

side is terraced into beds, which contain some 1800 different species of trees, shrubs, perennials, and annuals of various kinds, both indigenous and exotic. This garden serves as a forestry and botanical garden, and is an exceptionally fine one, covering an area of about 18 hectares. There is a forest nursery in the garden managed on most up-to-date lines.

The school demonstration forests adjoin the forest garden, and are kept up entirely for educational and demonstration purposes. They are situated in a hilly area presenting ever-varying conditions, aspects, and variations in soil, thus allowing of a variety of object-lessons with different species and mixtures being presented to the student. For example, these woods contain spruce and beech with birch in mixture; spruce and silver fir, or the two latter with birch. Or again, there are woods of spruce, beech, Scotch pine, silver fir, larch, maple, birch with maple and various mixtures, ash (pure, about thirty years old), alder (in wet valleys), oak, and a little *Æsculus*. There are some most interesting mixtures to be seen doing remarkably well, and forming an ideal of what demonstration woods should be. The steep slopes of the hill-sides are worked under different sylvicultural systems to the area of tableland above, where the woods are clear-cut and naturally regenerated or sown or planted. Exotics are being largely introduced, and thousands of plants are sent out annually from the forest garden and nursery in the demonstration area into the forests all over Saxony. Fencing of young planted areas and other ways of protecting young plants from deer, &c., are to be seen in practice in the woods. Time will not permit of my dwelling upon this excellent educational demonstration area; but from his earliest course in the lecture-room the student is taken out week by week into the forest garden or woods, and with his own hands learns how to trench, sow, plant, thin, and fell and measure up his woods; is taught to distinguish the different species of tree, and how they differ in their requirements of soil, light, moisture, &c.; is shown on what the foundations of sylviculture depend; and is gradually led, step by step and stage by stage, to understand and grasp both the theory and practice of the various branches of the lore of the woods comprised in forestry.

I should like to give another instance of this educational forest. The Imperial Institute of Forestry at St. Petersburg is probably the largest forestry college in Europe. The students number 500, all training for the controlling staff. In addition, there are thirty-three lower-grade schools containing fifteen students apiece, from which the ranks of the forest rangers and upper guards are filled. Attached to the institute at St. Petersburg are two educational forests, the one 14 versts (9 miles) from the capital, the other, and larger, 60 versts (40 miles) away. At each of them buildings are maintained for housing the professors and students during their visits. Portions of every summer are spent by the students in these woods occupied in practical work. The woods are entirely under the management of the director of the college, as is the case at Tharandt, and are managed on similar lines, and solely for demonstration purposes. The directors at both these places, as also the forestry professors (and this applies to many of the Continental colleges), are all practical men who have themselves been through the mill of executive work, have themselves held charge of large areas of woods worked entirely on a commercial basis, and are therefore in a position to see that the instruction given to the students is such as will return full value to the State or proprietor who employs the men leaving their institutions.

This is a point which I think worthy of the most serious consideration in this country. Too great stress cannot be laid on what are, after all, actual facts. The excellent and remunerative results of forestry in Europe, which we also wish to arrive at in the British Isles, are solely the result of the study of higher forestry both in the woods and in the laboratory. Practical foresters can only be successful in proportion to the knowledge they themselves possess or which is imparted to them by those who know. We can learn from other countries a great deal, but the application of what we learn must depend on ourselves and must be carried out by ourselves.

We have now seen what the Continental forestry colleges consider the essentials to the proper tuition of forestry as a science, and have shown how the student is gradually

led, not only to assimilate the theoretical portions of the study in the lecture-room, but to take with him what he has absorbed there and apply it practically in the woods. We have seen that these practical object-lessons must begin with the student's first lectures, that he must be taken into the woods at the beginning and be shown, step by step, that what he is being told in the lecture-room is not so much matter to be studied for an examination and to be subsequently forgotten when his text-books and note-books are thrown aside after the "pass" has been gained. It has been said of the forester that he is always at school, from the moment he first enters the lecture-room to commence his first course to the end of his life; and those of us who are foresters know this to be true. Our text-books and lecture notes remain our trusted friends to the end, and as we grow older and have had a more extensive practice and experience in forestry we grow more diffident about expressing definite opinions and laying down the law on the subject of the life-histories of our friends the trees. For the tree is very much like the human being. He has his wants and requirements, his fancies for particular aspects and localities, for certain soils and degrees of light, moisture, heat, and shade.

