

be distinguished: (a) *flood-basalts* (mainly oversaturated); (b) *oceanic basalts* (largely undersaturated); (c) *cone-basalts*, including those of rift valleys, horsts and troughs (dominantly undersaturated and notably felspathoidal). It was pointed out that the oversaturated type of magma has appeared at infrequent intervals but in enormous volumes, and that its chemical composition, as represented by basalts and quartz-dolerites, has been remarkably constant in space and time. While deriving undersaturated magmas directly from the basaltic layer, Dr. Tyrrell suggested that the oversaturated type may have originated by selective fusion of the peridotite or 'stony-meteorite' zone underlying the basaltic layer.

Dr. A. K. Wells expanded the evidence favouring refusion of ultrabasic material, with special reference to the dunite pipes of the Bushveld Complex. He endorsed the opinion that these 'carrot-shaped' intrusions are magmatic infillings, but regards them as re-fused differentiation products from the noritic magma of the Complex. Slides were shown demonstrating that both chromitite and magnetite-rock (presumed to have been derived from the norite) have behaved as fluids towards the associated silicate rocks. This striking reversal of the usual relations makes it not unreasonable to postulate refusion of early segregations. In connexion with the origin of the alkali rocks, Dr. Wells regrets that most British petrologists seem loth to accept the 'limestone-assimilation' hypothesis. He thinks the chain of circumstantial evidence cited by Prof. Shand is sufficiently strong to carry conviction, and he deprecates any suggestion that ijolite cannot be derived from basaltic or granitic magma, on the ground that it unfairly rules out the 'limestone-assimilation' hypothesis altogether.

Prof. H. H. Read examined the quality of the field-evidence connected with petrogenic theories. The rapid changes in the fashionable theories are clearly due to imperfections of field-knowledge. Arguments based upon badly exposed igneous bodies, such as the alkaline mass of Loch Borolan and Cnoc na Sroine in Sutherland, are obviously of little value. If petrologists endeavoured to assess the quality of their field-evidence we should have a guide to the order of validity of their conclusions. In Prof. Read's

opinion, the field-evidence for refusion and palinogenesis is entirely inadequate. In the case of contamination and hybridisation, however, the presence of discontinuities, and the complex and variable nature of the products, make the field-evidence of great value; but even here, the application of knowledge gained in these obviously mixed rocks to the interpretation of rocks about which no such field-evidence is forthcoming should be made with caution. The most important testimony in favour of assimilation as a petrogenic process is that read from field-evidence.

Mr. S. I. Tomkeieff presented an interim report of an investigation carried out in collaboration with Mr. C. E. Marshall on the Tertiary dykes of north-east Ireland, with special reference to 130 dykes of the Mourne swarm. These included olivinic types, but a majority belonged to the oversaturated and 'intermediate' types (andesitic variolites, leidleites, innimorites, etc.). The 'intermediate' types invariably contain half-digested xenocrysts of felspar and quartz, while xenoliths of partially fused granitic rocks are generally abundant. The field and petrographic evidence was found to be in perfect agreement with the views expressed by Prof. Holmes as to the origin of the similar suite of andesitic tholeiites occurring in the north of England. Mr. Tomkeieff outlined the igneous history of the Mourne centre as a whole and showed that the details are those to be expected on the theory of successive refusion advocated by Prof. Holmes.

Mr. W. Campbell Smith, in commenting on the views expressed by the previous speakers, pointed out that, from the nature of the case, field evidence of palinogenesis was not to be expected on anything more than a very limited scale. He is disposed to counsel caution in extending the explanation offered for the evolution of leucitic rocks to the still less tractable problems of the soda-rich rocks.

Dr. H. Jeffreys said that the origin of the crustal layers themselves had not been touched upon, though he contends that this is the fundamental problem. He considers that the granitic and basaltic layers probably represent the products of residual magmas left over from the crystallisation of the material of the Lower Layer, and suggested the possibility that the process may still be going on.

