Electric Telegraph Company as above mentioned, when the system was established, and when Latimer succeeded him he took up the subject of time signals enthusiastically, and gave much assistance in extending it, *e.g.* to regulation of the Post Office clocks, Westminster clock, longitude operations, &c. The Post Office clock regulation (*i.e.* the mechanical correction of clocks by hourly signal) was after some years discontinued.

About the same time Mr. Clark was the means of having magnetic observatories furnished with wires for the observation of Earth currents.

In 1882 he introduced his little transit instrument, illustrated and described in an octavo volume, *A Treatise on the Transit Instrument as Applied to the Determination of Time, for the use of Country Gentlemen.* "The motive of this little work," he said in the preface, "is a desire to introduce the transit instrument into more common use for purposes of utility and amusement. . . . The writer believes that if this charming instrument were more fully known it would become as popular as the stereoscope or the camera ; and the object is to show that it may be easily employed by amateurs or others who have not the slightest pretence to scientific knowledge." He also published a *Manual of the Transit Instrument*, 1882, *Transit Tables* annually from 1884 to 1888, and in 1886, in conjunction with the late H. Sadler, F.R.A.S., the *Star Guide*, a useful work of general reference. Mr. Clark's accuracy and clearness made him specially fitted for compiling works of reference. His *Dictionary of Metric and other Useful Measures* appeared eight years ago, and no errors, or practically none, have since been found in it. He collected a very fine library, specially rich in electrical science (he left 4,000 volumes and 2,500 pamphlets dealing with electricity, some of them of great value).

Mr. Clark was President of the Society of Telegraph Engineers (which has since become the Institution of Electrical Engineers) in the fourth year of its existence—1875. He became a member of the Institution of Civil Engineers in 1858, a Fellow of the Royal Geographical Society in 1862, of this Society in 1874, and he was also a member of other societies and institutions. He twice married, in 1855 and in 1863. By the first marriage he had two sons, of whom the elder is an engineer, and the younger, after serving in the 5th Northumberland Fusiliers, is now in the Government Land Office at Adelaide. The second Mrs. Clark survives, but there were no children by the second marriage.

Mr. Clark died suddenly on Sunday, 1898 October 30.

Edwin Dunkin was born on 1821 August 19, at Truro in Cornwall. He was the third son of William Dunkin, who was one of the computers of the *Nautical Almanac*. In those days the *Nautical Almanac* had no local habitation, and those engaged in its reductions could live where they pleased, and used to send their

computations to the comparer by post or mail-coach. It was not till 1832 that, in conformity with a resolution of the council of the Royal Astronomical Society, passed in 1830 November, which had been approved and sanctioned by the Lords Commissioners of the Admiralty, Lieutenant Stratford organised an office in London for the staff of the *Nautical Almanac*. The advent of this member of the family is duly chronicled in the minutes of the Board of Longitude (which office was at that time responsible for the expenses incurred by the reductions of the *Nautical Almanac*), as his father seized the opportunity of his arrival to write to the secretary and remind him that there were several months' arrears of salary due to him, the payment of which would be particularly acceptable at the present moment. For the first few years of his life the young Dunkin was educated at private schools in Truro, and, in his daily journeys to and fro, used to pass the Royal Institution of Cornwall, "never dreaming," as he used to say, "that after the lapse of over half a century he should one day return to his native town to deliver the annual address as its president." On the removal of his father to London, in 1832, to join the newly established office of the *Nautical Almanac* in London, he went to school in the neighbourhood of Camden Town, first to Grove House, and then to Wellington House, Hampstead Road, where Charles Dickens had been a scholar a year or two before. In 1837 he was sent to a school at Guines, near Calais, where he still was when his father died in the summer of 1838. As his two elder brothers had predeceased their father, he was left the eldest of the family, and *res angusta domi* necessitated his leaving school and finding something to do to make his own living. So it was that through the influence of his father's old friend, Mr. Davies Gilbert, M.P., F.R.S., and the help of Lieutenant Stratford, Edwin and his younger brother Richard were taken by Mr. Airy, the Astronomer Royal, as two of a staff he was getting together to reduce the planetary and lunar observations of Bradley, Bliss, Maskelyne, and Pond. The severity of this work has often been referred to by Mr. Dunkin; from eight o'clock in the morning till eight o'clock at night were they kept at work, with only one hour's interval, and so strict was the supervision that they might not even munch a biscuit. In the year 1840 Mr. Airy formed the Magnetic and Meteorological Department of the Royal Observatory, under Mr. James Glaisher, and Mr. Dunkin with J. R. Hind (afterwards the head of the *Nautical Almanac* office) was transferred to the observatory staff. Though this work was no sinecure, for there was not as yet such a thing as photographic registration, and therefore eye observations of the magnetic needles had to be made every two hours, day and night; yet the change was felt as a welcome relief to twelve hours' strictly supervised stool work at planetary reductions. In 1845 Mr. Dunkin was transferred to the astronomical department, and became a regular observer with the meridian instruments. His punctual and punctilious

