these ideas:—"This sympathy and help has been found, this action has been forthcoming, and it is possible to-day to say that in spite of some remaining hesitation, inevitable so long as the revolution in progress is not finally carried out, the French universities are fully conscious of their three-fold function, or rather, of the three stages of their functions, in regard to learning. The first stage is to be a centre of general culture, the second to prepare for professions and careers, and, at the top, for picked students, to give opportunity for learned research. It is these ideas which have inspired the new regulations for examinations that have been submitted to the faculties. The best programme for a university is not to have one. The best regulations for professors is full liberty to teach, and for students full liberty to choose, at their own risk, out of the varied teaching of the university, according to their tastes, their aptitudes, and their plans for the future. In France, such a state of affairs is impossible, at least for many long years."

The difficulty, however, of attaining the highest aim in the French universities has not been found so great as might have been expected. In the first place, there has always been a considerable number of students in Paris continuing at their work until twenty-four or twenty-five or even longer, and, secondly, those who are now elected professors, are nearly all men who have devoted themselves to research, have gained the highest distinctions in their researches, and are therefore well able to inspire students with a love of scientific inquiry. It is fifteen years since M. Liard's paper was printed. During that time the University of Paris has made great efforts to carry out the ideal which he proposed, and there is no doubt that it has been strikingly successful.

Thus these two great nations have come to the conclusion that this is the best way to educate the men who are to have the highest influence in the State and the nation.

In Germany every professor has to deliver public lectures for which no fee is demanded. The French go beyond this, and many of their best professors deliver lectures suitable for the general student who may not wish a degree but simply a knowledge of the subject discussed, and, of course, they can also attend the classes which have been arranged for the qualified students. Now surely if this is the way in which two great nations believe that they can best educate their highly endowed citizens, is it not time that we should attempt something of the same kind? I have again and again said that there would be no great difficulty in accomplishing this in the University of St. Andrews. We have many students who are eager to continue their studies at the University. In fact, the great majority of those who have obtained the highest honours would gladly remain behind if their studies could have been so arranged as are the studies for the doctor of philosophy of Germany or the doctorat d'état of France, and in this way we could bring up some of our men to reach the highest excellence in the comprehension of the various problems which arise in the government of the people and in the amelioration of society. The same remarks could be made in regard to the other three Scottish universities.

But a very serious question emerges when we think not of Scotland alone, but of the British Empire. Are the universities of England and of the British Dominions to remain in a position unquestionably inferior to that of Germany and France? Is our Empire to fail in providing the culture requisite for the highest minds? Are we to take no means to supply the most perfect training to those who are to exercise supreme influence on the mass of men in the nations under our sway—the teachers, the legislators, the governing officials, and the literary men who guide the Press? Surely something is far wrong, if we do not at once look into this matter with the view of establishing at least an equality with Germany and France.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—A memorial fund raised by the friends of the late Humphrey Owen Jones, F.R.S., fellow of Clare College, who, with his wife, was killed in the Alps in August, 1912, has been gratefully accepted by the University, and a Humphrey Owen Jones lectureship in physical chemistry has been established. The General Board of Studies will shortly proceed to appoint a lecturer. The stipend arising from the memorial fund is about 150*l*. Candidates are requested to send their applications to the registrary of the University on or before January 17.

IN connection with the development of the forestry department in the University of Edinburgh, a second lectureship has been founded, and Mr. J. Lyford-Pike has been promoted to the post.

A COURSE of five advanced lectures on generating stations will be given by Mr. W H. Patchell, at the Battersea Polytechnic, London, S.W., on Mondays, at 7.30, beginning on January 19. Admission to the lectures is free, and no ticket is required.

THE council of the Society of Engineers (Incorporated) may award in 1914 a premium of books or instruments to the value of 10*l*. 10*s*. for an approved essay on "The Status of the Engineering Profession." The competition is open to all, but, before entering, application for detailed particulars should be made to the secretary, 17 Victoria Street, Westminster. The last date for receiving essays is May 30, 1914.

COURSES of lectures in science and in literary subjects will be given in the University of Leeds on Tuesday, Wednesday, and Thursday, January 13–15. These lectures are intended primarily to meet the needs of teachers who find it difficult during the school term to keep in close touch with the most recent developments of thought in regard to their subjects. The courses will, however, be open not only to teachers, but to all students, whether former members of the University or not. Among the subjects of the courses are:—"The Rôle of Enzymes in Plant Metabolism," Prof. J. H. Priestley; and (1) "Artificial Parthenogenesis," (2) "Regeneration in Animals," W. O. Redman King.

THE Bulletin of the Massachusetts Institute of Technology, Boston, for December, 1913, contains a catalogue of the officers and students of the institute, a statement of the requirements for admission, and a description of the courses of instruction. In the account given of the facilities for research particulars are included of the Hawaiin Volcano Observatory. A gift to the institute in 1909 made provision for special research in seismology and other branches of geophysics. On January 1, 1912, the Hawaiin Volcano Research Association cooperated with the institute to establish an observatory and laboratory at the volcano Kilauea. Investigations are carried on by a resident staff, and properly qualified investigators are received at the observatory for special studies. A limited number of advanced students engaged in research dealing with the problems of volcanology and seismology are received also, and the work is described as specially suitable to candidates for the doctorate. Among topics suggested as thesis subjects we notice the spectroscopic study of volcanic flames, collection and analyses of volcanic gases, and optical pyrometry applied to molten magma in the field.

