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Assistant Registrar, an office which he held till his retirement seventeen years ago. He was well known as an archæologist and antiquarian, was the oldest living member of the London and Middlesex Archæological Society, and one of the original contributors to *Notes and Queries*; he was also a Fellow of the Royal Geographical and Historical Societies. Though of a retiring disposition, he took an interest in public affairs in connection with the district of St. Pancras, in which he lived, and in local charitable institutions.

He died on the 28th of January 1906, at the age of 88, and leaves a widow, a daughter, and seven sons. With one exception Mr. Coleman was the oldest Fellow of the Royal Astronomical Society, having been elected in June 1853.

RALPH COPELAND was born on the 3rd of September 1837, at Moorside Farm, near Woodplumpton, in Lancashire, and while still a child lost his father. He received his first instruction from a handloom weaver, who taught his pupils while working at his loom, until he at the age of about eight years proceeded to the grammar school of Kirkham. In 1853 he went to Australia and spent five years in the colony of Victoria, most of the time on a sheep run at the foot of the Australian Alps, though he was also for some time infected by the then raging mania for gold digging and made his way to the wild Omeo district. In after years Copeland was always fond of recalling incidents from this stirring period of his life, and it is much to be regretted that he could never be persuaded to write down his reminiscences, as they would have formed most entertaining reading.

Rough as the life was which he led during these five years, Copeland did not neglect to cultivate his mind, and it was during that time that he became deeply interested in astronomy. At his request his mother sent him a small telescope, and by means of this and a few popular books he made his first acquaintance with the heavens. Finally his thirst for knowledge decided him to leave Australia, and he started for home in the summer of 1858 in a clipper *vid* Cape Horn. On the voyage he made experiments as to the visibility of stars in daylight in the tropics, and succeeded in keeping *Jupiter*, and even *Sirius*, in sight until the Sun showed above the horizon; but after glancing at the Sun he was unable to find *Sirius* again, though he succeeded in picking up *Jupiter* for a short time.* He also followed with close attention the appearance and rapid development of Donati's Comet. He had wished to enter Cambridge University, but had to give up this plan and eventually entered the works of Beyer, Peacock & Co., locomotive engineers, of Manchester, as a volunteer-apprentice. Here he carried on the study of the stars commenced in Australia, and was fortunate enough to find

* See *Copernicus*, vol. iii. p. 204.

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among his fellow-apprentices several who shared his tastes and joined him in fitting up a small observatory for a 5-inch refractor by Cooke, at West Gorton, near Manchester. Copeland's first recorded observation was of the occultation of $\kappa$ *Cancri* on the 26th of April 1863, which Mr. Dawes communicated to the *Monthly Notices* (vol. xxiii. p. 221), and which attracted some attention at the time, as the disappearance of the star at the dark limb did not appear to be instantaneous, a fact which was denied by some observers but confirmed by others.

In the end Copeland resolved to desert mechanical engineering and to devote his life to astronomy, being also influenced by the bad prospects of trade in Lancashire due to the cotton famine during the American Civil War. Although he had been a married man for about five years (he had married a first cousin, Susannah Milner, in 1859) and was the father of a little girl, he made up his mind to study at a German University. In the spring of 1865 he matriculated in the University of Göttingen and commenced the study of astronomy, physics, and mathematics. Among his fellow-students were Behrmann, Börgen, and Schur, with whom he not only attended the lectures of Klinkerfues, Weber, Stern, and other professors, but also had the opportunity of becoming familiar with the use of astronomical instruments. The observatory was in charge of Klinkerfues, whose excellence as a teacher and charm of manner greatly endeared him to his pupils. In July 1866 Copeland had the misfortune to lose his wife, who died leaving him an infant son. In the summer of 1867 Börgen and he decided to carry out a considerable piece of work with one of the meridian instruments in the observatory, and as the Astronomische Gesellschaft was about to organise zone observations of all stars down to the ninth magnitude north of $-2°$ declination, they chose the zones $-1°$ and $-0°$ and commenced observing them with the Reichenbach transit circle on the 2nd of June 1867. Early in the following year Copeland took up his residence at the observatory, where his fellow-observer had also rooms, and in January 1869 the last zone was observed, while the reductions were so far advanced that the resulting catalogue of star-places could be published in the following summer. The work had been commenced before the programme of the zone work of the Gesellschaft had been settled, and it turned out that the plan adopted by the two Göttingen observers differed from that of the international undertaking, as the places of standard stars had been taken from the *Nautical Almanac*, while the stars below the ninth magnitude observed by Lalande and Bessel had not been re-observed. The catalogue was therefore not accepted by the Council of the Gesellschaft as a part of their undertaking, and the zone $-2°$ to $0°$ was some years later assigned to the Nicolajew Observatory; but as the Nicolajew Catalogue ($-2°$ to $+1°$) did not appear till the year 1900, the Göttingen Catalogue was for thirty years the chief modern authority for the



