subjecting puparia of *Drosophila melanogaster* to a temperature shock, was cited. Individuals inheriting the character were found from the twelfth generation onwards. In plants, it appeared from Darlington's work on male sterility in *Epilobium luteum* × *hirsutum* that plasmagenes restoring fertility appeared after fourteen generations. From knowledge of the physiology of pollen sterility in *Forsythia* and other plants, boron may be an important factor in the fertility mechanism. This linked up with the mineral content of the soil, as an example of an environmental factor that may exert an adaptation pressure. In discussing temperature, Crosby's paper on the "Role of Plasmogenes in Acquired Adaptations" was mentioned, and it was pointed out that no special assumptions were necessary if the applicability of the Le Chatelier principle were admitted. The effects of temperature were stated more precisely by the van't Hoff principle. It followed, that if a process was controlled partly by exothermic and partly by endothermic reactions, any change of temperature would have a differential effect. Applied to morphology, this could affect the shape of leaves or other organs. An explanation of the topocline in leaf shape in *Ulmus coritana* was possible, on these lines.

In the unavoidable absence of Prof. Waddington, his paper was read by Dr. A. J. Cain, who said that although random mutation and natural selection, together, constitute a mechanism or generating states of high *a priori* improbability, many people were not satisfied that this conventional theory contains the whole truth. The existence of environmentally adapted populations within a species could not be wholly irrelevant to the process of evolution. On general grounds, one would expect the capacity of an organism to respond to environmental stress to be under genetic control. Individuals within a population will vary in this respect and natural selection will favour those in which the response is greatest. Conditions for producing, experimentally, a really adaptive change in an organism had not been devised, but artificial selection could be applied to other environmentally induced responses. When *Drosophila* puparia are subjected to a hot shock, some individuals respond by developing abnormalities in the wing venation. After twelve generations, cross-veinless flies began to appear in untreated individuals. When these were bred together, without further treatment, strains could rapidly be built up, in which nearly all the individuals were cross-veinless. The original phenotypic response was now genetically fixed. Similar results were obtained with populations from different sources. In most wild-type stocks submitted to temperature shock, four types of abnormality occurred. If selection is practised on any one of these, its frequency increases, while that of the others does not. In generalizing from these experiments, it seems possible for a response, that was at first only imperfectly adaptive, to be 'tuned' more closely to the requirements of the animal's life. The mechanism revealed operates in a perfectly 'orthodox' Mendelian way. The most important question remaining for discussion is how it comes about that so many responses of animals to environmental stresses are adaptive. The answer may be based on two considerations. First, that development must be epigenetic, involving interactions between parts, so that, for example, changes in the skeleton are associated with changes in musculature, and *vice versa*; secondly, that selection acting on a macro-evolutionary time-scale will tend to favour types of epigenetic interaction that offer the possibility of adaptive response to stresses.

In the general discussion following, Dr. W. B. Turrill criticized Prof. Graham Cannon for his statements that bacteria had "no nucleus, no chromosomes and no sexuality". Dr. M. L. R. Petterson directed attention to the evidence, published in recent text-books, for the existence of genes in both bacteria and viruses, and Mr. P. F. Mattingly mentioned a very beautiful experimental demonstration by certain French workers of the existence of a linear arrangement of hereditary factors in *Escherichia coli*. Prof. Graham Cannon questioned the validity of work with bacteria kept in culture for considerable periods, and suggested that infection by viruses might affect the results. Dr. Dean admitted that the stocks employed had been in culture some years, but their behaviour was always tested in a standard medium before and after experiments with drugs or alternative carbon sources. Dr. S. M. Manton regretted that the discussion had centred so much around single isolated characters. Many characters are intimately correlated for the harmonious working of a whole animal. For example, the control of movement in a centipede involved nearly all parts of the body, and a change in a single character would be ineffective. The number of simultaneous gene changes necessary to account for tergite heteronomy in the centipedes is so prodigious that the concept needs reconsideration.

R. MELVILLE

OBITUARY

Sir Gerald Lenox-Conyngham, F.R.S.

THE working life of Colonel Sir Gerald Ponsonby Lenox-Conyngham, who was born at Moneymore, Londonderry, on August 21, 1866, the fifth son of Sir William Lenox-Conyngham, and educated at the Edinburgh Academy and the Royal Military Academy, Woolwich, may be reckoned from the time of his being commissioned second lieutenant, Royal Engineers, at the early age of nineteen. Even after his ultimate retirement sixty-two years later, he continued, until his death on October 27, to be the valued counsellor of his friends. The first half of his long career was in India; the remainder in Cambridge. Throughout he was sustained by Lady Lenox-Conyngham, whom he married in 1890. She was daughter of Surgeon-General Sir A. E. Bradshaw, and there was one daughter of the marriage.

An orderly line of progress throughout may be perceived. Lenox-Conyngham joined the Survey of India in 1889 and was then engaged on astronomical field-work for the next dozen years. During 1894–96, as partner to Burrard (later Sir Sidney Burrard), his senior by five years, he was on deputation out of India conducting observations for the precise longitude of India, then embarrassingly in doubt. These two great men—for they were of great stature and of equally notable ability—became and continued fast friends; but they ever remained to each other just 'B' and 'C'.

