

ROBERT GRANT was born at Grantown-on-Spey, N.B., on 1814 June 17. His father, Mr. Robert Grant, was a much respected tradesman of that town. He received the elements of education at the endowed school, which was established by the Earl of Seafield, proprietor of the district, and which provided for instruction in the ordinary branches of education, including the elements of Greek and Latin, in order that the youth of the district should receive the preparatory course of instruction requisite for entering any of the Scottish universities. In this school young Grant exhibited early indications of being an intelligent youth, with more than usual precocity. At the age of nine he commenced the study of Latin, and soon made rapid progress in this and other subjects. But while enjoying the prospect of a promising boyhood, his studies were, at the age of thirteen, interrupted by a serious and long-continued illness, which for six of the most important years of his youth incapacitated him for all school-work. During this long period, when most young men are actively preparing for their future position in life, young Grant was helplessly confined to a bed of lingering sickness, and dependent solely on the affectionate care of his

relatives. After completing his nineteenth year, his health became comparatively restored, when he resolved to renew his former studies, becoming his own instructor. With no other assistance than what he could obtain from books, the young student devoted himself most assiduously to the study of Greek, Latin, French, Italian, and elementary mathematics, with an enthusiasm which the long blank in his career served only to increase. Astronomy was not forgotten, and Sir John Herschel's *Treatise on Astronomy* was a favourite book of study. His astronomical tastes at this time were much encouraged by the interest he took in the return of Halley's comet in 1835, and in the annular eclipse of the Sun, 1836 May 15, when young Grant was able to make his first astronomical observation. In this manner he gradually qualified himself for the high position he afterwards occupied as the honoured historian of the progress of physical astronomy.

When his health became permanently established, Mr. Grant entered upon a short course of study at King's College, Aberdeen, but, considering that there would be a better opening for his special talents in London, he resolved to avail himself of the advantages which a residence in the great metropolis would afford. Here, during the next four years, he obtained employment in the counting-house of an elder brother as a bookkeeper. But in his leisure hours he became a devoted reader of standard works on astronomy and mathematics. It was about this time that he first conceived the notion of writing a brief history of physical astronomy from the earliest ages to the middle of the nineteenth century. He had already accumulated a mass of material suitable for his purpose, but he resolved to defer the commencement of this work until he had had an opportunity of consulting the works on astronomy contained in the great public libraries of Paris. In 1845 he took up his residence in Paris, where he remained nearly two years, supporting himself by giving lessons in English. During the greater part of this time he had a great advantage in the use of the library of The Institute, a privilege he owed through an introduction by one of his pupils. He usually attended the courses of astronomical lectures delivered by Arago at the Observatory, and by Le Verrier at the Sorbonne, including the inaugural discourse of the latter on his appointment as one of the professors.

During the five years following his return to London, in 1847, Mr. Grant devoted most of his time to the preparation of his classic work, *History of Physical Astronomy*. Though still unknown to the leading astronomers, he had already made himself master of the details of most of the principal astronomical investigations, and through a happy personal introduction by Mr. Woodfall, the well-known printer, to Captain R. H. Manners, R.N., then one of the honorary secretaries, he was able to continue his researches by a frequent use of the library of this Society, a concession he has, more than once, gratefully acknow-

ledged. Fortunately, shortly after Mr. Grant's return from Paris, he was introduced to Mr. Robert Baldwin, who, at that time, was the enterprising publisher of an excellent series of works known under the title of "The Library of Useful Knowledge," which received much popular attention. Mr. Grant proposed to contribute to this series a concise history of the principal investigations and discoveries in astronomy which have helped to build up our present knowledge of the physical movements and aspects of the heavenly bodies; or, in his own words, "to exhibit a view of the labours of successive enquirers in establishing a knowledge of the mechanical principles which regulate the movements of the celestial bodies, and in explaining the various phenomena relative to their physical constitution which observation with the telescope has disclosed." The proposal was at once accepted by Mr. Baldwin, and the work was first published in separate parts, or numbers; but, after the issue of the ninth number, this form of publication was discontinued. The first part appeared in 1848 September. The complete work was not published until 1852 March, before which Mr. Grant had been elected a Fellow of this Society. Some of the early numbers of the work were submitted to Professor De Morgan and a few other astronomers, all of whom were at once struck with the accurate and comprehensive grasp of the various theoretical researches, especially by an author hitherto unknown, and it was easily perceived that all the original authorities were carefully consulted by him, and that an attentive consideration was given to each subject. Some of the personal disadvantages under which Mr. Grant laboured are very truly described in the following paragraph taken from the Annual Report of the Council, 1853 February:—

