

It is a great incentive for the students that the college sends abroad those graduates who are of promising ability and of good character for the completion of their education.

Any boy above fifteen and below twenty-one years of age is admitted to the college after passing the entrance examinations. The graduates of the Government public or private middle schools, which are acknowledged by the Minister of Education to be on equal footing with the public middle schools, are admitted to the college without entrance examination on their scholarship, provided they receive satisfactory reports as to ability and character from the respective schools where they have graduated.

The cadets are of two kinds, those who are supported by loans from the Government or from some mercantile corporations, and those paying their own expenses. Such students of good character and ability as are deemed by the college authorities to be worthy examples to follow are treated as honorary students, and they are freed from their expenses.

The teaching and administrative staffs of the college comprise sixty-six members, and the total number of cadets undergoing instruction at the college, in workshops, and on board ships is 515.

To practise the cadets in making knots, seigings, splices, hitches, bends, bending and unbending, making and taking in sails, sending up and down yards and spars, a training ship named the *Meiji Maru* is moored in the basin belonging to the college, where the cadets are drilled after their morning class lessons are over. They are also drilled in boating, sailing and steering. The *Meiji Maru* was built at Glasgow, being of 1037.20 tons gross and 457.46 net tons; length 242 feet, breadth 29.25 feet, depth 21.50 feet. The college owns another sailing vessel named the *Kotonoo Maru*, used as a training ship. This was built in London, being 825.32 tons gross and 775.62 net tons; length 161.85 feet, breadth 17.65 feet. The ship is employed in coasting the neighbouring seas.

A large sailing vessel named the *Taisei Maru*, of more than 2000 tons, is now in course of building at the Kawasaki Dock in Kōbe, and when finished it will be used as a training ship in navigating not only to the different ports in Japan, but also to those of Europe, America, Australia, &c.

Besides the Government Nautical College, the Nippon Kaikin Eksaisaikwai (Japan Sailors' Home) is to some extent contributing toward the training of higher seamen. The association has branch offices at Tokio, Kōbe, and Nagasaki, where a number of ordinary seamen of some experience are instructed in order to prepare themselves for the examinations to obtain the higher seamen's licenses.

Other public institutions for training higher seamen are the nautical schools at Hakodate, Hokkaido; Oshima, Yamaguchiken; Ochigori, Ehimeken; Mitoyogōri, Kagawaiken; Toba, Miyeken; Sagagori, Saga; Toyoda, Hiroshimaken. In these institutions navigation and engineering courses are offered. The institutions are open to boys who have finished their four years' course at high elementary schools, and to those who are regarded upon examination as of equal ability. The course is about six and a half years, the lessons being as follows:—

Navigation Department.	Moral code.	Reading.
	Composition.	Mathematics.
	Physics.	Chemistry.
	Geography.	Foreign language.
	Drawing.	Gymnastics.
	Elements of surgery.	
Engineering Department.	General principles of seamanship, navigation, marine meteorology and shipbuilding.	
	Principles of mercantile marine business.	
	Mechanics.	Applied Mechanics.
	General principles of electricity.	
	General principles of shipbuilding.	
	Principles of mercantile marine business.	

The graduates of the institution mentioned are required to take the examination for higher seamen, and when they successfully pass it they are made deck-officers or engineers, but the graduates of the Nautical College are granted seamen's certificates without examination.

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THE SANDING-UP OF TIDAL HARBOURS.

At the meeting of the Institution of Civil Engineers on January 26 Mr. A. E. Carey read a paper on "The Sanding-up of Tidal Harbours."