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zone in question, while its earlier epoch and its accuracy make it permanently valuable in cases of proper motion.

Before the actual publication of the star catalogue Copeland had already entered on a different line of scientific work. Early in 1869 it was decided to send out a German Arctic expedition under Captain Koldewey, the aim of which should be to explore the east coast of Greenland as far north as possible. It occurred to Koldewey that it would be of great interest to measure an arc of meridian so near the Pole. Börgen, whom he consulted as to the feasibility of the idea, pointed out that it would be impossible to attempt to reach results of permanent value, since the expedition could not be devoted to this work alone, but that it would be most useful to make a detailed geodetic reconnaissance, on which at some future time a regular measurement of an arc could be based. Should this be made part of the work of the expedition he would be disposed to join it, but in that case Copeland ought also to join, since one astronomer could not possibly carry out the work alone. On hearing this the same evening, Copeland at once was fired with enthusiasm at the prospect of taking part in a scientific investigation of a novel kind, and spent half the night talking about the methods to be followed and the instruments to be used.* The preparations for the expedition were rapidly pushed on, while the two friends at the same time put the finishing touch to their studies by taking out the degree of Doctor of Philosophy, Copeland's dissertation being on the orbital motion of *α Centauri* (*Über die Bahnbewegung von α Centauri*, Göttingen, 1869, 24 pp. 8°).

The expedition started from Bremerhafen on the 15th of June 1869. It consisted of the *Germania* (on board which Copeland was) and a small sailing vessel, the *Hansa*. The latter was to have returned the same autumn after unloading stores, but it became unfortunately separated from its companion off the east coast of Greenland and was crushed in the ice, though the crew, after drifting on an ice floe for seven months, succeeded in reaching one of the Danish settlements on the west coast. The *Germania* safely reached the east coast, and wintered in latitude 74° 32′. Copeland showed himself as a most useful member of the expedition owing to his training as a mechanical engineer, as well as by his skill in the use of the rifle, whereby he contributed greatly to keeping the larder supplied with fresh meat. During the winter he and Dr. Börgen made regular meteorological and magnetic observations, and in February 1870 the work was commenced of selecting the nearest stations and erecting cairns on them for the geodetic work. In the course of the next two months stations slightly more distant were visited by Copeland without the help of his friend, who had been badly wounded by a bear in the beginning of March, whereby much precious time

* The writer is indebted to Professor Börgen for these particulars, which he wishes to be put on record here, as it was stated in an obituary notice after Copeland's death that he joined the expedition from love of adventure.

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was lost. It was, therefore, not till the beginning of May that a base, 709 metres in length, was measured close to the ship, after which the two observers started northward in a sledge. But the season was by that time too far advanced, the snow was too soft, and a rapid thaw set in early in June, rendering sledge travelling impossible. Instead of continuing operations as far as 75° 45′, as intended, it became necessary to stop at 75° 11′·5. The observations were made with an altazimuth with 5-inch circles, the latitude of the two end stations being determined by altitudes of the Sun. A good deal of valuable experience had been gained as to the best hours for taking observations and the most suitable localities for stations, which ought to be of great use for future geodetic observers in high latitudes. The results were published in the second volume of the work *Die Zweite Deutsche Nordpolarfahrt* (Leipzig, 1874).*

