showed a reduction between 1920 and 1925 amounting to 47 per cent. The reduction had been largest in organic chemicals.

Mr. Woolcock emphasised the fact that progress had been made, but it had been delayed by flooding the English market with enormous stocks of foreign fine chemicals, due to the prolonged notice that was given that the British Government was going to do something, whilst finally, although progress had been made, it was not sufficient. It was, however, an indication that, given the time and opportunity, we could develop in this country as good a fine chemical industry as could be developed in any other country.

Mr. Garland said that in considering the Safeguarding of

Industries Act a great deal depended upon the number of employees in an industry. On one occasion the President of the Board of Trade had stated that he would regard 2500 employees as the lowest limit of an industry which could be looked upon as of substantial importance. That was an example of the absurdity of endeavouring to estimate the importance of an industry by counting the noses of the people engaged in it.

Mr. F. H. Carr said that the chemists of the country would be to blame if they allowed England again to be placed in the position of dependence upon other countries for its chemical products in the same way that it was in 1914. Unfortunately, there was too much tendency on the part of those who should know better to decry British chemical products, and there had been some curious instances of this. Something more even than the Safeguarding of Industries Act was required in this country for the chemical industry. Certainly it would take more than the few years protection afforded by that Act to put the industry into the position it should be.

Prof. A. G. Green said he had just returned from America, and had been immensely impressed by the great impetus which had been given to chemical industry there, and especially to the fine chemical industry by the phenomenal development of the motor car industry.

Dr. Cox said that the figures showed that the fine chemical industry to-day was three times what it was before the war, that the wages paid were three times what they were pre-war, and that the capital involved was three times the pre-war figure. Really, the fine chemical industry should congratulate itself upon the rapid progress it had made, because not only did the figures show the increases to which he had referred, but British products now were equal to, and in many cases, better than the German fine chemicals.

Mr. Woolcock, in reply, said he preferred rather to understate than to overstate the case.

At a meeting held on 20th January, Dr. Stephen Miall opened a discussion upon "Collaboration between Chemical Organisations, with reference to the work of the Federal Council." He gave an historical survey of the steps which had led to the formation of the Union Internationale de Chimie Pure et Appliquée, of which the Federal Council was the British unit. He related the steps which had already been taken to secure

co-operation between the various chemical organisations in Great Britain.

Many members contributed to the discussion which ensued.

Manchester and District.—A meeting of the Section was held jointly with the Sections of the Society of Chemical Industry and the Society of Dyers and Colourists, and also the Manchester Literary and Philosophical Society, on the 6th November, at the Textile Institute. Mr. L. Guy Radcliffe, Chairman of the Local Section of the Society of Chemical Industry, presided.

A lecture, given by Sir William Bragg on "Long Chain Molecules," was greatly appreciated by a very large audience. In the discussion which followed, Dr. Levinstein, Dr. E. F. Armstrong, Prof. Lapworth, Prof. Robinson, Messrs. Radcliffe, Huebner, Harrison, Manley, and others participated. A vote of thanks to Sir William Bragg was carried with great enthusiasm.

A meeting of the Section was held on the 14th December at the Grand Hotel, Manchester, when Dr. Levinstein referred to the question of registration, and presented certificates to a number of new Associates. After the formal business, the evening was devoted to a "cabaret," which was attended by a large company of members and friends.

A meeting of the Section was held, on the 18th January, in the Rooms of the Manchester Literary and Philosophical Society —Dr. Levinstein in the chair—when a paper was read by Mr. C. Hollins on "Chemical Nomenclature."

Mr. Hollins pointed out that in adopting any scheme of chemical nomenclature it was necessary to bear in mind the purpose for which it was intended. The system adopted by the Bureau of Chemical Abstracts and the suggestions of Dr. A. M. Patterson for the numbering of ring systems were briefly reviewed, and a logical system of naming azo compounds was developed. A distinction was drawn between "parent names," which include no substituent groups, and "trivial names," such as toluene, aniline, salicylic acid, J-acid, etc. The conclusion was reached that (1) there should be a strictly logical system of nomenclature of international application, the principles of which should be easy to memorise; (2) this general system should be capable of modification to suit the requirements of different groups of chemical industries, the modification being

in one direction only, viz. the admission of special sets of "trivial names" readily translated back into the original strict system.

A discussion followed, at the close of which a vote of thanks proposed by Mr. L. G. Radcliffe, seconded by Mr. W. A. Silvester, was accorded to the lecturer.

Newcastle-on-Tyne and North-East Coast.—At a meeting of the Section held on the 20th January at Armstrong College—Dr. J. T. Dunn presiding—a very interesting lecture was delivered by Dr. J. A. Smythe on "The Crystallisation of Metals and Alloys." The lecture, which was illustrated by lantern slides, was much appreciated.

The Chairman announced that the Annual Dinner would be held jointly with the Local Section of the Society of Chemical Industry and the Newcastle Chemical Industry Club on the 26th March.

South Wales.—The following Officers and Committee have been appointed for 1925–26: Chairman, Prof. J. E. Coates; Committee, Messrs. C. A. Seyler, J. W. Adye, C. M. W. Grieb, J. R. Green, E. Anderson and Dr. L. E. Hinkel; Hon. Auditors, Messrs. E. A. Tyler and E. E. Ayling: Hon. Secretary and Treasurer, Mr. C. W. Wood. Mr. C. A. Seyler has been re-nominated as District Member of Council.

A Meeting of the Section was held at Swansea on 18th December at which the Chairman, Prof. J. E. Coates, announced that—in view of the fact that the official annual dinner of the local Sections of the Institute and Society of Chemical Industry was being held this session in Cardiff—the Committee had considered the opinions voiced at the Annual General Meeting and had decided to hold an informal dinner and smoking concert in Swansea towards the end of the session, at which ladies would be welcome.

The members later adjourned to a Joint Meeting with the South Wales Section of the Society of Chemical Industry, where Mr. Seyler presided and a very interesting paper on "Modern Resistance Glasses" was read by Mr. E. E. Ayling. The paper described the modern developments in research and manufacture of these types of glasses and was well illustrated with slides and specimens. An interesting discussion followed in which many members participated and the meeting terminated

with a vote of thanks to Mr. Ayling, moved by the Chairman Mr. C. A. Seyler.

Prof. J. E. Coates presided over a Joint Meeting of the South Wales Sections of the Institute and the Society of Chemical Industry, held at the Royal Institution, Swansea, on 22nd January, when Dr. Florence A. Mockeridge, of University College, Swansea, read an interesting paper, which was well illustrated with lantern slides, on "Some Economic Aspects of Botany."

Dr. Mockeridge dealt with the great economic value of botany to the trade of the country, and dealt particularly with the problems which the botanist referred to the chemist for solution. The value of the cultivation of plants under definite controlled conditions to meet the world's economic demands was explained. Modern methods were described of reclaiming waste lands and the prevention of land-slides by growing certain plants which alter the texture of the soil, thereby inducing the holding of rainfall, adding nitrogen to the soil, and forming organic matter, which induces beneficial bacterial action. The aesthetic and economic value of making plantations on such ugly sites as waste coal tips, and of modern afforestation schemes, and their relation to the water catchment areas, was described. Botany had shown how to gain the maximum economic value from such schemes.