The object of the paper was to indicate the effects of sanding-up in harbours situated (1) where no river debouches, and (2) at the mouths of rivers or estuaries. Of the three channels to the Port of Ostend one is now abandoned, and the other two are kept clear by the annual dredging of 950,000 cubic metres. Similarly the Port of Boulogne requires the annual dredging of 535,000 cubic metres. Mr. Carey considers that dredging is the only satisfactory expedient for conserving working depths at the mouths of sand-threatened harbours. Littlehampton is an instance of a permanent harbour at a river-mouth, but the entrance is almost dry at low water. The obliteration of Ceará Harbour, Brazil, a work which occupied ten years and cost more than 400,000*l.*, provides an instance of the extinction of a harbour by sand. From a study of the various stages in the construction of the harbour of Madras, it appears that the changes in the contour of the coast which resulted from the first two years' working included a progressive shoaling of the entire area of the harbour up to the original $7\frac{1}{2}$ -fathom line. In the opinion of the mixed commission appointed by the Indian Government in 1883, unless the opening of the harbour as designed were closed, and a new opening to the north-east substituted, the harbour would prove valueless as a shelter for shipping.

Referring to the harbours of Denmark, Mr. Carey said that on the west coast the only harbour is that of Esbjerg, and, with this exception, fishing-boats have no shelter except the mouth of the Limfjord. At Hirtshals a Government harbour was projected at a cost of 550,000*l.*, and the works were started in 1879. The work is now sanded-up and abandoned, except that the pier has since been prolonged. The utilisation of the Ringkjøbingfjord was advocated, and plans were submitted of an isolated harbour connected by viaducts with the shore at Sandnaeshage, a favourable spot owing to the depth of water there, and the protection of an outlying reef. The Danish Government has now determined on the construction of a small harbour at Skagen, and of two isolated moles, respectively at Hanstholm and Vorupør. In view of the precarious nature of tidal harbour work, a departure from established practice is called for. Harbours of refuge have a limited range of utility, unless in land-locked positions. In a number of instances it would be practicable by means of piled structures to create shipping facilities which would meet reasonable requirements, and come within the resources of local authorities, also avoiding the permanent expense of dredging. Such structures would, however, have to be carefully designed, especially in relation to their height, crantage, and the moorings for vessels frequenting them.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The following appointments of examiners for 1904 and 1905 have been approved:—In the final honour school of chemistry, Mr. Herbert B. Baker; in the preliminary examination in physics, Mr. Robert E. Baynes; in chemistry, Mr. George B. Croushaw; in botany, Mr. A. C. Seward, F.R.S.

It has been resolved in convocation to confer the degree of D.C.L., *honoris causa*, upon Mr. Henry Wilde, F.R.S., and of M.A., *honoris causa*, upon Mr. J. J. Manley, curator of the Daubeny Laboratory, Magdalen College.

A sum of 1200*l.* has been offered to the university by Mr. Philip Francis Walker for the purpose of founding a studentship for original research in pathology. The studentship will not be confined to members of the University of Oxford. Elections to it are to be made by a board consisting of the Vice-Chancellor, the regius professor of medicine, the Waynflete professor of physiology, the president of the Royal College of Physicians, and Mr. Philip F. Walker. It is not to be awarded by the result of a competitive examination. The studentship is to be tenable for three years, and of the annual value of 200*l.*

In order to avoid the overlapping of practical work in

chemistry done in the various college laboratories and in the museum, a scheme is being tried this term in which each laboratory specialises in a particular subject, and men migrate to the courses they wish to attend instead of remaining in the laboratory to which they are normally attached. Preliminary work is taken at the museum by Mr. Fisher, Mr. Walden, and Mr. Lambert; quantitative analysis by Dr. Watts at the museum and Mr. Manley at Magdalen; organic chemistry by Mr. Marsh and Mr. Sidgwick at the museum; physical chemistry by Mr. Nagel and Mr. Hartley at Balliol; inorganic chemistry by Mr. Baker at Christchurch.

On February 9 resolutions will be submitted to congregation for the purpose of making Greek an optional subject in Responsions for candidates intending to read for the honour school of mathematics or natural science. It is proposed that candidates should offer as a substitute for Greek (a) a mathematical subject or a scientific subject, both of which are to be determined by the board of natural science; and (b) a modern language, viz. either French or German.

CAMBRIDGE.—His Majesty the King has graciously announced his intention of visiting the university on Tuesday, March 1, on the occasion of the opening of the new buildings for the law school and Squire Law Library, the medical school, the Sedgwick Memorial Museum, and the botanical laboratory.

Dr. H. K. Anderson has been appointed university lecturer in physiology in the place of Prof. Langley.