All these the forester must know and study, and even then his fastidious friend will often discover something he dislikes, and refuses to grow. The forester has to set to work to find out what this something is, and meanwhile all he has done is a failure—a failure, that is, unless he is a thoroughly trained scientific man. As such he will turn his failures to account, for he will place them on record so that he and others like him may set to work to get at the reasons for the failure of a crop which, so far as human forethought was capable of doing, had been given every chance. How much sound practical knowledge and observations have been lost to the foresters all over the world by this regrettable neglect to place upon record their failures. Almost more valuable are they to record than the successes; to the forester far more valuable. This is one of the spots upon which the scientific forester can place a finger in the British Isles. Had one a full, or even a partial, record of all the failures of the past, how much simpler would be the task at present facing the nation of getting its forestry house in order.

Scotland is more favourably situated and in a better position as regards woods of a high educational value than any other portion of the British Isles for undertaking this necessary research work. There are woods in Scotland, many of them known by repute, others less well known, in which the student on his practical course can learn a great deal and in which work of high importance to afforestation in the British Isles can be carried on. Edinburgh is very favourably situated for participating in this pioneer work, and has every intention of taking her share in it.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—To-day, November 10, Graces will be offered to the Senate proposing that the offer of the Worshipful Company of Drapers to erect a new physiological laboratory at Cambridge be gratefully accepted, subject to the conditions set forth in the letter, dated February 11, 1910, from the clerk to the company; that a syndicate be appointed to discuss details with the company; and that the Vice-Chancellor be authorised to convey to the court of assistants of the company the grateful thanks of the university for their munificent benefaction. Further, that the Vice-Chancellor, Dr. Mason, Master of Pembroke College; Mr. Shipley, Master of Christ's College; Dr. Langley, professor of physiology; Dr. W. M. Fletcher, and K. Lucas, of Trinity College, be the syndicate appointed under the above-mentioned Grace.

Applications for the tenure of the Benn W. Levy studentship in bio-chemistry should be sent to Mr. F. G. Hopkins, Trinity College, on or before Wednesday, November 30, 1910. Applicants should state their university standing and previous scientific experience, mentioning if they are in receipt of any other endowment for research. The studentship is open to members of the University of Cambridge who have been admitted to a degree, or to members of

Girton or Newnham Colleges who have acquitted themselves so as to have deserved honours and have fulfilled the conditions respecting length of residence which members of the university are required to fulfil before being admitted to a degree. The annual value of the studentship is 100*l.* The student, during his or her tenure of the studentship, shall prosecute original research in bio-chemistry, and shall not engage in such other work as in the opinion of those entrusted with the administration of the fund would seriously interfere with his or her original inquiries. The appointment will be for one or two years, at the option of the managers.

Notice is given that a prize of 50*l.* out of the Gordon-Wigan fund will be awarded at the end of the Easter term, 1911, for a research in chemistry, of sufficient merit, carried out in the University of Cambridge. Candidates for the prize must have taken Part I. of a Tripos examination, and be under the standing of M.A. The research may be in any branch of chemistry. The dissertation, with the details of the research, must be sent to the professor of chemistry not later than June 10, 1911.

The local examinations and lectures syndicate is about to appoint an assistant secretary for examinations. The person appointed will be expected to enter on his duties not later than January 1, 1911. The appointment will be made in the first instance for the period ending March 31, 1912, at a stipend of 400*l.* a year. The post will after that date be held during the pleasure of the syndicate, and the stipend will be raised by annual increments of 25*l.* to 500*l.* Graduates of the university who desire to offer themselves as candidates are requested to send their names to Dr. Keynes, Syndicate Buildings, so as to reach him not later than 9 a.m. on Monday, November 21.