Dr. Mockeridge discussed the effect of calcium, potassium and iron on plants, although these elements do not actually enter into the plant tissues, and emphasised the fact that their rôle is still unknown and that chemists must come to the aid of botanists, if this and many similar problems are to be solved, and the greatest wealth extracted from the land.

Notes.

Chemical Industry Club.—For the furthering of co-operation among chemical organisations, the President and Council have authorised the issue of a leaflet referring to the Chemical Industry Club, with a view to directing the attention of Fellows and Associates to the facilities afforded by the Club to members of the profession of chemistry.

Attention is directed to a recent publication by the Association of British Chemical Manufacturers entitled "Some British Fine Chemicals" produced by members of the Association, copies of which can be obtained on application to the General Manager, A.B.C.M., 116 Piccadilly, London, W.1.

The Association looks for the support of research chemists and other users of fine chemicals in their endeavours to build up and to maintain a successful fine chemical industry. The pamphlet does not contain a complete list of fine chemicals made in this country, but enumerates approximately 3,000 products of a section of the members of the Association.

Sir Robert Hadfield has been awarded the Cross of the Legion of Honour by the French Government in recognition of his contributions to metallurgy.

Mr. E. A. Mann has been elected a Member of the House of Representatives of the Commonwealth of Australia for the City of Perth, Western Australia.

Journal and Proceedings.—The Council cannot accept responsibility for the opinions expressed in papers and lectures reported in the JOURNAL AND PROCEEDINGS, and publication does not signify endorsement of those opinions.

January Examinations, 1926.

Summary of the Report of the Board of Examiners.

An Examination in General Chemistry for the Associateship was held at the Institute from 4th to 9th January, inclusive. Sixteen candidates were examined and seven passed:—

Adams, Frederick William, School of the Pharmaceutical Society, and Chelsea Polytechnic Institute.

Balmforth, Leonard, B.Sc. (Lond.), Trained under G. E. Johnson, B.Sc., F.I.C., at the Municipal Technical College, Hull.

Blood, John Walter, University College, Nottingham.

Riley, Thomas, The University, Liverpool.

Shipman, George Eric, B.Sc. (Lond.), Trained under G. E. Johnson, B.Sc., F.I.C., at the Municipal Technical College, Hull.

Walton, Thomas, Municipal Technical School, Blackburn.

Winterbottom, Edgar, B.Sc. (Manc.), The University, Manchester.

Four candidates were referred in the translation of French and German technical literature only.

INORGANIC CHEMISTRY.—In theoretical inorganic chemistry, there was one script of outstanding merit. With this exception, it was noteworthy that the more advanced questions were better answered than the elementary ones. Thus, in most of the answers to a question on nitrous anhydride there was not only a complete failure to grasp the point at issue, but also ignorance of elementary facts. As in previous examinations the answers to questions in physical chemistry were very unequal. In the practical inorganic exercises, the technique of the candidates was generally good. The methods of separation of lead and silver were not generally well chosen. The qualitative exercise was fairly well done; in two cases, exceptionally well done.

ORGANIC CHEMISTRY.—There were no written papers of outstanding merit, although the majority of candidates' answers were satisfactory. Very little was known concerning modern synthetic processes for producing methyl alcohol. Answers to the question on the chemical constitution of glucose and laevulose were often very hazy. The syntheses of certain organic compounds were better understood than the alternative

question on the use of three typical inorganic reagents in organic chemistry. In the practical examination, the results obtained in the quantitative estimation of lactose in solution were, in the majority of cases, marred by arithmetical errors in calculation. In the organic practical work generally, it is worthy of note that the best results were obtained by the candidates whose benches were the tidiest during the two days' work.

The following papers and exercises were set:—

MONDAY, 4th JANUARY, 1926: 10 *a.m. to* 1 *p.m.*

(FOUR *questions only to be attempted.*)

1. Give a short account of the preparation and constitution of the polythionic acids. Describe in detail methods for the preparation of barium dithionate and sodium tetrathionate.

2. State the chief sources of potassium salts and describe the methods of extraction and purification. Give details of a method for the preparation of a specimen of potassium chloride containing less than 0·1 per cent. of impurities.

3. Give an account, from the historical point of view, of the development of the conception of valency.

4. Mention three industrial operations in which gas analyses form part of the routine of control. Outline suitable methods for each of the three operations you select and give full details for one case.

5. Write a short essay on either (*a*) The mass spectrograph, (*b*) The relation between magnetic susceptibility and chemical constitution, or (*c*) Any recent work in inorganic or physical chemistry in which you are interested.

2 *to* 5 *p.m.*

(FOUR *questions only to be attempted.*)

1. Review the experimental evidence for and against the view that the gas obtained by the interaction of arsenious oxide and nitric acid (S.G. 1·35) is nitrous anhydride, N_2O_3.

2. Give methods for the quantitative determination of either (*a*) molybdenum and tungsten, from a mixture of molybdenum and tungsten oxides, or (*b*) arsenic, antimony and tin, from an alloy containing other metals.

3. Define K,Q,R, and T in the van't Hoff equation $\frac{d\ (\log K)}{dT} = \frac{Q}{RT^2}$ and give an outline of the proof (full proof not required). Give an account of some of the applications of this expression.

4. Describe the construction and use of the hydrogen concentration cell and shew how it can be applied to the determination of the ionic product for water.

5. Describe the sources, mode of extraction and purification of either (*a*) arsenious oxide, or (*b*) bismuth.

TUESDAY, 5th JANUARY, 1926: 10 *a.m. to* 1 *p.m.*

(*Questions Nos. 5 and 6 are alternatives.*)

1. What contributions to organic chemistry are associated with the names of the following chemists:—Bunsen, E. Frankland and V. Meyer.

2. Describe the methods now available for the large scale production of methyl alcohol. Outline TWO industrial processes in which this alcohol is used as a reagent.

3. What is implied by the term "quinone?" Describe the preparation of any TWO representative quinones. Indicate briefly why this group of substances is of interest in connexion with hypotheses concerning colour and chemical constitution.

4. Write a concise essay of about 700 words on ONE of the following topics: (*a*) Dynamic isomerism, (*b*) Chemical constitution of glucose and laevulose.

5. Give an account of the production from natural sources and of the synthesis of any TWO of the following organic compounds : (*a*) nicotine, (*b*) citric acid, (*c*) caffeine, (*d*) adrenaline (suprarenine or epinephrine)

or

6. Illustrate the employment in organic chemistry of the following inorganic reagents:—(*a*) thionyl chloride, (*b*) chlorosulphonic acid, (*c*) sodium hydrosulphite, $Na_2S_2O_4$.

WEDNESDAY, 6th JANUARY, 1926: 10 *a.m. to* 4.30 *p.m.*

1. Solution C contains an organic compound. Ascertain to which class of carbon derivatives it belongs and if possible, identify it. (*Lactose*).

2. Determine the amount of this organic compound in solution C expressing your result in grams per litre.

THURSDAY, 7th JANUARY, 1926 : 10 *a.m. to* 4.30 *p.m.*

Identify the two organic compounds which are the components of material D (D′: *p-cresol* and *o-toluidine*, D″: *m-cresol* and *p-toluidine*.

FRIDAY, 8th JANUARY, 1926: 10 *a.m. to* 4.30 *p.m.*

Solution A contains a mixture of silver and lead nitrates. Determine the amount of each metal, expressing the result as grams of metal per 100 grams of solution. One of the metals (at choice of the candidate) is to be determined by two different methods.