The regulations for an examination and diploma in tropical medicine and hygiene were approved by the senate on January 28.

At Bedford College for Women on Thursday, March 17, Dr. J. Lawrence will give a lecture on "Pioneers in Philology."

THE Finance Committee of the Liverpool Corporation has decided to recommend the council to make the municipal grant of 10,000*l.* to the university only on certain conditions, which include inspection and report on the educational methods of the university, an annual report by the university to the council, and the devotion of at least 1000*l.* of the grant to Liverpool scholarships, including the assistance of undergraduates and post-graduates.

THE first conference in connection with the School Nature Study Union was held on January 30 at the Passmore Edwards Settlement, Tavistock Place, London, under the presidency of Dr. Heath, director of special inquiries and reports at the Board of Education. Papers were read by Mr. C. B. Gutteridge, of Alleyn's School, Dulwich, on nature-study in secondary schools and how its claims may be advanced, and by Miss Johnson, on nature-study in a village elementary school.

A LARGE part of the National Library at Turin was destroyed by fire on January 26. The library was housed in the buildings of the University of Turin, and was under the control of the university authorities. It contained 350,000 printed books, of which 100,000 have been lost, amounting in value to half a million francs. The globe constructed by the monk Basso in 1570 has been destroyed. The very choice collections of fifteenth century manuscripts from the Abbey of Bobbio were rescued, and altogether about 1000 manuscripts out of 4000 have been saved in a more or less damaged condition. The university has been closed, as some of the halls give signs of collapsing.

WE learn from *Science* that Syracuse University has received 30,000*l.* from the estate of the late James J. Belden; 10,000*l.* goes to the Medical College and 20,000*l.* to the College of Liberal Arts. Syracuse University also receives the residue of the estate of the late John Lyman. The value of the estate is not stated, but special bequests to charitable institutions were made by Mr. Lyman amounting to more than 30,000*l.* The Catholic University of America has received 10,000*l.* from the Knights of Columbus, and Princeton University has received a bequest of 5000*l.* from the late Louis C. Vanuxem, of Philadelphia. The Clark University has received from Mr. Carnegie 20,000*l.* for a library.

IN connection with the generous gift recently made to the University of London by Mr. Martin White for the encouragement of the study of sociology, a course of eight lectures on "Cities and their Culture-Resources" will be delivered this term by Prof. Patrick Geddes, commencing to-day, February 4. Dr. E. A. Westermarck, lecturer on sociology at the University of Helsingfors, will commence a course of seven lectures on "Early Custom and Morals" on Tuesday, February 9. Both courses will be delivered at the London School of Economics and Political Science. At Prof. Geddes's lecture to-day Sir Arthur Rücker will preside, and will make a general statement with regard to the scope of the Martin White benefaction for the study of sociology.

THERE is a steady and growing demand in the State of Illinois for high school teachers who have had a liberal college training together with a thorough preparation in the special branches which they are to teach. The demand upon the University of Illinois for high school teachers of science has for several years so far outrun the actual supply that places might commonly be found for two or three times the number of competent graduates available. The university has published a circular of information concerning the courses and facilities offered by it to science teachers, so that students and instructors may be generally advised of the facts, and a larger number of capable students may be led to prepare themselves for high school science work. The circular points out that the preparation of a teacher for high school science teaching must consist in part of study of the sciences he intends to teach, in part of the more general study necessary to his liberal education, and in part of the pedagogical studies and experience essential to his immediate success as a teacher.

ON Friday last, Prof. Howard Marsh gave an inaugural address as professor of surgery in the University of Cambridge. In the course of his remarks he said that the changes which had taken place in surgery in recent years were as great as those which had revolutionised so many other departments of human energy. The new starting point consisted in the discovery by Pasteur that many diseases in the vegetable and animal kingdoms were due to the action of minute organisms or bacteria. The next step was the application of Pasteur's discovery to surgery by Lister, who commenced the investigations into the use of substances by which these harmful bacteria might be excluded or destroyed. The thirty years that had since elapsed had been years of revelation and advance in every direction. While the fundamental principle was the same, methods of procedure had undergone rapid development. It had been gradually disclosed to us that there was no organ anywhere in the body which was not amenable to operation, no part which was so constituted or endowed that it could not, under the aseptic method, be treated by surgical interference.

