

and Mr Coleman's dry-air mechanical refrigerators were fitted up in many steamers. Mr Coleman acquired a modest fortune from his invention, and, retiring to Bearsden, near Glasgow, he built a small private laboratory in connection with his house, and devoted himself entirely to original investigation. He contributed numerous papers to the Philosophical Society of Glasgow, to this Society, to the Society of Chemical Industry, and to the Institution of Civil Engineers. For many years Mr Coleman suffered from weak health, and at length his frail body succumbed to a complication of disorders. He was a man of bright and lively intelligence, who took an original view of any scientific question to which his mind was directed. Although eminently practical as a chemical engineer, he had a great regard for the first principles of science, and even for those problems in chemistry and physics that are of merely speculative interest to most men. Few were more gifted with the power of recognising the practical applications of scientific theory, and it was this quality of mind that led him to the invention of the machinery for the mechanical transference of heat with which his name will always be associated.

Franz Cornelius Donders. By Professor M'Kendrick.

This distinguished physiologist and ophthalmologist was born in North Brabant on 27th May 1818, and died at Utrecht on 24th March 1889. Educated in the Dutch Royal Hospital for Military Medicine and Surgery, he practised for a time as army surgeon in Vliessingen and in the Hague; but an anatomical and pathological investigation on the nervous centres having attracted the attention of the authorities, he was soon appointed lecturer on anatomy and physiology to the Royal Military Academy in Leyden. This office he held till 1848, when he was appointed professor extraordinary in the Medical Faculty of the University of Utrecht; in 1852 he became an ordinary professor; and on the death of Schroeder van der Kolk, in 1862, he was called to the chair of physiology. He filled this chair till 1889, when he retired in compliance with the law of the universities in Holland, by which no professor can occupy a chair after attaining his seventieth year. Soon after his retirement his health gave way, and he died after a series of apoplectic attacks.

In 1843, when physiologists were much occupied with the cell theory of Schleiden and Schwann, Donders carried on researches with Müllder, more especially in the chemical examination of the tissues while under the microscope. He also about this time came under the influence of the great German physiologist Johann Müller, whose doctrines, more especially those relating to the nervous system and the senses, have largely moulded the life-work, not only of Donders, but of Helmholtz, Carl Ludwig, and many other physiologists in Germany. In these early years, also, he was much occupied with the study of the dynamical characters of living beings, and in a well-known paper on the Metabolism of Tissue as the Source of the proper Heat of Plants and Animals, he showed how the skin acts as a regulator of bodily temperature, and he discussed the relation between heat and work in the living tissues. The fame of Donders largely rests, however, on his researches on vision. In 1846 appeared a paper on the Movements of the Human Eye, and this was followed by many similar contributions through a series of years. In these papers, which were largely devoted to the problems of single vision, the nature of the horopter, the conditions of stereoscopic vision, and the mechanism of the movements of the eyeballs, Donders substantially laid the groundwork of our present knowledge of these subjects. He also wrote on the Relation between Convergence and Accommodation, the Regeneration of the Cornea, and on the Use of Lenses in the Treatment of Squint. After a visit to London in 1851, when he became acquainted with the distinguished ophthalmologist von Graefe, he resolved to devote his life chiefly to this department of the medical art, and for many years he enjoyed a large practice as an ophthalmic surgeon. For twelve years he edited the *Nederlandsch Lancet*, in the pages of which many important communications on ophthalmological subjects appeared from his pen. The great work of his life, however, was a volume entitled *Anomalies of Refraction and Accommodation*, a translation of which was published by the New Sydenham Society. Familiar with the researches of Gauss, Listing, and Helmholtz, Donders investigated mathematically and by experiment the optical conditions of the normal eye, and showed how these were modified in myopia, hypermetropia, and astigmatism. He also discussed theoretically the influence of age upon refraction and the mechanism of accom-

modation, and he gave precision to the optical methods for ascertaining and estimating anomalies of refraction. In all of these researches he not only showed himself to be an able mathematician and physicist, but he enlisted the interest of the medical profession at large by the careful clinical records given of individual cases suffering from anomalies of vision, and by the ingenuity and efficiency of the means devised for their relief. Donders also contributed papers on Physiological Time in Psychological Processes, the Nature of Vowel-Tones, Speech, and the Cardiac Sounds. All his writings are characterised by exactitude of statement, facility in illustration, and graceful diction. The subject is always treated with the hand of a master. Of commanding stature, a dignified presence, a large Apollo-like head with a luxuriant wealth of hair, dark somewhat rugged features, and eyes that sparkled with the lustre of genius, Donders was a man whose personality is not likely soon to fade from the memory. Eminent among physiologists, chief among oculists, a great teacher, and a good citizen, his life-work is thus summed up by his friend Moleschott:—"Of him it would be difficult to pronounce whether he was greater or more prolific as an investigator, or clearer or more effective as an expositor, or, lastly, more duteous and helpful as a healer of that organ which is the portal of wisdom and love."

Rev. James Grant, D.D., D.C.L. Oxon. By A. Beatson Bell,
Esq., Advocate.

(Read January 5, 1891.)

James Grant was the third son of the Rev. Dr Andrew Grant, proprietor of the estate of Limepotts, in the county of Perth, and minister successively of Portmoak, Kilmarnock, Canongate, Trinity College, and St Andrews, Edinburgh, Dean of the Chapel Royal, and Chaplain in Ordinary to George III., George IV., and William IV.

He was born in the manse of Portmoak, Kinross-shire, on 23rd January 1800, and when James was quite a child, his father was translated to Kilmarnock. He there received the elements of his education, and on his father's subsequent translation to Edinburgh