(*This exercise may be completed to-morrow, but the methods proposed must be notified to the examiner to-day.*)

SATURDAY, 9th JANUARY, 1926: 10 *a.m. to* 4.30 *p.m.*

1. Complete yesterday's exercise.

2. Report on the nature of sample B. (*Barium sulphate, barium aluminate*, and slight excess of *barium hydroxide.*)

Candidates were also required to translate short passages from *Chimie et Industrie* and the *Berichte*.

Obituary.

FREDERIC HUNGERFORD BOWMAN died at Manchester on the 28th May, 1925, in his 87th year. Born at Huddersfield, he was educated at Longfield Academy, Halifax, and proceeded in 1851 to Edinburgh University. He then entered the Union Bank—now Lloyd's Bank—where, in the course of time, he succeeded his father as managing director, and in 1893 was elected Chairman of the Mercantile Bank of Lancashire (now Lancashire and Yorkshire), of which he was one of the founders. From an early date in his career, he became interested in worsted spinning and devoted himself to researches which were subsequently incorporated in his publications on textile fibres,—especially cotton and wool,—which became recognised as standard works on the subject. In addition to an early book on *Colour in Woven Design*, his works include:—*The Structure of the Cotton Fibre and its Relation to Technical Applications* (1908), and *The Structure of the Wool Fibre and its Relation to the use of Wool for Technical Purposes* (1908).

In 1865, jointly with his brothers, Malcolm and Henry. he founded the business of Messrs. Bowman Brothers, cotton spinners and doublers, at Range Royd Mill, and afterwards at Union and Lee Bank Mills. In 1886 he was selected by the Royal Commission of the Indian and Colonial Exhibition of South Kensington as the judge to report on the wools of the world which were then exhibited.

In 1893, in association with Mr. Walter Thompson and others, he founded the firm of Bowman, Thompson & Co., Ltd., Chemical Manufacturers, at Lostock Gralam, near Northwich. About ten years later these works were amalgamated with Messrs. Brunner, Mond & Co., and he then practised in Manchester as a consulting chemical engineer, until his retirement in 1921. He was one of the founders of the Institution of Electrical Engineers and a pioneer in wireless telegraphy.

He was elected a Fellow of the Institute in 1888.

ALBERT TOMPKIN, who died suddenly on 9th January in his 41st year, was educated at the People's College and University College, Nottingham. In 1901 he joined the staff of Messrs. Boots Pure Drug Company, Ltd., with whom he was engaged on analytical research work until 1915, when he was appointed head of the Pharmaceutical Research Laboratory of the Company, which position he held at the time of his death.

He was elected an Associate of the Institute in 1919.

HEDLEY GEORGE WATTS was drowned while bathing at St. Brelade's Bay, Jersey, in August last, in his 32nd year. He was educated at the Royal Grammar School, Worcester, and in 1912 proceeded to Oxford University as a Natural Science Exhibitioner of Christ Church. There he remained for two years, taking second class honours in Mathematical Moderations in 1913, afterwards beginning to read chemistry for the Honours School of Natural Science. At the outbreak of war he immediately joined the 21st Royal Fusiliers (Public Schools Brigade), and shortly after obtained a commission in the King's Liverpool Regiment. He served both in France and Salonika, where he was wounded. He was awarded the M.C. on 1st January, 1918. After demobilisation in 1919 he returned to Oxford and took a war degree in chemistry. He continued working under Dr. F. D. Chattaway in the laboratory of Queens' College, and was awarded the B.Sc. by research. Early in 1921, he was engaged on work under the Chemical Warfare Committee, War Office, and later was transferred to the Experimental Station at Porton, Wilts.

He was elected an Associate of the Institute in 1922.

Books and their Contents.

The following books have been presented by the authors or publishers, and may be seen in the Library of the Institute:—

"Benzene Derivatives, The Synthesis of." S. C. Bate. Pp. xii.+229. (London: Ernest Benn, Ltd.) 21*s*.

Hydrocarbons; nitro compounds; amines; diazo, etc., compounds; derivatives containing sulphur; phenols; alcohols; aldehydes; ketones; aromatic carboxylic acids; chlorides and anhydrides; amides; esters; nitrites; triphenyl methane group.

"Industrial Chemistry, An Introduction to." S. I. Levy. Introduction by Sir William Pope. Pp. xiii.+288. (London: G. Bell & Sons, Ltd.) 15*s*.

Process costing; large scale operations; works equipment; a general survey of chemical industries; the fuel industries; sulphuric acid; the alkali industry; intermediates and explosives.

"Organic Syntheses." Edited by Carl S. Marvel. Pp. vii.+110. (London: Chapman & Hall, Ltd.) 7*s*. 6*d*.

An annual publication of satisfactory methods for the preparation of organic chemicals.

"Physics, Introduction to Theoretical." Arthur Haas, translated from the 3rd and 4th editions by T. Verschoyle. Vol. II. Pp. 414. (London: Constable & Co., Ltd.) 21*s*.

Part III.: Atomic theory: the elementary quanta; theory of the hydrogen atom; Röntgen rays; theory of the elements; general theory of spectra and of atomic structure. Part IV.: Theory of Heat: Statistics; thermodynamics. Part V.: Theory of Relativity: Special Theory; theory of gravitation.

"Solvents in Synthetic Organic Chemistry, The Use of." D. W. MacArdle. Pp. vii.+217. (London: Chapman & Hall Ltd.) 15*s*.

Inorganic solvents; organic solvents for inorganic salts. The author deals with the following as solvents: alcohols, higher alcohols and ethers; organic acids, esters, ketones and bases, hydrocarbons, inert liquids, solid diluents. Special means of inducing crystallisation; salting out; bibliography.

National Health Insurance.

National Health Insurance Act, and Widows', Orphans', and Old Age Contributory Pensions Act.—The following information may be of interest to chemists whose salaries are not substantially higher than the limit of £250 per annum prescribed by the National Health Insurance Act, 1924, and the Widows', Orphans', and Old Age Contributory Pensions Act, 1925.

An opportunity is afforded by the new Pensions Act to persons who are not normally affected by the provisions of the Act, to become contributors, in order to secure the benefits which are provided by the National Health Insurance and new Pensions Acts.

Generally, the Widows', Orphans', and Old Age Contributory Pensions Act applies only to those persons who are insured under the National Health Insurance Act and to certain classes of persons who would be insured, but for a Certificate of Exception issued by the Ministry of Health to their employers.

Fairly wide provision is made, however, in the Pensions Scheme, whereby persons who would otherwise be debarred from the privileges of the Pensions Act, may become voluntary contributors and thereby secure all the benefits of both schemes.

A voluntary contributor is qualified to receive all the benefits of the Health and Pensions Acts, with the exception that if his total income exceeds £250 per annum, he is not entitled to medical benefit (i.e. the free services of a medical man, and medicines) under the Health Act.

In addition to the usual benefits under the National Health Insurance Act, many insured persons are entitled to additional benefits which are provided by their approved societies from surpluses which have been declared upon valuation of the societies. These additional benefits vary according to the particular society concerned, but generally include increases in the cash benefits, dental treatment and the provision of dentures, and optical treatment.

The contribution to secure the benefits of the National Health Insurance and Contributory Pensions Schemes is 1s. 6d. per week for men and 1s. 1d. per week for women, but where a person is disqualified to receive medical benefit by reason of income exceeding £250 per annum, the contribution is reduced by 2d. per week.

