publication, and a considerable number of such papers have appeared in scientific and technical journals.

A high value is attached to the thesis work; and rightly. In it the student is placed in the attitude of an independent investigator. He is thrown to a large extent upon his own resources in devising methods of investigation and in finding means of overcoming the difficulties that always arise in original work. Such individual aid is given to each student as is necessary to keep him from too great loss of time from using wrong methods of procedure, without, on the other hand, giving him such specific directions as would entirely deprive his work of originality. He thus acquires a knowledge of the patience, care, and time which it is usually necessary to spend upon the experimental solution of any new and untried problem. This early training of investigators has produced excellent results. A register of the publications of the Institute and of its officers, students, and alumni, between 1862 and 1882, was compiled by

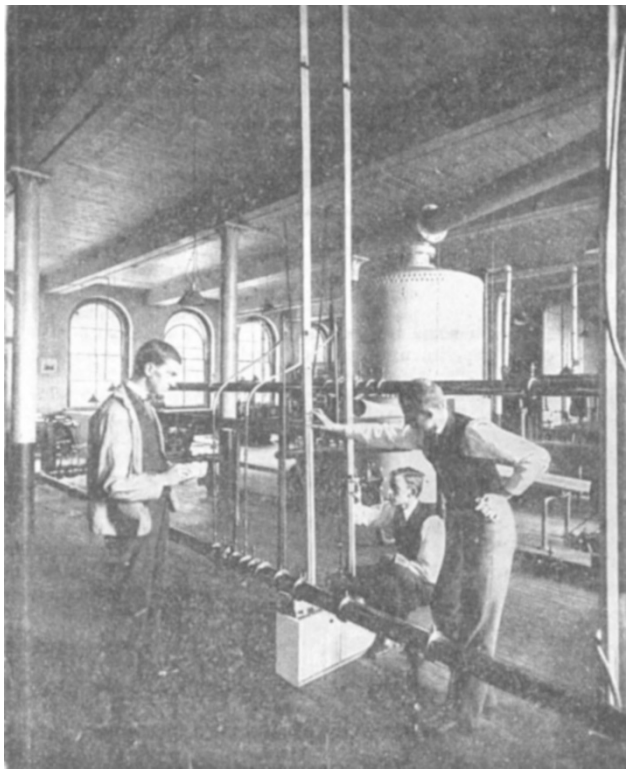

Fig. 3.—Hydraulic Laboratory.

Prof. W. R. Nichols, and has been brought up to date by the late Prof. L. M. Norton and Prof. A. H. Gill. The list includes books, pamphlets, reports, contributions to periodicals—everything, in fact, except contributions to daily newspapers—made by the the teaching staff during their connection with the school, and by students during their connection with the school and in after life. As Prof. Gill remarks, no truer index of the value of an educational institution can be found than the work which its alumni have done and are doing, and when we say that the total number of titles of communications given in the list is nearly 2,900, thirteen hundred of which have been added since 1888, it will be agreed that the system of training at the Massachusetts Institute of Technology is one that gives a love of investigation to the students; and to the man of science this desire to extend natural knowledge should be the end and aim of all scientific education.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—At a meeting of the Junior Scientific Club, on Friday, October 27, Mr. M. D. Hill, of New College, was elected President for the current term. Mr. E. S. Goodrich exhibited some recent additions to the University Museum, including a specimen of Palæospondylus, a specimen of Indris brevicandatus, and the brain of "Sally," the chimpanzee, who was so well known at the Zoological Gardens. Mr. Wynne-Finch, of New College, read a paper on mining; and Mr. Gordon, of Keble College, read a paper on the effects of temperature on the incubation of eggs.

The Ashmolean Society held a meeting on Monday, October 30, when Mr. A. G. Vernon Harcourt read a paper on the properties of ferrous chloride, and Dr. W. B. Benham one on the effects of sedentary life on certain annelids.

The Junior Scientific Club seems to have ousted the older and more senior Ashmolean Society almost completely. At the meetings of the latter, which offers communications of at least equal, perhaps of greater, interest than the Junior Society, the attendance seldom reaches a dozen, and of these a large proportion consists of ladies who are more or less directly interested in the lecturer. The attendance at the Junior Scientific Club, on the other hand, is always large, and frequently exceeds fifty. The reason of this disparity is not easily found. Some people attribute it to the lesser formality of the proceedings of the younger society, and to the fact that smoking is permitted during the meetings.

The Sherardian Professor of Botany announces a course of six lectures on forestry, to be given by Dr. J. Nisbet, at the Botanic Garden, daily from Monday, November 6, to Saturday, November 11, inclusive.

CAMBRIDGE.—The Engineering Laboratory Syndicate ask for a grant of £1000 to enable them to complete the buildings required for the accommodation of the department. From private sources nearly £5000 have been subscribed for the purpose, but this is insufficient for the whole of the work in contemplation. Prof. Ewing reports that no less than seventy-four students have entered for courses in engineering during the present term; and it is very desirable that their work should not be hampered by delay in providing the necessary rooms for their accommodation. It had been hoped that subscriptions towards so valuable an extension of the scientific equipment of the University would flow in liberally, but the stream of benefaction seems for the present to have dried up.

