

Psycho-analysis is a lengthy process, demanding much tact and ingenuity from the psychologist or physician, but its results are of such surpassing interest and value that it should be regarded as one of the most important methods of mental science.

WILLIAM BROWN.

### THE SURVEY OF INDIA.<sup>1</sup>

THIS general report for 1911-12, which has lately appeared, states concisely the progress made in the various departments of the Survey of India, the detailed descriptions and discussions of results being present in vol. iii. of the Records of the Survey. In the year under review, Colonel S. G. Burrard, F.R.S., was confirmed as Surveyor-General in succession to Colonel F. B. Longe. Topographical surveys were pushed on in various parts of the country, and work was done to meet some special requirements, of which may be mentioned the large-scale map of the Delhi site, with contours at 5 ft. vertical interval for the use of the town-planning committee. On the Geodetic Survey the astronomical latitudes of eleven stations were determined, and at one of these, Bihar, the largest southerly deflection of the plumb-line as yet found in India was found. Pendulum observations were made over the same region. In the principal triangulation the Sambalpur meridional series was commenced, and carried from lat. 23° to lat. 22°. In Kashmir secondary triangulation was carried along the Hunza and Kanjut valleys to form a connection with the Russian triangulation in the Taghdumbash Pamir.

The field detachments of the Magnetic Survey were employed on the detailed examination of the Deccan trap area in Central India and Hyderabad State, where considerable abnormalities exist. Comparative observations were made at the survey base stations, and a large number of repeat stations were visited for observation. In the Map Publication Office orographic colouring, by means of a series of colour tints from light green through yellows, browns, purples, and red, has been adopted for the one-millionth scale in place of shading as facilitating the provision of information. These sheets differ in size and in the unit (foot) of the vertical measurements from those of the international map, but as they form the key to the whole system of nomenclature and the arrangement of the topographical sheets, they cannot be dispensed with.

A series of "departmental papers" is to be commenced. These will be numbered serially, and will include all papers which, being published for departmental use, do not fall within the scope of the "Professional Papers," and are not of public interest.

Those, however, who are interested in the technical details of surveying will turn rather to the third volume of the Records of the Survey of India, where full accounts of this work will be found. Topographical surveys included triangulation, levelling, traversing, and detailed measurement on various scales from 1 in. to one mile, to 20 in. to one mile in cantonment survey. Many points of interest and modifications in procedure are noticed, among which we may mention the experimental use of Bristol boards instead of drawing paper on the plane-tables used in the field. If these are fastened firmly to the board by one edge only, and loosely by cloth slips

<sup>1</sup> General Report on the Operations of the Survey of India during the Survey Year, 1911-12. Prepared under the Direction of Colonel S. G. Burrard, F.R.S., Surveyor-General of India. (Calcutta: pp. vii + 36 + 12 maps, 1913.) Price Two Rupees or Three Shillings.  
"Records of the Survey of India." Vol. iii., 1911-12. Prepared under the direction of Col. S. G. Burrard. Pp. 176 + 12 maps. (Calcutta.) Price 4 Re. or 6s.

on the other sides, the trouble arising from distortion of the sheet when working in very dry climate is greatly reduced. Further experience with these boards is awaited.

In geodetic work the use of a new and more powerful zenith-telescope is reported, and determinations of latitude were made with it at eleven stations. Of these all stations but one, Khajnaur, on the north side of the Siwalik Hills, the attraction of the plumb-line is southerly, the largest value being at Biharas, mentioned above. In the pendulum work, observations were made to the north of the Ganges in a region which showed unusually low density, and it is suggested that Karachi, situated on the edge of the high plateau which forms the southern edge of the Ganges valley, may be near the crest of a ridge of high density. An important piece of work in this connection was an investigation of the isostatic theory of Mr. Hayford, with respect to a number of Indian stations, and the results obtained for the above-mentioned stations are given. In the account of precise levelling it is mentioned that experiments are being carried out with a new pattern of aluminium staff.

A full account of the magnetic survey and work in the observatories is given, but this calls for no special remark. In an appendix is given a synopsis of geodetic work near Dehra Dun, which is illustrated by a map showing the triangulation and gravity observation stations, as well as the lines of precise levelling. The whole volume forms a valuable contribution to the literature of high-grade surveying.

H. G. L.

### THE ASSOCIATION OF TECHNICAL INSTITUTIONS.

THE twenty-first annual meeting of the above association was held at the Clothworkers' Hall, Mincing Lane, on January 30 and 31 last, and was attended by upwards of 120 delegates representing all the important technical institutions in the United Kingdom, of whom about ninety-seven are enrolled in the association.

The new president, Sir Alfred Keogh, K.C.B., on taking the chair, delivered his inaugural address, in which he dealt with the report of the Royal Commission on the reconstitution of the University of London, and especially with that part of it concerned with technological studies. He expressed great satisfaction with the position accorded to the faculty of technology in the proposals of the Commission, particularly with respect to the methods of administration and with the prominence assigned to the sphere of utility in educational questions.

The Commission recommended the establishment of a self-governing faculty of technology in the University, such faculty to embrace all branches of applied science. He dwelt upon the extreme importance of bringing the specialisation of science well within the sphere of the University, and expressed gratification that entrance to the University would be made more accessible to the fit student with greater freedom for the teacher.

Various questions of considerable importance to the well-being of technical institutions were considered. Amongst them, the registration of teachers and the proposals of the newly established Teachers' Registration Council. Great satisfaction was expressed with the happy solution of this extremely difficult question by means of which the profession of teacher had been unified, and it was unanimously agreed that it was desirable that all eligible members of the teaching staffs of technical institutions should seek enrolment.

