ruling in chemistry, and sought to replace them by "Energetics", or non-hypothetical laws based on the transformations of energy. Nernst always insisted, on the contrary, that thermodynamics and molecular theory must hold equal rank in a complete interpretation of physico-chemical phenomena. This is the key to nearly all his work, and is reflected in the title of his text-book: "Theoretical Chemistry from the Standpoint of Avogadro's Rule and Thermodynamics".

Of the large number of subjects which Nernst investigated, it is only possible in a brief notice to mention some in which he appears as a theorist and experimenter of great originality. These include his work on electrochemistry, the heat theorem and the quantum theory of solids.

In the electrochemical researches, three groups are most prominent. The first was the theory of the galvanic cell based on the idea of electrolytic solution pressure—the tendency of an electrode to throw out charged ions to a limit balanced by the osmotic pressure of the solution, and so to develop a potential difference. The formulæ based on this are still the foundation of the theory of electromotive force. Incidentally, his proposal to use the hydrogen electrode as the standard of electrode potential is still in use. Closely related to this work is that on the potential differences set up between solutions of electrolytes in contact. The theory of the effect of an electrolyte on the solubility of another having a common ion ('solubility product') threw light on many branches of chemical work, and the so-called distribution law, giving the way in which a substance distributes itself between two non-miscible solvents, is one of the most important in the study of heterogeneous equilibrium.

In his treatment of thermodynamics, Nernst made use of Helmholtz's equation relating the diminutions of energy (U) and free energy (A) in a process with the temperature coefficient of the free energy (dA/dT), itself equal to minus the entropy increase ($-\Delta S$), namely, $A - U = T \cdot dA/dT$. He used this equation with great ingenuity in various fields, and its form lent itself very well to the discovery of the famous Nernst Heat Theorem (sometimes, and by Nernst himself, called the Third Law of Thermodynamics). By an inductive process, based on an extensive knowledge of the experimental results—another characteristic of his procedure—he singled out a field of changes in which the equation $dA/dT = 0$ approaches exact validity as the temperature approaches the absolute zero. This implies that $A = U$, and many years previously he had pointed out that this—the so-called Thomsen-Berthelot principle—had a kernel of truth, which could never be disclosed apart from the numerical data. The Nernst Heat Theorem was at first mostly used in the calculation of chemical equilibria from thermal results. In its later developments its intimate relation with the theory of entropy and statistics has been made clear.

It was characteristic of Nernst that he quickly appreciated new discoveries and theories, and that he usually recast the theory into a more intelligible and practical form which appealed directly to chemists. The quantum theory, which was strangely overlooked in England, he recognized as likely to transform many branches of physical chemistry, and in two directions, in photochemistry and the theory of solids, he turned it to most fruitful applications. In the experimental work on the heat capacities of solids at very low temperatures he showed great skill

in devising new apparatus—including the use of a metal block as the calorimetric substance—and gave a firm foundation to the quantum theory of specific heats. He invariably strove towards simplification and elimination of redundancy both in theory and in apparatus, and in this work liquid hydrogen was made available in quantity by means of a very simple and effective apparatus at a time when it was regarded as a rarity in most laboratories. He was also interested in the technical applications of physical chemistry, and the Nernst lamp well illustrates his practical ingenuity.

Nernst's work lies at the foundation of many branches of physical chemistry which are most actively studied at the present time, and all physical chemists recognize his outstanding contributions to their science.

J. R. P.

Rev. H. J. Riddelsdell

HARRY JOSEPH RIDDELSDELL entered business after school, but studying in his spare time took the B.A. degree of London and gained an exhibition at Jesus College, Oxford, where he graduated in honours and won the Hall-Houghton Prize. He took Holy Orders, and after holding a curacy at Leeds parish church became sub-warden of St. Michael's College, Llandaff, a post he held for seventeen years. In 1914 he was appointed rector of Wigginton and later became vicar of Bloxham. He retired from parish work in 1936 and died on October 17, 1941.

Riddelsdell's long residence in the country gave opportunity of using his quick eye and active mind in observation of Nature, and enabled him to make a thorough study of the flora of the neighbourhood. In 1907 he published "A Flora of Glamorgan", and from 1901 he contributed numerous notes to the *Journal of Botany* and other periodicals. He was a frequent contributor to the Botanical Exchange Club and sent valuable notes for the annual reports. The difficult and critical brambles became a special subject under the guidance of the Rev. W. Moyle Rogers, and after the death of the latter Riddelsdell became the leading authority on the genus in Britain and determined specimens for collectors. He visited many parts of Great Britain for the purpose of this study and a number of new forms were described.

The work to which Riddelsdell gave most of his leisure and ripe knowledge was the flora of Gloucestershire, sponsored by the Cotteswold Naturalists' Field Club. From 1908 as editor he organized and directed the work of Club members and dealt with the large quantity of lists and records already accumulated. A final revision had begun when illness compelled him to leave the task unfinished.

Riddelsdell was first and foremost a faithful and scholarly servant of the Church, devout and unselfish and loved by all around him. In addition, his energy, enthusiasm and quick apprehension enabled him to accomplish much in his leisure and made him a delightful companion in the field. He was elected associate of the Linnean Society in 1925 and his valuable herbarium is preserved in the British Museum (Natural History).

W. C. BARTON.

We regret to announce the death of Captain Guy Dollman, assistant keeper of zoology (first class) in the British Museum (Natural History), on March 13, aged sixty-five.