"During the past year Mr. Grant has completed his *History of Physical Astronomy*, a work the first numbers of which formed his introduction to the Society. It is very seldom that the Council are called upon to notice any work of so peculiar a merit. If Mr. Grant had possessed perpetual access to extensive libraries, and peculiar inducements to consult them; if he had passed many years in historical research, had matured his judgment by long habits of discussion with others of like pursuits, and had learned by small attempts how to venture on larger efforts, the production of a sustained history, of extent and matter such as he has published, would have excited admiration, and would have called forth some remark on the true secret of success in such undertakings. But when it is considered that the author had no more connection with libraries than anyone may command for the asking, and no peculiar calling to tempt him into research; that he has not reached middle life, and that his opportunities were furnished, as is understood, by the leisure of ill-health or convalescence; that he had, before the publication of his work, little or no sustained opportunity of communication with those who could have helped to direct his reading or form his judgment,

and that he never published anything whatever previously to the appearance of this well-conceived, well-executed, and greatly-wanted history, the Council, while they state that the work has taken a place among standard books of history from its first appearance, under circumstances which greatly enhance the merit of its author, congratulate the Society upon the prospect of numbering Mr. Grant among its executive members."

After a careful perusal of this remarkable history of the labours of astronomers from the remotest times, the reader cannot fail to be struck with its completeness, and with the rare skill and power displayed in the discernment of the salient points of some of the most difficult researches in astronomy, many of which, from their nature, are of a controversial as well as of an abstruse character. But, in most cases, the author has most scrupulously endeavoured to assign to each of the great men who had been working independently on the same line of research their proper share in the common labour. The President, the late Manuel J. Johnson, Radcliffe Observer, on presenting the Gold Medal of the Society to Mr. Grant, in 1856, very truly remarked, that "nowhere is this more conspicuous than in the discussion relative to the discovery of the planet *Neptune*. By a simple narration of facts he has placed the history of that great event in so clear and so true a light that I believe I am not wrong in saying he has gained an author's highest praise under such circumstances—the approval of both the eminent persons concerned."

In 1852 November Mr. Grant was requested by the Council to undertake the duty of editing the *Monthly Notices*, in succession to the Rev. R. Sheepshanks. His literary tastes encouraged him to introduce some new features in that publication, especially brief notices and abstracts of valuable astronomical papers that had recently appeared in the *Comptes Rendus*, *Astronomische Nachrichten*, and other scientific serials, including the *Memoirs* of different societies at home and abroad. These editorial notices were much appreciated at the time by the Fellows of the Society, and they were continued by him in successive volumes as additional records of astronomical research carried on outside the Society. Mr. Grant continued in charge of the *Monthly Notices* and *Memoirs* of the Society until his appointment by the Home Secretary, in 1859 November, to the important office of Professor of Astronomy and Director of the Observatory in the University of Glasgow, in the vacancy caused by the death of Professor J. P. Nichol. He, however, did not obtain the definite control of the Observatory until 1860 May. He was succeeded by Professor Cayley in the editorship of the Society's publications.

Professor Grant has communicated several interesting papers to the Society. One of these, published in 1853, contains an investigation of the correction to be applied to the apparent ellipticity of a planet, in consequence of the elevation of the Earth



above the plane of the planet's equator. In this important paper Professor Grant has clearly shown that his astronomical talents were not confined solely to the literature of astronomy. Of his other communications to the Society, we need only allude to a paper read at the 1871 December meeting, "On Telescopic Observations of the Phenomena seen in contiguity with the Moon's Limb during Eclipses of the Sun, and the Results which have been therefrom deduced." The principal object of this paper was to point out that the conclusions expressed by Professor Grant on p. 400 of his *History of Physical Astronomy*, relating to the origin and nature of the red sierra observed on the Moon's limb during total eclipses of the Sun, were actually derived from an inductive inquiry based upon a discussion of the observations of all former eclipses recorded in history. The portion of the *History of Physical Astronomy* containing Professor Grant's conclusions on the subject were published in the winter of 1850-51. At this time it was still an open question whether the corona and red prominences were solar or lunar phenomena. It is interesting therefore to note how decided Grant was in the opinion he had given in his book. "While engaged in this enquiry," he remarks, "I endeavoured to show that the phenomena observed during solar eclipses, whether corona, streaks or patches of light, or prominences great or small, are all solar phenomena. While the results of observation were either positively in favour of the solar aspect of the case, or adverse to the lunar aspect, there did not appear to exist a shadow of a proof in support of the lunar origin of the phenomenon." It was a great satisfaction to Professor Grant that, having been a member of the *Himalaya* eclipse expedition to Spain in 1860, he had had the opportunity of witnessing at Toloño the scarlet sierra of which he had given so plausible an interpretation ten years before.

