CAMBRIDGE.—Dr. Forsyth, F.R.S., has been appointed Chairman of the Examiners for Part II. of the Mathematical Tripos.

Mr. E. H. Hankin, Fellow of St. John's College, and Professor of Bacteriology at Agra, has been appointed to represent the University at the Indian Medical Congress to be held at Calcutta in December.

The following is the Syndicate appointed to consider a report on the question of special encouragement, by new degrees or otherwise, for post-graduate study and research in the University: The Vice-Chancellor, Dr. Maitland, Dr. D. Macalister, Dr. Jebb, Dr. Forsyth, F.R.S., Prof. Marshall, Prof. Gwatkin, Prof. Foster, F.R.S., Prof. Thomson, F.R.S., Mr. A. W. W. Dale, of Trinity Hall, and Mr. W. Bateson, F.R.S., of St. John's College.

A Grace authorising the Cavendish Laboratory Syndicate to obtain specifications and tenders for the proposed extension of the Laboratory, was offered to the Senate on November 22.

SCIENTIFIC SERIALS

American Journal of Science, November.—On variations and mutations, by W. B. Scott. The author discusses the problem of animal morphology in its various aspects, and the different lines along which a solution has been sought for. These are that of comparative anatomy, embryology, and palæontology, to which, since Bateson's work on the study of variation, a fourth has been joined. The author criticises in detail Bateson's method and its results, and comes to the conclusion that we can no longer assume as a fundamental and self-evident truth that individual variations are the material from which new species are constructed.—Resonance analysis of alternating currents, by M. J. Pupin. This analysis is performed by means of a "resonator circuit" consisting of an inertia coil, a rheostat and a condenser in shunt with an electrostatic voltmeter. The capacity of the condenser is gradually increased from zero upwards. Whenever a capacity has been reached, which with the self-induction of the resonator circuit produces resonance with one of the harmonics in the main circuit, then the resonant rise of potential produces a large deflection in the voltmeter. In this manner all the harmonics which are present in the current of the main circuit can be detected in a few minutes.—On some new methods of obtaining platinochlorides, and on the probable existence of a platinum subchloride, by M. Carey Lea. One of the new methods employs potassium acid sulphite, with a solution of which potassium platinic chloride is moderately heated. The reduction takes about ten to twelve hours, and is known to be complete when the solution has a pure red colour free from yellow. The second method is that with alkaline hypophosphites. If in obtaining potassium platinochloride with the aid of a hypophosphite in excess, the heat is continued after complete conversion to the red salt, the solution in a few minutes changes from red to dark brown. The substance which gives the solution this dark brown colour is very deliquescent, and cannot be crystallised. It cannot be completely separated from the other substances in solution. The author is led by its reactions to suspect that it is a subchloride of platinum, analogous to that of silver.

Journal of Anatomy and Physiology, October. — Dr. Gustav Mann, in a paper entitled "Histological Changes induced in Sympathetic, Motor and Sensory Nerve Cells by Functional Activity (preliminary note)," gives an account of experiments made by him to test the observations of Hodge and F. Vas. Dr. Mann's observations relate to the cervical sympathetic ganglia (which also formed the subject of F. Vas's investigations), the motor area of the cerebrum, and to the retina and optic centres of the brain. His results in part agree with those of Hodge, in part with those of Vas, but they also in other particulars go beyond both. He considers that he has placed beyond doubt, that: (1) During rest, several chromatic materials are stored up in the nerve cell, and that these materials are used up by it during the performance of its function. (2) Activity is accompanied by an increase in size of the cells, the nuclei, and the nucleoli of sympathetic, ordinary motor and sensory ganglionic cells. (3) Fatigue of the nerve cell is accompanied by shrivelling of the nucleus, and probably also of the cell, and by the formation of a diffuse chromatic material in the nucleus.

SOCIETIES AND ACADEMIES

LONDON.

Royal Society, November 15.—"On the Ascent of Sap." By Henry H. Dixon, Assistant to the Professor of Botany, Trinity College, Dublin, and Dr. J. Joly, F.R.S.

Strasburger's experiments have eliminated the direct action of living protoplasm from the problem of the ascent of sap, and have left only the tracheal tissue, as an organised structure, and the transpiration-activity of the leaf wherein to seek an explanation of the phenomenon. The authors investigate the capability of the leaf to transpire against excessive atmospheric pressures. In these experiments the leaf was found able to bring forward its water meniscuses against the highest pressures attained and freely transpire. Whether the draught upon the sap established at the leaf during transpiration be regarded as purely capillary or not, these experiments lead the authors to believe that it alone is quite inadequate to effect the elevation by direct tension of the sap in tall trees. Explanations of the lifting of the sap from other causes prove inadequate.

A reconsideration of the principal experiments of previous observers and some new experiments of the authors lead to the view that the ascent is principally in the lumen and not in the wall.

The explanation of how the tensile stress is transmitted in the ascending sap without rupture of the column of liquid is found in the stable condition of this liquid. The state of stability arises from two circumstances: the internal stability of a liquid when mechanically stretched, whether containing dissolved gases or not, and the additional stability conferred by the minutely subdivided structure of the conducting tissue, which renders the stressed liquid stable even in the presence of free gas.

By direct experiments upon water containing large quantities of dissolved air, the state of internal stability is investigated And, further, by sealing up in the vessels, in which the water to be put under tension is contained, chips of the wood of *Taxus baccata*, the authors find that their presence in no case gives rise to rupture of the stressed liquid, but that this occurs preferably anywhere else, and usually on the glass walls. The establishment of tensile stress is effected in the usual way, by cooling the completely filled vessel. A measurement possessing considerable accuracy afforded 7½ atmospheres as being attained in some of the experiments.

The second condition of stability arises directly from the property of the pit-membranes to oppose the passage of free gas, while they are freely permeable to the motion of a liquid. Hence a chance development of free gas is confined in effect to the minute dimensions of the compartment in which it is evolved, and this one lumen alone is rendered for the time being non-conducting. On the other hand, in the water-filled portion of the tracheal tissue, the closing membranes, occupying the median and least obstructive position, the motion of the stress sap is freely allowed. The structure of the conducting tissue is, in fact, a configuration conferring stability on a stressed liquid in the presence (from various causes) of free gas. As neither free gas nor unwetted dust particles can ascend with the sap, the authors contend that the state of tensile stress necessary to their hypothesis is inevitably induced.

The energy relations of the leaf with its surroundings, on the assumption that evaporation at capillary water-surfaces is mainly responsible for the elevation of sap, may be illustrated by the well-known power of the water-filled porous pot to draw up mercury in a tube to which it is sealed. The authors describe an engine in which the energy entering in the form of heat at the capillary surfaces may be in part utilised to do mechanical work: a battery of twelve small porous pots, freely exposed to the air, keeping up the continuous rotation of a fly-wheel. Replacing the porous pots by a transpiring branch, this too maintains the wheel in rotation. This is, in fact, a vegetable engine. In short, the transpiration effects going on at the leaf are, in so far as they are the result of spontaneous evaporation and uninfluenced by other physiological phenomena, of the "sorting demon" class, in which the evaporating surface plays the part of a sink of thermal energy.

If the tensile stress in the sap is transmitted to the root, the authors suggest that this will establish in the capillaries of the root surface meniscuses competent to condense water rapidly from the surrounding soil. They show by experiment the power possessed even by a root injured by lifting from the soil, of condensing water vapour from a damp atmosphere. Such a state