representing deities and saints. The whole of the relievo work had originally been coloured, and there were fresco paintings besides. The excavations of these relievos proved no easy task, as the structures threatened to collapse when the sand was removed. Yet Dr. Stein succeeded in clearing ninety-one large and numerous small relievos. Photos were taken of the larger relievos, while the smaller ones were taken to England. In style and details of execution the Rawak sculptures resemble the Græco-Buddhist sculptures of the Peshawar Valley and the neighbouring regions. Chinese copper coins, found among the ruins, proved to be coins of the Han dynasty. As the rule of the kings of this dynasty covers the period of 25–220 A.D., and some of their coins are known to have been current until the close of the fourth century, we have thus a chronological limit, to which the Rawak sculptures may safely be referred.

Finally, we must at least touch upon one negative, though none the less important, result of Dr. Stein's journey of exploration. During his last eight days' stay at Khotan he succeeded in clearing up the doubts he had long entertained concerning the genuineness of certain very puzzling manuscripts and blockprints "in unknown characters" which had for some years past been purchased from Khotan and added to the "British Collection of Central-Asian Antiquities" in Calcutta. With the help of the Chinese authorities he got hold of the very man—one Islām Ākhūn—from whom most of these documents had been bought. The man was brought before Dr. Stein, who forced from him, in the course of a prolonged cross-examination, an open confession of his manufacture of "old books." Dr. Stein has shown that it is easy to distinguish the forgeries from genuine old manuscripts, and there is no fear that any scholar will, in future, be deceived into trying to decipher the "unknown characters" of Khotan manuscripts.

This brief sketch will suffice to give an idea of the singular importance of the discoveries made by Dr. Stein. But the costly treasures brought by him from Chinese Turkestan will require the most careful examination and study to be made fruitful for further research, and who could be better fitted for this task than the happy discoverer himself? While congratulating both the Indian Government and Dr. Stein on the brilliant discoveries made in Central Asia, we can only express our sincerest hope that the authorities of the India Office may see their way to grant Dr. Stein the leisure required for completing the work so happily begun, in order that the present "Preliminary Report" may soon be followed by a Detailed Report of Dr. Stein's tried workmanship.

M. WINTERNITZ.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE authorities of Reading College have received an intimation that the Treasury recommends the advancement of the College to the list of University Colleges, with a Government grant of 1000*l.* a year for five years. The grant will be subject to the Treasury audit, but local subscribers have assured the necessary income.

PROF. HEWLETT, director of the Department of General Pathology and Bacteriology at King's College, London, has arranged a vacation course in practical and clinical bacteriology to commence Wednesday, August 6, and end Saturday, August 16. The course will consist of lectures, demonstrations and practical work; in the latter, the members of the class will make for themselves permanent preparations of the chief pathogenic micro-organisms and will carry out the principal manipulations employed in bacteriological investigations.

A MEETING of numerous representatives of primary, secondary (including technical) and other branches of education was recently held at the Municipal School of Technology, Manchester, to consider whether arrangements should be made for a conference of science teachers in the north of England on the lines of those established by the Technical Education Board of the London County Council, which have been held in London during the Christmas vacation for some years past. The proposal to hold similar conferences in the north of England was unanimously adopted, and a committee formed to make the necessary arrangements. The first conference will be held on Friday and Saturday, January 2 and 3, 1903, at Manchester.

A LIST of requirements and courses at the Clarkson Memorial School of Technology, Potsdam, New York State, has been received. The institution was founded in 1895 to provide technological education of college standard, and is a constituent college of the University of the State of New York. It is of interest to note that the regular courses of work extend over four years and that satisfactory evidence of thorough preparation must be given by students who wish to enter the college. Now that the London polytechnics are part of the University of London, efforts should be made to introduce or extend the same kind of regulations as to systematic work and preliminary studies.