Soon after his return from Greenland Copeland was appointed Assistant Astronomer at Lord Rosse's Observatory at Birr Castle, and entered on his duties there in January 1871. In the following December he married Theodora, daughter of the distinguished orientalist Professor Benfey, of Göttingen. This marriage brought him three daughters and a son. At Birr Castle Copeland was for the first two years chiefly occupied with the observations on the Moon's radiant heat embodied in Lord Rosse's paper on this subject in the *Philosophical Transactions*, 1873. In 1874 he was appointed Assistant in the Dublin University Observatory at Dunsink, but was granted leave of absence to accompany Lord Lindsay to Mauritius to observe the transit of *Venus*. On the outward voyage, in the yacht *Venus*, a call was made at the small uninhabited island of Trinidad, in the South Atlantic, where Copeland was fortunate enough to discover a great tree-fern (*Cyathea Copelandi*), groves of which are found only in the loftier and nearly inaccessible parts of the island. The observations of the transit were only partly successful, owing to cloudy weather. On the eventful day Copeland observed with a 6-inch equatorial and double-image micrometer.

This expedition was the beginning of his connection with the observatory of Lord Lindsay (now Lord Crawford) which lasted for the remainder of his life. He stayed only a little over a year at Dunsink (where he observed red stars with the transit circle), and took charge of the Dun Echt observatory in the summer of 1876 in succession to Mr. Gill. He was singularly well suited to the post, as his great mechanical skill was particularly useful in an observatory where an unusually great number of astronomical and physical instruments had been collected, while his thorough knowledge of scientific literature and fondness of rare books made him a valuable help to Lord Crawford in forming a great astronomical library. The Mauritius expedition had left a troublesome legacy in the shape of an immense amount of

* A short account of the geodetic work (with a map) is given by Dr. Börgen in the *Vierteljahrsschrift d. a. G.*, vol. vi. p. 280.



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unreduced observations connected with the latitude and longitude work, which gave Copeland a great deal to do during the first five or six years at Dun Echt. The results were brought out in 1885 in a quarto volume of more than 500 pages, the third volume of the *Dun Echt Observatory Publications*. An interesting result of this work was the discovery of a considerable deflection of the plumb line in the island of Mauritius, the sum of the observed deviations at the Government Observatory and the German station being no less than 56″·6, a natural consequence of the island being but the exposed summit of a mountain some 15,000 feet high, standing on the floor of the ocean, while the observations were made some 3,000 feet below the highest points.

Among the instruments at Dun Echt Copeland specially devoted himself to the 15-inch refractor, with which he regularly observed every comet which became visible, while he for some years also computed elements and ephemerides of them. Most of these computations were published in the *Dun Echt Circulars*, by means of which Lord Crawford for ten years distributed news of discoveries of comets, &c. In January 1881 Copeland became joint editor of "*Copernicus*, an international Journal of Astronomy" (3 vols. 1881–84), which, though printed in Dublin, was the organ of the Dun Echt Observatory. As Copeland was always somewhat inclined to postpone the final completion and publication of his scientific work, it was fortunate that this journal for some years supplied a much-needed stimulus, and some of his best work is accordingly to be found in *Copernicus*. The end of the year in which he settled at Dun Echt witnessed the outburst of Schmidt's Nova *Cygni*, the remarkable spectrum of which was regularly observed by Copeland in January and February 1877, and on the 2nd of September he made the then totally unexpected discovery that the spectrum had become reduced to a single bright line—a discovery which forms an epoch in the history of our knowledge of temporary stars. The spectroscope was also turned on every comet visible at Dun Echt, and a specially rich harvest of results was furnished by the two great comets of 1881, Wells' Comet 1882 I, and the Great Comet of 1882. In the spectrum of Wells' comet Copeland and his assistant, Mr. Lohse, noticed on the 27th of May the presence of the yellow sodium line, both components of which were beautifully seen some days later, while the widely opened slit allowed the image of the comet to be clearly seen in the light of the D lines. Even these interesting observations were surpassed by those made on the 18th of September 1882, in full daylight, of the great comet close to the Sun. Not only were the bright D lines seen again, but also a whole row of bright lines, the best defined of which were afterwards identified with prominent iron lines, while the numerous dark Fraunhofer lines of the daylight spectrum supplied a background which showed that the comet lines were displaced towards the red end of the

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spectrum, indicating that the comet was receding from the earth. All these important observations are published in vol. ii. of *Copernicus*.