International Institute for Documentation

THE eleventh Conference of the International Institute for Documentation was held in the Bibliothek für Kunst und Technik, Frankfurt am Main, during the week which ended on September 3. Great credit is due to Dr. Walter Schürmeyer, Director of the Bibliothek, for the excellent manner in which the Conference was planned and carried out. It is of interest to note that this Conference was the first held under the Institute's new title of "Documentation", which at the Tenth Conference (of the "Institut International de Bibliographie", as it was then called), held at the Hague on August 24-29, 1931, was chosen as a more appropriate title, in view of modern developments in the collection and classification of the records of intellectual activities.

On the first day, members of the Conference were received by the mayor and municipal authorities of Frankfurt, and by the Rector of the University, in the historical Kaisersaal des Römers; after which, a public assembly was held in the town hall, when Dr. J. A. Frins, director of the Dutch Patent Office,

delivered his presidential address. All papers presented at the Conference were issued in two bound volumes¹ to participants in advance. M. Paul Otlet, one of the founders of the Institute in Brussels, spoke on the history and fundamental principles of documentation, and Dr. Ehrenfried Pfeiffer² described the technical documentation service of the Verein deutscher Ingenieure in Berlin.

There was a short discussion of the joint paper, "Systematic Subject Indexes to Periodical Volumes" by Prof. A. F. C. Pollard and Dr. S. C. Bradford³, in which is described the method of the subject-matter index to volume I (1931) of the *Power and Fuel Bulletin*, a notable development of indexing practice.

In Great Britain, where an undecimalised and therefore troublesome system of measures and money is still patiently endured, one would least expect to find the decimal system extensively adopted in the classification of literature; but Dr. S. C. Bradford⁵ quotes a list of 28 important British scientific

institutions which, even in the year 1930, had decimalised and thus simplified their documentation. The fundamental value of decimal classification lies in its mechanical simplicity, its universal application, and its 'pure' numerical symbolisation which overrides all language barriers and opens up wonderful possibilities of international co-operation. The enthusiasm of all who have adopted the system and proved its worth, shows it to be a vital factor in modern librarianship.⁶

Abbreviated editions of the "Classification Décimale Universelle, Table systématique complète" have appeared in German⁷ and in Spanish,⁸ and a Danish edition is now in preparation. All such editions will be faithful translations of the French, and will follow the German in respect of abbreviation. The "Index Alphabetique de la Classification Décimale", a comprehensive alphabetical subject-matter index to the whole of the decimal classification system, can now be obtained from the Institut International de Documentation, Palais Mondial, Bruxelles.

In the course of the Conference, an exhibition was set out in the Bibliothek für Kunst und Technik, to illustrate modern library equipment, such as visible file indexes, photostat apparatus, and the application of the 'Adrema' system in mechanical selective documentation, which has been adopted with considerable success in the Bibliothek der Technischen Hochschule, Berlin,⁹ for example. The Adrema Co. has now worked out in detail a scheme for the direct mechanical selection of decimal

references to six places (that is, up to 999,999 or a million classification sub-divisions¹⁰).

At the conclusion of the Conference, a dinner was held in the clubhouse of the Frankfurter Gesellschaft für Handel, Industrie und Wissenschaft, a feature of which was the decimalised menu card. This was the work of Dr. Julius Hanauer, who threatened that at the next Conference he would produce an international menu card of decimal numbers without words. It was provisionally decided that the next Conference of the Institute should be held in Paris next summer, in collaboration with the Institut International de Co-opération Intellectuelle.

H. P. SPRATT.

¹ "I.I.D., Vorträge der 11. Konferenz". Bibliothek für Kunst und Technik, Frankfurt am Main. 6 gold marks the two volumes.

² "Der Literaturnachweis des Vereines deutscher Ingenieure". I.I.D., Vorträge der 11. Konferenz, vol. 2, p. 243.

³ "I.I.D., Vorträge der 11. Konferenz", vol. 2, p. 121.

⁴ Published monthly by the British National Committee, World Power Conference.

⁵ Bradford, Dr. S. C.: "Die Entwicklung der wissenschaftlichen Bibliographie und des bibliographischen Quellennachweisedienstes in England". Minerva-Zeitschrift, Jahr. 7 (1931), Heft 1-2, p. 10.

⁶ Spratt, H. P.: "Scientific (Technical) Libraries". Chapt. iii, The Year's Work in Librarianship, vol. 4 (1931).

