

indicate the presence of one bristle factor in the sex chromosome and another in the third group, but the exact relation of these to the increase in number of bristles has not been determined. The environment also influences the number of bristles which appear. In MacDowell's experiments forty-nine generations were bred, and it was found that in a uniform environment selection had no effect after the thirteenth generation; statistical methods show that selection failed to shift the modal condition, and no mutations occurred during the experiments.

In a study of the effects of alcohol on white rats, the same author (*Proc. Nat. Acad. Sci.*, vol. iii., p. 577) finds that alcoholised rats showed a considerable falling off in the weight of their offspring, and a still greater loss in fecundity. Twenty-nine pairs of normal rats produced three hundred young in the same time that thirty alcoholised pairs produced one hundred and eight young. He also (*Proc. Soc. Exptl. Biol. and Med.*, vol. xvi., p. 125) finds that the children and grandchildren of parents which had been treated with alcohol for two months before the birth of their young were less apt than the controls in learning to run a maze or to make a multiple choice.

The Leguminosæ are well known to have usually compound leaves, but several genera have unifoliate varieties, or even species. Blakeslee (*Journal of Heredity*, April, 1919) describes such a form arising as a mutation in the Adzuki bean (*Phaseolus angularis*). His studies of *Datura* (Blakeslee and Avery, *Journal of Heredity*, March, 1919) have disclosed a number of new forms differing from the type in shape of capsule, foliage, and other characters. They transmit their characters as a complex, chiefly through the female, and in one instance a distinct new species seems to have arisen which breeds true, but appears to be sterile in crosses with the parent species.

R. R. G.

Increase of Population—a Warning.

PROF. E. M. EAST has much that is important in his address as retiring president of the American Society of Naturalists, meeting at Princeton (*Scientific Monthly*, vol. x., 1920, pp. 603-24). At present there are about 1700 million people, with an annual increase of between 14 and 16 millions. The white race is increasing much more rapidly than the yellow or the black. China's 300 million population is practically stationary. With the exception of France, few white peoples are increasing at a less rate than 10 per thousand. It is true that in most of the civilised countries of the world the birth-rate is slowly but steadily decreasing, but the result is not what many would have us believe. Where the birth-rate is low, the death-rate is low, except in France. Prof. East predicts that, owing to the steadily increasing development of preventive medicine, the decrease in the birth-rate will have no great effect on the natural increase in the world for many years to come. If the rate of increase actually existent during the nineteenth century in the United States should continue, within the span of life of the grandchildren of persons now living the States will contain more than a billion inhabitants. "Long before this eventuality the struggle for existence in those portions of the world at present more densely populated will be something beyond the imagination of those of us who have lived in a time of plenty." The law of diminishing returns is even now in operation in a comparatively new country like America, thought to be supplied with inexhaustible riches. Prof. East considers in detail what may be done by improved utilisation of energies,

improved agriculture, improved breeding, and so on; but he is not sanguine. To the criticism that he has not allowed for the "immense possibilities in the way of utilising sea food," he responds with vigour. The cloud grows denser when it is noticed that the birth-rate of the foreign population of the United States, coming largely now from eastern and southern Europe, is so much greater than that of the Anglo-Saxon stock (to which, it is claimed, most of the superior types belong) that within a century the latter will be but a fraction of the whole. Prof. East looks forward to severe restriction of immigration; the spread of education; equitable readjustment in many economic customs; rational marriage selection which will tend to an increase of the birth-rate in families of high civic value; and among the rank and file a restriction of births commensurate with the family resources and the mother's strength.

Glass Technology.

WE have received from the Department of Glass Technology, University of Sheffield, a copy of vol. ii. of "Experimental Researches and Reports" published by that department. The papers included have already appeared in the *Journal of the Society of Glass Technology*. They range over a somewhat wide field of the glass industry, and include papers dealing with bottle-glass and glass-bottle manufacture, chemical glassware, glass for lamp-working purposes, besides accounts of such relevant investigations as the accurate calibration of burette tubes, a simple apparatus for the detection of strain in glass, and the annealing temperatures of lime-soda and magnesia-soda glasses. There are also a paper descriptive of the glass industry of North America and an account of the year's progress in glass research under the auspices of the Glass Research Delegacy. The condition of the glass industry in this country undoubtedly calls for sustained and systematic research, and this contribution of the Department of Glass Technology of the University of Sheffield must be of considerable assistance to what should be a great and national industry. The newly founded Glass Research Association has also an extensive programme of research in the field of what may be called industrial and laboratory glass, and the British Scientific Instrument Research Association is also more particularly concerned with investigations into optical glass. With such a measure of co-operation and co-ordination as the development of the researches shows to be necessary between these various bodies, there is hope that the users of all types of glass in this country may be able to find a home supply equal, if not superior, to the foreign sources to which, before the war, they perforce had to go for much of the glass they needed.

Rate of Evolution.

