muscles and brain; objectively, the attainment of some useful object. Such knowledge was called skill or art, and the man who attained it was a skilled workman, an artisan, an artist, a master of his craft. The continuity of this kind of knowledge depended on tradition, and its improvement was by invention. Its acquirement was called technical education; its results were seen in the products of agriculture which feed us, in the ships and railroads which carry us round the globe, in the triumphs of steam and electricity, of preventive medicine and antiseptic surgery, in the matchless steel, the wondrous armour-plates, and all the vast output of the skilful industry of Sheffield. But there was another kind of knowledge—the desire for which came later in human history—the knowledge of what things mean, of how they consist, of why one event follows another. This knowledge was not active, but contemplative, not practical, but theoretical, not technical, but scientific. Its end was purely intellectual; subjectively, the pleasure of exerting the mental powers; objectively, the truth about things. We call this knowledge science; that is, not only acquaintance with the objects around us, or natural history (descriptive botany, zoology, mineralogy, geology, astronomy, and anatomy), but also some insight into their constitution and growth, into the laws of their origin, their actions, their decay and metamorphoses. This was called natural philosophy. Its improvement depended, not on invention of tools and methods, but on discovery of facts and their relations. It was only indirectly useful, and the pleasure it gave was in proportion to the intelligence of the man who felt it: "*Felix qui potuit rerum cognoscere causas.*" The abstract sciences seem to have arisen out of the needs of useful arts—geometry out of measuring the rising of the Nile, arithmetic out of counting the hosts of a Persian despot or the gains of an Indian money-lender, trigonometry out of setting landmarks, chemistry out of the alchemist's search after gold, botany out of materia medica, and anatomy out of surgery. Amply has the debt been repaid. At the present time all the progress in useful arts was called "scientific," and rightly so, for all depended upon natural science. Agriculture rested on the basis of organic chemistry, geology, and botany, navigation on astronomy, the working of metals on physics and chemistry, engineering on mathematics, medicine on physiology, and if ever the art of governing mankind was to be more than empirical, it would rest on profound knowledge of palæontology and neuro-physiology.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—On October 1, the first day of the Michaelmas term, Dr. Alex Hill, Master of Downing, was formally admitted to the office of Vice-Chancellor. The retiring Vice-Chancellor delivered an address to the Senate, in which he reviewed the events of the past academical year. The emphatic rejection of the proposals in reference to degrees for women rendered it probable that some years must elapse before the University would grant any further rights or privileges to women students. The statement published last term by the Chancellor, as to the pressing financial needs of the University, had already led to one munificent gift of 2000*l.*, and it was hoped that this would be followed by others. Valuable donations to the museums and laboratories were acknowledged. Among new appointments were included the Professorship of Mental Philosophy, the Gilbey Lectureship in Agriculture, the Lectureship in the Hausa Language, and the Lectureship in Physiological Psychology.

The death of Prof. C. S. Roy, F.R.S., who has filled the chair of Pathology since 1884, took place on October 4. The late professor has been incapacitated by serious illness for over a year, but his death was somewhat sudden. The department has been superintended during his prolonged absence by Dr. Kanthack, of St. John's College, the deputy-professor.

IT is stated in *Science* that the plans are well formulated for the proposed new physical laboratory of Dartmouth College, New Hampshire, the result of the 75,000 dollars bequest of the late Mr. Charles T. Wilder. The committee has set apart 50,000 dollars for its erection and 20,000 dollars for maintenance. Additional grants have been made for an observatory, the foundations for which will be laid at once.

PROF. G. B. HOWES presided at the annual meeting for the distribution of the prizes gained by the students of the Westminster Hospital Medical School, on Thursday last. Reference was made in the report, read by the Dean of the College, to the resignation by Dr. Dupré of the post of lecturer on chemistry after thirty-three years' service, and it was stated that he had been succeeded by Dr. Wilson Hake. The entrance natural science scholarship, value 60*l.*, was awarded to Mr. E. C. Whitehead, and the entrance scholarship of 40*l.* to Mr. F. D. Martyn.

MR. R. C. CHRISTIE has given to Owens College, Manchester, the whole of his share of the estate of the late Sir Joseph Whitworth, as residuary legatee. It is estimated that the value of the gift is 50,000*l.* Mr. Christie has expressed the desire that the sum should be devoted to the erection of such buildings as the governors should think fit in connection with the college, only stipulating that the name of Sir Joseph Whitworth may be associated with the new buildings, and that they may be accepted and treated as a further gift from him to the college. It is also announced that two friends of the college have given sums respectively of 20,000*l.* for the erection of a physical laboratory and 5000*l.* for the maintenance of it; also that Mr. Edward Holt, of Manchester, has sent a cheque for 1500*l.* towards the erection of a museum at the college. Mr. Christie's fund will probably be devoted first of all to the erection of a hall for ceremonial and other large gatherings at the college.

