follicles of negroes (*Bull. et Mém.* Soc. d'Anth., Paris, 1904, p. 124), and have obtained interesting results. The follicle forms at least half a spiral and is not flattened; the distribution of hair on the scalp is uniform, but all the hairs of the same spiral tuft have the intradermic portion of their curves orientated in nearly the same direction, and it is apparently this uniformity of the neighbouring follicles that determines the formation of spiral tufts; a semi-circular oblique crest ridge of fibrous tissue constricts the upper portion of the hair bulb, and thus causes the flattening of the hair and its spiral twist.

Mr. E. H. C. Walsh, in an illustrated note on stone implements found in the Darjeeling district (*Journ.* As. Soc. Bengal, lxxiii. p. 21), states that all the implements he found were polished "celts," with the exception of a dumb-bell shaped hammer head. The general belief of the people is that these axe-heads are thunderbolts which have fallen from heaven; they are chiefly found with the medicine men, who use them as charms in their incantations to drive out or cure disease, and also on account of their reputed medicinal properties when mixed with water; on several specimens the scraping or rubbing on stones to obtain medicine is very noticeable. Numerous references to other papers dealing with the subject are given. On p. 27 of the same *Journal* P. O. Bodding describes some shoulder-headed and other forms of stone implements in the Santal Pargans; it is not yet clear who were the makers of these distinctive implements—possibly they were Mon-Kmer and Munda peoples. The *Journal* also contains some interesting folklore.

Some time ago M. Verneau directed attention to some skulls from Palæolithic interments at Mentone with a remarkable negroid aspect, and M. Hervé has noted two somewhat similar Neolithic skulls from Brittany. Prof. Manouvrier points out in the *Bull. et Mém.* Soc. d'Anth., Paris (1904, p. 119), that all these "negroid" characters occur in European or other non-African skulls, but they are very rarely found in conjunction. All the skulls of this type are female; in following out this hint Dr. Manouvrier discusses the "negroid" characters, and comes to the conclusion that in a dolichocephalic population in which the prognathism of the men is so marked, a corresponding degree of prognathism in the women, combined with other characters that are characteristic of female skulls, would give a negroid appearance without any need to conclude that there was a negro element in the population. The same author describes (p. 67) a remarkable trepanned Neolithic skull, and (p. 101) some senile Neolithic skulls.

As the result of a long and careful comparative study of the skeletal variations of the foot in primates and in the races of man, Th. Volkov (*Bull. et Mém.* Soc. d'Anth., Paris, 1903, 1904) arrives at the following conclusions:—The skeleton of the foot of the prosimians bears many traces of the primitive type of foot of the ancient mammals, and presents many intermediate forms between this type and that of the foot of monkeys. The skeleton of the foot of the lower primates appears to be the result of adaptation to arboreal life of ancestors whose foot resembled that of existing rodents. The skeleton of the foot of anthropoids represents the extreme of this adaptation, but at the same time (among the hylobates and partly in the gorilla) the beginning of adaptation to standing and to bipedal progression. The skeleton of the foot in the lower races of man presents as a whole, and for each bone in particular, evident and numerous traces of adaptations characteristic of climbers antecedent to the assumption of the erect attitude and bipedal progression. The ethnical characters range from the oblique and flat foot to the straight and arched foot. Consequently the arch of the foot represents the most essential character from an anthropological point of view. The index of curvature, that is to say, the relation between the height and length of the foot, or especially the tarso-metatarsian length, should be considered as a very important anthropometric datum. The skeleton of the foot of the new-born infant reproduces primitive and transitory forms in the development of the human foot in general, and thus its study possesses a very great anthropological importance.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following is the speech delivered by the Public Orator, Dr. Sandys, on Thursday last, in presenting Dr. E. B. Tylor, F.R.S., professor of anthropology in the University of Oxford, for the degree of Doctor in Science *honoris causa*:—

Adest vir et propter aetatis dignitatem et propter studia in rerum originibus primis exquirendis praeclare posita inter primos merito numerandus, quem iamdudum admirati, nunc demum honore diu debito decoramus. Abhinc annos quinque et quadraginta consuetudines Mexicanas antiquas diligenter exploravit. Deinde de prisco hominum cultu, opere in maximo et doctrinae variae plenissimo, plus quam semel disputavit. Illo vero in opere, animarum praesertim in regno perlustrando aliorum antecursor constitutus, successoribus omnibus facem splendidam praetulit. Denique de anthropologia universa egregie disseruit, hominum ipsorum studium hominibus imprimis proprium esse iure optimo arbitratus. Nemo fortasse magis merito liberalitatem illam Terentianam prae se ferre potest:—

"homo sum, humani nil a me alienum puto."