The scheme for examinations in agricultural science will come before the Senate for decision on November 9. Already a note of dissent has been sounded by a well-known theological graduate.

Mr. R. A. Sampson, Fellow of St. John's, has been appointed Professor of Mathematics at the Newcastle College of Science.

SCIENTIFIC SERIALS.

L'Anthropologie, tome iv. No. 3.—The current number contains four papers of much interest. Dr. R. Collignon contributes an article on the proportions of the trunk among the French, whom he divides into three classes: (1) the Celts, in the sense in which Broca used that term, that is to say, a short, dark, brachycephalic and mesorhine people, such as those found in Auvergne, Limosin, and the centre of France generally; (2) the tall, fair, dolichocephalic Kymris, found in the north-eastern or Belgic departments of France; and (3) those who are really cross-breeds. The measures of the trunk are five in number:—(1) The total height, in the sitting position, from the inter-clavicular notch to the seat; (2) the maximum bi-acromial diameter; (3) the maximum bi-humeral diameter; (4) the maximum bi-iliac diameter; (5) the maximum bi-trochanteric diameter. The following measures of the thorax are also taken: (1) the distance from the superior border of the clavicle to the inferior border of the false ribs, measured on a perpendicular line passing over the nipple; (2) the transverse width, and (3) the antero-posterior width, at the height of the nipples; (4) the circumference just below the nipples; (5) the circumference about 3 c.m. below the nipples. Observations were made on sixty Celts, seventy Kymris, and eighty Celto-Kymris. It appears that there is a regular gradation between the three classes. Among the brachycephalic Celts, the trunk and thorax are shorter than amongst the dolichocephalic Kymri, whereas in all other respects the measurements of the Celt exceed those of the Kymri. The people of mixed blood occupy an intermediate position. When the total height or the length of the

trunk is taken as a standard, the same general results are obtained, but the length of the thorax as compared with that of the trunk is greater in the Celts than in the Kymri. A comparison with similar measurements of various races of Tunis, negroes of the Soudan, and a single bushman, leads the author to the conclusion that in any given race all the measures of the body increase in absolute length and diminish in relative length as the stature increases, and *vice versâ*.—In a paper on the Matriarchate in the Caucasus, Maxime Kovalevsky adduces facts which tend to prove that the ancestors of the mountaineers who live in the high valleys of the Caucasus at the present time practised what Morgan and Fison have called "group marriage."—Dr. H. Ten Kate gives an account of his researches in Malaysia and Polynesia during a scientific mission promoted by the Royal Geographical Society of the Netherlands, in the course of which he examined 999 Malaysians of different races, and 314 Polynesians. The predominant colour of the skin among the Malaysians is brown and dark brown, while among the Polynesians it is light brown and yellow. The Malaysians have generally wavy or curly hair, but straight hair is a characteristic of the Polynesians. The Malaysians are mesocephalic; the Polynesians brachycephalic. Among the Malaysians the nose is concave or *retroussé*, while the Polynesian noses are straight and aquiline in about equal proportions. As regards stature, the Malaysians are below middle height and the Polynesians tall.—Dr. P. Topinard gives an interesting account of Anthropology in the United States, where the subject has received so much attention during the last few years. The question of the antiquity of man in North America is discussed at some length, and the general conclusion arrived at is that it does not exceed 15,000 years. Dr. Topinard proposes to continue the examination of American questions in future numbers of *L'Anthropologie*.