performance of all the duties entrusted to him, and his dexterity as a computer, had thoroughly secured Mr. Airy's interest. The first appearance of his name in the Greenwich volume, he was fond of saying, caused him as pleasurable sensations as any he experienced in his life, and, taken generally, he looked back upon his years of observing as ones which produced for him the most healthful and happiest period of his life. It was about this time he was offered the position of astronomer on the scientific expedition of H.M.S. Beagle, but, as he was looking forward to matrimony, he preferred to remain where he was. In 1847, on the erection of the altazimuth, Mr. Dunkin was put in charge of the instrument and reductions, with one computer, Hugh Breen. For some years these two alone worked this instrument, and took turns of half a lunation at a time, observing the Moon every night that it was visible—an arrangement which must have entailed many an anxious watch. On the occasion of a total eclipse of the Sun in 1851 July, Mr. Dunkin was selected by Mr. Airy to be a member of the official party which went to Christiania to observe this phenomenon, and his account of his observations formed his first contribution to the *Monthly Notices*. In those days the interest of a solar eclipse was concentrated in the study of "Baily's Beads," and as to whether the prominences belonged to the Sun or Moon, and it is curious to recall the fact that Mr. Dunkin, after watching a prominence for over a minute during the eclipse, was inclined to the conclusion that prominences had some connection with the Moon, though he admitted that he might be wrong. In 1853 Mr. Airy and M. Quetelet arranged a preliminary plan of operations for the purpose of determining by telegraph the longitude between Greenwich and Brussels. In accordance with this plan, Mr. Dunkin, as representative of Greenwich, and M. Bouvy, as representative of Brussels, conducted a most successful series of observations. So successful had been this experimental determination that in the following year M. Le Verrier, the head of the Paris Observatory, wished that the operation should be repeated between Greenwich and Paris, and, therefore, as soon as he had taken up his residence at the observatory, one of his first actions was to accept Airy's proposition for a telegraphic determination of longitude between the two observatories made two years previously to Le Verrier's predecessor, Arago, and which, for various reasons, had not yet been carried into effect. Again Mr. Dunkin represented the Greenwich Observatory, while the Paris Observatory was represented by M. Faye, and the operations were carried through with a completeness and accuracy unknown in former operations. In 1854 Airy planned an elaborate series of observations for the purpose of ascertaining the weight of the Earth. The place chosen for this series of pendulum experiments was the Harton coal pit near South Shields. Two invariable pendulums were used, one of which was mounted in a building on the surface, and the other almost vertically 1,260 feet below. For three weeks, under Mr. Dunkin's directions, six

observers continuously observed the swings of these pendulums from Monday morning to Friday evening, and during these three weeks no untoward occurrence interrupted the observations ; but on the day after the instruments had been removed an accident occurred in the shaft to some of the lifting apparatus, which, had it happened during the observations, might have injuriously affected the result.