In October 1882 Copeland started for Jamaica, where he successfully observed the transit of *Venus*. During his stay in the island it occurred to him that it would be of interest to test the suitability of the slopes of the Andes for astronomical observation, and, as Lord Crawford liberally met the necessary outlay for this digression, Copeland made his way across the Isthmus of Panama towards the end of December. As the expedition had not been thought of before leaving home, his outfit was rather scanty, consisting of some meteorological instruments, a small Vogel spectroscope, and a six-inch refractor by Simms, the fine equatoreal mounting of which had to be left behind as far too heavy for mule transport. In its place a light mounting was despatched from Dun Echt, together with a Browning automatic spectroscope, but they were delayed on the way, owing to the war between Chile and Peru, and did not reach him till the 2nd of June 1883, and then only in a damaged condition. He had first intended to go to Quito, but on reaching Gauyaquil this was found to be impossible, owing to revolution, so he had to go on to Peru. Landing at Mollendo on the 2nd of February, he proceeded to Arequipa by the interesting railway and utilised an enforced delay of a week in that town to get a 6-inch lathe transformed into a very fair equatorial mounting. The rainy season was now in full swing, and when he reached Vincocaya (14,360 feet above the sea) nothing could be done there, for which reason he went on to La Paz, in Bolivia, across the Lake of Titicaca, to gain experience of the means of transport and the state of the sky in that country. He established himself at Puno, on Lake Titicaca (12,500 feet), from the 17th of March to the 2nd of June, after which he again observed at Vincocaya till the 27th of June before embarking for Panama. With the Vogel spectroscope he found a number of stars with bright line spectra and several star-like planetary nebulæ, and would doubtless have accomplished much more in this direction if his instrumental equipment had been better. Though the direct results of his observations were not numerous the expedition had shown the great possibilities of a thoroughly equipped astronomical expedition or a permanent observatory in the regions visited by him; and in after years, when Harvard College Observatory had established a branch at Arequipa, it was a great satisfaction to Copeland to feel that he had been the pioneer of Peruvian astronomy, although he had rather advocated the choice of some place between La Paz and Lake Titicaca. His "Account of some Recent Astronomical Experiments at High Elevations in the Andes" appeared in vol. iii. of *Copernicus*, which volume also contains a short account of his visit to various American observatories in August 1883 on his way home.*

* Two lengthy "Reisebriefe aus Südamerika," dated February 1883, are

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After his return home in September 1883 Copeland found enough to do in preparing his results for publication and seeing the Mauritius volume through the press. He next resumed his spectroscopic work whenever a special opportunity offered itself, as on the appearance of the new star in the nebula of *Andromeda* and on the discovery of Mr. Gore's variable star in *Orion* (*Monthly Notices*, vols. xlvi. and xlvii.). In 1886 the observatory was enriched by a magnificent star-spectroscope made by Messrs. Cooke & Sons. Almost the first time this instrument was directed to the nebula in *Orion* it revealed the presence of the $D_3$ line in its spectrum, and soon afterwards of a very faint line at W. L. 447·6 (*Monthly Notices*, vol. xlviii. p. 360). Encouraged by this unexpected discovery Copeland commenced a regular spectroscopic survey of the brighter nebulæ, and (judging from private letters written at that time) these observations made with a very powerful instrument would, if persevered in, have produced very valuable results, but his removal from Dun Echt unfortunately caused them to be interrupted, and they were never resumed. In 1887 an observing station was established on the top of the Barmekin Hill, close to Dun Echt, for the purpose of studying the low Sun spectrum by the aid of a Rowland grating and an ingenious and rapid recording apparatus; but his journey to Russia in the summer of that year to observe the total eclipse of the Sun (of which he saw nothing, owing to clouds) prevented Copeland from sharing in this interesting work, which Dr. Becker carried out most successfully. During that year and the following one every spare moment was devoted to the revision and passing through the press of the *Catalogue of the Crawford Library*. It had always given Copeland great pleasure to acquire rare and valuable books and memoirs for this great collection, particularly in the department of comets, and almost to the last year of his life he lost no reasonable opportunity of adding to it. The catalogue, which was published in 1890, is one of the most valuable guides to astronomical literature (particularly previous to 1700) and is simply indispensable to the collector.