The proposals forwarded by the Studies Syndicate have been rejected by the Senate by, roughly speaking, three to two. The poll taken was the largest on record, and on the Grace affecting Greek the "non-placets" were 1559 and the "placets" 1052. The result is extremely disappointing to all those who wish to see Cambridge take its rank as a leading university in the Empire. There is, however, a strong consensus of opinion that the matter should not be allowed to rest where it is. Perhaps a consultation between the two opposing bodies might lead to some plan acceptable to the more moderate members of both parties.

The Vice-Chancellor announces that he has appointed Colonel Sir Frank Younghusband, K.C.I.E., to the office of reader on Sir Thomas Rede's foundation for the present year.

Mr. E. H. Hankin, Fellow of St. John's College, and analyst and bacteriologist to the North-West Provinces and Oudh, has been approved by the general board of studies for the degree of Doctor in Science.

MR. H. O. ARNOLD-FORSTER, M.P., Secretary of State for War, has consented to give away the prizes to the students at the Woolwich Polytechnic on April 1.

THE Huxley lecture of the University of Birmingham will be delivered by Prof. E. B. Poulton, F.R.S., in the large lecture theatre of the Midland Institute, on Thursday, March 23.

IN the *Engineering and Mining Journal*, Mr. G. S. Raymer gives an illustrated description of the Simpkins laboratory at Harvard. It is designed for the study of continuous ore-dressing operations on a considerable scale, the plant consisting of a 5-stamp battery and additional apparatus of the most recent type.

THE formal opening of the new building of the École polytechnique of Montreal, in affiliation with Laval University, took place on January 28. This school was founded in 1874 to give French-Canadian youths an opportunity of obtaining a training in practical science. Its sphere has been limited, but with the new building and improved equipment better results are anticipated.

MR. CHARLES H. HACKLEY, of Muskegon, Mich., has made, we learn from *Science*, a bequest of 50,000*l.* to the Hackley Manual Training School of Muskegon, which, added to 72,000*l.* already given by Mr. Hackley, makes the school's total endowment 122,000*l.* Mount Holyoke College will receive, we learn from the same source, 34,400*l.* as the residuary legatee of the late Mr. Edmund K. Turner.

IN an article entitled "The Lesson of Coopers Hill," the *Indian Daily Telegraph* of February 1 institutes a comparison between the methods of government in the cases of Coopers Hill and the City and Guilds of London technical colleges. The success of the latter is traced to adaptation in them of the methods followed in the great German polytechnics which is shown by their senates or college boards

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responsible for their educational systems. The article proceeds to direct attention to the Thomason Civil Engineering College at Rurki in connection with a proposal at a recent meeting of the Allahabad University to abolish the faculty of engineering, and favours the introduction in the college at Rurki of the method of government which has assured the success of the colleges of the City and Guilds.

THE Berlin correspondent of the *Times* states that in the course of a debate on the estimates for the Ministry of Education in the Prussian Chamber on March 2, an official of that Ministry, Geheimrath Reinhardt, gave some interesting information with regard to the success of the so-called "reform schools," in which the study of the classics is begun at the age of twelve, and Greek not until the age of fourteen. One great advantage of this system is that the decision to assign a pupil to the modern (Realschule) or to the classical school (Gymnasium) can be postponed to a stage when his abilities and tastes can be better estimated. Geheimrath Reinhardt stated that the system of this "reform school" had hitherto been adopted at three classical Gymnasia, and the result was that of 123 pupils in the highest form who presented themselves for the leaving examination only four failed to pass, and of these four three succeeded six months later. Experience had shown that as a result of beginning Latin and Greek at a later age than was customary, the interest of the pupils in their work was rendered keener, and their diligence was certainly in no wise inferior to that of the pupils of the ordinary Gymnasia.

THE fourth annual report of the executive committee of the Carnegie Trust states that sums amounting to 38,114*l.* have been claimed and handed over to the four Scottish universities during the year. The grants for library purposes and for provisional assistance in teaching, amounting in all to 6400*l.*, have been fully paid. The grants for buildings and permanent equipment available for 1904, including a balance of 12,635*l.* unexpended in 1903, amount to 33,035*l.* Of these, the sum of 20,146*l.* has been claimed. Claims for grants towards teaching endowments amount for the year to 11,568*l.* These include contributions to the foundation of two chairs—that of history in the University of Aberdeen, and that of geology in the University of Glasgow. The scheme of endowment of post-graduate study and research has now entered upon its second year. The total expenditure for 1903–4 under the scheme was 3386*l.* The estimated outlay for the current academic year is 5177*l.* Applications for fellowships, scholarships, and grants for 1905–6 must be lodged on or before May 1 with the secretary to the trust, from whom application forms and regulations can be obtained. In the research laboratory of the Royal College of Physicians, the purchase of which was announced in the previous annual report, the superintendent reports that the past year has been one of steady and satisfactory work in all departments. Thirty-five workers have held places in the laboratory, and have been engaged in forty-seven investigations.

