

### AUSTRALIAN EXPERIMENTAL FARMS.

THE importance attached by the various Australian Governments to the encouragement of agriculture is shown in the fact that in most of the colonies a department of agriculture has been established, the official head of which is a member of the colonial ministry. In New South Wales a site suitable for a central establishment was selected at Ham Common, near the town of Richmond, in the Hawkesbury district, about 39 miles from Sydney, where an area of about 4000 acres was resumed for the purpose. The college and farm are now in their seventh year of existence. Accommodation is provided for ninety-six resident students, and during 1898 there was a full roll. Theoretical as well as practical instruction is imparted by experts in every branch of agriculture, and experimental work is carried on with cereal and other crops. There is an orchard, 30 acres in extent, and a vineyard, 10 acres in extent, and the cultivation of plants for the production of scent has also been begun. There are also experimental farms at Bomen, 304 miles from Sydney, in the Murrumbidgee district; and at Wollongbar, 366 miles from Sydney, in the Richmond River district. The former is near the town of Wagga Wagga, and embraces an area of 2460 acres, of which 1200 acres are in cultivation, 1000 acres being devoted to growing cereals, of which 500 acres are for seed wheat; 85 acres to fruit trees and grape-vines, and 80 acres to forage plants; while 8 acres are under olive trees; the remaining portion being taken up by irrigation plots, nursery and experimental plots. Quarters have been provided for twenty-five students. At the Wollongbar Farm experiments have been made with sugar-canes obtained from New Guinea, sugar cultivation being a staple industry on the Clarence, Richmond, and other northern rivers. Experiments with grasses for the grazing of dairy cattle have been carried on, and steps taken to assist the dairying industry, which is greatly on the increase in the northern parts of the colony. Other trials are being made with citrus fruits, pineapples, bananas, and various other tropical and semi-tropical fruits. The total area of the farm is 263 acres. The experimental farm at Bathurst, 145 miles from Sydney, is largely devoted to the cross-breeding of sheep, irrigation, fruit-growing, cereal culture, and general mixed farming. The area of the farm is 596 acres, to which leased areas of 176 acres have been added. The area under cultivation is 370 acres. There are 1000 sheep and lambs on the farm; and nine students have been enrolled. Another farm is situated at Coolabah, in the dry country, about 424 miles from Sydney, where there are about 200 acres in cultivation, trials being systematically made with various kinds of wheat, maize, sorghum, cow-peas, grasses, fodders, and so on. There is also a travelling instructor, whose duty it is to visit the rural districts and give personal advice and practical demonstration in all matters connected with agriculture. Under the direction of the Government pathologist, investigations are carried out at the laboratories at the Sydney, Bathurst, and Wagga Wagga farms. At a laboratory at Pymble, a few miles from Sydney, the diseases of citrus plants have formed the subject of special inquiry. Operations at Bathurst are not specially directed to agriculture, but are confined more to the diseases of stock; but at Wagga Wagga the work of the laboratory is mainly in connection with wheat and other farm crops.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A SCHOOL of forestry is to be established at Yale University. The large estate bequeathed by the late Prof. O. C. Marsh will be used as a school of botany, and will also be used for the present as a school of instruction in forestry.

BESIDES the degrees recognised by the State, the universities of France can grant degrees exclusively scientific, but which confer none of the rights or privileges belonging to the State degrees, and which must in no case be declared as equivalent to them. We learn from the *Lancet* that the Nancy faculty of medicine is not content with its power to present candidates for the university doctorate as regards medicine, but desires the right to present for a degree persons who have shown their especial knowledge in biological science. The council of the University of Nancy has agreed to this proposition, and accepted it at a special meeting. The resolution has just been approved by the Minister of Public Instruction, and so, starting during

the current scholastic year, the faculty of medicine at Nancy is authorised to present candidates for the new degree, which is the first of the kind to exist in France.

THE unsatisfactory condition of the teaching of geography in this country should afford plenty of scope for the work of the Geographical Association, which aims "to improve the teaching of geography by spreading the knowledge of all such methods as call out the pupil's intelligence and reasoning powers and make geography a real educational discipline, instead of merely loading the memory with names and isolated facts." The membership of the Association has hitherto been limited to teachers in secondary schools and others interested in public school education. At the recent annual meeting, its boundaries were extended, and the Association is now open to all teachers of geography, and to other persons desirous of encouraging improved methods of geographical instruction. Geography as it is usually taught ought to be banished from our schools, for it is of no scientific value whatever, and benumbs a child's intellect instead of developing it. When the authorities which supervise and examine the work done in primary and secondary schools take a wider view of geography than at present exists, when, in fact, they make geography mean physiography, there will be hope for the rational methods of teaching which the Geographical Association seeks to encourage.

A SHORT time ago it was proposed to form a Bureau or School of Research in Washington, under the supervision of the Smithsonian Institution. The Regents of the Institution are in sympathy with the scheme, but they consider that their present powers are scarcely broad enough to embrace the work proposed. They may, however, decide to ask Congress to provide the means for organising the scientific work of the various Government departments, and for co-operating with the universities and colleges of the United States in systematic research work. The Bureau would be in connection with the proposed National University, upon which subject a sub-committee of the National Educational Association has just presented a report. The committee suggests that if the Smithsonian Institution is unable to take the initiative in the matter, the Bureau of Education shall become the administrative centre of the Bureau of Research. Under the terms of either of the plans proposed, it is assumed that the persons admitted to carry on research will be graduates of a college or university in good standing, or will have had an equivalent training. The committee point out that such a bureau of research, whether it be placed under the care of the Smithsonian Institution or under that of the Department of Education—which would supersede the existing Bureau of Education—would be a source of strength to the higher education of the United States and a great advantage to the Government in its work of promoting the progress of science and the useful arts, and in applying the result of scientific investigation to the development of the natural resources of the country, of agriculture, of manufactures, and of commerce.

### SCIENTIFIC SERIALS.

*American Journal of Science*, March.—Hot water and soft glass in their thermodynamic relations, by C. Barus. Glass shares the property of colloids, of being soluble in a liquid when the latter is hot enough. Glass is dissolved in water heated under pressure to 210°. Every glass at a sufficiently high temperature must eventually show complete solubility in water. Such solutions are, however, unstable at ordinary temperatures. The solubility of silicates in very hot water has an important bearing upon natural phenomena. Sea-water more than 200 metres below the surface of the ocean will remain liquid at 200°. If, therefore, water from anywhere below that depth penetrates into the earth as far as the isotherm for 200°, the rock there, if of the character of glass, will become liquefied, apart from pressure. The hydrated silicate is thus virtually fluid 8 kilometres below the surface, and the level of aqueous fusion is five times as near the surface as that of igneous fusion.—An electrical thermostat, by W. Duane and C. A. Lory. The thermostat, which is of very high efficiency, consists of a wooden trough containing an ordinary salt solution, which is heated by an electric light current introduced through zinc plates at the ends of the trough. The regulating device is a set of brass tubes filled with alcohol, whose expansion depresses a thread of mercury in one arm of a U-tube, and thus makes