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The Genesis of the World.

"WHENCE sprang this world, and whether framed
By hand divine or no—"

are questions that have fascinated and perplexed the greatest thinkers of every age, or at least since man reached such a level of intellectual evolution that he could speculate about them. If we may reason from our knowledge of the mentality of the lowest grades of humanity as we know them to-day, it is reasonably certain that man must have existed on the earth for æons before he attained to a degree of mental development that would enable him to give the slightest consideration to such matters. Anthropologists tell us that even in this twentieth century there are races of men, situated in remote and widely separated regions of the world, who have never framed, and, so far as can be discovered, have never attempted to frame, any conception or surmise concerning its origin. And yet these races are as far removed in development from the prehistoric man as the prehistoric man was from the ape.

It is nevertheless true that thousands of years before the beginning of our era there were some whose mental powers enabled them to ponder upon the problem, and to attempt to form the beginnings of a theory of creation which should in some measure satisfy their curiosity and reasoning faculty. But these people existed comparatively late in the history of mankind, and still later in the history of the world. We are apt to think that the legends of Brahma, the spirit who created by his will and the mere exercise of thought the primeval water, the primordial element out of which the world was fashioned, date from the remotest periods of antiquity. This is not so, as we now reckon the age of the world, or the time that man has existed upon it.

It is far from our present purpose to attempt to trace, however slightly, the broad outlines of the growth of knowledge and speculation concerning the genesis of the world—from the myths of primitive races down to our times, when the great enigma is being attacked by modern methods of research and in the light of contemporary science. The subject is too vast to be handled within the narrow confines of an article such as this. But it may be worth noting how characteristic is the difference between the modern methods and the old. The earliest cosmogonies were based upon conceptions which were really incompatible with the experiences of those who framed them. These conceptions must have been repugnant to the intelligence of all who were alive to the teachings of natural phenomena, or refused to blind their reason at the behests of the priests by whom the myths were devised. In one respect the speculations, or at least some of them, may be said to be so far scientific in that they contain the

germ of the theory of evolution. But they all presupposed the action or intervention of supernatural forces, and as such had no real scientific basis. Purely metaphysical speculation leads nowhere, and the unsubstantial subtleties of dialecticians leave us cold. We seek to elucidate what has been for countless ages an inscrutable problem in the light of the lessons of physical science. We reason from the facts of astronomy, geology, physics, chemistry, and biology as we know and understand them, and as each new development arises we apply its teaching to the solution of the mystery. It has already been pointed out that the application of the mechanical theory of heat, spectrum analysis, thermal radiation, radiation pressure, and radio-activity to cosmogonic phenomena has done more to elucidate these problems than all the speculative theories and systems of former ages put together.

The lecture[1] which Prof. Nernst reprints in the little brochure before us is, we believe, the latest attempt to focus the outcome of modern research upon this question of the origin and mode of formation of the world. He applies to it the knowledge with which his study and training as a worker and expositor of chemical physics has equipped him. Furthermore, he has sought the aid of students in fields of inquiry other than his own when these have any direct relation to his subject. The lecture was originally delivered in Berlin as one of a series of popular discourses arranged by the Prussian Academy of Sciences about a year ago, and has been repeated in parts of mid-Europe, notably in Vienna and in Prague. As published it has been considerably enlarged. It is prefaced by a short introductory statement defining the problem and explaining its limitations, and the methods by which it may be attacked. It is furnished with a long appendix, practically as extensive as the lecture itself, in which details are developed which would be out of place in a purely popular exposition. As may be anticipated, the whole is instructive and highly suggestive, and we have read it with interest and pleasure. Nevertheless we rise from its perusal with a humbling sense of the inadequacy of our present means to grapple with so stupendous a problem. More than ten years ago the same theme was handled by Prof. Svante Arrhenius in his "Werden der Welten" and afterwards in "The Life of the Universe," and it may be doubted whether in reality Prof. Nernst has succeeded in carrying the matter any further. How partial and inadequate is the basis on which even the latest cosmogony rests was well brought out in the discussion last year at the Edinburgh meeting of the British Association on the age of the earth. The work of one epoch does little more than upset that of its predecessor. Premises in regard to the earth's heat are vitiated by the discovery of radio-active materials. We are still in ignorance as to the true source of solar energy. Secular contraction apparently is not enough to account for it. We have absolutely no definite knowledge on so fundamental a matter. The more we learn the greater seems our ignorance. We can but go on groping for the light, testing our surmises as best we may in the feeble glimmer that our present knowledge sheds.

Negligible as is the scientific merit of the old cosmogonies, they had at least the charms of imagery and fancy —charms at which the cold, unsympathetic eye of a passionless science looks askance. Even the imagination of a Tyndall would find it difficult to invest our modern cosmogony with the vestiges of such attributes.

[1] "Das Weltgebäude im Lichte der Neueren Forschung." Von Prof. Dr. W. Nernst. Pp. iv+63. (Berlin: Julius Springer, 1921.) In Germany, 12 marks; in Great Britain, 48 marks.

Textile Research Fellowships.

THE British Research Association for the Woollen and Worsted Industries represents the culmination of a movement which was started at the University of Leeds during the early days of the war. Two objectives were then in view, research specially applied to the elucidation of problems presented by the textile industries, and a deeper and more extensive education with the object of promoting the introduction of the sciences and scientific method into industry whenever and wherever possible. It was perhaps natural that the first of these objectives should dominate when, in what it conceived to be the larger interest of the community, the University handed over its missionary work to the newly constituted Research Association, which included representatives from the whole of the woollen and worsted industries of Great Britain and Ireland.

The experience of this association is now tending to emphasise the need for well-trained, sympathetic men actually placed in the works if the achievements in research—which already are by no means inconsiderable —are to be used at all: still more is this necessary if anything like full value is to be drawn from research results.

It is therefore not surprising that the research association should consider it not only expedient but also absolutely necessary that well-trained University and other students should be encouraged to resist the more direct call of industry and to prepare themselves for the difficult but very necessary work of introducing more science into industry. Whether this appeal will achieve the desired result depends not only upon the fellows and scholars which the association is now selecting, but also upon the sympathetic consideration given to their work and its possibilities by the controllers of industry. In addition to ability, there must