The Vice-Chancellor gives notice, on behalf of the Board of Geographical Studies, that Mr. R. T. Günther has consented to deliver a lecture in Cambridge on Friday, November 11, at 5 p.m., on "Earth Movements of the Italian Coast." The lecture will be given in the Sedgwick Museum, and will be illustrated by lantern slides. Members of the University and others are invited.

The Regius professor of physic gives notice that Prof. Osler has consented to deliver a lecture on November 17, at 5 p.m., in the large theatre of the medical schools, on "Medical Education in France."

OXFORD.—The congregation of the University of Oxford had before it on November 8 the first of the important series of statutes framed by the Hebdomadal Council, in pursuance of the comprehensive scheme of reform initiated by the Chancellor, Viscount Curzon. The adoption of the statute, which deals with the constitution and powers of the boards of faculties, including that of mathematics and natural science, was advocated by the President of Magdalen, the Master of University College, and Prof. Geldart. Its provisions were sharply criticised by the Warden of All Souls and the Master of Balliol, and its rejection was recommended by Prof. Holland and the President of Corpus. The preamble was carried in a full house by a majority of rather more than two to one; but there is no doubt that strong efforts will be made to modify the effects of the statute by amendment, especially those of its provisions which deal with the composition of the electorate and with the control exercised by the University and colleges respectively over the subjects and methods of instruction.

The tenancy of the well-known house in Broad Street, long the residence of Sir Henry Acland, has lately been acquired for the Oxford School of Geography. When the necessary arrangements have been completed, the house will contain a library, reading-room, and collections of maps, views, and models. Part of the premises will be fitted up for the use of the Beit lecturer in colonial history (Mr. W. L. Grant), and accommodation will be provided for purposes of general geographical instruction and research. The whole will be under the direction of Prof. A. J. Herbertson. This much-needed development of the facilities for geographical studies in the University has been made possible by the generosity of Mr. Bailey, of Johannesburg, who has given 500*l.* towards the adaptation of the house, and has promised 250*l.* a year for five years towards its maintenance.

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Mr. O. G. S. Crawford, of Keble College, has been appointed junior demonstrator in geography for one year.

Mr. G. C. Robson, formerly exhibitioner of New College, has been elected to the vacant Naples biological scholarship lately held by Mr. J. S. Huxley, of Balliol College.

Mr. Selwyn Image, of New College, who has recently delivered his inaugural lecture as Slade professor of fine art, is a well-known student of the microlepidoptera, and is at present a member of the council of the Entomological Society of London. The seal of the society, which is a work of great artistic merit, was designed by the new Slade professor.

To encourage further interest in the subject of oceanography, it has been decided to invite the members of Dr. Bruce's class in geography at the summer school at St. Andrews this year to write essays on certain aspects of oceanography, and to submit them at the end of next spring. The essays are to be on one or other of the following subjects:—(a) on the effects of wind, temperature, and salinity on the circulation of the ocean, or (b) on the question of continental connections. The competition is only open to members of Dr. Bruce's class, and the essays must be lodged with the director of studies on the last day of April, 1911. Two prizes will be awarded, viz. two sets of the report on "The Scientific Result of the Voyage of the s.y. *Scotia* during the Years 1902, 1903, 1904." The two successful essays will be published either by the Scottish Oceanographical Laboratory or in the *Scottish Geographical Magazine*.

The *Electrical Review* in its issue of October 21 directs attention to the great falling off in attendance at the evening classes of our technical schools which occurs during the course of each winter session. It contrasts the eagerness of the prospective student in consulting the teachers as to his course, in buying the text-books, and in making all his arrangements for strenuous work during the forthcoming winter evenings, with his tired and weary look and his vain attempt to follow the explanations given by his class teacher three months later. For this change, sheer fatigue and inability to stand the strain of perpetual day and evening work are responsible, and the *Review* charges the evening-school authorities with attempting too much and demanding attendance on the part of students for four or five evenings per week. It points out that undue strain can only be prevented by a reduction of the evenings of attendance to two, or in exceptional cases to three, per week, and urges the authorities to take this step as a means of improving both day and evening work of the students who attend their evening classes.