A person who is not compulsorily insured under the National Health Insurance Act may become a voluntary contributor, provided one of the following conditions applies to him:—

(a) That he has at some time since 15th July, 1912, been continuously insured for 104 weeks under the National Health Insurance Act and has paid 104 contributions;

(b) That he served in His Majestry's Forces during the late War for a period of 104 weeks and was entitled to be insured under the National Health Insurance Act in respect of such service;

(c) That he has been engaged in an "excepted" employment for 104 weeks since 15th July, 1912;

(d) That he has been engaged in an insurable employment for 104 weeks but did not pay contributions by reason of a Certificate of Exemption issued by the Minister of Health.

Persons who are qualified under one of the above headings and desire voluntary insurance, must make application *before 4th July*, 1926. Such application may be made either to the Ministry of Health or to an Approved Society, but it is materially to the advantage of the applicant to join an Approved Society, as otherwise the full benefits of the National Health Insurance Act cannot be secured.

Pension benefits are constant, whether the person contributes to an Approved Society, or through the Ministry of Health, but as regard the health benefits, persons contributing through the Ministry of Health can only receive in benefits the amount of contributions actually paid, whereas members of Approved Societies receive the full benefits of the National Health Insurance Act whatever the amount of contributions paid. Moreover, additional benefits are only available to members of an Approved Society.

Chemists who desire further information are advised to consult an approved Insurance Society.

"What the Manufacturer Expects of the Junior Chemist."

By GUSTAVE J. LEMMENS.

[*A paper read before the Institute of Chemistry Students' Association (London), on 28th January,* 1926.]

I CAN clear the ground on the subject on which I am asked to speak to you to-night by a negative proposition which the senior chemist will readily understand—and the more senior he becomes, if I may be allowed the barbarism, the better he will understand it—but which I fear the junior chemist does not usually appreciate.

What the manufacturer wants *last* of all from the junior chemist, is chemistry. I mean *last,* in point of time.

If I am to commit myself to a definite statement as to the highest qualifications that an up-to-date employer wants most from a junior chemist entering his service, I think that I should give first place to that of a fast centre forward, or a tricky slow bowler who can deliver a ball with a leg or off break as he pleases; or, better still, that he shall be that very rare and self-sacrificing hero, a good club organiser. I assure you that I am not toying with cheap paradox, and that I mean it very seriously. But I admit that the onus of justification of making the proposition is on me.

I suggest that the intelligent administrator wants from his staff, primarily, the qualifications which they are each individually better qualified to fill than others. That, I think, we may take as axiomatic. This being so, it is fortunately not necessary for me to justify my first statement, because it has been laid down, by no less an authority than Prof. Armstrong, that few chemists know any chemistry, and none of them know anything else. Prof. Armstrong ought to know. I can only contribute the fact that I sat under him more years ago than I care to recall, and I certainly know none.

Next, if an employer wants one or more junior chemists, we may postulate at least one senior chemist on his staff, and this presupposes an organisation of some magnitude. That being so, we may also assume the existence of some form of what is known nowadays as "welfare" organisation,—some degree of

interest by the management, personal and material, in the social side of the lives of their employees.

Now, it is a delicate subject in these days of unrest and censoriousness, but the occasion being privileged, we can frankly agree that a definite distinction exists in one respect between the operative and organising types of mind and temperament. Left to themselves, the ordinary rank and file will generally display little or no initiative in the organisation of their own athletic and social activities, and even when they do, it is evanescent. On the other hand, one of the many advantages of college training, from which I am assuming that the junior chemist, who is our subject, has more or less recently emerged, is that it promotes certain special social qualities, and technical experience therein, that are essential for such work, as well as practical experience in some of the higher qualities that lubricate life,—self-sacrificing service, team-work, and *esprit de corps*. Who can contribute these better than the typical, or I trust typical, junior chemist?

Of course, he must not be a "superior person" or a snob, and, to do him justice, he generally is not. One of the first things he learns in the practical rubbing shoulders with large staffs, is that there are far finer and more rigid distinctions of caste among the ranks below his than above it, which will enable him to view class distinctions from a new angle.

I recollect being interested in my youth in considerable alterations being carried out on a large country house, requiring something like a hundred men, for whom messing arrangements had to be provided. It was found that these were rendered particularly complicated by the fact that the masons would not mess with the labourers, the plasterers with the masons, or the joiners with the plasterers; while the plumbers formed an aristocracy of their own. In organising the celebrations for the coming of age of the son of the house, a feast to the men brought them all together: they very kindly waived their class prejudices for the occasion, but retained their liberty to criticise each other's table manners.

I need not pursue this subject further, you will appreciate the implications without my dotting all the i's and crossing the t's; but there is a by-product of great practical and professional importance.

It is still the fashion to some extent for the rest of the staff in a large organisation, including the management, to look somewhat askance at the laboratory. This is partly the fault of the critics and partly the fault of the chemists. Without

dwelling on details, I should like to point out that the chemical profession as a whole (and by chemical profession I mean, here, individual workers in laboratories as distinguished from the trade in chemical products), commands an aggregate fund of remuneration. This fund is quite elastic, and, independent of what any individual may be receiving at a given moment. This total fund is divided up among the members of the profession, so that in the long run it affects the pockets of every individual directly, and indirectly, but not less surely, by pressure of competition among them.

Now, this fund will contract or expand according to the degree of popularity or unpopularity of the laboratory, and it is the duty and personal interest of every chemist to popularise his profession by fair means or foul. This is such an important point that I am going to use plainer language about it. The profession of chemistry, at any rate in the junior ranks, is, like all technically interesting and attractive professions, overcrowded. That is to say that the supply of qualified junior chemists is greater than the demand, and as an inevitable result the standard of remuneration of each individual, that is his market price, is adversely affected. This is not due to the greed of the management—that is a superstition—but to the competition among applicants for positions. For every junior chemist employed there are half-a-dozen anxious to get his job, not merely enviously keen to deprive him of it, but really needing it for the bare necessities of existence, if they are to become self-supporting citizens.

Now, it is obviously more remunerative for each individual to help in extending the demand, and thus relieve the pressure, by popularising the laboratory, rather than by preoccupying himself in keeping off his rivals with a stick. The best thing that chemists individually and collectively can do in their own personal interests is to enlarge the demand for their services by popularising themselves and their activities.

The two ways of popularising the laboratory department are efficiency in its operation and the promotion of goodwill toward its personnel among the rest of the staff. The latter is best done from the bottom, by cultivating friendly relations with the workmen. Now, properly approached, this is extraordinarily easy. The efforts of professional agitators to sow dissension and discontent among working men is largely a failure. Any impression that may exist to the contrary is due to the fact that any success therein is recorded. It is "news," whereas failure is

not, and remains unrecorded. The general run of workmen are personally first-rate fellows, as anyone who has had personal relations with them, judiciously exercised, will readily testify. Their leading characteristic is their readiness to meet one a good deal more than half way. If one is determined to be friendly and refuse to see indications of suspicion or standoffishness, these readily disappear and are replaced by cordiality. Once such relations are established, there is nothing in reason that you can ask of the average workman that he will not readily do for you.