THE twenty-seventh annual general meeting of the Institute of Chemistry was held on March 1. In the course of an address Mr. David Howard, the president, referred to the steady growth of the institute, saying that he thought there was still a wide field for those possessing the highest chemical knowledge and skill, and that those who had to call in the aid of such knowledge and skill were becoming more and more alive to the importance of employing only the properly trained and competent. He emphasised the importance of requiring all candidates to produce evidence of a high standard of general education. The professional chemist should be a professional man as well as a chemist, and must, therefore, possess that general culture which is essential if he is to deal with his work in a professional spirit. Referring to the position of the institute in connection with the Sale of Food and Drugs Acts, he mentioned that 94 per cent. of the public analytical appointments were held by fellows of the institute. The president alluded to the action of the Board of Agriculture in encouraging provincial technical and agricultural colleges to undertake professional chemical work gratuitously, or at purely nominal fees. In the endeavour to help dairy farmers, the board has induced the colleges, which are maintained by grants for technical education, for the benefit of a particular class, to compete with professional chemists, particularly those retained by the agricultural associations, at the expense of the general public. The president held that the colleges need the grants for the promotion of the education of farmers in the science and practice of agriculture, without diverting them to other purposes. It is for them to instruct the farmers in agricultural chemistry.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 2.—"The Theory of Photographic Processes: on the Chemical Dynamics of Development." By S. E. **Sheppard** and C. E. K. **Mees**.

If a photographic plate be exposed to light and developed, the transparency to light of the silver deposited is related to the mass thereof by the equation $D = -\log_{10}T$, where D (termed the density) is proportional to the mass of silver per unit area. This relation has been confirmed with great care for densities varying from 0.5 to 3.5, and for the plates and developer used a density of 1.00 corresponded to 0.01031 gram of silver per 100 sq. cm. This quantity is termed P, the "photometric constant" of the deposit.

A study of the relation of the density to the time of development resulted as follows:—

(*a*) The silver deposited increases rapidly at first, then more slowly, and finally tends to a limit.

(*b*) This limit depends only on the exposure.

(*c*) The velocity depends on the concentration of the reducer.

(*d*) A soluble bromide reduces the velocity, but the "slowing off" with time is not so rapid.

A theoretical investigation of development based on the theory of reaction-velocities in heterogeneous systems led under certain conditions to the equation $dD/dt = \kappa(D_\infty - D)$, w D_∞ is the limiting density, D that at the time t. On integration this leads to the expression

$$1/t \log D_\infty/D_\infty - D = \kappa;$$

$(D_\infty - D)$ is then the reacting surface.

κ was experimentally shown to be constant.

Further, as κ is theoretically $\Delta/\delta\ a$, where Δ is a diffusion-constant, δ the diffusion path, and a the concentration of the reducer, the velocity should be proportional to this, which was experimentally found.

The addition of alkaline bromides gradually alters the course of the reaction, introducing an induction period, but for the "maximum" velocity $\kappa \times \log Br = a$ constant.

The value of κ depends greatly on the physical condition of the plate, diminishing with keeping, probably from lowered diffusivity.

An important deduction from the development formula is that the ratio of the densities due to two exposures is constant and independent of the time of development, which was confirmed.

For a series of increasing exposures for a certain range Hurter and Driffield showed that $D = \gamma(\log E/i)$, where γ is development-constant.

Hence as γ is proportional to D, and as

$$1/t \log D_\infty/D_\infty - D = \kappa,$$

therefore $1/t \log \gamma_\infty/\gamma_\infty - \gamma = \kappa$, an expression which may be used to compare the velocities of different developers. For ferrous oxalate, citrate and fluoride the following table was obtained:—

Developer	Relative efficiency
Ferrous citrate	1.00
Ferrous fluoride	2.95
Ferrous oxalate	48.7

Further communications are to be made on the influence of temperature, of soluble bromides, on the reversibility of the reaction, on the microscopy of, and on the exposure and development, nature and destruction of the "latent image."

The object of the investigation is to make the study of development quantitative and to bring it in line with general physicochemical theory.

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