HITHERTO none of the technical institutes has been specially organised for the optical trades, though optical classes have been held in several of them, notably in the Northampton Institute in Clerkenwell. But the optical trades appear to have awakened to the need of specialised instruction of the highest kind for the young men in their industry, and a movement to create a real Optical Institute is on foot. The Optical Society has approached the Technical Education Board of the London County Council to urge upon it the creation of such an establishment. If the Technical Education Board could see its way to organise and equip a special technical school in optics, and endow it with a grant of 3000*l.* or 4000*l.* a year, we might expect great things for the future of the optical trades. When it is remembered how greatly the electrical industries of Great Britain have benefited by the electrical teaching and the electrical laboratories established twenty years ago by the City and Guilds Institute, one wonders why similar optical laboratories, properly equipped for the teaching of technical optics, have not been long ago organised. The present movement is a sign that England is waking up.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 13.—"The Refractive Indices of Fluorite, Quartz and Calcite." By J. William Gifford. Communicated by Prof. Silvanus P. Thompson, F.R.S.

Tables are given of the refractive indices of the above substances for twenty-six wave-lengths, from wave-length 7950 Rb to wave-length 1852 Al inclusive at 15° C., and of the temperature refraction coefficients. To ensure accuracy a new method of observation was adopted. The prisms were polished on three sides, and deviations were measured at each of the three angles. The indices were calculated by the formula

$$\mu = \sin \tfrac{1}{2}(D + 60^\circ)/\sin 30^\circ.$$

The difference of the angles of the prisms from 60° were in each case less than 4 seconds of arc. When this is the case the error introduced is less than 0·0000001 in the index. It is not, therefore, necessary to measure the angles with accuracy. Some of the rays from the collimator are reflected from the base of the prism and enter the telescope. The image of the slit thus obtained coincides with the refracted image only when minimum deviation is reached. In cutting the goniometer circle a burr is thrown up by the engraving tool on each side of every division. By two small electric lamps behind the reading microscope either or both burrs are made to appear as fine white lines. With the help of quartz fibres measurements are made on these and the mean taken. A correction is made for the error of the reading microscope, and special precautions have been taken to ensure the optical correctness of the prisms. An exact copy of the original measurements for line C fluorite is given. An approximate estimate of the total error gave for the 119 indices in the table,

33 less than... ...	0·0000023
39 ,, ...	0·0000034
31 ,, ...	0·0000084
15 more than ...	0·0000084
1 only as great as but not more than ...	0·0000150

Some indices for left-handed quartz are given, and a rough determination of the specific gravities of right and left quartz. The partial and proportional dispersions of fluorite, quartz and calcite for the visual spectrum and their lens combinations are also given, together with a list of focal lengths for unity and a table of curves for the whole spectrum with ordinates for a mean focal length of six thousand nine hundred and eighty-five millimetres.

PARIS.