THE DUKE OF CONNAUGHT on November 5 laid the foundation-stone of the new University Hall of the Cape University. The council of the University presented an address, in which the hope was expressed that the union now accomplished in South Africa would lead to the conversion of the present Cape University into a teaching university for the whole of South Africa, by incorporating existing institutions of higher education as constituent colleges, and by creating chairs for those subjects for which no single college could provide. In replying, the Duke of Connaught said he trusted that the funds necessary to convert the Cape University into a great teaching university would be forthcoming. At a university luncheon held on the same day, Mr. Malan, Union Minister of Education, announced that Mr. Otto Beit had agreed to divert the sum of 200,000*l.*, bequeathed by the late Mr. Alfred Beit for the foundation of a university at Johannesburg, to the creation of a great teaching university at Grootte Schuur, the estate of the late Mr. Cecil Rhodes outside Cape Town. It was also announced that Sir Julius Wernher has promised to make up the amount to a total of 500,000*l.*

A new engineering laboratory was opened at the Darlington Technical College on October 20 by the Hon. C. A. Parsons, F.R.S. During the course of his address Mr. Parsons said that in the early part of last century engineering was principally guided by traditional rule and trade knowledge, handed down from father to son and from master to apprentice. Engineering has gradually assumed a more important place, its field of operations has become wider and more complex, and it has become

imperative to institute, instead of the old and primitive methods, systematic technical training for young men. There is probably no field of work in modern times where so great an amount of well-ordered experimental investigation has been undertaken as in engineering. Referring to the advantages of engineering workshops, Mr. Parsons said that knowledge, more especially of the practical kind, must be acquired when a man is receptive, and at such an age when ideas and impressions become so ingrained as to constitute intuitive and guiding principles in after life. In the engineering laboratory students are brought face to face with materials and machinery for dealing with and discovering principles; they gradually acquire a familiarity with practical engineering and the power to think in engineering materials, and to form a mental picture when it is necessary to design a new or improve an old machine or to design new methods of work. Such a training fits a student to go out into the world with mind and eyes alert, ready to acquire more knowledge, and fit to command success in most branches of engineering. By the help of good technical training a much larger proportion of men of high standard are produced than formerly—men of knowledge capable of taking the lead and commanding, and able and willing to deal fairly with their subordinates.

THE executive council of the County Councils' Association has made a series of recommendations with regard to rural education. They follow the main lines of the proposals of the Departmental Committee on Agricultural Education, which reported two years ago. Among other plans, the council encourages the formation of separate agricultural committees appointed by the county education committees. Another proposal is to appoint, in consultation with the agricultural college with which the county may be associated, a resident agricultural instructor and adviser at a salary of not less than 500*l.* per annum, who shall be under the control of the county council. The duties of this officer will be to give courses of lectures during the winter months; to supervise experiments and demonstration plots; to visit farms, small holdings, or allotments, and advise as to the appearance of disease in crops, insect pests, and on other matters; to meet bodies of farmers at local exhibitions and shows for the purpose of discussion; to organise classes for instruction in farm labour subjects and prize competitions in connection with such subjects as hedging, ditching, and thatching; and to advise the committee as to the establishment of permanent centres for agricultural instruction. It is also suggested that each county should organise, with the aid of the agricultural adviser, developments of a semi-educational character in connection with cooperative small holdings, instruction in pig-breeding, the establishment of poultry societies for improving breed and management, the provision of instruction in bee-keeping, the establishment of demonstration small holdings, the provision of a central county garden with demonstration and experimental centres for horticulture, and the provision of a demonstration farm of 100 to 300 acres, which might be used later as the nucleus of a farm institute. The association estimates that 2000*l.* per annum will be needed as a commencement, and suggests that an application should be made for a grant of this amount. The association has adopted the view of the Departmental Committee that "agricultural education is of such vital importance to the United Kingdom that no effort should be spared in making the provision for it as full and complete as possible," and that a complete system of technical agricultural education is "the natural corollary to the vast sums spent on elementary education in the rural parts of the country."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 3.—Sir Archibald Geikie, K.C.B., president, in the chair.—Sir D. Bruce and others: (1) Trypanosome diseases of domestic animals in Uganda. II.—*Trypanosoma brucei* (Plimmer and Bradford). (2) Trypanosome diseases of domestic animals in Uganda. III.—*Trypanosoma vivax* (Ziemann).—H. G. Plimmer, W. B. Fry, and H. S. Ranken: Further results of the experimental treatment of trypanosomiasis: being

