

to older minds than mine, beyond the banks of Newfoundland.

But we see, from all that has been said, the *vast* importance of noting the *colours* of the clouds. We depend much in this country on the colour of the clouds for weather prediction. Ice, however, at this time of year, by refrigerating the atmosphere, often interferes with calculation.

Hailer Grace, Newfoundland

THE PROGRESS OF EVOLUTION¹

THE new journal mentioned below is edited jointly by Dr. Otto Caspari, of Heidelberg, Prof. Dr. Gustav Jäger, of Stuttgart, and Dr. Ernst Krause (Carus Sterne), of Berlin; and on the list of its contributors are the names of Charles Darwin, Ernst Haeckel, Friedrich von Hellwald, and many others whose scientific creed is Darwinism.

The editors in their introductory statement say that a new day has dawned for natural science, since our great countryman applied the natural laws which govern the whole universe to the phenomena of the development of life, and showed the fallacy of assigning that central position in nature to man himself which had been attributed to him for ages, as Copernicus did in the case of our planet three centuries ago. Man, who seemed to stand above nature hitherto has, without being drawn down from his eminent position, been incorporated with nature as one of her integral parts. The new monistic philosophy caused a wonderful reaction, and an animated reciprocal intercourse arose between the subjective and objective sciences. All the sciences which treat of man, from anthropology, ethnology, and the psychology of peoples, to the history of culture and states, national economy, the philosophy of law, history, and religion, and the sciences of morals and dietetics, proved to be natural sciences quite as much as mineralogy, biology, the practical education of man, and the cultivation of plants and animals.

The result of this general intercourse of the different sciences, has been a continued and encouraging confirmation of the monistic principle contained in the theories of descent and development; the literature, however, which was generated by the reaction, is dispersed and can be collected only from the various scientific journals. Thus, a general desire for collection and concentration has sprung up amongst all those who look upon the theory of development as a considerable progress of the human mind.

The new *Kosmos* will bring together what has hitherto been unconnected; will point out the gaps still existing, and thus lead to their being speedily filled; will reduce contrasts and contradictions to their true nature, and will oppose pernicious dogmatism. *Kosmos* will, with regard to the special domains of natural science, bear a certain critical and polemical stamp, its editors being aware that even science is best developed and strengthened in the fight for its existence, and that in the end the "fittest" theory will survive. All articles in the new serial are written in popular language, and are intended for a large circle of readers.

The first number contains a series of very interesting articles, of which we may mention—Philosophy and its Union with Natural Science, by Otto Caspari; On Inheritance, by Dr. Gustav Jäger; On Modern Anthropology, by the same; On the Chronicles of the History of Development, by Ernst Haeckel; The History of Creation and Chorology two Centuries ago, by Carus Sterne; On the Significance and Objects of Ethnography, by Friedrich von Hellwald; and an excellent review of Darwin's work on Cross and Self-Fertilisation, by Dr. Hermann Müller.

¹ *Kosmos; Zeitschrift für einheitliche Weltanschauung auf Grund der Entwicklungslehre.* (1 Heft, April, 1877.)

ENGINEERING EDUCATION IN JAPAN

THE technical education of engineers is a subject which has engaged public attention for a long time past and is one of great national importance. It is somewhat singular that this country, foremost as it has always been in matters of engineering enterprise, should be so behindhand in the systematic education of its engineers, there being no establishment in England devoted to that object which is recognised by the profession. Under the system that has been in vogue up to a comparatively recent period a youth intended for an engineer is taken from school at the age of sixteen being thereby deprived of the most valuable years of his education, and placed in some engineering manufactory, where he remains, perhaps, till he is twenty. In those four years his so-called "training" consists in going through the manual routine of the various workshops and "picking up" what knowledge he can by keeping his eyes open and living on good terms with the workmen. His last year is usually spent in the drawing-office, where, by a similar process of "picking up," he learns how to draw if not to design machinery or works of construction. At the end of that time his education is supposed to be complete, and he either remains as a draughtsman until something better is offered him, or he enters the office of another engineer for the purpose of improvement. All this time the far more important theoretical training is neglected altogether, no classes or examinations are held, no lectures or other instructions are given, and though some few energetic young men in some way make up this loss by private study they are a great exception, and the hours of manual work are usually so heavy (from 6 A.M. till 5 P.M.) as to render working in the evening both fatiguing and unprofitable.

The Continental system goes to the other extreme, teaching the theory and discarding the practice. This system is as bad as the other, for experience has shown that in engineering works a practical man without scientific training seldom makes such serious blunders as a scientific man without practical experience. It can only be by a judicious combination of the two systems, allowing science and practical experience to work hand in hand together in the education of an engineer that the best results can be looked for, and in these days of close competition, not only between man and man, but between country and country, it is of the utmost importance to a nation that its engineers should be instructed upon the best and soundest principles. The Indian Government recognised this when it established the Royal Indian Engineering College at Cooper's Hill for the systematic training of engineers for the Public Works Department of India; and it is remarkable that the profession of engineering should stand alone in England as having no recognised *Alma Mater* of its own. Many years ago an engineering college was established at Putney upon a good system, but it was badly managed, and after becoming a nuisance to the neighbourhood, was ultimately shut up; at the present time, with the exception of the technical classes at the Crystal Palace and at King's College, which, in a small way, are doing good work, there is no institution in this country devoted to the education of engineers.

While England is so far behindhand in this important question, a great work has been done by the Japanese Government in the establishment of an Imperial College of Engineering at Tokei, an institution which gives to its students a highly scientific training, combined with actual practical experience in engineering workshops which give employment at the present time to over three hundred workmen, but which are being largely increased and are turning out all classes of engineering work.