MANY of the syllabuses of the subjects in which examinations are held by the Department of Science and Art have been modified. As already announced, the examinations in the honours stage of most of the science subjects will in future be divided into two grades: Part I. of a more advanced character than the advanced stage; and Part II. dealing with the highest branches of the subject. The honours portions of the syllabuses of most of the subjects have been re-written in consequence of this new regulation. The syllabuses of naval architecture, applied mechanics, and general biology (Section I.) have been entirely re-written. Prof. J. Perry is now an examiner with Mr. W. H. Greenwood in applied mechanics, and the new syllabus of the subject gives unmistakable evidence that he has had much to do with its composition. Prof. Perry has also been appointed an examiner in steam; and Dr. Fream has been appointed an examiner in agriculture. Prof. L. C. Miall's new syllabus of an introductory course of biology should be seen by all who are interested in the teaching of the subject.

THE new Directory of the Department of Science and Art has just been published. Many modifications have been made, both in the regulations for conducting science and art schools and classes, and in the syllabuses of the subjects recognised by the Department. We can only refer to a few of the changes. It is announced for the first time that recognition may be refused to any class which the Department considers to be unnecessary, or to compete unduly with a neighbouring school. This regulation will probably be the means of reducing the undesirable competition which often exists between science classes near one another. Schools may now be managed by a public company, provided that the articles of association specify 5 per cent. per annum as the maximum dividend. Counties and county boroughs which possess an organisation for the promotion of secondary education may elect to be responsible to the Department for the science and art instruction within its area. In such case grants will in general only be made to the managers of new schools and classes if they are acting in unison with the local authority.

A LARGE building, in which the art and technical schools of Leicester will be incorporated, was opened by the Bishop of London on Tuesday. The cost of the new buildings and site is just under 40,000*l.* The site extends to nearly three-quarters of an acre, and the main frontage is 220 feet, with an elevation of four stories. Two of the floors are devoted to technical instruction in hosiery and boot and shoe manufacture, with a full complement of all kinds of old and new machinery showing the development of the processes of manufacture, engineering, plumbing, dyeing, painting, &c. The two upper floors will be occupied by the school of arts. A portion of the roof of the building is flat, and on this a conservatory has been erected for studies of plant-life. At the opening ceremony Sir Thomas Wright, chairman of the committee, stated that the whole of the funds for the new building would be provided out of the excise

duties, or what was commonly called "beer money." This contribution from the Exchequer would be sufficient to pay the interest on the outlay, provide a sinking fund, and leave a balance of 1250*l.* per annum towards the annual expenditure.

IN an introductory address delivered at the Yorkshire College, Leeds, on Friday last, Mr. T. R. Jessop described the magnificent provision made for the study and practice of medicine and surgery in some of the cities in Russia. He said that he found several of the Russian hospitals and cliniques far in advance of our own. Of the recently completed Moscow cliniques it was difficult to speak in adequate terms. Built at a cost of about half a million pounds sterling, half of which was contributed by a few wealthy ladies, whilst the remainder, as well as an endowment of 43,000*l* yearly, was guaranteed jointly by the Imperial Government and the municipality, they consisted of a dozen or more separate detached handsome buildings, erected on an open estate of from forty to fifty acres, situated about a mile and a half outside the busy city. Each building was a complete hospital, with its own lecture room, laboratory, professor's room, &c., and in those requiring it there was provided a suite of operating rooms which might well serve as models for any hospital. Each building was adapted for a special purpose, for dealing, namely, with surgical or medical cases, children's diseases, ophthalmic, contagious, nervous, nasal, and aural affections, and so on. And all this had been done for the sole purpose of educating medical students, and providing the country with competent medical men.