The years which Copeland was destined to spend at Dun Echt had now come to an end. They were undoubtedly the happiest years of his life. Surrounded by his family and free from all distraction by extraneous duties or routine work, he was able to make full use of the splendid opportunities for original work afforded by the instruments and library under his charge. No wonder that he was very attached to the place and was glad to return to it several times to spend his summer holidays in his old house and to meet again many friends he had made in the neighbourhood.

In August 1888 Professor Piazzi Smyth resigned the offices of Astronomer Royal for Scotland and Professor of Astronomy in

published in the *Deutsche Geographische Blätter* (vol. vi. Bremen, 1883); they give a most vivid description of his journey from Mollendo to La Paz and of a trip to the Island of Coati in Lake Titicaca.

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the University of Edinburgh. For some years previously the question of reorganising the Edinburgh Observatory had been under consideration, and it had even been proposed to hand it over to the University. But this was prevented by the noble liberality of Lord Crawford, who offered the Government to present the whole of the instrumental equipment of his own observatory, together with his astronomical library, to the nation, on the sole condition that the thus enriched Edinburgh Observatory should be maintained as a Royal Observatory. The offer was accepted and Copeland was appointed to the vacant offices on the 29th of January 1889, and removed to Edinburgh in the following April. The first subject to engage his attention was naturally the selection of a site for the new observatory, and after a careful examination of the neighbourhood of Edinburgh he finally chose Blackford Hill, as being south of and quite clear of the smoke of the city, and yet not at too great a distance from the University where he had to lecture. From the beginning he was deeply interested in his professorial duties, and though it was at first uphill work to attract students to the astronomical lectures (which his predecessor had managed to evade for many years) he gradually succeeded in forming an astronomical class, the members of which gave evidence at the annual examination of having benefited well by the lectures as well as by the practical demonstrations in the observatory.

In 1891 Copeland read a paper before the British Association, at its Cardiff meeting, "On the Probable Nature of the Bright Streaks on the Moon" (*Report*, 1891, p. 576). He pointed out that the streaks are only visible when the light falls more or less closely in the line of sight, while they come into view quite regardless of the inclination of the surfaces on which they occur. He concluded that each elementary portion of the streak surface is of a form which is symmetrical to the spectator from whatever point it is seen, a condition which the sphere alone seems to fulfil; and he therefore suggested that the streaks are produced by a material pitted with minute cavities of spherical figure, or strewn over with minute, more or less transparent, solid spheres. To test this hypothesis a plaster model of the Moon was made, on which the bright streaks were represented by lines of minute spherules of transparent glass attached to the surface, which were found to possess the desired property of remaining inconspicuous under cross light, while they flashed out brilliantly when lit up from the front. When suitably illuminated the phases of the model were seen, on photometric examination, to follow a law not very unlike that of the lunar phases found by Zöllner. The short note on this subject does not seem to have attracted much attention; it was to have been followed by a more detailed memoir, which, through press of other work, was never written.

While the new Observatory was being planned and erected Copeland had, of course, only the resources of the old Observatory

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on the Calton Hill at his disposal; and he was therefore, to his regret, only able to a limited extent to observe the new star of 1892 in *Auriga* on its first appearance (*Trans. R. S. Edinb.* vol. xxxvii. p. 51), though he had the pleasure, on its reappearance in the autumn, of studying its spectrum at Dun Echt, where the 15-inch refractor had not yet been dismounted. But he took the opportunity offered by this transition period to make arrangements for a new reduction of Henderson's meridian observations, in connexion with which he paid a visit to Berlin in 1893 to consult Professor Auwers on various points. The work turned out to be much more considerable than anticipated; from 1896 it has been carried on by Dr. Halm, and at Copeland's death the printing of the resulting star catalogue for 1840 had not yet been completed. His holidays, whether spent at Dun Echt or elsewhere, often merely meant a change of work, as when he, in the summer of 1894, travelled about the west of Scotland and the north and east of Ireland in order to interview people who had seen a brilliant meteor which, on the 18th of May, at 8 P.M. (in broad daylight), had passed from N.W. to S.E. He succeeded in computing a path agreeing well with the necessarily very rough observations, but his usual wish to postpone the publication of a paper till after repeated applications of the file prevented in this, as in other instances, the publication of his results.

