

organisms as well as animals and plants of all degrees and complexity and of rank in the scale of life. All these forms are subordinate to man, and when in contact with him are made to serve his purposes. In the same way all mankind will not rise in type. Many races will die out, especially those who just fall short of the highest type, while others by degradation or differentiation may continue to exist as parasites or servants of the higher type.

Mere association into a community is not sufficient to ensure success; there must also be differentiation of function among the parts, and an entire subordination of the activity of each part to the welfare of the whole. It is this lesson which we English-speaking races have at the present time most need to learn. In the behaviour of man almost every act is represented in consciousness as some emotion, experience or desire. The state of subordination of the activities of all units to the common weal of the community has its counterpart in consciousness as the "spirit of service." The enormous value of such a condition of solidarity among the individuals constituting a nation, inspired, as we should say, by this spirit of service, has been shown to us lately by Japan. In our own case the subordination of individual to State interests, such as is necessary for the aggregation of smaller primitive into larger and more complex communities, has always presented considerable difficulty and been accomplished only after severe struggle. Thus the work begun by Alexander Hamilton and Washington, the creation of the United States, is still, even after the unifying process of a civil war, incomplete and marred by contending State and individual interests. The same sort of difficulties are being experienced in the integration of the units, nominally under British control, into one great nation, in which all parts shall work for the good of the whole and for mutual protection in the struggle for survival.

The Lesson of Evolution.

Just as pain is the great educator of the individual and is responsible for the laying down of the nervous paths, which will determine his whole future conduct and the control of his lower by his higher centres, so hardship has acted as the integrator of nations. It is possible that some such factor with its attendant risks of extermination may still be necessary before we attain the unification of the British Empire, which would seem to be a necessary condition for its future success. But if only our countrymen can read the lesson of evolution and are endowed with sufficient foresight, there is no reason why they should not, by associating themselves into a great community, avoid the lesson of the rod. Such a community, if imbued by a spirit of service and guided by exact knowledge, might be successful above all others. In this community not only must there be subordination of individual to communal interests, but the behaviour of the community as a whole must be determined by anticipation of events—*i.e.* by the systematised knowledge which we call Science. The universities of a nation must be like the eyes of an animal, and the messages that these universities have to deliver must serve for the guidance and direction of the whole community.

This does not imply that the scientific men, who compose the universities and are the sense organs of the community, should be also the rulers. The reactions of a man or of a higher mammal are not determined immediately by impulses coming from his eyes or ears, but are guided by these in association with, and after they have been weighed against, a rich web of past experience, the organ of which is the higher brain. It is this organ which, as the statesman of the cell community, exercises absolute control. And it is well that those who predicate an absolute equality or identity among all the units of a community should remember that, although all parts of the body are active and have their part to play in the common work, there is a hierarchy in the tissues—different grades in their value and in their conditions. Thus every nutritional mechanism of the body is subordinate to the needs of the guiding cells of the brain. If an animal be starved, its tissues waste; first its fat goes, then its muscles, then its skeletal structures, finally even the heart. The brain is supplied with oxygen and nourishment up to the last. When this, too, fails, the animal dies. The leading cells have first call on the resources of the body. Their needs,

however, are soon satisfied, and the actual amount of food or oxygen used by them is insignificant as compared with the greedy demands of a working muscle or gland cell. In like manner every community, if it is to succeed, must be governed, and all its resources controlled by men with foreseeing power and rich experience—*i.e.* with the wisdom that will enable them to profit by the teachings of science, so that every part of the organism may be put into such a condition as to do its optimum of work for the community as a whole.

At the present time it seems to me that, although it is the fashion to acquiesce in evolution because it is accepted by biologists, we do not sufficiently realise the importance of this principle in our daily life, or its value as a guide to conduct and policy. It is probable that this doctrine had more influence on the behaviour of thinking men in the period of storm and controversy which followed its promulgation fifty years ago, than it has at the present day of lukewarm emotions and second-hand opinions. Yet, according to their agreement with biological laws, the political theories of to-day must stand or fall. It is true that in most of them the doctrine of evolution is invoked as supporting one or other of their chief tenets. The socialist has grasped the all-importance of the spirit of service, of the subordination of the individual to the community. The aristocrat, in theory at any rate, would emphasise the necessity of placing the ruling power in the hands of the individuals most highly endowed with intelligence and with experience in the affairs of nations. He also appreciates the necessity of complete control of all parts by the central government, though in many cases the sense organs which he uses for guidance are the traditions of past experience rather than the science of to-day. The liberal or individualist asserts the necessity of giving to each individual equal opportunities, so that there may be a free fight between all individuals in which only the most highly gifted will survive. It might be possible for another Darwin to give us a politic which would combine what is true in each of these rival theories, and would be in strict accord with our knowledge of the history of the race and of mankind. As a matter of fact the affairs of our States are not determined according to any of these theories, but by politicians, whose measures for the conduct of the community depend in the last resort on the suffrages of their electors—*i.e.* on the favour of the people as a whole. It has been rightly said that every nation has the government which it deserves. Hence it is all-important that the people themselves should realise the meaning of the message which Darwin delivered fifty years ago. On the choice of the people, not of its politicians, on its power to foresee and to realise the laws which determine success in the struggle for existence, depends the future of our race. It is the people that must elect men as rulers in virtue of their wisdom rather than of their promises. It is the people that must insist on the provision of the organs of foresight, the workshops of exact knowledge. It is the individual who must be prepared to give up his own freedom and ease for the welfare of the community.

