are some interesting investigations into the proper motions of 250 stars, which Argelander was led into by comparison of observations.

He always kept in view the desirability of obtaining accurate meridional observations of all stars down to the ninth magnitude, whose approximate positions are contained in the *Durchmusterung*. It was necessary, if this could be done, that the labour should be shared by different Observatories, and be prosecuted on a uniform system. Thus would a basis be afforded for a much larger number of accurate determinations and observations of every kind. In the year 1867 Argelander laid his plan before the German Astronomical Society, which was afterwards adopted, with trifling modifications. The Bonn Observatory was to undertake one zone of 10° in breadth of declination; but Argelander, now approaching his seventieth year, entrusted the details of the execution to his assistants, engaging himself in labours of smaller compass, such as investigations of stellar proper motion.

Argelander always took a lively interest in the progress of science generally, and also in the affairs of the University of Bonn, of which he was twice elected Rector. Many of the scientific societies of Europe and America made him one of their corresponding or honorary members, and he was chosen an Associate of our own on the 14th of January 1831, being also our medallist in the year 1863.

Until the summer of 1874 he had always enjoyed excellent health; but in August of that year he was attacked by a fever of the typhus kind, which visited the neighbourhood about that time. In the autumn he rallied, and was able to resume some of his labours. But the appearance of recovery was delusive; his strength failed more and more, and, retaining his interest in science almost to the last, a tranquil death early in the morning of February 17, 1875, terminated a life which had been so useful to astronomy. His wife (with whom he had been affectionately united for nearly fifty-two years), two sons, and one daughter, married to Professor Krüger, survive him. W. T. L.

Heinrich Louis D'Arrest was born at Berlin on the 12th of August 1822. His family is of French extraction, his ancestors having been among the Huguenot refugees who settled in Germany after the Revocation of the Edict of Nantes in 1685. In early life his tastes and inclination naturally led him to the study of mathematics, which was followed by its practical application in astronomical calculations and observation even while still a student at the University of Berlin. His name was first brought into notice outside his native city by an independent discovery of Mauvais' second Comet, which he detected on July 9, 1844, two days after it was first seen at Paris. At this time he had attained considerable skill as an observer, as is

shown by the fact that while informing Professor Encke of the discovery on the same night, he also furnished a position of the comet determined from a good series of observations. Although anticipated on this occasion, he had the good fortune to detect another comet on December 28 of the same year. Continuing his cometary investigations, D'Arrest communicated to Professor Schumacher, in September 1845, a very careful discussion of the observations of Colla's Comet, which had been first detected by the naked eye in the first week of the preceding June. Soon after this D'Arrest was appointed an assistant at the Observatory of Berlin, then under the direction of Professor Encke. In 1848 he accepted the office of Observer at the Leipzig Observatory, and shortly afterwards that of Professor of Mathematics and Astronomy in the University. Here he remained till 1857, when he received the appointment of Director of the new Observatory in connection with the University of Copenhagen, in which his first duty was the superintendence of the construction and instrumental equipment of the new establishment.

During D'Arrest's residence at Leipzig, he discovered the interesting periodical comet which bears his name, new osculating elements of which have recently been computed by M. Leveau, referred to in a subsequent section of this Report. He also during this time communicated to the *Astronomische Nachrichten* and the *Monthly Notices* numerous elements and ephemerides of the minor planets and comets calculated by himself, and in 1851 he published a valuable paper on the general system of the minor planets. Soon after his appointment to the Leipzig Observatory, he commenced his important series of observations of the positions of the Nebulæ. These Leipzig observations appeared, as a first instalment of nebulæ results, in his work published in 1856, entitled, *Resultate aus Beobachtungen der Nebelflecken und Sternhaufen.* The merits of this, and of his still more important work on the observation of the nebulæ, made subsequently at the Observatory of Copenhagen, entitled *Siderum Nebulosorum Observationes Havnienses*, were fully considered by our President in his address delivered on presenting the Gold Medal of the Society to our late Associate at the last anniversary; and, for this reason, there is no need for us to dwell upon them here, except to remark that, had these volumes been the only production of Professor D'Arrest, they would alone be a sufficient memorial of the observational energy displayed by him both at Leipzig and Copenhagen. From the beginning to the end of his career he may truly be classed as one of our principal observing astronomers; and in proof of this, a glance at his numerous contributions on various astronomical subjects, to be found in the *Astronomische Nachrichten*, and in other scientific serials, is a sufficient testimony. This activity and devotion to astronomical research continued to the end of his life, for even in the number of the *Astronomische Nach-*

richten which records his death, some valuable remarks by him on some newly discovered objects exhibiting Star-spectra similar to Secchi's third and fourth types are also inserted. The Royal Society's Scientific Catalogue contains a list of 104 separate papers by D'Arrest published before the end of 1863.

D'Arrest was the discoverer of one minor planet, *Freia*, in addition to several comets. Before the systematic observation of the nebulæ occupied so much of his time, he did good service to astronomy as the calculator of the elements of the orbits of the comets of Colla, Biela, Brorsen (second), Hind (second), Colla (second), Miss Mitchell, and others. He also published elements of the orbits of various planets, among others, of *Astræa*, *Iris*, *Flora*, and *Hygeia*, soon after their discovery. He was indeed at this time one of the most energetic of the many young German astronomers who undertook the calculation of elements and ephemerides of newly discovered planets and comets, a necessary and important branch of our science, which is still so successfully cultivated at the present time in Germany under the able supervision of Dr. Foerster and Dr. Tietjen.

As a conscientious and skilful teacher, D'Arrest was popular among those who came to him for instruction. Whenever he detected real abilities in his pupils, with a never-failing energy he afterwards helped and assisted them in their studies, not forgetting at the same time that he was himself still a student, and that when in his thirty-sixth year he commenced the study of a foreign language which he perfectly mastered. He was indeed naturally endowed with superior abilities, which he constantly and progressively developed by the most diligent study. His knowledge of astronomical literature was very extensive, and he was also a good geometer, which is clearly manifested in several of his minor works. His intercourse with his father-in-law, the celebrated geometer, Möbius, of Leipzig, may possibly have influenced him in this branch of mathematics. But the inclinations and talents of D'Arrest were more particularly directed to a class of scientific research in which conjectural reasoning was the main point of investigation, as well as to those observations in which great technical knowledge was not so much required as the power of observing phenomena properly and correctly, and afterwards giving an accurate interpretation of what has been seen. Acting in this spirit, D'Arrest employed much of his time in investigating the nature of the composition of the heavenly bodies, and particularly of the nebulæ; and this subject had of late years been the main study and object of his life, leading him to undertake a series of spectroscopic observations of the nebulæ, a discussion of which, giving the results obtained, was published at Copenhagen in 1872.

Professor D'Arrest, during the latter years of his life, was subject to an occasional nervous prostration, caused probably