THE annual general meeting of the Association of Technical Institutions was held on January 29. Sir John Gorst was elected president for the ensuing year; and in the course of his presidential address he remarked that the great object of most schools seems to be to make the children still and quiet and orderly instead of having them thirsting for knowledge and eager in its pursuit. The questioning which is natural to children is abolished in favour of a system of answering questions put to them, and in these questions anything like originality or eagerness is at once repressed in the interests of discipline. After a certain time the individuality of a restless, eager, curious child is entirely crushed out, and a stolid, quiet, orderly, stupid class is obtained. The object of all teaching ought to be the development of the general powers of the body and mind of the scholar and not its specific and definite preparation for some particular profession. That comes when it is time to specialise. The spirit of technical instruction—the teaching of the student to do something and to acquire knowledge for the purpose of being able to do something—ought to pervade the whole of our education from childhood to manhood. At the annual dinner of the institution, the chairman, Sir J. Wolfe Barry, referred with satisfaction to the fact that the Royal Society had recently addressed a communication to the universities directing

their attention to the urgent necessity for some reconsideration of the requirements of the universities from secondary schools. The Royal Society recognised, as of course it must recognise, the great importance of the humanities, but it felt that there was something wanting in the career which was insisted upon, especially at the older universities. This induced headmasters of secondary schools to select their most promising pupils entirely with a view to scholarships in classical literature, and to insist upon all the boys in a school spending a great deal of their time in studies for which, no doubt, many of them were fitted, but not all. The Royal Society had done a real service to the country by directing attention to this subject.

THE annual meeting of the court of governors of the University of Birmingham was held on January 28, when the Chancellor, Mr. Chamberlain, presided. During the course of a speech on the motion for the adoption of the annual report, Mr. Chamberlain referred to the question of Government aid for university education. He said, "I should be very sorry to see, in any application which may now or hereafter be made—either to public bodies or to the Government—any idea that that was to dispense individuals from their personal duty in the matter. I think undoubtedly that the Government might make a more liberal response to what individuals have in so many cases done, and nowhere more conspicuously than in Birmingham. When we are dealing with such modern universities as Manchester, Liverpool, and Birmingham, I think it is creditable to the inhabitants of the districts in which they are placed that they should have met so readily the calls upon them, and I think they are almost entitled to demand from the Government a corresponding contribution. But I should myself deprecate any attempt to throw the whole charge upon the Government, and thereby to lose all that we gain by the local patriotism which is evoked, the local self-denial, and the earnest interest which follows upon it. We shall ask the Government, in view of the very great development of this institution, for a larger grant, and we shall be supported by other institutions in the same position." We have on many occasions pointed out in these columns that generous treatment on the part of the State for university education, so far from diminishing private endowments and munificence, causes a marked increase of enthusiasm and generosity among the wealthy merchants and manufacturers. It is a mistaken policy, in a matter of such importance as the provision of facilities for higher education, to urge that Government assistance should only follow private efforts in the same direction, and if our statesmen adopt the working policy outlined by the Chancellor of the University of Birmingham, this country will have to wait a long time for a complete and satisfactory university system. Let the Government set the example and publicly recognise in a substantial manner its sense of the value of higher education, and private enterprise and endeavour will soon be aroused in a corresponding degree.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 21.—"On the Structure of the Palæozoic Seed, *Lagenostoma Lomaxi*, with a Statement of the Evidence upon which it is Referred to Lyginodendron." By Prof. F. W. Oliver and Dr. D. H. Scott, F.R.S. Received December 15, 1903.

The present communication deals with the structure of *Lagenostoma Lomaxi*, a fossil seed from the lower Coal-measures, and with the evidence upon which the authors refer it to the well-known Carboniferous plant, Lyginodendron.

It is found that this species of *Lagenostoma*, especially in its young form, was enclosed in a husk or cupule, borne on a short pedicel.