The new regulations of the Board of Education dealing with junior technical schools were the subject of considerable discussion, and the view was generally expressed that all forms of specialised teaching should come within the scope of the new regulations, and that all limiting conditions as to the pupil's future outlook should be entirely removed from the regulations.

Special consideration was given to that section of the report of the Royal Commission which dealt with the examination of the external student desirous of proceeding to the degrees of the University of London. It was agreed that access to the examinations of the University should continue to be, as in the past, effectively provided for with such improvements in method as experience would suggest, but that no steps should be taken which should in any way diminish in standing or importance the quality of the degree awarded to the external student, or which should impair the position of the external as compared with the internal student. It was further strongly urged that there should not be, as proposed, any exclusion of unattached students from the examinations in technology, including engineering, in view of its disastrous effect upon higher technological education, and that it was of the utmost importance that the relations hitherto subsisting between the London polytechnics and the University of London should be maintained, and the recognition of eligible teachers in these institutions be continued.

The question of the new and important regulations for the establishment of technical bursaries by the "1851" Exhibition Commissioners with a view to the assistance of eligible graduates of the universities desirous of proceeding immediately to industrial employment was fully considered, and it was agreed that the Commissioners should be asked to consider the desirability of including within the list of accepted universities other qualified technical institutions.

The very important question of compulsory continued education in respect of children who had left the elementary schools to enter into employment with a view to their further education, both vocational and general, was carefully considered.

It was urged that having regard to the vast expenditure of public money, amounting now to upwards of twenty-four millions sterling per annum, and with a view to conserve the results of this expenditure, not only should "half-time" be abolished, but all regulations by means of which a child may be relieved of attendance at school before he reaches the age of fourteen, and that there should be enacted a law under which children leaving the elementary school at fourteen should be required to attend within the usual hours of labour a continuation school, which shall include in its curriculum not only vocational subjects, but such subjects of a general character as shall conduce to his effective preparation for the duties of life, and that the responsibility for the due observance of the law be laid upon the employers. It was shown that only a mere fraction of the children leaving school for employment continued their education, the figures being, for those between fourteen and seventeen years of age, only 300,000 out of a total of 2,335,000, or 13 per cent., with the result that there was a most serious economic and moral loss to the nation.

It was further shown that the German Government, realising this great loss to the German nation, had for some years established compulsory day continuation schools for children in employment throughout the empire, with most satisfactory results. There was a general consensus of approval. In the city of Berlin in 1910-11 there were 68,000 students of both sexes enrolled in continuation schools, of whom 32,000 were students in compulsory schools.

J. H. R.

NO. 2310, VOL. 92]

#### ANCIENT PIGMENTS.

IN *Archaeologia*, vol. lxiv., pp. 315-35, Prof. A. P. Laurie, of the Royal Academy of Arts, presents us with the chief results of an important research on the historical and local succession of the use of "ancient pigments." His material has been drawn almost entirely from western Europe, Chinese, Persian, and Indian painting not being discussed. His conclusions, derived mainly from the optical and micro-chemical examination, necessarily much restricted, of valuable illuminated MSS., amplify rather than correct those of previous investigators, such as Sir Humphry Davy, Marcellin Berthelot, and other chemists of the nineteenth century, but synthetic experiments have in some cases been utilised. The story more nearly approaches completeness in some sections than in others. The lakes, for example—pink, lilac, red, crimson, and purple—have not as yet, in all cases, revealed their origin. Perhaps the series and sequence of blue pigments may be cited as a characteristic example of Dr. Laurie's fuller treatment of his subject. Of the six blues included in the early list—indigo, Egyptian-blue, the mineral azurite or chesylite, real ultramarine from lapis lazuli, blue verditer and smalt—the most interesting is without doubt Egyptian-blue. To this remarkable pigment Prof. Laurie has devoted much attention, having finally determined its composition and properties, and also the *optimum* temperature for its production (see Proc. Roy Soc., vol. lxxxix. A, pp. 418-29). Although these six pigments were not all in use everywhere and at the same time they cover the early centuries and the period between classical times and the close of the sixteenth century. Later additions to blue pigments comprise Prussian-blue, near the beginning of the eighteenth century; cobalt-blue, and artificial ultramarine in the first quarter of the nineteenth century; and cœruleum about the year 1870. This dating of pigments and of their use is of the highest importance in connection with questions as to the provenance and authenticity of works of art. For full details Prof. Laurie's paper, with the annexed tables, must be consulted. A few typographical errors in this important memoir should be noted; Robertson on p. 321 should be Roberson; sulphur not silver should appear in the second line from the bottom of p. 331; and the name of the mollusc from which the Irish monks prepared the Tyrian purple employed in their illuminated MSS. is not quite accurately given in the earlier of the tables appended to the memoir. It may be suggested that this purple pigment, which is a dibromoindigotin, ought to be identifiable where its presence is suspected by means of its high content of bromine.

A. H. C.

#### CELLULOSE AND ITS DANGERS.

THE Departmental Committee on Celluloid, appointed by the Home Secretary some fifteen months ago to consider the precautions necessary in the storage and use of this substance, has recently issued its report (Cd. 7158, 1913). From this it appears that the product accepted as "celluloid" in the report consists essentially of gelatinised nitro-cellulose and camphor, the proportion of nitro-cellulose usually varying from 70 to 75 per cent. in ordinary celluloid articles, and from 80 to 90 per cent. in cinematograph films. It ignites very readily, and burns with great rapidity and fierceness; moreover, in certain circumstances it may take fire without the direct application of flame. If submitted to a moderately high temperature for some time it suddenly decomposes with evolution of considerable heat and the emission of inflammable and poisonous gases