

of an Imperial Agricultural College in connection with an Experimental Farm and Research Laboratory, to be carried on under the general direction of the Inspector-General of Agriculture, at which it is intended to provide a thorough training in all branches of agricultural science, combined with constant practice in farming work and estate management (see p. 564). There will be courses of instruction extending to five years, which will qualify men to fill posts in the Department of Agriculture itself, such as those of assistant directors, research experts, superintendents of farms, professors, teachers, and managers of encumbered estates.

In conclusion the Governor-General in Council states in the minute that the system of education thus extended makes provision in varying degrees for all forms of intellectual activity that appeal to a civilised community. It seeks to satisfy the aspirations of students in the domains of learning and research; it supplies the Government with a succession of upright and intelligent public servants; it trains workers in every branch of commercial enterprise that has made good its footing in India; it attempts to develop the resources of the country and to stimulate and improve indigenous arts and industries; it offers to all classes of society a training suited to their position in life; and for these ends it is organised on lines which admit of indefinite expansion as the demand for education grows and public funds or private liberality afford a larger measure of support. It rests with the people themselves to make a wise use of the opportunities that are offered to them, and to realise that education in the true sense means something more than the acquisition of so much positive knowledge, something higher than the mere passing of examinations, that it aims at the progressive and orderly development of all the faculties of the mind, that it should form character and teach right conduct—that it is, in fact, a preparation for the business of life.

The aspirations of the Government of India, so far as university education in particular is concerned, may be gathered both from the minute already referred to and from the Viceroy's speech at the meeting of his Legislative Council on the occasion of the passing of the Universities Act. The minute points out that it has been realised in India that universities which are merely examining bodies tend to accentuate the defects of the Indian intellect—the disproportionate development of the memory and the incapacity to observe and appreciate facts. It is proposed to reconstitute the unwieldy senates of the universities, and to define and regulate the position and powers of the syndicates. The universities are to be empowered to provide teaching, while collegiate teaching will be tested by inspection in addition to examination, and a higher educational standard will be enforced from collegiate colleges. Government is prepared to afford liberal financial aid to enable universities to adapt themselves to the new conditions, and it is hoped that such aid may stimulate private beneficence.

Lord Curzon, in his speech to the Legislative Council, said that the fact that the Government had taken the power of the last word in the entire programme of reconstruction of Indian universities is the best guarantee that the programme will not be inoperative, though he regretted that the Government is compelled to be so dominant a factor in the settlement of Indian problems. But, he continued, if the Government had not taken up this particular problem of higher education, who would have done it? and if the Government had not made itself responsible for seeing it through, who could give any guarantee that it would not have proved abortive? It is quite likely, said the Viceroy later, that the senates and syndicates of the universities of India will be perfectly competent to stand by themselves and will make no mistakes, but if not, and until they are created, the matter must necessarily be in doubt, and the Government must, in common prudence, retain the power.

It is consequently clear enough that the improvement of education in India in the immediate future is now fully assured, and it may be expected with confidence that the result of this development will in our eastern empire be identical with that in other countries, viz. an increased prosperity and national well-being.

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PLATING UPON ALUMINIUM.

MANY attempts to plate other metals upon aluminium have been tried, but although apparent success has—for a short time—attended some of these efforts, the film of metal plated on has not been of such a nature as to stand wear or rough usage. Messrs. C. F. Burgess and Carl Hambuechen publish a new method in the March number of *Electrochemical Industry*. The difficulty of plating on aluminium is generally, and probably correctly, attributed to the invisible film which forms upon that metal when exposed to air. Therefore most of the methods previously described depend upon the removal (or attempted removal) of this film by means of solvents, such as acids or alkaline hydroxides, and the rapid transference from the pickling to the plating bath.

An ideal method would be to plate in a bath containing some substance which would dissolve off the film of oxide from the aluminium and thus leave it clean for the deposition of the metallic film. Messrs. Burgess and Hambuechen find that the presence in the bath of soluble fluorides, such as sodium or ammonium fluoride, or preferably a small quantity of free hydrofluoric acid, dissolve off or prevent this film formation.

The next important point is to plate as a base metal, upon the aluminium, one which will adhere tenaciously to its surface, or partially alloy with it. Zinc appears to possess this property of adhesion to a high degree.

The method of procedure is first to clean the aluminium by immersion for a few minutes in a bath of hydrofluoric acid; this produces a suitable roughening of the surface; the adhesion to a perfectly polished surface is not satisfactory. On removal from this bath the aluminium is rinsed in running water, dipped for a few seconds in a bath consisting of a mixture of sulphuric acid 100 parts and nitric acid 75 parts, again rinsed in water, and placed in the plating bath.

The plating bath consists of a mixture of zinc and aluminium sulphates, which is very slightly acidified, and contains about 1 per cent. of hydrofluoric acid and an equivalent amount of potassium fluoride. After the deposition has continued for a few minutes with a current density of 10 to 20 amperes per square foot the article is taken from the bath, washed and dried. Other metals, such as copper or silver, may now be deposited upon the zinc coating, using the ordinary precautions commonly observed in the deposition of such metals upon zinc.

If gold is to be deposited upon it, it is necessary first to plate on a thin coating of copper, otherwise in a short time the gold sinks into the zinc and in a few weeks almost disappears.

The authors do not state whether aluminium coated with zinc can be readily soldered, but probably there would be no difficulty in doing this.

F. M. P.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

WE learn from *Science* that Mr. John D. Rockefeller has given 100,000*l.* to the Johns Hopkins Hospital, in order that the work of the institution may not be curtailed owing to the losses from the recent Baltimore fire. The Maryland Legislature has voted 5000*l.* annually for two years to the Johns Hopkins University. By the will of Mrs. Farnham, widow of the late Prof. Henry Farnham, Yale University receives 10,500*l.* for the endowment fund of the medical school and 7900*l.* for the endowment fund for the library.

It is announced in *Science* that the Assembly has passed a Bill appropriating 50,000*l.* for the New York State College of Agriculture at Cornell University; that President C. E. Miller, of Heidelberg University, Tiffin, Ohio, has secured pledges to the amount of 30,000*l.* for the fuller equipment of this university, 10,000*l.* of this amount to be expended in buildings, and 20,000*l.* to be added to the permanent endowment; and that Mr. Andrew Carnegie has given 6000*l.* to Berea College in Kentucky.

At a recent meeting of the New York section of the American Chemical Society a discussion on the training