Inside the laboratory, the first function of a junior chemist is to qualify himself to be a senior chemist, and he will best achieve the necessary qualifications by carefully refraining from usurping the functions of the senior chemist. To round off this part of the story, I may trespass for a moment outside the region of my immediate subject and say that the most profitable effort of the senior chemist is to train his juniors to supplant him. Of course, if a senior chemist is uneasily conscious of the fact that he is not competent, or barely competent, to hold down his job, then he will jealously safeguard it by keeping his subordinates rigidly in their places and insisting on doing all the important work himself. In fact this is not a bad test of the quality of the senior chemist. But let not the junior chemist criticise his senior in this respect. Whatever he may fancy, he is not a reliable judge in the matter, being essentially biassed by his own immediate interests. It can be safely left to the employer who, by virtue of his position, has the necessary experience to size the matter up. One of the first things an intelligent employer learns is that a martinet is generally a fraud: it is the man who is sure of himself and his competence that can afford to be easy going, and his attitude will not be misunderstood.

If the senior chemist is a high grade man, with ambitions to fill higher posts than that of senior chemist, he will appreciate that his real interests lie in the maximum efficiency and productiveness of his department and not in his own narrow professional credit. The highest qualification that a man can have is efficiency in delegation. Carnegie attributed his material success in life to his capacity in choosing men who could do his work better than he could do it himself and letting them do it. But don't let the junior chemist make the easy mistake of misinterpreting this. It is not his business officiously to usurp the functions of his seniors; the distinction lying in the fact that the choice of what shall be delegated lies with the senior and

not with the junior. The latter has merely to do what he is told.

This is the proper place to plant the platitude that the first qualification for positions of command is to learn how to obey. One cannot efficiently impose discipline on one's subordinates until one has learnt to suffer its imposition oneself with equanimity. I don't want to rub in the obvious unduly, but it is not merely a convention or a question of the privileged position of the senior, as some sufferers are inclined to imagine and resent. It is not that at all, but is based on solid practical grounds. The primary business of the senior in any staff, chemical or other, is allocation of work. But work is the primordial curse and not an end in itself, which, as far as the laboratory is concerned, is the collation, interpretation, and application of results. Now, if the juniors are going to exercise their own judgments as to whether and to what extent directions are to be carried out, the orderly collation and interpretation of results becomes impossible. The final responsibility is not the junior's but the senior's. The golden rule thus becomes the same as that in the merchant service at sea—"Obey orders, though you break owners." The natural corollary also follows—when the junior becomes a senior, he must impose the same obligation on his juniors. If he bears this in mind while he is a junior, he will find the unquestioning and implicit carrying out of orders easy and natural instead of being, as is too frequently the case, exceedingly irksome.

The two leading direct demands that the management will make on the junior chemist's work are reliability and speed. Here I have to emphasise by repetition what has, of course, been drummed into every junior chemist, and which I fear needs the emphasis, the distinction between reliability and accuracy; and I am not going to content myself with the usual and simple distinction which asserts that reliability is accuracy to a sufficient degree for all practical purposes, while accuracy in itself is the carrying out of results to as many significant figures as possible. I say that such a statement, though usually accepted without challenge, is simply not true and is an ignorant misuse of language.

Consider for a moment, an indicating instrument, such as a voltmeter, or a thermometer, as distinct from an integrating instrument, such as a gas meter. It will readily be seen that the above definition of accuracy is wholly inaccurate and means something quite different,—namely, sensitiveness. You may be able to read an unusually sensitive thermometer to several significant

figures, and its calibration may, or may not, be accurate. But even if it is dead accurate, it by no means follows that observations made with it are reliable. Many other conditions besides sensitiveness and accuracy enter into reliability. For example, a measurement of temperature of the contents of an ordinary standard beaker, made with a highly sensitive and accurate thermometer will be different from that made of the contents of a litre flask, because such a thermometer has always an abnormally high thermal capacity and of itself introduces a cooling or heating effect on the material under test. But both observations may be strictly accurate.

Oh, I am fully aware that you know all about that as well as I do, or better; and it is not my present business to deliver a lecture on the technique of accuracy of measurement, but to emphasise the fact that reliability is quite a different matter, not in degree but in kind, from accuracy, and I am deliberately pursuing it in order to clear the ground for important points strictly relevant to my main subject.

Now, manipulative accuracy is easy; junior chemists who can make routine determinations to a high degree of manipulative accuracy, are three-a-penny; but the man who can give you as good a result from one determination as from twenty, and takes the necessary precautions to ensure it, is a man.

Take sampling. How few junior chemists really understand how to sample reliably! I know that there are certain standard rules about sampling, which are more or less followed, but reliability calls for more than this, and, in real life, all the refinements in determinations are frequently vitiated by inefficient sampling.

It will probably not have escaped you that the second requirement, that of speed, is promoted by reliability, as a by-product therefrom. If your results are reliable, repetitions and misconceived attempts to secure a higher order of accuracy by taking the mean of a number of unreliable determinations, with their accompanying consumption of time, are unnecessary.

Perhaps one of the most useful faculties in securing reliability and speed, is a thorough understanding of the theory of errors and probabilities. The junior chemist should thoroughly grasp the significance and use, as working tools, of the average, the weighted average, the mean, arithmetic and geometric, the median and the mode. The practice, as a pastime, of analysis of the elements of error inherent in any determination, is a most useful exercise, not on its own account, but because it

will open up a wide field of information as to the direction in which special care must be taken and where it can be relaxed; will promote a special sense of estimating how largely any given factor looms in the final result. In the absence of this sense of faculty, one is apt to waste much time over some factors that matter little one way or the other.

I am reminded of an incident in my young days. It has nothing whatever to do with our present subject, but may be illuminating as practical experience of the point. Its recollection has many times prevented me from making mistakes in this matter. One August, our family party was making its annual exodus to the Highlands. On this occasion, we were rather a large party, and the number of our railway tickets was sufficient to secure certain privileges, including a saloon to ourselves with luggage compartment attached, worked through from Tunbridge Wells to Perth. We had my grandmother with us, a lady of advanced years and very frail, and one can imagine what the journey in a carriage attached to the Scotch express, wagging its tail at high speed would mean to her. So we arranged that if we arrived at Euston before the train was made up, we should be put in the middle of the train. If we arrived too late, we should have to be coupled on to the end. On going round London, we arrived somewhere about Addison Road, and there were boarded by an official, who asked what we were; on being told by the member of our party who had the organisation in hand, he said: "Then you're a 'special'," and was told that he supposed that we might be called that. Whereupon he said that by arrangement with the station-master at Tunbridge Wells that our payment there included all charges up to Perth. The official retorted that what the station-master said did not interest him, but that it was his duty to collect from us as a special train. The argument went on fruitlessly for some time, until a retired naval officer took a hand, when it degenerated into an altercation, and we were told at last that unless we paid, we should be put into a siding until we did. We were then getting nervous that we should be too late at Euston, and my host asked me to try to get some sense into the official, but added "I'm not going to be bluffed into paying again." I asked, "How much?" The official said: "One and ninepence." I gave it to him in coppers, and we went on.

I hope that what this incident implies is quite clear to you. It has been suggested to me that it may not be, although I paid you the compliment of assuming that it is. But no harm

is done by rubbing it in, so I will remind you that every final result, in chemistry as in other activities, is built up of a number, sometimes a very large number, of factors, and in our efforts to achieve an optimum degree of reliability and accuracy, we are liable to spend an undue amount of time and attention on some of them which, in comparison with others, do not amount to anything.