⁷ "Dezimal-Klassifikation, Deutsche Kurzausgabe", bearbeitet im Auftrage des Deutschen Normenausschusses von Dipl.-Ing. Heinrich Günther. Beuth-Verlag G.m.b.H. Berlin, 1932.

⁸ "La Clasificación Bibliográfica Decimal", por Luis Méndez Albarrán. Badajoz, Antonio Arqueros.

⁹ Predeek, Dr. A.: "Die Adrema-Maschine als Organisationsmittel im Bibliotheksbetriebe." 20 pp. Berlin, "Organisation" Verlagsges. m.b.H. (S. Hirzel), 1930. 1 gold mark. See also: "Die mechanische Herstellung und Auswertung des technisch-wissenschaftlichen Literaturnachweises." 's-Gravenhage, Nederlandsch Instituut voor Documentatie en Registratuur, 1930, Publicatie No. 51, p. 31.

¹⁰ Predeek, Dr. A.: "An Ever-ready Printed Catalogue." Report of Proc. 8th Conference (1931), p. 47, A.S.L.I.B., London.

Structure of Solid Bodies

AN important symposium on the elementary structure of solid bodies (chiefly non-metallic), at which many distinguished foreign savants participated, was held in Leningrad on September 13-18 at the physico-technical institute.

In an introductory paper, A. F. Joffe (Leningrad) discussed the permanent distortion of crystals and pointed out that structurally perfect crystals offer least resistance to distortion. W. L. Bragg (Manchester) described the results of X-ray analyses of substances of more complicated structure, such as silicates. V. Heitler (Göttingen-Moscow) dealt with a semi-classical theory of the homopolar valence forces. Mrs. M. Classen (Leningrad) described the measurement of the limit of elasticity in perfect crystals and indicated that non-metallic crystals show annealing effects similar to those of metals. J. Frenkel (Leningrad) analysed the concepts 'solid' and 'liquid', pointing out that many properties which used to be considered characteristic of solids are shared to some extent by liquids, and vice versa. Liquids, for example, have a measurable rigidity under high-frequency mechanical oscillations. B. K. Fredericks (Leningrad) discussed the 'swarm theory' of liquid crystals. J. D. Bernal (Cambridge) considered the rational classification of crystals according to the nature of the weakest bonds and the rotation of molecules or radicals present.

J. Errera (Brussels) spoke on the dielectric polarisation of solids, distinguishing between ionic polarisation due to high frequency in substances far from their melting point (sodium chloride), and dipole polarisation due to low frequencies in substances near their melting point (water). A. V. Kurtchatov (Leningrad) dealt with the dielectric properties of Rochelle salt and explained the occurrence of the

upper Curie point by the Lorentz interaction of rotating dipoles. The nature of the lower Curie point remains obscure, some ascribing it to the 'freezing' of the dipoles and others to a depolarising action determined by the symmetry of the crystal. N. Achulov (Moscow) considered magnetostriction and explained the abnormal character of the mechanical properties of ferro-magnetic bodies in terms of electronic orientations under the influence of mechanical stresses. He gave, further, a new method for calculating the magnetic susceptibility in crystals. P. L. Kapitza (Cambridge) spoke on magnetostriction in non-ferromagnetic bodies (bismuth and others).

R. H. Fowler (Cambridge) presented a report on Wilson's theory of semi-conductors which attributes their electrical properties to the thermal excitation of a very few electrons into states of motion which enable them to move freely through the crystal. In contrast to metals, the electrical properties of semi-conductors are classical. E. Tamm (Moscow) read a paper on the peculiar 'surface-bound' electronic states in non-metallic crystals and another paper on the calculation of the work-function for metals; in this he showed that the work depends solely on the polarisation of the metal (though the notion of the corresponding 'image-force' is not valid). Finally, J. E. Mayer (Baltimore-Göttingen) dealt with new developments of Born's theory of ionic forces in crystals, based upon the wave-mechanical conception of interatomic forces, and on electrical polarisation.

In connexion with the above symposium, a discussion was held on Dirac's electrodynamic theory to which Fock (Leningrad), Podolsky (Pasadena-Kharkov) and Shubin (Sverdlovsk) made interesting contributions. Nuclear phenomena, especially the