new departure has been made by the establishment of a school for carriage builders.—The opening of the new session at the Northampton Institute is marked by several important developments. Rooms have been specially fitted up for the teaching of electro-chemistry in special relation to the trades of the district, and valuable courses in electrolysis, electro-plating and electrotyping have been arranged. A metallurgical department has also been established, and a special laboratory has been fitted up in connection with it. Special classes for opticians have been arranged in conjunction with the Spectaclemakers' Company, a laboratory has been equipped for the practical teaching of optics, and a graded series of examinations has been drawn up.

THE work of the two London polytechnics which are independent of the Board's Technical Education aid, the East London Technical College and the Goldsmiths' Institute, continues to show increased activity. In the chemical department at the Goldsmiths' Institute a special course has been organised for brewers and sugar refiners; while the art department continues to take a leading position among the art schools of the country. At the East London Technical College (People's Palace) last year's work has been marked by conspicuous success, the college having secured an open science scholarship at Merton College, Oxford, two Whitworth exhibitions of 50*l.*, and two National scholarships, besides numerous other distinctions.

A SERIES of articles upon Dr. John Radcliffe, the generous benefactor of Oxford University, has recently appeared in the *Pharmaceutical Journal*. Dr. Radcliffe was born in 1650, the year after the execution of Charles I. He went to London in 1684, and rapidly became a most successful, though eccentric, physician. He died in the year 1714, leaving the great bulk of his large fortune, consisting of money and of lands and houses in Yorkshire, Northamptonshire, Bucks, and Surrey to Oxford University. He bequeathed 40,000*l.* to build a library in Oxford, with 150*l.* a year for the salary of the librarian, and another yearly 100*l.* for the purchase of books. The Radcliffe Library, one of the finest buildings in Oxford, was opened in 1749, and furnished mainly with medical and scientific books. The building has since been annexed to the Bodleian as a reading room, when the contents of the library, greatly increased in the course of years, were transferred to a building specially affected to them in the new University Museum. It is now a magnificent collection of books on medical, physical, natural, biological and general science, kept up to date, easily accessible, and has given a considerable impulse to scientific study at Oxford. In order to make provision for select Oxford alumni studying medicine, to learn what was doing in medical science abroad, Radcliffe made over for ever to his own first and favourite Oxford College—University—his Yorkshire estates, for the foundation of two travelling fellowships of 300*l.* a year each and tenable for ten years, to be given to carefully selected alumni studying medicine at Oxford. At present there are three such Radcliffe travelling fellowships, with an annual income of 200*l.* each and tenable for only three years instead of the original ten. Besides this he left 5000*l.* to enlarge the buildings of University College. Any surplus accruing from the Yorkshire estates after the foregoing objects were effected was to be applied to the purchase of advowsons to be given to members of University College. Finally, mention of minor benefactions to Oxford and to individuals being omitted, he left, after payment of his specified bequests, all his estates in the various counties already enumerated to trustees to be applied to such useful purposes as they in their discretion should think best. And well have the Radcliffe trustees fulfilled their duty, remembering the claims both of philanthropy and science. With the funds at their disposal was built the Oxford Public Infirmary, opened for the reception of patients in 1779, and the Radcliffe Observatory at Oxford, supplied with all the instruments and appliances of modern astronomy, and a dwelling house for the Observer.

SCIENTIFIC SERIALS.

American Journal of Science, September.—Transition temperature of sodic sulphate, a new fixed point in thermometry, by T. W. Richards. Sodium sulphate, $Na_2SO_4 + 10H_2O$, "melts" at almost exactly 32·48° according to the mean mercury thermometer, and this temperature is so easily obtained by means of that salt and so constant as to be of great use in the future for thermometric and thermostatic purposes.—Distribution and quantitative occurrence of vanadium and molybdenum in rocks of the United States, by W. F. Hillebrand. Vanadium occurs in quite appreciable amounts in the more basic, igneous and metamorphic rocks, up to 0·05 per cent. or more of V_2O_3, but seems to be absent, or nearly so, from the highly siliceous ones. The heavy ferric aluminous silicates like biotite and amphibole are indicated as sources. Molybdenum is probably confined to the more siliceous rocks, where it occurs in very minute quantities.—Electrosynthesis, by W. G. Mixter (second paper). Gaseous mixtures are subjected to a glow discharge in a eudiometer. Concentration of the discharge does not affect the total amount of compound formed. Thus, a mixture of hydrogen and oxygen will give the same amount of water vapour whatever the form of the glow discharge. The combination increases with the pressure, but not in proportion to it. A mixture of oxygen and ammonia forms ammonium nitrite, which is deposited as a white coating.—Notes on species of *Ichthyodectes*, including the new species *I. cruentus*, and on the related and herein established genus Gillicus, by O. P. Hay. The supposed new species is primarily founded on a somewhat imperfect left maxilla from Butte Creek Canyon in Western Kansas. It differs from Cope's *I. anaides* in having larger teeth. For Cope's *I. arcuatus* and Crook's *I. polymicrodus* the author proposes the new generic name Gillicus, being a saurocephalid with maxilla falciform, relatively short. Gape of mouth smaller than in *Ichthyodectes*.—Origin and significance of spines, by C. E. Beecher (continued). Natural selection could not originate a spine, but after a spine had appeared this agency would tend to preserve and allow the spine to develop along certain lines. The simple antlers of the Tertiary deer may have reached the highest degree of efficiency as weapons by ordinary natural selection. The subsequent increasing complexity of the antlers cannot have improved their usefulness, and probably arose according to the law of multiplication of effects, aided by a process of sexual selection.