Academy of Sciences, July 7.—M. Bouquet de la Grye in the chair.—The president announced to the Academy the loss it had sustained by the death of M. Faye, member of the Section of Astronomy.—On the relation between the intensity of the voltaic current and the amount of electrolytic action, by M. Berthelot.—The properties of a certain anomaly capable of replacing the anomalies already known in the calculation of the disturbances of the smaller planets, by M. O. Callandreau.—On the development of analytical functions in a series of polynomials, by M. Paul Painlevé.—The local treatment of the localisations of rheumatism, by M. Ch. Bouchard. From the experimental results quoted, the superiority of local treatment by injection over general treatment by the same drug (sodium salicylate) is well marked. The author concludes that in general it is better to apply the drug only at the place where it is useful, by injection.—M. Bouvier was nominated a member of the Section of Anatomy and Zoology in the place of the late M. Filhol.—On a new linear group of four variables, of finite order, by M. Léon Autonne.—On the electrolysis of silver nitrate, by M. A. Leduc. It is generally stated that the bath of nitrate of silver becomes more and more acid after prolonged electrolysis; the contrary effect was, however, observed by Rodger and Watson. It is shown how either result may be obtained by varying the conditions in a definite manner. It is noted incidentally that the counter electromotive force of a silver nitrate voltameter, which has been usually assumed to be zero or extremely small, is in reality by no means negligible, amounting to about 0·03 volt.—On the action of self-induction in the ultra-violet portion of spark spectra, by M. Eugène Néculcéa A continuation of previous papers, the present instalment giving a study of tin.—New researches on open currents, by M. V Crémieu.—On the nature of the coherer, by M. J. Fenyi. A coherer formed of four steel needles in parallel is no more sensitive than a single needle, but if the four are placed in series a greater electromotive force can be placed in the circuit, and the sensibility is accordingly increased.—The dissociating action of the divers regions of the spectrum on matter, by M. Gustave le Bon.—Dark light and actinoelectric phenomena, by M. Gustave le Bon.—On the hydration of zinc oxide, by M. de Forcrand. A thermochemical study of the solution of zinc oxide.—The oxidising properties of a pyranol, by M. R. Fosse. Dinaphthopyranol possesses an oxidising action towards hydriodic acid, an attempt to prepare the hypoiodite resulting in the formation of the tri-iodide of the oxonium compound.—The condensation of nitromethane with aromatic aldehydes, by MM. L. Bouveault and A. Wahl. The best condensing agent for the reaction between the nitromethane and the aromatic aldehyde is sodium methylate; the sodium salt which separates is then treated with zinc chloride. The reaction has been applied to anisic, piperonylic and ortho-nitrobenzoic aldehydes and to furfurol.—The action of diazoic salts on desmotroposantonine and desmotroposantonous acid, by MM. E. Wedekind and Oscar Schmidt.—On a new proof of the cellular resistance of the saccharomyces and on a new application of this property to industry and the distillery, by M. Henri Alliot. The method which is usual in distilleries for removing nitric acid and other volatile acids prejudicial to the development of the yeast is to add sulphuric acid to the molasses, heat to boiling and force through a current of air. To avoid this, the author takes some of these volatile compounds and grows an acclimatised yeast by gradually adding increasing quantities of these antiseptic compounds to the cultures. The properties thus acquired by the yeast are sufficiently permanent for industrial use in the distillery.—On the active principles of the poison of the toad, *Bufo vulgaris*, by MM. C. Phisalix and Gab. Bertrand. Toad poison owes its activity to two principal substances—bufotaline, of a resinoid nature, and bufotenine.—On the nature of bufonine, by M. Gabriel Bertrand. The bufonine described by Faust does not exist in toad poison directly extracted from the glands, but has its origin in other parts of the skin. It appears to be an impure cholesterine.—The influence of sulphocyanic acid on the growth of *Aspergillus niger*, by M. A. Fernbach. The sulphocyanide does not appear to interfere with the growth of the mycelium, but arrests fructification.—On the influence of choline on the glandular secretions, by M. A. Desgrez. Although an advanced decomposition product of albumin, choline is not without use to the organism in which it is produced, it exerts a favourable influence on the nutritive exchanges and contributes especially to the retention of phosphorus.—The disappearance of ethers in the blood *in vitro*, by MM. Maurice Doyon and Albert Morel.—Inhibition produced by interference on the retina, by M. Aug. Charpentier.—On the autoregulation by carbonic acid of the energetic working of organisms, by M. Raphael Dubois.—The influence of temperature on the parthenogenetic development, by M. C. Viguier.—On the evolution of the branchial formations in the lizard and slow-worm, by MM. Prenant and Saint-Remy.—Contributions to the anatomical study of *Rhabdopleura Normani*, by MM. A. Conte and C. Vaney.—On the cause of the changing colours of teguments, by M. H. Mandoul.—On a new method for the destruction of the pyralis and other noxious insects, by MM. Vermorel and Gastine. The use of liquid insecticides having proved non-efficacious, recourse was had to gaseous poisons, hydrocyanic and sulphurous acids, sulphuretted hydrogen, &c., but without effect. By means of a special apparatus, steam at 50° C. was then applied to the leaves, and this mechanical method, which used with due care proved to be without injurious effects on the vines, was found to be very serviceable.—On the presence of the Aptian stage in south-east Africa, by M. W. Kilian.—On the volcanic eruption of May 8 at Martinique, by M. Thierry.

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