

In 1915 Madigan married Wynnis Wollaston, by whom he had three sons and two daughters, all of whom survive him. While grieving his loss, his many friends may be comforted by the thought that one who loved the wide open spaces was spared possibly many years of enforced inactivity. He has left behind a record of service to his country of which any man might well be proud. J. A. DOUGLAS

#### Prof. P. J. Daniell

PROF. P. J. DANIELL, professor of mathematics in the University of Sheffield, died on May 25, 1946, at the age of fifty-seven. He was educated at King Edward VI School, Birmingham, and at Trinity College, Cambridge. He was Senior Wrangler in 1909, the last year in which the names of the candidates in Part 1 of the Mathematical Tripos were placed in order of merit. In Part 2 of the Natural Sciences Tripos in 1910 he obtained a first class, and in 1912 he was awarded a Rayleigh Prize. After studying in Göttingen for two years and then acting as an assistant lecturer at the University of Liverpool, he went to the Rice Institute, Texas, where he was professor of mathematics until 1923. In that year he returned to England as professor of mathematics in Sheffield, and held this post until his death. In the summer of 1945 he had a serious illness from which he did not fully recover, and he died about a year later after a sudden relapse.

Prof. Daniell was a distinguished scholar of pure and applied mathematics. The most important of his earlier contributions to mathematical knowledge were related to generalized integrals and derivatives. He extended the Radon-Young integral to space of an

infinite number of dimensions, and his integral was applicable, for example, in the theory of functionals. He considered also generalized derivatives, using methods that were based partly on Young's work in one dimension and partly on ideas introduced by himself. His research, however, extended over a wide field of applied science, and much of his time and energy were spent in assisting and advising research workers in a variety of problems. His mathematical investigation on the propagation of flame motion, for example, was related to experimental work carried out by the Safety in Mines Research Board in Sheffield. Perhaps his most important work of this kind was that done during the War, when he was engaged in problems arising from the control of instruments designed to pick up and locate targets such as aeroplanes and ships. He assisted in the work of improving the performance of such instruments, and he was a leading exponent of the frequency response approach to the problems involved in the design of these instruments. He initiated methods in dealing with problems of back-lash, and he assisted the Admiralty in ultra-high-frequency detection methods.

In educational affairs generally, Daniell took an active share in addition to his university activities. He was the representative of the University of Sheffield for more than twenty years on the Joint Matriculation Board, and took a significant part in shaping its policy.

His death means a great loss to the mathematical world, but he is especially missed in the University of Sheffield, where his experience and wisdom would have been of great value in guiding the developments now in progress.

## NEWS and VIEWS

### Library of Sir James Hall, Bart., of Dunglass, Haddingtonshire

IN the last week of February, Messrs. Hodgson and Co., of Chancery Lane, London, offered for sale the library accumulated at Dunglass House, in East Lothian, in the latter half of the eighteenth and the earlier part of the nineteenth century by Sir James Hall (1761-1832), the distinguished geologist, and other members of his family. The collection contained many early and important works in various branches of science and in medicine, but was of more particular interest on account of the geological works included. Hall was a pioneer in experimental geology, and carried out a number of classic laboratory experiments devised to support some of the conclusions reached by his friend James Hutton, from general reasoning based on geological field work, and embodied by the latter in his "Theory of the Earth". One series of experiments was designed to show that molten basalt lava, when cooled slowly, forms a stony or crystalline mass comparable with the basalt occurring in Nature, rather than a vitreous mass, as was usually contended at that time. The second and more famous series was instituted to determine the combined effects of heat and pressure on carbonate of lime, the problem being to find out if powdered chalk could be converted into firm limestone or into marble by heating in a confined space. Hutton's view that marble would result was based on geological

grounds, but was apparently at variance with experimental facts, as then known. Some preliminary trials were carried out during Hutton's lifetime, but a more prolonged and systematic series of experiments was not commenced until after the latter's death, having been postponed in deference to his marked disapproval of those who "judge of the great operations of the mineral kingdom by kindling a fire and looking into the bottom of a crucible".

The main experiments, which proved entirely successful in their object, were carried out during the period 1798-1805; and full details were recorded by Hall, in the form of a diary, in two folio volumes. These are the volumes which appeared in the sale room as Lot 98, bearing the title "Chemical Experiments made with a view to Obviate some of the Difficulties in Dr. Hutton's 'Theory of the Earth'". It is a matter for satisfaction to be able to record that these diaries were purchased by Messrs. Quaritch on behalf of the National Library of Scotland, where they will now find a permanent and appropriate resting place. Among other works of interest sold, the writings of James Hutton were well represented, not only by his lesser-known books, but by two copies of his famous "Theory of the Earth". The publication of this book, in 1795, has long been recognized as a landmark in the history of geology. The prices obtained, £110 for one copy and £95 for the second, reflect not only its scientific importance but also its great rarity.