At the Headmasters' Conference, held on December 23 and 24, at Reading School, Sir Alfred Ewing, director of naval education, gave an address on the scheme of special entry for public schoolboys into the Navy. This scheme of special entry was introduced last year at very short notice, and the number of candidates who came forward was probably not at all so great as may be expected in the future. The candidates numbered ninety-two, and forty-one were taken for the training. Sir Alfred Ewing said hitherto the naval tradition has been unbroken which has required that officers shall join the service at so early an age that they can owe little or nothing to public school training and influence. Now, for the first time in British history, the Navy has said to the public schools, "Send us of your finished product." He asked the cooperation of the headmasters because anything which affects the supply of officers for the Navy, whether the volume of the supply or its efficiency, is a matter of profound national concern. By the scheme of special entry public schoolboys may enter the service at the age of eighteen, and undergo a brief period of professional training for eighteen months, after which they become midshipmen. The qualification desired in naval cadets entered in this way is substantially a good general education not specifically classical, but an education in which, apart from the more humane elements, there is a considerable bias towards mathematics, physical science, and mechanics. The reason of the bias is that these subjects form so much of the professional knowledge which a naval officer has to possess, and so what is substantially the Woolwich entrance examination, without one or two features of the present examination, has been adopted. In taking the public school boy and giving him a brief professional training, it would be very hard to give all the practical mechanical knowledge which the naval officer ought to possess in so short a time, unless there was initially some foundation for such knowledge or at least some aptitude for practical mechanics on the part of the candidate. Therefore the Woolwich list of examination papers is supplemented by introducing a paper on very elementary engineering—a paper intended rather to test the aptitude than the training of the candidate. This is an attempt to attract those who have a special bent towards engineering. Other subjects discussed at the conference were the Teachers' Register and several points in connection with classical education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Meteorological Society, December 17.—Mr. C. J. P. Cave, president, in the chair.—R. C. **Mossman** and Mr. C. **Salter**: The great rain storm at Doncaster, September 17, 1913. On that day during a period of disturbed weather, a very heavy and local fall of rain took place in the vicinity of Doncaster. The storm lasted fourteen hours, and in that time more than 4 in. of rain fell at six stations, of which four had more than 5 in. The small area embraced by the heavy rain is shown by the circumstance that more than 4 in. fell over only sixty-one square miles, while more than 0·50 in. fell over 2336 square miles. Over the latter area 47,330 million gallons of water were precipitated. No adequate explanation of the storm can be offered, and the phenomenon affords an opportunity for special investigation.—Dr. J. E. **Church**, Jun.: Recent studies of snow in the United States. The author first gave a description of the snow sampler and weigher, which is an instrument he has designed for quickly measuring the depth and the water content of snow upon mountains. He then referred to some of the phases of the snow problem which were susceptible of solution by the aid of this instrument, and showed that the evolution of the snow leads directly to the practical problem of the relation of mountains and forests to the conservation of snow. This is of vital interest wherever irrigation is essential to agriculture, as in the western portion of the United States and in Australia. It is also closely related to the problem of stream control.—C. E. P. **Brooks**: The meteorological conditions of an ice sheet and their bearing on the desiccation of the globe. As the regions occupied by extensive ice-sheets at the present day, viz. Antarctica and Greenland, are the centres of permanent high-pressure areas, with slight precipitation, the author infers that the regions occupied by similar ice-sheets in the glacial period were likewise occupied by permanent anticyclones. The maximum extent of glaciation occurred at about the same time in different regions of the globe, and also coincided with the maximum of the pluvial period, or period of greater rainfall than the present, in the unglaciated regions. But a general decrease in temperature should lead to a decrease, not an increase, in the amount of evaporation, and hence of precipitation. The explanation of the paradox lies in the different distribution of the precipitation.

EDINBURGH.

Royal Society, December 4, 1913.—Prof. Hudson Beare, vice-president, in the chair.—Dr. W. N. **Shaw**: Principia atmospherica—a study of the circulation of the atmosphere. Section I. consisted of five axioms or laws of atmospheric motion, viz. the relation of motion to pressure, the computation of pressure and of the application of the gaseous laws, the law of convection, the law of the limit of convection, and the law of saturation. Section II. contained two lemmas or postulates regarding the relation between temperature and pressure in the stratosphere and in the troposphere, and the average horizontal circulation in the northern hemisphere. In Section III., which formed the bulk of the address, Dr. Shaw laid down for discussion six propositions, three of which had been already dealt with in a communication recently made to the Scottish Meteorological Society and published in the journal of the society for 1913. The remaining three were then considered in some detail, viz.: (1) the conditions necessary to maintain a steady atmospheric current; (5) the calculation of the distribution of pressure and temperature in the upper air from the observations of structure represented by soundings with a pilot balloon; (6) to account for the general circulation of the atmosphere in the northern hemisphere.—Sir William **Turner**: Observations on the auditory organ in the Cetacea. The paper was in two parts, in which were treated respectively the external auditory meatus and ear-wax, and the tympano-petrous bones. One of the specimens of ear-wax exhibited was about 20 in. long, and had been obtained from a blue whale near the South Shetland Islands. Sir William Turner also read a note upon a siliceous sponge of the order Hexactinellida, consisting of white delicate thread-like spicules collected into two tufts or bundles.

December 15.—Prof. James Geikie, F.R.S., president, in the chair.—Prof. C. R. **Marshall**: The pharmacological action of tetra-alkyl ammonium compounds—part ii., the action of tetra-ethyl-ammonium chloride; part iii., the action of methyl-ethyl-ammonium chlorides. Tetra-ethyl-ammonium chloride resembles tetra-methyl-ammonium chloride in inducing paralysis by an action on the myo-neural junctions. It needs, however, much larger doses. Unlike tetra-methyl-ammonium chloride, it has no action on vagal terminations, and it is difficult to produce with it temporary cessation of the respiration. Trimethyl-