The seed, which is of cycladean character, is fully described, and its relation to other fossil and recent seeds discussed.

The cupule enclosing the seed was borne terminally on a pedicel; it formed a continuous, ribbed cup below, and divided above into a number of lobes or segments. Externally, both pedicel and cupule were studded with

numerous prominent multicellular glands of capitate form. The anatomy indicates that the whole organ was of a foliar nature.

A comparison with the vegetative organs of *Lyginodendron Oldhamium*, with which the seeds are intimately associated, demonstrates a complete agreement in the structure of the glands and in the anatomy of the vascular system. Where vegetative and reproductive organs, presenting identical structural features, not known to occur in other plants, are thus found in close and constant association, the inference that the one belonged to the other appears irresistible.

As regards the position of the seed on the plant, two possibilities are discussed; the cupule, with its pedicel, may either represent an entire sporophyll or a modified pinnule of a compound leaf. Either view is tenable, but various comparative considerations lend a somewhat greater probability to the second alternative.

In the concluding section of the paper, the systematic position of *Lyginodendron* is discussed. On the whole of the evidence, the position of the genus as a member of a group of plants transitional between filicales and gymnosperms appears to be definitely established. While many filicinean characters are retained, the plant, in the organisation of its seed, had fully attained the level of a Palæozoic gymnosperm. There are many indications that other genera, now grouped under cycadofilices, had likewise become seed-bearing plants. It is proposed to found a distinct class, under the name *Pteridospermæ*, to embrace those Palæozoic plants with the habit, and much of the internal organisation of ferns, which were reproduced by means of seeds. At present the families *Lyginodendrea* and *Medulloseæ* may be placed, with little risk of error, in the new class *Pteridospermæ*.

January 28.—"The Morphology of the Retrocalcarine Region of the Cortex Cerebri." By G. Elliot Smith, M.A., M.D., Fellow of St. John's College, Cambridge, Professor of Anatomy, Egyptian Government School of Medicine, Cairo. Communicated by Prof. A. Macalister, F.R.S.

Chemical Society, January 20.—Dr. W. A. Tilden, F.R.S., president, in the chair.—It was announced that the Rev. T. J. Prout had presented to the society a photograph of a portrait by Hayes of Dr. William Prout, F.R.S., the originator of Prout's hypothesis.—The following papers were read:—The chemical reactions of nickel carbonyl, parts i. and ii.: J. Dewar and H. O. Jones. It is shown that nickel carbonyl is completely decomposed by the halogens, cyanogen and sulphur, carbon monoxide, and the corresponding nickel compounds being produced. With aromatic hydrocarbons of the benzene series, in presence of aluminium chloride, the carbonyl compound condenses to form aldehydes and anthracene derivatives; with naphthalene a complex hydrocarbon is produced.—Optically active asymmetric nitrogen compounds, *d*- and *l*-phenylbenzyl-methylethylammonium salts: H. O. Jones.—A microscopic method of determining molecular weights: G. Barger. The author has improved his method of determining molecular weights by observing the relative changes in size of a series of alternate drops of two solutions enclosed in capillary tubes, so that the experimental error has been reduced to within 5–10 per cent.—Studies in the acridine series, part i.: J. J. Fox and J. T. Hewitt.—*ortho*-Nitrobenzoylacetate: E. R. Needham and W. H. Perkin, jun.—The *cis*- and *trans*-modifications of *ααγ*-trimethylglutaconic acid: W. H. Perkin, jun., and A. E. Smith.—The influence of substitution on the rate of oxidation of the side chain, part i., oxidation of the mono- and dichlorotoluenes: J. B. Cohen and J. Miller.—The interdependence of physical and chemical criteria in the analysis of butter fat: T. E. Thorpe. Investigation of the butter produced in the United Kingdom has shown that the chemical nature of this fat is dependent on climatic influences, the nature of the fodder, the breed of the cow, the period of lactation, and the idiosyncrasy of the individual cow. Tables of the chemical constants of the butters examined illustrating this are given.—A simple thermostat for use in connection with the refractometric examination of oils and fats: T. E. Thorpe.—The condensation of furfuraldehyde with sodium succinate: A. W.