The longitude at Karachi which they found was closely confirmed thirty years later by observers of the 1926 International Longitude Project, who had manifold advantages of developments such as wireless telegraphy.

Local arrangements for two solar eclipse parties visiting India in 1898 were entrusted to 'C'. At one of the camps he met H. F. Newall, professor of astrophysics at Cambridge, and formed with him a lasting and fruitful friendship. Then came some years of precise latitude field-observations from which deflexions of the vertical—the *direction* of gravity—are derived. 'B' was then seeking the cause of these and previously found deflexions: extra observational evidence, in the form of the force of gravity, was needed.

Thus in 1902 a gravity survey was planned. 'C' was delegated to Europe to examine, acquire and standardize the best available pendulum equipment; and two years later he took to India a set of four brass von Sterneck half-second pendulums. The next few years, during which I was fortunate in being associated with him, saw the beginning of the series of observations which had nearly covered India and Burma before the Second World War. A great difficulty with brass pendulums in field-survey is finding the temperature of the pendulum shaft. 'C' went far to meet this by his 'dummy' pendulum, the shaft of which contained a thermometer. Later he proposed invar pendulums, but was dissuaded by reason of the magnetic susceptibility of invar. Nevertheless, subsequent pendulums have usually been made of invar.

In 1912 he became superintendent of the Trigonometrical Survey. He was an excellent administrator—a firm but sympathetic and trusting chief. Absence of disorder and steady progress of work in hand were apparent in offices where he was in charge, whether field-party or directorate. The onset of the First World War frustrated his natural promotion to surveyor-general; for the services of Sir Sidney Burrard were extended for the duration of the war. Thus Lenox-Conyngham retired as superintendent in 1920, having been elected a Fellow of the Royal Society in 1918 and received the honour of knighthood in 1919.

In 1898 Prof. Newall had had a close view of the then greatest existing practical geodetic organization; and he felt strongly that geodesy, neglected in Britain, should be promoted. So at a well-chosen time he used his great powers in that direction. Only a month ago, at a luncheon given in Trinity College by friends to Sir Gerald and Lady Lenox-Conyngham to mark their attainment of the tenth decade, Sir Gerald made a remarkable speech; and he recounted how after return to England in 1920 he had received a letter from the then Master of Trinity, Sir J. J. Thomson, asking him if he would accept a praelectorship in geodesy coupled with a fellowship of Trinity, and with what satisfaction he assented.

The formation of a School of Geodesy involved especial difficulties for a newcomer to the University; but his charming presence and shrewd sense inevitably prevailed. The School was formed, and later in 1931 was expanded into the Department of Geodesy and Geophysics. Geodetic and topographical surveying became one of the four subjects for the Geographical Tripos, and the School became the training centre for most of those who later became the principal survey officers of the British Colonial Empire. Meantime, the University created a readership in geodesy and appointed Lenox-Conyngham to it, having previously conferred on him the degree of M.A.

During this second career, he attended all the general assemblies of the International Union of Geodesy and Geophysics, from the first at Rome in 1922 to the sixth at Edinburgh in 1936. He also represented H.M.'s Government at the second and third Pacific Science Congresses in Australia in 1923 and Japan in 1926. The inhabitants of Montserrat, Windward Islands, alarmed at the increasing frequency of earthquake shocks, petitioned the Governor to obtain scientific opinion as to their security. So the Council of the Royal Society, consulted by the Colonial Office, invited Lenox-Conyngham to visit the neighbourhood and to investigate the seismic circumstances; this he did in 1936. He gave some account of this in a Friday Evening Discourse at the Royal Institution on March 12, 1937. He also served on the Council of the Royal Society for the periods 1920–21 and 1934–36.

Lenox-Conyngham had become the father of British geodesy. Recently, he received the affectionate greetings and congratulations of the International Association of Geodesy; and his death, inevitable though it be, is a lively sorrow to a wide international circle.

J. DE GRAAFF-HUNTER

NEWS and VIEWS

The New Scientist

THE interpretation of scientific research and discovery to those who have had no special scientific training and especially to people who have practical interests in the applications and implications of science is now a fundamental need in any country. This need is well met in the United States through *The Scientific American*; somewhat similar journals are published in various countries on the Continent of Europe, and recently one dealing with science for the layman has been launched in India. In this respect, Britain has been backward, although it has several excellent journals of more 'popular' appeal, and frequently newspapers and general popular journals carry excellent interpretative scientific articles. Yet in spite of this there have been repeated calls from industrialists and others, who have realized the need for men and women other than the scientists themselves to understand at least the aims and objectives of research, for a medium which will meet their needs. The very idea, therefore, of such a journal in Britain is welcome, and now it has become manifest in the issue on November 22 of the first number of the weekly periodical, *The New Scientist* (Cromwell House, Fulwood Place, High Holborn, W.C.1).

The aim of this journal is to appeal to all who are interested in scientific discovery and its impact on, and utilization in, industry, commerce and society in general. There are many such people to-day, for the impacts of science are many and profound. It is at last realized that Britain badly needs many more and better trained scientists and technologists; but it can scarcely be expected that such needs will become satisfied or even that the best efforts will be