Bulletin de l'Académie des Sciences de St. Pétersbourg, New Series, vol. iii. No. 3.—Preliminary report on the results of the archæological expedition to the Orkhon River, by W. Radloff. The ruins of Khara-Calgasun, the old city of the Uigurs, close by which lie the ruins of a palace of the Mongol Khans, have been explored, as also the Tüküe monuments in the valley of Tsaidamin-nor. In the monastery of Erdeni-dsu, about 27 miles south-east of Kosho-tsaidam, and 20 miles south of Khara-balgasun, the expedition has discovered several stones, covered with Mongolian, Tibetan, and Persian inscriptions which, in Prof. Radloff's opinion, prove that the old town of Karakorum stood at this spot. This position would agree with the Chinese indications which give to Karakorum a position of 100 *li* south of Ughei-nor. Many maps, plans, photographs, and casts of inscriptions have been brought in by the expedition.—Reports of MM. Clements, Dudin, Yadrintseff, and Lewin, relative to the same expedition.—Photographic spectrum of Nova Aurigæ, 1892, observed at Pulkova, by A. Belopolsky. Full details of the observations and measurements made on the photographs are given. In his conclusions the author considers an eruption of the star as not probable, and concludes in favour of a superposition of the spectra of two or more bodies in the spectrum of the Nova.—On a group of peculiar rocks brought from the Taimyr-Land by A. Middendorff, by Dr. K. Chrustschoff.—On a new species, *Felis pallida*, from China, by Eug. Büchner. The species is near to *Felis chaus*, Güld., but partially differs in coloration, as also in the length of the tail. The specimens described were brought in by Przewalski in 1884 from the south Tetung ridge in Gan-su.—On the state of the basin of the Black Sea during the Pliocene Age, by N. Andrusoff. The following conclusions are arrived at: The now deep part of the Black Sea remained submerged since the Sarmatian epoch, and was covered with brackish lakes of the Caspian type; however, it was separated from the Mediterranean by a continent which occupied the place of the Archipelago and the Ægean Sea. This continent was submerged, and a communication between the Mediterranean and the Black Sea was established at a very recent epoch, when the Black Sea already had its present shape.—On the differential equation of Lamé-Hermite, by F. Brioschi.—On the Perseids observed in Russia in 1892, by Th. Bredikhin. Observations, with the view of determining the decrease of the inclination of the orbits of the meteors, in proportion to the time-interval from August 10·5, have been made throughout the duration of the shower at Moscow, Pulkova, and a place in the district of Kineshma. All observations, including 339 meteors, are embodied in seven lists, or charts, published in full. The radiant has been deduced from each chart separately, and given for eight different dates, from July 29 to August 29. The surface of radiation has a circular form, its diameter having a length of nearly 45°, and the radiant point really suffered displacement.—On the embryonal development of the birch, preliminary communication, by S. Nawaschin. It has two phases in common with the development of the Casuarinæ, which therefore cannot be separated from other Angiosperms. They are evidently connected, through the birch, with the lower Angiosperms (Apetales).—On the representation of the daily change in the temperature of the air by means of Bessel's interpolation formula, by H. Wild. Critics of conclusions, opposed to those of the author, and arrived at by Dr. Paul Schreiber, director of the Chemnitz Meteorological Institute.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, October 18.—Henry John Elwes, President, in the chair.—Mr. R. Adkin exhibited two *Leucania vitellina* and one *L. extranea*, taken in the Scilly Islands, in August 1893.—Mr. R. South exhibited a specimen of *Polyommatus bœticus*, and a number of varieties of *Chrysophanus phlæas*, captured in Kent, in September last, by Mr. Sabine; also a curious variety of *Argynnis euphrosyne*, taken in Lancashire in May 1893; a pallid variety of *Vanessa urticæ*, taken in Monmouthshire, in July 1893; and a *Triphæna pronuba*, the right wings of which were typical, and the left wings resembled the variety *innuba*, caught at sugar, in Dovedale, Derbyshire, in July 1893.—Mr. G. H. Verrall exhibited a specimen of the Tsetse (*Glossina morsitans*), and also one of the common European allied species (*Stomoxys calcitrans*). He also exhibited a specimen of *Hæmatobia serrata*, Dsv., which hes tated was not uncommon on cattle in England, but believed to be harmless; while in North America the dreaded "horn-fly" is said to be the same species.—Mr. Elwes exhibited a larva which he had found three days previously under stones on a moraine, apparently quite destitute of vegetation, in the Austrian Tyrol, at an elevation of about 7000 feet. He remarked on the number of Alpine butterflies, some of them in fresh condition, which he had seen whilst chamois-hunting in the Austrian Tyrol during the last week, and he suggested that in such a fine autumn as the present one collectors might find more novelties among the larvæ of Alpine species than in the summer.—Col. Swinhoe read a paper entitled "A List of the Lepidoptera of the Khasia Hills" (pt. 2). The President said he thought all entomologists would be grateful to Col. Swinhoe, Mr. Hampson, Mr. Meyrick, and others for the work they had recently been doing in describing the moths of India; but as the district of the Khasia Hills was probably richer in species than any other part of India, except Sikkim, and new species were being received almost daily, it was impossible to make any list complete. Mr. Jacoby, Mr. McLachlan, Mr. Jenner Weir, and Col. Swinhoe continued the discussion.—Mr. E. Meyrick communicated a paper entitled "On a Collection of Lepidoptera from Upper Burma." The author stated that the species enumerated in the paper were collected by Surgeon-Captain Manders whilst on active service in the Shan States and their neighbourhood, shortly after the British annexation of the territory. A discussion followed, in which the President, Surgeon-Captain Manders, and Col. Swinhoe took part.

PARIS.

Academy of Sciences, October 23.—M. de Lacaze-Duthiers in the chair.—Observations of Brooks' Comet (1893, October 16), made at the great equatorial of the Bordeaux Observatory, by MM. G. Rayet and L. Picard.—On the movements of the surface of the heart, by M. Potain. The object of this investigation was to obtain the interpretation of the cardio-pulmonary sounds resulting from the movements communicated to the lung by the heart, and the local inspiration phenomena produced by these movements. The movements were recorded by an instrument capable of tracing simultaneously at several points of the surface the displacements in all directions. From these traces the actual trajectories of the points were constructed, the points being five taken on the accessible surface of the ventricle of an animal with an open chest. The general movement thus indicated is, during systole, a rapid retreat of the surface and an equally rapid translation to the right; this is, in fact, the well-known torsional motion. At the end of the ventricle, the retreat is only effected towards the end of the systole. At the beginning