

appear to be insufficient in themselves, and the scientific interpretation of phenomena not capable of treatment by classical mechanics has proceeded with the use of entities which must possess the qualities of hypotheses. This method Huygens, if not Newton, would have supported.

Science is fortunately an activity in which no one need consider whether his methods have the blessings of the patriarchs or not, but it is interesting to see that in this particular respect the Huygensian attitude confers more freedom than the Newtonian and that, in regard to the broad conception of the place of hypotheses, Huygens was a more profound methodologist than Newton. Newton, on the other hand, showed the clearer grasp of the nature of scientific laws as inductions from which the particular event might be deduced. Whether he would have regarded it as the true function of science to build up a colligative system from which, ultimately, laws might be deduced is another matter. Probably it would appear to him, as it does to certain modern critics, to be a repetition of the errors of Cartesianism though in a more scientific—if not less metaphysical—guise.

In the scientific work of the eighteenth and nineteenth centuries the distinction which presents itself before many others is that of the status of mathematical laws. Following Newton's example, some physicists considered that it was undesirable to go beyond the mathematical formulation of laws. Ampère and Cauchy investigated electric forces mathematically on the Newtonian law of inverse squares; in Great Britain Faraday and Clerk Maxwell studied the effect of the intervening medium and tried to picture a mechanism by which electric forces could be transmitted. The former is the Newtonian, the latter the Huygensian method. The same divergence is clear in the treatment of the concepts of energy and entropy. As mathematical quantities they are doubtless valid abstractions; as fictitious entities existing in their own right, they raise questions of their reality which cannot be answered with final agreement except by those who adopt the same metaphysics. To keep science clear of metaphysical entanglements has long been regarded as of the first importance. It is surely in this light that Newton's famous axiom should be remembered.

¹ "La Théorie physique", 18 (1906).

² "The Metaphysical Foundations of Modern Science", 207 (1932).

³ Op. cit., 370 *et seq.*

OBITUARIES

Mr. Arthur Grove

THE death of Arthur Grove on February 2, in his seventy-eighth year, removes a noted personality from the ranks of the scientifically minded gardeners. The youngest son of Sir George Grove, editor of the "Dictionary of Music and Musicians" and first director of the Royal College of Music, Arthur Stanley Grove was, like his father, an engineer, but early in his life he became attracted to horticulture, as his father had been to music, and he acquired a remarkable collection of plants in his garden near Henley. Stimulated by H. J. Elwes, Grove became interested in the genus *Lilium* and made this a life-long study, but though he specialized on lilies he maintained a very wide interest in gardening and was for many years the chief contributor on horticultural subjects to *The Times*. He had an unusual

knowledge of good plants and wrote extensively in the gardening Press.

The success of Grove's horticultural skill should be appraised in the light of virus diseases. He took infinite pains with his lilies and achieved remarkable success, but some species repeatedly failed after a few years. In any lily collection there is virus-infected material from which the most carefully raised seedlings may become affected. Grove was baffled and mystified, but never gave in. He attributed his failures to such factors as soil acidity, or alkalinity, or to Botrytis. This was not surprising since plant pathologists could give him no light. Virus diseases of lilies were, indeed, not generally recognized in Great Britain until some years after Ogilvie's work had been published (1928).

The most important work upon which Grove embarked was the preparation of a Supplement to Elwes's "Monograph of the Genus *Lilium*", and in this he was able to incorporate the results of his unrivalled experience. He had a profound respect for authority, and as an amateur he hesitated to run counter to the writings of professional botanists. It was partly owing to this fine feeling and partly on account of ill-health that he sought expert help when he came to face the critical and much confused species that had to be described for the later parts of the Supplement.

Grove was elected a fellow of the Linnean Society in 1903. He was awarded the Victoria Medal of Honour of the Royal Horticultural Society in 1924, the Veitch Memorial Gold Medal in 1934, and the Gold Medal of the Massachusetts Horticultural Society in 1936. He was, moreover, the first recipient of the Lyttel Lily Cup. He had an attractive literary style and will always be remembered for his great charm of manner and for his whimsical humour.

A. D. C.

Dr. Edward Bureš and Prof. Stefan Kopeč

IT has recently been learned that Dr. Edward Bureš, lecturer in organic chemistry at the Charles University, Prague, until the Germans closed the university, has died. He was arrested soon after the outbreak of war and has presumably died in a German concentration camp.

Dr. Bureš had made several contributions to the study of plant chemistry, having described a number of new sterols, for example, raphanisterol from mustard, alkaloids (nymphæine from water-lily) and glycosides.

Prof. Stefan Kopeč, professor of biology in the University of Warsaw, was killed some months ago by the Germans. He was arrested among the 150 Polish persons, every tenth of whom was shot. They had not committed any offence but were taken as hostages after an unsolved incident in which a German was killed.

We regret to announce the following deaths:

Dr. Frank Conrad, assistant chief engineer of the Westinghouse Electric and Manufacturing Company of Pittsburgh, on December 11, aged sixty-seven years.

Prof. P. H. Hanus, emeritus professor of education in Harvard University, on December 14, aged eighty-six years.

Prof. Simon Isaac, formerly professor of internal diseases in the University of Frankfurt, an authority on diabetes.