On taking up his residence at the Glasgow Observatory in 1860, Professor Grant found that the only instruments at his disposal were a transit-circle by Ertel & Sons, of Munich, of six French inches aperture, a Dollond refractor of three inches aperture, a sidereal clock, and a few other instruments of minor importance. To these were added, in 1863, the Ochtertyre equatoreal by Cooke, of nine inches aperture, formerly belonging to Sir W. Keith Murray, and a small transit instrument of three inches aperture, the latter chiefly for educational purposes. The funds for the purchase of these instruments, and for the erection of the building in which the equatoreal is mounted, were obtained through the liberality of a few gentlemen, chiefly residents of Glasgow. The equatoreal was frequently employed by Professor Grant in the usual extra-meridian observations of comets, minor planets, and in measures of a selection of double stars, taken from Struve's *Mensuræ Micrometricæ*; but in later years the absorbing demands of the new star catalogue necessitated its use only for the observation of occasional phenomena.

In 1861 Professor Grant proposed to the Town Council of

Glasgow a scheme for controlling certain of the public clocks in the City and Port by a direct current of electricity from the Observatory, so that they might be regulated continuously to exhibit true Greenwich mean time. After some controversy on the subject, the Town Council decided to accept the proposal of Professor Grant, who at once adopted the plan of controlling invented by Mr. R. L. Jones, of Chester, which had been previously employed with success at Liverpool and other places. This system of control of the public clocks has been continued to the present time as a part of the daily duties of the Observatory.

In 1865 May Professor Grant, in co-operation with the Astronomer Royal, made a special series of observations for the determination of the difference of longitude between the observatories of Glasgow and Greenwich by an interchange of galvanic signals of star-transits on four simultaneous clear nights. The details of the observations are inserted in the *Monthly Notices* for 1865 December. Among his other miscellaneous work, Professor Grant favourably observed the great meteoric shower of *Leonids* on 1866 November 13, a large number of which supplied him abundant materials for establishing the position of the radiant point. He has contributed to the *Monthly Notices* the details of this great display, as well as of those observed on 1868 November 13, 1872 November 27, and 1885 November 27. He was also fortunate to observe, at the Glasgow Observatory, the ingress of the planet *Venus* during the transit of 1882.

Some reference should be made here to Professor Grant's valuable contribution to an important correspondence on the celebrated "Chasles" forgeries of the Pascal papers, which assisted more than any other in deciding the true character of these documents. Professor Grant, in the *Times* of 1867 September 20, admirably exposed, in the most conclusive manner, that the whole series of papers submitted to M. Chasles were, on the face of them, utterly fallacious. His argument was based upon certain numerical results contained in the so-called Pascal papers, and he shows clearly that these forgeries were concocted from corresponding numbers in the third edition of the *Principia*, published in 1726, Pascal having died in 1662.

One of the principal objects Professor Grant had in view from the beginning was the observation with the transit-circle of a selected list of stars, in order that their observed positions might be ultimately incorporated into a Glasgow Catalogue of Stars. It was his intention at first to confine the selection to the B.A. Catalogue, but he finally resolved to include in the list several thousands of telescopic stars, mostly taken from the first volume of Weisse's Bessel. The results of his more than twenty years' work with the transit-circle are contained in the "Catalogue of 6,415 Stars for the epoch 1870, deduced from observations made at the Glasgow University Observatory during the years 1860 to 1881." This excellent work, which was pub-

lished in 1883, is not only found useful in supplying sensibly accurate mean places of a large number of stars of the eighth and ninth magnitudes, suitable for employment as reference stars in connection with observations of minor planets and comets, but the places are sufficiently reliable for the determination of proper motions. In the introduction to this volume Professor Grant has determined the proper motions of 99 stars, which, with few exceptions, had previously escaped detection. The preparation of a work of such magnitude must necessarily involve an immense amount of observation and calculation in a well-equipped observatory, but when it is considered that this important catalogue is the outcome of an observatory provided with only a scanty allowance for one assistant, it is difficult to form an adequate conception of the heavy responsibility which must have fallen on Professor Grant during the progress of the calculations and the arrangement of the work for the press.