Symons's Monthly Meteorological Magazine, September.—British local meteorological publications. Some important additions have been made to the list given in the last number of this journal, among which we may mention (1) an annual report of about thirty pages, by Mr. Chandler, Borough Meteorologist of Torquay, and a separate report on the climate of Devon; (2) a valuable summary of all Manx meteorological observations, by Mr. A. W. Moore; and (3) some remarks on the climate of Oban, with averages for the ten years 1887-96, by the Medical Officer of Health.—Evaporation and temperature, by Prof. Carpenter. This is an abridgment of a paper in the *U.S. Monthly Weather Review* of May 1898, showing the difficulty of determining from ordinary observations of the vaporimeter the quantity of water added to the atmosphere daily by evaporation from the oceans, lakes and continents. The principal elements of uncertainty in determining the quantity of evaporation from a surface of water are the temperature of the water and the velocity of the wind at the surface.—Rockall. The August number of the *Scottish Geographical Magazine* contains an excellent account of this rocky islet, by Mr. M. Christy. The possibility of building a lighthouse and observatory, and connection by a telegraphic cable, is discussed. The value of the latter would be very great for the purpose of weather telegraphy, but at present the difficulty of expense is insurmountable.—Results of meteorological observations at Camden Square, London, in August, for forty years, 1858-97. The mean of all the highest maxima was 84°·0, and the mean rainfall 2·39 inches; in this year the maximum temperature reading was 87°·9, and the rainfall 1·18 inches.

THE nineteenth volume of the *Memoirs* of the Caucasian branch of the Russian Geographical Society is perhaps even better than its remarkably good predecessor. Its chief feature is a map, on the scale of 13 miles to an inch, of Transcaucasia, upon which all the divisions into provinces, districts, cantons and villages are given, and the religions of the inhabitants of each village are shown in different colours. The map is accompanied by full ethnographical-statistical lists of the whole population. The next map of great interest is one of Kurdistan, upon which the distribution of the Kurd population (the Sunnites, the Kizilbashs, and the Yezids separately) is shown, together with the Armenian and Nestorian population and the percentage of Christians in each separate district. This map accompanies a paper, by Colonel Kartseff, on the Kurds,

in which their geographical distribution, their division into stems, their history, and their present institutions and general conditions are discussed. In the same volume we find a most valuable list of 597 trigonometrically-determined spots in Transcaucasia and the Terek province, with their latitudes, longitudes and altitudes, indexed according to latitudes and alphabetically; four very good geographical, economical and statistical descriptions of the provinces of Stavropol, Terek and Zakataly, with a map of the province of Stavropol giving the distribution of landed property; an interesting paper on the forests, the forestry, and the inhabitants of the woodlands of Ichkeria, in Daghestan; and a list of the Alpine plants (270 species) of Central Caucasus, by Prof. Akinfieff—the result of seven years' work. In an appendix we find two long papers, one, by N. Dinnik, containing a graphic account of his Caucasian journey—this time to the head waters of the Urushten and Byelaya rivers (with a large-scale map, 3½ miles to the inch); and another, on the common law of the Svanes, their habits and customs, written by such an excellent authority on this subject as Prince Raphael Eristoff.—The twentieth volume of the same periodical, just received, contains an admirable map of all Caucasia and Transcaucasia, with very carefully drawn mountains, on the scale of 27 miles to the inch. It accompanies the first instalment of a work, "Transcaucasia," in which Colonel Lisovskiy gives a general physico-geographical description of Transcaucasia—its physical features, its geology, its vegetation, and its animal world.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 19.—M. Wolf in the chair.—On the clinical value of the agglutination of Koch's bacillus by human blood serum, by MM. S. Arloing and Paul Courmont. The results of over one hundred cases show that the aggregation of the tubercle bacilli when the blood serum is introduced into a culture may furnish, very rapidly, an important element of information in the early diagnosis of true tuberculosis. There were, however, two remarkable cases where the test failed, though tuberculosis was undoubted and in an advanced stage. The fact that positive results were almost always obtained when the tuberculous lesions were in an early stage renders the serum reaction the more valuable. Feeble aggregation was induced in some cases where tuberculosis was not found by the ordinary clinical methods, and the inference is drawn that latent tuberculosis may be consistent with the appearance of perfect health. One of the latter cases afterwards developed into tubercular laryngitis.—Observations and elements of the Perrine-Chofardet comet by M. G. Fayet.—Observations on the Perrine-Chofardet comet, made with the large equatorial at the Observatory of Bordeaux, by MM. L. Picart and Courty.—Synopsis of the solar observations made at the Royal Observatory of the Roman College during the first quarter of 1898, by M. P. Tacchini.—On the colorations of the less fusible porcelain enamels, by MM. A. Le Charpentier and P. Charpy. A list of the colours obtainable from various metals, all of which have been tested upon the manufacturing scale. The compositions are given of erbium and neodymium blues, erbium and neodymium greens, neodymium violet and erbium red.—Influence of gravity and light upon the dorsiventral organisation of the branches in inflorescences, by M. H. Ricome.—On the balloon ascents of June 8, 1898, on the occasion of the fourth international experiment, by MM. Hermite and Besançon.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (Mathematico-physical Section), part 2 for 1898, contains the following memoirs communicated to the Society:—