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a progress report to a committee of the Royal Society. This paper gives detailed results of the continuation of the work which has been going on under the direction of a subcommittee of the Royal Society. The general results have confirmed an opinion which the authors have before expressed, viz. that antimony is a more powerful trypanocide than arsenic, and that such compounds as they have tried have not shown such severe toxic effects as some arsenic compounds have. But there are unpleasant effects produced (varying according to the animal used) by antimony, such as sloughing and necrosis at the seat of injection and severe pain, so they have devoted considerable time to the study of new methods and new forms of antimony. Finding that in dogs the subcutaneous and intramuscular administration caused pain and sloughing of the tissues, intravenous injections of the salts were tried. The elimination of the antimony was so rapid, however, that, beyond prolonging life, little good effect was produced; so that eventually the injection of the metal itself, in state of finest division (devised and prepared for them by Dr. R. H. Aders Plimmer, of University College), was tried. This is taken up by the leucocytes, and is gradually transformed into some soluble compound, and their idea was that perchance it might be carried to parts of the body not easily accessible to other methods of administration. The results so far have been, on the whole, more satisfactory than those of any other means they have tried, but the technique in many animals is difficult, and there have been difficulties in the preparation of the antimony. Although putting a metal into the circulation sounds impossible, they have not had any case of plugging of capillaries in rats, guinea-pigs, rabbits, dogs, goats, or horses. It of course acts much more slowly than the salts, and takes from two to three times as long to clear the peripheral circulation of trypanosomes as subcutaneous injection of a salt does. But the excretion is also much slower, so that the blood and organs are in much longer contact with antimony than when a salt is administered. If carefully administered no irritation of the tissues is produced, and the vessel walls are not affected. Animals appear to be more susceptible to overdosage than with the salts; and it is curious that an animal with trypanosomes in the blood can bear well a dose which is fatal to a healthy animal. It has also been used intraperitoneally successfully in rats and rabbits. A number of experiments have been made with silver salts, with negative results in every case. A number of experiments have been made with two new compounds (one an arsenic-camphor compound, one an organic antimony compound) kindly sent to them by Dr. Morgan, of the Imperial College of Science, with negative results.—Dr. J. W. W. Stephens and Dr. H. B. Fantham: The peculiar morphology of a trypanosome from a case of sleeping sickness, and the possibility of its being a new species (*Trypanosoma rhodesiense*). The main points of the paper may be thus summarised:—(1) This trypanosome was first observed by one of the authors (J. W. W. S.) in February in the blood of a rat infected from a case of sleeping sickness. (2) The patient, W. A., infected in Rhodesia, had never been in *Glossina palpalis* areas, though he had been in areas infested with *G. morsitans* and *G. fusca*. (3) The trypanosome shows long forms and short stout or stumpy forms with hardly any free flagellum, but it is unique in that about 6 per cent. of the forms have the nucleus at the posterior (non-flagellar) end near the blepharoplast, and in some cases actually posterior to it. (4) Such forms have not been described before in any known strain of *T. gambiense*. (5) Prolonged search has been made for them in the stock laboratory strain of *T. gambiense*, but they have not been found. (6) They are not due to the drying of the blood films, because they can be seen by *intra vitam* staining, and because dried films of the ordinary *T. gambiense* strain do not show them. (7) They are not degenerate, as division forms of them occur. (8) They are not due to drug treatment, because the original animals were inoculated before treatment was begun. (9) These forms still persist in rats, guinea-pigs, rabbits, and monkeys. (10) On morphological grounds the authors believe they are dealing with a new species of human trypanosome also causing sleeping sickness, for which they propose the name *T. rhodesiense*.—Dr. F. W. Mott: Note upon the