A Second Glasgow Catalogue of 2,156 stars, in the preparation of which Professor Grant took a great interest, was published a few weeks only after his death. This catalogue contains the mean places of all the stars observed between 1886 and 1892, with the object of explaining certain inconsistencies in the former catalogue, or where there was any suspicion of proper motion shown by a comparison which Professor Grant instituted between the places of the W. B. stars in the First Catalogue, and the corresponding places of Bessel and Lalande. In the introduction he gives the details of 192 new determinations of proper motion. He personally revised the greater portion of this work while passing through the press; but his health must have been failing fast when he wrote in the early autumn that his assistant, Mr. Connell, "was especially helpful to me in the final stage of the catalogue passing through the press, when, in consequence of severe illness by which I was overtaken at the time, the aid of an assistant familiar with the whole details of the work was indispensable." Though still an invalid, Professor Grant had the gratification of completing the introduction, and he continued to examine and correct all the proof-sheets of the catalogue, even down to the last sheet, which he looked over on the morning of his death.

In 1868 the Glasgow Observatory was chosen as one of the stations at which systematic meteorological observations were made in connection with the Meteorological Office in London. Professor Grant was greatly interested in these observations, and faithfully performed all that was required. In 1883 some of the stations, including Glasgow, were closed, but through his strenuous exertions he prevailed upon the Town Council and the Clyde Trust to provide the pecuniary assistance necessary to continue the observations as before.

Professor Grant's intimate knowledge of the French language did good service in the translation of Arago's well-known *Astronomie Populaire*, which was edited by him and Admiral



W. H. Smyth, and published, with editorial foot-notes, in 1858. He also assisted in the translation of Arago's corresponding volume of biographies of eminent scientific men. About this time he had the permission of the Astronomer Royal to attach himself to the Royal Observatory, where he obtained some practical experience in making astronomical observations. This course of instruction extended over nearly twelve months, and the practice he obtained in the use of the instruments was found to be of considerable service to him in after years in his own observatory.

In addition to his astronomical papers printed in the *Monthly Notices*, Professor Grant was an occasional contributor to the *Astronomische Nachrichten*, the *Comptes Rendus*, the *Proceedings of the Philosophical Society of Glasgow*, Charles Knight's *English Cyclopædia*, and other works. He has also delivered courses of astronomical lectures on several occasions, the most important of which were those delivered in 1854 and 1855 at the London Institution, Finsbury Circus, and in 1868, 1869, and 1870 at the Royal Institution. Shortly after, he delivered three similar courses of lectures to ladies at the University of Glasgow.

The honorary degree of M.A. was conferred on Professor Grant in 1855 by the University of Aberdeen, and that of LL.D. in 1865. On 1865 June 1 he was elected a Fellow of the Royal Society. During three years he filled the office of President of the Philosophical Society of Glasgow. As before stated, the Gold Medal of the Royal Astronomical Society was awarded to him on 1856 February 8 for his *History of Physical Astronomy*.

On 1874 September 3 Professor Grant married Elizabeth Emma, daughter of the late A. C. Davison, of Newcastle, New South Wales, and co. Monaghan, Ireland, by whom he leaves one son and three daughters. Although he was the subject of so much physical weakness during his youth, he always appeared to his friends to be in the full enjoyment of health and vigour. He called on the writer at Blackheath in 1892 March, when all who saw him were surprised at the activity of mind and body exhibited by him on that occasion. His brightness was particularly marked when references were made to some pleasant reminiscences of mutual association with some valued astronomical friends long since passed away. For some time, however, it had been observed by his family that his health was visibly failing, and particularly so in the early summer months. He never really rallied again, though his strength was sufficient to allow him to take a continued interest in his work, and to examine and correct the proofs of his Second Catalogue, which was passing through the press during his last illness. For a period of three months preceding his decease he was seen to become gradually weaker, but his voice was as strong, and his mind as clear, to the last hour of his life as they ever had been. His friends hoped that a brief relaxation from his observatory work in the bracing air of his native Strathspey would restore

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him for a time, but he had not been there long before his bodily weakness increased, and during the last few weeks he very gradually and peacefully faded away. The end came rather suddenly. He died at Grantown, on 1892 October 24, in the seventy-ninth year of his age.

Professor Grant was elected a Fellow of the Royal Astronomical Society on 1850 June 14, and was a member of the Council from 1853 to 1860.

E. D.