This not only leads to waste of time—and time is the most expensive material we use, and the one we use the most of—but it is apt to distract attention from, or crowd out, far more important elements in a result. It is useful, therefore, to take some considerable pains over surveying to what extent the various factors in a result loom in the total, and adjust the attention which we devote to them accordingly.

Another useful aid to speed and reliability is strict standardisation of method, even down to mimeographed forms for entry of observations. It is remarkable how methodical organisation of routine determinations simplifies them. The ingenious mind will even devise complex circular slide-rules which are easily made photographically. Such standardisation has special advantages of its own. In many routine determinations, such for example as moisture-content, it is far more important to establish the amount of successive variations from the normal, up or down, and whether, and in which direction, there is any tendency to change as successive batches of product are turned out, or successive batches of supplies are received, than that the absolute figures should be known. That is to say, a constant error, due to method, is relatively unimportant so long as it is constant, and variations are reliably recorded. This is an aspect of discipline. If a junior chemist thinks that he knows a better way, he must confine himself to thinking so, and continue to employ the standardised method, until he can succeed in persuading the chief chemist to establish his method as the standard, but not till then.

Apart from his daily routine, the junior chemist will do no good in life unless he gives his imagination free play. Pinero describes a financier as a pawnbroker with imagination: a chemist without a developed imagination will always remain in the pawnbroker class. But he must not let his imagination get mixed up with his daily routine, or his reliability and utility in his work will evaporate.

He should also be an insatiable reader and "bung full" of curiosity, but his reading and curiosity, equally with his imagination, must be under strict control and be directed to a definite

end, by which I do not mean narrow specialism but the avoidance of dilletanteism.

It is an invaluable habit to record regularly the fruits of his reading and satisfied curiosity,—not in detail; because no mind but the narrowest will persevere against the tedium of making continuous records, although this tedium will be much mitigated by habit; but he should, so far as possible, make records of references to sources of information, which can be turned up when occasion arises,—a sort of mechanical memory, recollection without tears. It is a common experience for all of us that when we are suddenly confronted with a demand for knowledge or information, perhaps in urgent and important circumstances,—such as a law suit; we exclaim: "I remember I saw something about the very point somewhere, about three years ago, that interested me at the time, but I'm hanged if I can remember what or where it was." No one can be expected to retain all the information that one acquires casually, but a very great deal can be done by maintaining a 5 by 3 card index, and carrying a loose-leaf pocket book with leaves of the same size, which can be detached and slipped among cards.

Then there is the cultivation of the ancillary arts,—photography, microscopy and electrotechnics, and practice in manipulative ingenuity in glass-blowing, soldering and metal-and wood-working. All such matters depend, of course, largely on personal tastes; and there are others, such as statistical work, the cultivation of skill in the management and interpretation of graphs and charts, the working out of equations to curves, and the correction of recorded observations by the employment of the method of differences. These are not, I assure you, merely academic exercises, but they enable one to clothe the bare bones of recorded chemical facts with living tissue, and turn our daily drudgery into a fascinating reality.

Can most of us look on our work as a leading grocer looks on his? A friend of mine, a director in a large concern, placed his son with a grocer to study the business, and, after the lad had been in the tea department for six months, meeting the employer one day casually in the street, my friend asked him how his son was shaping, and was told: "Very well indeed, he is a bright boy, and knows all there is to know about tea except the swank." He asked: "If he can learn all about tea except the swank in six months, how long will it take him to learn the swank?" He was told: "The rest of his life. Tea is not a trade, it is a religion."

The Register.

At the meeting of Council held on 22nd January, 1926, 2 Associates were elected to the Fellowship, 40 new Associates were elected, and 15 Students were admitted.

The Institute has lost 1 Fellow and 2 Associates by death.

New Fellows.

Cadman, William Henry, B.Sc. (Wales), c/o The Anglo-Persian Oil Co., Ltd., Masjidi-i-Suleiman, Via Mohammerah, Persian Gulf.

Elworthy, Reginald Thomas, B.Sc. (Lond.), Mines Branch, Department of Mines, Ottawa, Canada.

New Associates.

Babiak, Miss Jane, B.Sc. (Lond.), 11, Blackstock Road, Finsbury Park, London, N.4.

Banks, Reginald Joseph Henry, B.Sc. (Lond.), 92, Gladstone Avenue, Manor Park, London, E.12.

Bell, Frank, B.Sc. (Lond.), 11, Edwy Parade, Gloucester.

Benson, Donald, B.Sc. (Manc.), 31, Greenwood Avenue, Blackpool.

Berry, Harold, M.Sc.Tech. (Manc.), 45, Sydney Road, Steel Bank, Sheffield.

Britnell, Edward, B.Sc. (Lond.), 9, Osterley Avenue, Isleworth.

Clapham, Joseph Edward, B.Sc.Tech. (Manc.), Messrs. Joseph Storey & Co., Ltd., Heron Chemical and Colour Works, Lancaster.

Collin, Miss Ella Mary, B.Sc. (Lond.), 14, Leamington Gardens, Seven Kings, Ilford, Essex.

Crerar, Percy Robertson, B.Sc. (Lond.), 88, Florence Road, Stroud Green, London, N.4.

Evans, Arthur Burke Agard, B.Sc. (Birm.), M.Sc. (McGill), 39, Upland Road, Selly Park, Birmingham.

Fell, Edward Albert, A.R.C.S., 1, Cautley Avenue, Clapham Common, London, S.W.4.

Fife, James George, B.Sc. (Lond.), 5, Warwick Road, Wanstead, London, E.11.

Goldstein, Maurice Edward, B.Sc. (Lond.), 46, St. Paul's Avenue, Cricklewood, London, N.W.2.

Harding, Arthur Jacob Immins, M.Sc.(Birm.), Ratcliffe House, The Fosse, Syston, nr. Leicester.

Harris, Miss Eileen Winifred, B.Sc. (Birm.), 37, Cambridge Road, King's Heath, Birmingham.

Howlett, John, B.Sc. (Liv.), 9, Larnach Road, Hammersmith, London, W.6.

Jones, Edward Emlyn, B.Sc. (Wales), Eastwood, Elmtree Avenue, Aberystwyth.

Lloyd, William Vivian, B.Sc. (Wales), Caer-Bryn House, Tondu, Aberkenfig, Bridgend, Glam.

Lorimer, Henry, B.Sc. (Glas.), A.R.T.C., 90, Buccleuch Street, Garnethill, Glasgow.

Maclagan, Noel Francis, B.Sc. (Lond.), 2, Vereker Road, West Kensington, London, W.14.

Morgan, Walter Thomas James, M.Sc. (Lond.), 171, Kensington Avenue, Manor Park, London, E.12.