PROF. E. G. CONKLIN discusses (*Scientific Monthly*, 1920, vol. x., pp. 589-602) the difficult question of the rate of evolution, including under evolution (a) diversification of species, (b) more perfect adaptation to the conditions of life, and (c) increasing differentiation and integration, or, more briefly, progress. If the rate of diversification ("divergent evolution") depends upon the number of mutations that appear, Prof. Conklin argues that it should be proportional, other things being equal, to the rate of reproduction. But this

does not seem to be the case. If the rate of improvement in adaptation ("adaptative evolution") depends upon the rate of mutation and the severity of elimination, it also should be proportional to the rate of reproduction; but the finely adapted birds and mammals have a relatively low rate of reproduction. If the rate of "progressive evolution" depends upon the rate of mutation and the severity of selection, it again should be proportional to the rate of reproduction; but the most complex and most highly differentiated of all animals have the lowest rate of reproduction. In face of the difficulty of accounting for the differences in the rate of evolution, Prof. Conklin doubts whether current theories as to the causes of evolution are wholly satisfactory. It may be doubted, however, whether we are able to state the problems of diversity of rate with sufficient precision to allow of their being used as tests of the validity of the ætiological formulæ in the field. It is likely enough that there are factors of organic evolution still to be discovered, but we do not think that Prof. Conklin exhausts the potency of those that are already known. Thus, after writing: "It seems highly probable that the rate of mutation is influenced by environmental conditions, as Plough has shown in the case of the pomace-fly, and it is probable that environment has played a large part in the rate of evolution," he adds: "On the other hand, the evidences against the inheritance of the effects of use and disuse are so strong that one hesitates to invoke their aid." We submit, however, that the rôle of a changeful environment in affording mutational stimulus has very little to do with its rôle in imprinting modifications. We agree, all the same, with Prof. Conklin that there is no reason for supposing that the formulation of the factors in evolution is approaching exhaustiveness. Ætiology is still a young science.

University and Educational Intelligence.

THE Air Ministry announces that Dr. O. S. Sinnatt, lecturer in mechanical engineering at King's College, University of London, has been appointed professor of aeronautical science at the R.A.F. Cadet College, Cranwell.

WE learn from *Science* for August 27 that the family of the late Sir John Darling, of Adelaide, South Australia, has contributed the sum of 15,000*l.* towards the cost of erecting a new building for the medical school of the University of Adelaide. This building will be designed to accommodate the departments of physiology, biochemistry, and histology, and the medical library. The building will be erected and equipped at a cost of 25,000*l.*

A FULL account of the courses of instruction in the various departments of Bradford Technical College will be found in the calendar which has just been issued. Full-time day courses in technical sciences are provided which extend over three or four years; they lead to the college diploma. Part-time courses, mainly evening work, are also given. The latter are intended to meet the needs of those who are engaged in industry during the greater part of their time. Special facilities are also given to students who may wish to undertake advanced study or research work. The college is well provided with laboratories, among which may be mentioned the engineering and testing shops, a complete plant for the production of textiles, and a power-house which has been arranged for demonstration purposes.

THE calendar of Birkbeck College has been issued, and contains useful information for students intending to take degrees at London University. The courses provided by the college are set out in detail; they

consist of day and evening courses in the faculties of arts and science, and evening courses in the faculties of laws and economics. Facilities are also provided for post-graduate and research work. During the autumn and spring terms special courses of lectures on the history of London will be given, and there will also be four lectures, commencing October 11, on "The Thomson Effect" by Mr. H. R. Nettleton for the physics side. Particulars of university and other courses can be obtained from the office of the college or by letter to the secretary.

THE calendar of the London School of Economics and Political Science has been issued, and contains a detailed syllabus of all the courses available for students. Classes are open to those who intend to proceed to degrees in economics and commerce, and also to such as wish to pursue specialised or advanced study on topics on which they may be engaged. All the courses necessary for the degrees of B.Sc.(Econ.) and B.Com. are given at hours which make it possible for both day and evening students to take them. The school provides courses for a number of university diplomas and school certificates; among these are the university diploma for journalism, the academic diploma in sociology and social science and the certificate in social science, the academic diploma in geography, and the commercial and geography certificates granted by the School itself. Facilities are also provided for students desirous of proceeding to the degrees of Master and Doctor of Science, Philosophy, Laws, and Literature.

IN the calendar of the Merchant Venturers' Technical College, Bristol, attention may be directed to some novel features which are mentioned. The first is the Bristol "sandwich" scheme of training for engineers. This course takes five years to complete, about half of which are spent in a works and the other half in the university. A number of engineering firms co-operate with the college for this instruction, and others have expressed their willingness to accept students who have completed the course, in some cases at reduced premiums. Another feature of the college is a two years' course for apprentices. The curriculum extends over two years, and the classes take up one day each week. Students who pass the two examinations given will receive the Engineer Apprentice's Testamur. A series of popular lectures will also be given during the autumn and spring, two of which should be of scientific interest, namely, "Lightning and Thunder," by Prof. J. T. Macgregor-Morris, and "Devices which Won the War," by Mr. J. R. Raphael.

Societies and Academies.

PARIS.

Academy of Sciences, August 23.—M. Henri Deslandres in the chair.—A. Lacroix: The existence in Madagascar of a silicate of scandium and yttrium, thortveitite. This mineral, the richest known in scandium, was discovered in 1911 by J. Schetelig in Norway, and since that time has not been found in any other locality. Amongst specimens collected from the pegmatite of Befanamo, Madagascar, was one which agreed in its physical properties with the mineral described by Schetelig. The presence of scandium, ytterbium, and neoytterbium was confirmed by the spectrograph, and there were also indications of zirconium, aluminium, and titanium. In view of the importance of obtaining a sufficient supply of scandium for a more complete study of this element, other minerals from this region have been examined spectroscopically, and scandium has been detected in cymo-