April 30.—W. Voigt: Thermo-dynamical contributions on the interrelations of galvanism and heat.

May 14.—E. Riecke: Second memoir on the theory of galvanism and heat. W. Voigt: On the magnitude of the stresses and strains involved in the production of shearing in Iceland spar. E. Marx: The dispersion of the electrical spectrum of water. P. Stäckel: On transformations of motions.

June 11.—W. Voigt: Is the pyroelectricity of crystals entirely referable to piezoelectric action?

June 25.—E. Riecke: The reactive pressure of kathode rays. J. Orth: Fifth report on the work of the Göttingen Pathological Institute.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Nine Years at the Gold Coast: Rev. D. Kemp (Macmillan).—Stories of Starland: Mary Proctor (Bacon).—The Discharge of Electricity through Gases: Prof. J. J. Thomson (Constable).—Canalisations Électriques: R. V. Picou (Paris, Gauthier-Villars).—Organographie der Pflanzen, &c.: Prof. K. Goebel, Zweiter Teil, 1 Heft (Jena, Fischer).—Fourteenth Report of the U.S. C.S. Commission (Washington).—Second Stage Mathematics: edited by W. Briggs (Clive).

PAMPHLETS.—A Determination of the Ratio of the Specific Heats at Constant Pressure and at Constant Volume for Air, Oxygen, Carbon-Dioxide, and Hydrogen: O. Lummer and E. Pringsheim (Washington).—Meteorology in Mysore for 1897: J. Cook (Bangalore).—Cape of Good Hope: Report of the Meteorological Commission for the Year 1897 (Cape Town).—Contributions to the Morphology of Lepidoptera: Dr. K. Jordan.—An Examination of the Classificatory and some other Results of Eimer's Researches on Eastern Papilios: Dr. K. Jordan.—Zweckmässigkeit und Anpassung: Prof. J. W. Spengel (Jena, Fischer).—Clinical Observations on 2000 Obstetric Cases: Dr. G. P. Mathew (Simpkin).

SERIALS.—L'Anthropologie, Tome ix. No. 4 (Paris, Masson).—Zoologist, September (West).—American Naturalist, August (Ginn).—Boletim do Museu Paraense, Vol. 2, No. 3 (Pará).—Memoirs and Proceedings of the Manchester Literary and Philosophical Society, 1897-98. Vol. 42, Part 4 (Manchester).—History of Mankind. F. Ratzel, translated, Part 29 (Macmillan).—Zeitschrift für Physikalische Chemie, xxvii. Bd. 1 Heft (Leipzig, Engelmann).—Archives of the Roentgen Ray, August (Rebman).—Botanische Jahrbücher, Funfundzwanzigster Band, 4 Heft (Leipzig, Engelmann).—Jahrbücher der Central-Anstalt für Meteorologie und Erdmagnetismus, 1894, 2 Vols., 1895, 1896, 1897 (Wien).—Bulletin de l'Académie Royale des Sciences, &c., de Belgique. 1898 (Bruxelles).—Annuario p.p. Observatorio do Rio de Janeiro, 1898 (Rio de Janeiro).—Proceedings of the American Philosophical Society, July (Philadelphia).—Economic Journal, September (Macmillan).—Records of the Botanical Survey of India, Vol. 1, No. 2 (Calcutta).

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