Mowat, Duncan Mackay, B.Sc. (Glas.), 785, Main Street, Carlton, Nottingham.
Peek, Reginald John, B.Sc. (Lond.), c/o Mrs. Holmes, 21, Woodbrooke Road, Bournville, Birmingham.
Peel, John Buttery, B.Sc. (Dun.), 2, Chesterfield Road, Newcastle-on-Tyne.
Rawson, Arthur Edward, M.Sc. (Birm.), 477, Redding's Lane, Hall Green, Birmingham.
Shoppee, Charles William, Ph.D., B.Sc. (Lond.), A.R.C.S., D.I.C., Department of Organic Chemistry, The University, Leeds.
Snelson, Francis William, A.R.C.S., 40, Manor Road, Richmond, Surrey.
Taylor, Albert Edward, B.Sc. (Wales), 5, Morgan Street, Llanbradach, Glam.
Turner, Harold Augustus, M.Sc. (Sheff.), 6, Coverdale Road, Millhouses, Sheffield.
Vaughan, Ernest James, M.Sc. (Lond.), A.R.C.S., D.I.C., 3, Church Terrace, Lewisham, London, S.E.13.
Walker, Oswald James, Ph.D., B.Sc. (Edin.), 23, Buccleuch Place, Edinburgh.
Watkin, Job Elphin, B.Sc. (Wales), Golfa, Alexandra Road, Aberystwyth.
Welch, Kenneth Norman, B.Sc. (Dun.), The Hollies, Westfield Drive, Gosforth, Newcastle-on-Tyne.

New Associates (by examination).

Adams, Frederick William, Woodcote, Southfield Park, Pinner.
Balmforth, Leonard, B.Sc. (Lond.), Clifton Villa, South Street, Cottingham, Yorks.
Blood, John Walter, Market Place, Bingham, Notts.
Riley, Thomas, 70, Brownlow Hill. Liverpool.
Shipman, George Eric, B.Sc. (Lond.), 278, Cottingham Road, Hull.
Walton, Thomas, 492, Whalley New Road, Blackburn.
Winterbottom, Edgar, B.Sc. (Manc.), Dunheved College, Launceston, Cornwall.

New Students.

Black, Raphael, 34, Park Street, Cheetham, Manchester.
Davidson, William, 28, Stuart Avenue, Scotstoun, Glasgow.
Endersbee, William Thomas, 4, Wilmington Gardens, Barking, Essex.
Huelin, Frank Edwin, Darlington, Western Australia.
Hutcheson, William Bell, 15, Radnor Street, Clydebank, Glasgow.
Isaac, Sidney Thomas, 1, Dillwyn Square, Brynhyfryd, Swansea.
Kent, Cyril Roy, Kenny Street, Bassendean, Western Australia.
Lockie, Miss Grace Eleanor, 34, Plato Road, Brixton, London, S.W.2
Mackie, Alexander, 25, East Trinity Road, Leith.
Middleton, Arthur William, 27, St. Bernard's Road, East Ham, London, E.6.
Mitchell, William Brockie, c/o Mrs. Campbell, 82, Marchmont Crescent, Edinburgh.
Rowland, William Weir, 10, Wardie Avenue, Edinburgh.
Seal, Eli, 118, High Street, Swansea.
Snellgrove, Frederic Mortimer, 69, Palace Road, Tulse Hill, London, S.W.2.
Taylor, James Luke McLaren, Dalnaglar, Comrie Road, Crieff.

DEATHS.

Fellow.

Frederic Hungerford Bowman.

Associates.

Albert Tompkin.
Hedley George Watts, B.A., B.Sc. (Oxon.).

General Notices.

Examinations in 1926.—The arrangements for examinations during 1926 are as follows:—

Dates of Exams.	*Entries close.*
19th to 24th April, 1926.	Monday, 15th Feb., 1926.
or 26th April to 1st May, 1926.	
20th to 25th Sept., 1926.	Monday, 19th July, 1926.
or 27th Sept. to 2nd Oct., 1926.	

Copyright.—A lecture will be given at the Institute on Friday, the 12th March, at 8 p.m., by Mr. E. J. MacGillivray, Barrister-at-law, on Copyright, with special reference to scientific and technical papers and publications, the President in the chair.

The lecture will be open to Fellows, Associates and Registered Students and Members of other Chemical Bodies.

Notice to Associates.—Associates elected prior to February, 1923, who have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain from the Registrar particulars of the Regulations and forms of application for the Fellowship.

Appointments Register.—A Register of Fellows and Associates of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to notify the Institute of suitable vacancies for qualified chemists.

Students who have been registered as Students of the Institute for not less than six months and are in the last term of their college course may receive the Appointments Register of the Institute on the same terms as Fellows and Associates, provided that their applications for this privilege be endorsed by their Professors.

Lists of vacancies are forwarded twice weekly to those whose names are on the Appointments Register. Fellows and Associates who are already in employment, but seeking to improve their positions, are required to pay 10*s.* for a period of six months. Members and Students who are without employment are required to pay 6*s.* 6*d.* for the first period of six months,

and, if not successful in obtaining an appointment, will thereafter be supplied with the lists gratis for a further period of six months if necessary.

The Institute also maintains a Register of Laboratory Assistants who have passed approved Preliminary Examinations and, in some cases, Intermediate Science Examinations.

Fellows and Associates who have vacancies for such assistants and students are invited to communicate with the Registrar.

The Library.—The Library of the Institute is open for the use of Fellows, Associates, and Registered Students between the hours of 10 a.m. and 6 p.m. on week-days (Saturdays, 10 a.m. and 1 p.m.), except when examinations are being held. The library consists of books which are likely to be required by candidates during the Institute's practical examinations.

The comprehensive Library of the Chemical Society is available, by the courtesy of the Council of the Society, for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 a.m. to 9 p.m. on week-days (Saturdays from 10 a.m. to 5 p.m.).

Registered Students of the Institute are also permitted for the present year to use the Library of the Chemical Society for reference purposes, but not to borrow books.

Members and Students of the Institute using the library of the Society are required to conform to the rules of the Society regarding the use of its books.

Berichte der Deutschen Chemischen Gesellschaft.—The Council will be grateful to any member who will assist in making up the Institute's set of the *Berichte* for the years 1924 and 1925 and since.

Changes of Address.—In view of the expense involved, through frequent alterations of addressograph plates, etc., Fellows, Associates, and Registered Students who wish to notify changes of address are requested to give, as far as possible, their *permanent* addresses for registration.

Covers for Journal.—Members who desire covers for binding the Journal (cost about 1*s.* 2*d.* each) are requested to notify the Registrar of their requirements by indicating the dates of the years for which they are desirous of binding the Journal.

Arrangements have been made with Messrs. A. W. Bain & Co., Ltd., 17–19, Bishop's Road, Cambridge Heath, London, E.2, to bind volumes of the JOURNAL AND PROCEEDINGS on the following terms:—Buckram case, 1*s.* 2*d.*; binding, 2*s.* 9*d.*; postage and packing, 9*d.*; in all, 4*s.* 8*d.*

Lantern Slides for Lectures.—Fellows and Associates are invited to co-operate in forming a collection of slides, to be kept at the Institute and placed at the disposal of members who wish to give lectures, or, alternatively to notify the Registrar if they are prepared to lend slides for this purpose. The collection already includes a large number of portraits and pictures of alchemists and chemists. These have been found useful lately by members lecturing on various phases of the history of chemistry Fourteen slides have been presented recently by Mr. Fred Scholefield.

Sir George Beilby Memorial.—A Joint Committee of Officers and representatives of the Institute of Chemistry, the Institute of Metals, and the Society of Chemical Industry has issued an appeal for funds and particulars of a proposal for the establishment of a memorial to the late Sir George Beilby.

With the concurrence of the Councils of the three bodies—of each of which Sir George was a past-president—the appeal has been issued for subscriptions towards a fund from which, at intervals to be determined by the administrators, substantial sums will be awarded to mark appreciation of a record of distinguished work in science, bearing in mind the special interests of Sir George Beilby, viz., applied chemistry, chemical engineering and metallurgy. The proposal does not imply an award on the result of a competition for work on a set theme or the solution of a definite scientific problem, but the recognition of work of exceptional merit.