THE following entrance scholarships have been awarded in medical schools:—*Guy's Hospital Medical School:* Scholarship for University students (anatomy and physiology), of the value of 50*l.*, to Mr. A. H. Davies, Caius College, Cambridge. Open scholarships in science —First scholarship, of the value of 150*l.*, to Mr. A. E. H. Parkes, Guy's Hospital Medical School; second scholarship, of the value of 60*l.*, to Mr. W. H. Harwood-Yarred, Dulwich College. *St. Mary's Hospital Medical School:* Science scholarships.—144*l.*, Mr. M. F. Kelly; 78*l.* 15*s.*, Mr. J. B. Albury; 78*l.* 15*s.*, Mr. D. E. Finlay; 52*l.* 10*s.*, Mr. J. H. Wells; exhibition of 26*l.* 5*s.*, Mr. H. R. Kidner and Mr. M. T. Williams. University Scholarships.—57*l.* 15*s.*, Mr. F. C. Eve; 57*l.* 15*s.*, Mr. C. Killick; exhibition of 26*l.* 5*s.*, Mr. A. Whitmore. *St. Thomas's Hospital Medical School:* First entrance scholarship in natural science (150*l.*) to Mr. W. H. Harwood-Yarred, and the second, of the value of 60*l.*, to Mr. Francis H. Whitehead. The University Scholarship, of the value of 50*l.*, to Mr. Frank Cecil Eve, of Emmanuel College, Cambridge. *Charing-cross Hospital Medical School:*—Livingstone Scholarship (100 guineas), to Mr. S. A. Boyd; Huxley Scholarship (55 guineas), to Mr W. J. O'Brien; Universities' Scholarship (60 guineas), to Mr. W. G. Rogers. Entrance scholarships have also been awarded to Mr. E. Bayley (60 guineas), Mr. C. L. Lakin (40 guineas), and Mr. G. S. Welham (30 guineas). *London Hospital Medical College.*—Price Science Scholarship (120*l.*), Mr. J. Jones; Price Anatomy and Physiology Scholarship (60*l.*), open only to competitors from Oxford or Cambridge, Mr. C. Warren (Oxon.); science scholarship (60*l.*), Mr. R. T. Dolbey; science scholarship (35*l.*), Mr. M. T. Williams.

SCIENTIFIC SERIALS.

Symons's Monthly Meteorological Magazine, September.—Climatological records for the British Empire in 1896. A table is given showing the chief climatological elements at eighteen stations in various parts of the globe, and is accompanied by interesting remarks upon the results. The highest shade temperature, 111°·2, occurred, as is most frequently the case, at Adelaide, in January. A temperature of 104°·8 was recorded at Malta, in August, which appears to be unprecedented. No station has ever approached Winnipeg in respect of minimum shade temperature, and the daily and yearly range, but the values for 1896 call for no special remark. The least daily and yearly range were recorded at Grenada; the values appear to be normal, and are very similar to those obtained at Barbados in former years. The highest mean temperature always occurs at Ceylon; in 1896 it was 81°·5, but the average for fifteen years at Bombay is less than a degree below that for Ceylon. The driest station, viz. that recording the lowest relative humidity, has for many years been Adelaide, while Esquimalt is the dampest. The highest temperature in the sun, 177°, was recorded at Trinidad, and the lowest temperature on grass was −23°·5 at Toronto; the radiation temperature is not registered at Winnipeg. The greatest rainfall, 101·06 inches, occurred at Colombo, and the least, 15·17 inches, at Adelaide, this value being much below the average. The fall at Mauritius, 68·17 inches, is the greatest since 1877. The greatest amount of cloud was recorded at Esquimalt, which slightly exceeds that of London; the clearest sky was observed at Grenada, where the average amount was 3·6, the scale being 0 to 10.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 27.—M. A. Chatin in the chair.—On the hypocycloid with three inflections, by M. Paul Serret. A continuation of a preceding paper.—On the stability of the phosphorescent sulphides of strontium, by M. J. R. Moureto. Specimens of phosphorescent strontium sulphide, prepared by five different methods, and exposed to air and sunlight at a temperature of 45° C., undergo a decomposition with production of hydrogen sulphide, and a sulphate.—On parastannyl chloride, by M. R. Engel. Metastannic acid, if washed with boiling water before drying in a vacuum, contains two molecules of water less than the acid prepared with cold water. This gives with hydrochloric acid an insoluble metastannic chloride, $Sn_5O_9Cl_2.2H_2O$, which differs from the chloride previously known by two molecules of water. From this a new stannic acid is obtained, to which the name of parastannic acid is given.—On some double chlorides formed by cinchonamine, by MM. Léon Boutroux and P. Genvresse. The alkaloid forms double chlorides with cadmium, zinc, and copper chlorides, the analyses and crystallographic characters of which are given.—On the improvement of humous earths, by M. J. Dumont. The application of potash manures, with a small proportion of lime salts, or of phosphatic slag, is recommended.

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