Whether our type is the one that will give birth to the super-man it is impossible to foresee. There are, however, two alternatives before us. As incoherent units we may acquiesce in an existence subordinate to or parasitic on any type which may happen to achieve success, or as members of a great organised community we may make a bid for determining the future of the world and for securing the dominance of our race, our thoughts and ideals.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

ST. ANDREWS.—At a meeting of the University Court held on Saturday last, Dr. Arnold Hartley Gibson, senior demonstrator and assistant lecturer in engineering and lecturer on hydraulics at Manchester University, was appointed to the chair of engineering at University College, Dundee, in the room of Prof. Fidler, resigned.

Mrs. Edwin Neave was appointed lady warden of University Hall, St. Andrews, in the room of Miss Melville, who was recently appointed to Queen Margaret's College, Glasgow.

Mr. F. M. Milne was appointed lecturer in clinical pathology, and Mr. Charles Kerr clinical medical tutor.

THE eighty-seventh session of Birkbeck College will be begun on Monday next, when an address will be delivered by Principal H. A. Miers, F.R.S.

HARVARD UNIVERSITY has received the sum of 3000*l.* from Mrs. J. A. Rumrill in memory of her late husband. It will be used to establish three scholarships.

MR. T. MATHER, F.R.S., has been appointed professor of electrical engineering at the City and Guilds Central Technical College in succession to the late Prof. Ayrton, F.R.S.

THE new buildings of the Nicol Russell Engineering School and the Fisher Library (in connection with the University of Sydney, New South Wales) were opened by Lord Chelmsford on September 20.

THE inaugural address of the session 1909-10 of the University of Bristol will be delivered on Thursday evening, September 30, by the Vice-Chancellor of the University, Sir Isambard Owen, who will take as his subject "The Significance of a University."

THE Tulane University of Louisiana has during the past year come into possession of the following amounts:—400,100*l.* from the Newcomb estate, which sum will go to the Newcomb College—the women's department of the University—founded by Mrs. J. L. Newcomb as a memorial to her daughter; 10,000*l.* from Mrs. I. A. Richardson towards the establishment of a chair of botany; and 1000*l.* from the late Miss L. Miles for the purchase of books for the library.

THE Home Secretary has signified to the council of the Royal College of Surgeons his decision to approve the by-laws regarding the admission of women to the examinations for the diplomas of the college. He has further expressed his willingness to sign the formal document which is to be submitted after the next meeting of the council of the college on October 14. It is understood, however, that meanwhile it will be possible to complete the necessary formalities in time for women to enter for the examinations of the Royal College to be held in January next.

MR. W. BUCHANAN has been appointed lecturer on electro-technics and the design of electrical machinery to Faraday House, London. Mr. Buchanan had a distinguished college career, first at the Royal College of Science, London, and subsequently at Glasgow University, where he was "Thomson experimental scholar" in Lord Kelvin's laboratory. He has been for fifteen years with the Electric Construction Company, Wolverhampton, first as designer of alternating current machines and subsequently as chief engineer.

THE calendar of the Merchant Venturers' Technical College, Bristol, is now available. It will be remembered that in connection with the inauguration of the University of Bristol it was arranged that this college should provide the faculty of engineering in the University. A preliminary prospectus has been issued of the lectures and courses of practical work in the laboratories and workshops, designed, amongst other things, to prepare students for the various degrees in engineering to be conferred by the University. In addition to this university work the college is to continue to provide the continuous and complete preparation for an industrial career which it has hitherto done. Day and evening classes in a great variety of technological subjects have been arranged for the coming winter. It is satisfactory to find from the calendar that earnest efforts are being made by the governors and principal of the college to secure the active cooperation of employers in their endeavours to provide suitable technical education for the men and women engaged in the industries of Bristol and neighbourhood.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 13.—M. Bouchard in the chair.—H. Deslandres communicated a telegram from P. Lowell, stating that the presence of free oxygen has been proved in the atmosphere of Mars. The oxygen band B is clearly stronger in the Mars spectrum than in that of the moon.—The movements of the upper solar atmosphere above and round the faculæ. The cellular vortices

of the sun: H. Deslandres. Details of the work done with the new spectrograph at the Observatory of Meudon. A diagram is given showing the radial movements of the upper K₃ layer of the solar atmosphere above and round a facula.—The study of sea temperatures: A. Bouquet de la Grye. A knowledge of the temperatures of the sea over a wide area is an important factor in weather forecasts.—The trypanolytic power of the blood of some cold-blooded vertebrates with respect to *Trypanosoma evansi*: A. Laveran and A. Pottit. The blood of some of the cold-blooded vertebrates contains active trypanolytic substances, and there seems to be a relation between the presence of these substances and the toxicity of the serum. Closely related vertebrates showed differences in the trypanolytic power, the case of *Rana esculenta* and *R. temporaria* being especially remarkable in this respect.—The problem of Sophus Lie: N. Saitykow.—Practical formulæ for the calculation of aerial helices: M. Drzewiecki.—The magnetic rôle of oxygen in organic compounds: P. Pascal. The constants given in this paper enable the value for the magnetic susceptibility of an organic compound containing oxygen to be used as a guide to its structure.—The estimation of phosphorus in combustible substances by the calorimetric bomb: P. Lemoult. If certain precautions are taken, details of which are given, the determination of phosphorus in organic compounds by combustion in the calorimetric bomb possesses advantages over the methods in general use both in rapidity and accuracy.—The law of the fading of mnemonic traces as a function of the time in *Limnaea stagnalis*: Henri Piéron.—The natural means of defence of certain cold-blooded vertebrates against the trypanosome of surra, *Trypanosoma evansi*: A. Massaglia. Phagocytosis appears to play no part in the destruction of the trypanosomes.

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