The Joint Committee hopes to raise a sum of not less than £5000—providing an income of about £250 a year for awards.

Mr. Patrick H. Kirkaldy and Mr. John Fry have consented to act as Honorary Treasurers.

The Secretaries of the three co-operating bodies have been appointed Honorary Secretaries, with the Registrar and Secretary of the Institute of Chemistry as convener.

Contributions may be addressed to the Hon. Secretaries Beilby Memorial Fund, 30, Russell Square, London, W.C.1.

Institute of Chemistry Benevolent Fund

Founded in 1920 as a memorial to Fellows, Associates and Students who died in the service of their country, 1914—1918.

The list of contributors published at the close of 1925 should have included the following:—Annual Subscribers: T. M. Lowry and D. H. Peacock; Subscribers: T. C. Humphreys and J. M. Ogilvie.

The contribution from the staff of the British Association of Research for the Cocoa, Chocolate, Sugar, Confectionery and Jam Trades, which was erroneously entered under a single name, was received from the following:—L. E. Campbell, G. L. Clothier, A. G. Coulson, C. L. Hinton, S. G. Kendrick, and T. Macara.

The subscribers to the contribution from the Edinburgh and East of Scotland Section were:—E. Anderson, W. M. Ames, A. A. Boon, L. G. Brown, J. A. Burns, A. M. Cameron, W. T. Dow, junr., E. V. Ellis, L. Fletcher, C. Forrester, N. T. Hay, M. Howie, J. W. Ingham, A. Lauder, B. D. W. Luff, R. Moyes, A. McGill, J. A. Robertson, Sir James Walker, J. A. Watson, H. E. Watt, W. A. Williams, and W. T. H. Williamson.

Contributions may be forwarded to

The Hon. Treasurer,

BENEVOLENT FUND, INSTITUTE OF CHEMISTRY,

30, RUSSELL SQUARE, LONDON, W.C. 1.

LOCAL SECTIONS OF THE INSTITUTE

Sections.	*Hon. Secretaries.*
Birmingham and Midlands:	Dr. W. J. Hickinbottom, A.I.C., 142, Albert Road, Stechford, Birmingham.
Bristol and South-Western Counties:	A. W. M. Wintle, F.I.C., 170, Newbridge Road, St. Anne's Park, Bristol.
Cape of Good Hope:	Dr. C. F. Juritz, M.A., F.I.C., Department of Agriculture, Cape Town.
Edinburgh and East of Scotland:	J. W. Ingham, M.Sc., F.I.C., Dept. of Chemistry, Heriot-Watt College, Edinburgh
Glasgow and West of Scotland:	Dr. W. M. Cumming, F.I.C., Royal Technical College, Glasgow.
Huddersfield:	Percy Calam, B.Sc., A.R.C.S., A.I.C., 4, Hillside Avenue, Fartown, Huddersfield.
Ireland (Belfast):	J. C. A. Brierley, M.Sc., F.I.C., Broadbent, North Circular Road, Belfast.
,, (Dublin):	Dr. A. G. G. Leonard, F.I.C., 18, Belgrave Road, Dublin,
Leeds Area:	H. J. Hodsman, M.B.E., M.Sc., F.I.C., Dept. of Fuel, The University, Leeds.
Liverpool and North-Western:	John Hanley, F.I.C., 7, University Road, Bootle, Liverpool.
London and South-Eastern Counties:	E. B. Hughes, M.Sc., F.I.C., c/o The Institute of Chemistry, 30, Russell Square, London, W.C.1.
Manchester and District:	Dr. Albert Coulthard, F.I.C., 136, Barlow Moor Road, West Didsbury, Manchester.
Newcastle-on-Tyne and North-East Coast:	F. H. Walker, B.Sc., A.I.C., 17, Chester Street, Newcastle-on-Tyne.
South Wales:	Dr. A. G. Ramsay, A.I.C., 4, Hawthorne Avenue, Uplands, Swansea.
Malaya:	Morris Jamieson, B.Sc., A.R.C.S., A.I.C., Government Analyst's Department, Singapore, Straits Settlements.
New Zealand:	W. Rest Mummery, F.I.C., Box 2, Aramoho, Wanganui, Auckland, New Zealand.

Institute of Chemistry Students' Association (London).

Hon. Secretary, FRANK E. JOSELIN, B.Sc., 86, Pendle Road, Streatham, S.W.16.

Publications of the Institute

Copies of the following publications of the Institute are now obtainable at the prices indicated below:—

HISTORY OF THE INSTITUTE, 1877–1914. Special Edition. 21*s.*

LECTURES:

"Cement." Bertram Blount, F.I.C. 2*s.* 6*d.* net.

"Cellulose." C. F. Cross, B.Sc., F.I.C. 2*s.* 6*d.* net.

"Some Scientific Aspects of Tanning." J. T. Wood, F.I.C. 2*s.* 6*d.* net.

"Modern Applications of Chemistry to Crop Production." Sir E. J. Russell, O.B.E., F.R.S. 2*s.* net.

"Chemists and the Patent Laws." Horatio Ballantyne, F.I.C. 2*s.* net.

"Some Aspects of the Law of England affecting Chemists." E. J. MacGillivray, Barrister-at-Law. 2*s.* net.

"The Progress of Chemistry in Public Affairs." J. T. Dunn, D.Sc., F.I.C. 2*s.* net.

"Chemistry as a Career." A Synopsis of Lectures given by the Registrar 1921–1923. 2*s.* net.

"The Influence of Chemical Research on Medicine and Forensic Medicine. Sir William H. Willcox, K.C.I.E., C.B., C.M.G., M.D., F.I.C. 2*s.* net.

"Notes on Contracts of Service." G. S. W. Marlow, B.Sc., F.I.C., Barrister-at-Law. 2*s.* net.

"Copyright: with special reference to Scientific Papers and Publications." E. J. MacGillivray, Barrister-at-Law. 2*s.* net.

REGULATIONS FOR THE ADMISSION OF STUDENTS, ASSOCIATES AND FELLOWS. *Gratis.*

PROCEEDINGS (prior to 1920). Four Parts annually. 1*s.* net.

JOURNAL AND PROCEEDINGS (1920 and after). Six Parts annually. 2*s.* each net.

EXAMINATION PAPERS. Annual Sets (prior to 1917), 6*d.* each (7*d.* by post). After 1917, 1*s.*, post free.

OFFICIAL CHEMICAL APPOINTMENTS. *5th Edition*, 1924. 5*s.* net. (To Registered Students, 2*s.*)

REGISTER OF FELLOWS, ASSOCIATES AND STUDENTS, 1926. 5*s.* net.

ADVERTISEMENTS.

JOURNAL AND PROCEEDINGS.—The terms for advertisements in the Journal and Proceedings of the Institute can be obtained on application to the Registrar.

The circulation is approximately 6000—chiefly to analytical, consulting and technological chemists, professors and teachers of chemistry.

The advertisement pages are offered especially to manufacturers of laboratory glassware, porcelain, and silica ware, of filter paper, chemical and physical apparatus, balances, microscopes, and laboratory requirements generally; also to publishers of scientific books and to booksellers.

Advertisements are subject to the approval of the Publications Committee.