In 1862 Mr. Dunkin was again employed in the determination of telegraphic longitude, this time of Valentia in Ireland. It was during this expedition that Mr. Dunkin discovered the difficulty of keeping a seat in an Irish car when both hands are busy in carefully nursing delicate astronomical instruments. In 1870 Mr. Dunkin was made superintendent of computers, and relieved from all night work. In 1876 he was elected a Fellow of the Royal Society, and from 1879 to 1881 served on the Council. On the resignation of Sir George Airy as Astronomer Royal, his successor, Mr. Christie, recommended Mr. Dunkin for the vacant post of Chief Assistant, and the Admiralty thereupon appointed him to the post for three years only, on account of the superannuation regulations, so that Mr. Dunkin's official connection with the Observatory terminated in 1884 August, at the age of sixty-three, after a service of forty-six years, since when he has not taken a very active part in astronomical affairs. In 1890 and 1891 he served as President of the Royal Institution of Cornwall, and delivered at Truro two presidential addresses on the subject of Astronomy, the first dealing with the influence of the spectroscope and photography on the science, and the second with recent advances in the science generally.

Mr. Dunkin joined the Royal Astronomical Society in 1845, and at the time of his death was the fourth oldest Fellow on our list. For many years he contributed various papers of more or less interest to the *Monthly Notices*. His most important work was a paper, modelled on a similar one by Airy, discussing the solar motion in space from the proper motions of 1,167 stars, and printed in the *Memoirs*. He became a member of the Council in 1868, and in 1870 he was elected Secretary, which position he held for seven years. During his period of office the Society moved its quarters from Somerset House to its present abode at Burlington House, and the trouble entailed by removal fell chiefly on his shoulders. In 1884 he was elected President of the Society, and delivered the usual addresses on the presentation of the medal to Dr., now Sir W. Huggins, and of a joint medal to Professor Pritchard and Professor Pickering, which was the first occasion on which a bye-law passed in 1871 for recognising independent work on the same lines had been carried into effect. Latterly Mr. Dunkin attended the meetings of the Society only occasionally, as he found the journey from town late at night too fatiguing.

Mr. Dunkin took a share in an endeavour to popularise

astronomy and meet the requirements of an educated and inquiring age. Mr. Dunkin re-arranged and brought up to date a new edition of Dr. Lardner's *Handbook of Astronomy*, and wrote the well-known work, *The Midnight Sky*, which contains maps and diagrams, with the names of the principal stars visible from London for each month of the year, besides a general description of the heavenly bodies. He also wrote a book of obituary notices of astronomers, which contains twenty-four biographical sketches of astronomers, mostly written for the *Annual Report of the Royal Astronomical Society*. Besides these books, Mr. Dunkin contributed many miscellaneous papers to the *Leisure Hour* and other periodicals.

Mr. Dunkin enjoyed his well-earned pension for fourteen years, and died on 1898 November 26 at his residence, Kenwyn, Kidbrook Park Road, Blackheath, after a short illness. He married on 1848 April 4 Maria, eldest daughter of the late Samuel Joseph Hadlow, formerly a member of the Stock Exchange. His wife and an only son survive him.

Mr. Dunkin was a man who never affected to array himself with scientific qualifications which nature did not intend him to wear, but liked to describe himself as "a practical astronomer of forty years' standing," and as such he will be remembered.

W. G. T.

JOHN HIPPISLEY, eldest son of the late Rev. Henry Hippisley, was born at Lamborne Place, Berkshire, 1804 October 29. He was educated at Rugby under Dr. Wooll, and at Oriel College, Oxford. He graduated in 1825, taking a second class in both classics and mathematics. He twice married; first in 1831 to Anne Elizabeth Clare, by whom he had three sons and two daughters, of which family three survive; and secondly in 1843 to Georgiana Dolphin, by whom he had two sons and two daughters, of which family also three survive.

Mr. Hippisley possessed considerable mechanical ability, and was devoted to astronomy. He built an observatory at Ston Easton Park, and constructed an excellent reflecting telescope there, casting and grinding its 9-inch speculum with his own hands, and making the body of the telescope, and also the driving-clock, himself. He also personally designed and constructed the machine by which he ground and figured his speculum, and made many other machines and models not so closely connected with astronomy. He was also an artist of much talent, and continued to paint in oils till quite recently. In *Mem. R.A.S.*, Vol. xxiii. p. 56, Lassell mentions an oil painting of the Orion Nebula, made by Mr. Hippisley under Lassell's superintendence from his original sketches. The painting was presented to the Society, and now hangs in the meeting room. It closely resembles the plate accompanying the paper referred to.

Early volumes of the *Monthly Notices* contain six papers from his pen. In vol. xiv. he describes a 'Remarkable Appearance of