In the meantime the new and stately Royal Observatory on Blackford Hill was approaching completion, the instruments at Dun Echt were dismounted, packed, and forwarded to their new destination, and in May 1895 Copeland took possession of his new home. The unpacking and mounting of the instruments occupied most of that year, so that it was not till April 1896 that the Observatory could be formally opened by the Secretary for Scotland, Lord Balfour of Burleigh, in the presence of Lord Crawford, who gave an interesting account of the origin of the new institution. It might now have been expected that Copeland would have resumed the vigorous activity which he had displayed at Dun Echt, but at that very time it began to be evident that his energy and capacity for work had sensibly declined, and there can be no doubt that the heart disease to which he eventually succumbed had already then commenced to undermine his strength. He never again engaged in any lengthy investigation; still his enthusiasm and love of science induced him to undertake three expeditions to observe total eclipses of the Sun. In 1896 he went to Vadsö, in Finmark, and was (as in 1887) much disappointed at seeing nothing of the eclipse, for which he had made elaborate preparations, bringing with him a 40-foot telescope, with 4-inch Dallmeyer lens, mounted on trestles so as to point exactly to the Sun at mid-totality. He had, however, what to him, as an old Arctic traveller, was the great pleasure of being among the first to greet Nansen on his arrival at Vardö, in the *Windward*.

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Undaunted at this second failure, he accepted the invitation of the Joint Permanent Eclipse Committee to take part in the observations of the eclipse of the 22nd of January 1898 in India. He took his 40-foot telescope with him, this time arranged as a horizontal telescope, in which the image was received on 18-inch plates moved by clockwork, while a direct-vision prism, mounted on a slide in front of the object-glass, could be drawn into position by an attendant, transforming the telescope into a prismatic camera. To increase the chances of success he on this occasion selected a station at some distance from other observers, and established himself at Ghoglee, in the Central Provinces, where he was favoured by a cloudless sky. He was equally successful two years later, when he went to Santa Pola, on the south-east coast of Spain, and observed the eclipse of the 28th of May 1900. Of both these expeditions preliminary reports only appeared in the *Proceedings of the Royal Society*, reprinted in the Appendices to the *Monthly Notices*, vols. lviii. and lx.

The first astronomical event of the new century, the appearance of Nova *Persei*, was duly announced in No. 54 of the *Edinburgh Circulars*, which Copeland issued in continuation of the *Dun Echt Circulars*, and that number turned out to be the last one he was to send out, while the spectroscopic examination of the star which he made during the earlier stages of its development was the last astronomical work he was to take part in. In the summer of 1901 he had a severe attack of influenza, from which it may be said that he never recovered. To try to shake off the effects of the illness he went to Wiesbaden in May 1902, but after hurrying to catch a train on the German frontier he was seized with an attack of angina pectoris, which unhappily was but the first of very many similar attacks during the next three years. He had reluctantly to give up his lectures, but he could not give up the hope of still being able to occupy himself with scientific subjects, and, as he was unable to mount the stairs to his beloved "optical room," he made, early in 1904, arrangements for darkening one of the rooms on the ground floor of the Observatory, in order to resume some of the optical experiments of which he had always been so fond. But he was never able to attempt this work. In the spring of 1904 he proposed to retire, but, as the pension offered him was exceedingly small, he was compelled to give up the idea; indeed, for some months in the summer and autumn of that year he was so ill that his death did not seem far distant. Once more his health seemed to improve; after a visit to the seaside in the beginning of 1905 the dreaded attacks ceased in the month of April, and he was tolerably well, though rather weak during the summer. But in the autumn the ordinary symptoms of heart failure appeared, together with other complications, and he passed away peacefully on the morning of the 27th of October, after having been confined to his bed for a little over a fortnight.

Copeland was a man of highly cultured mind, who made

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good use of the many opportunities of acquiring knowledge which he enjoyed throughout his life. Even during the last few years he tried to forget his sufferings by taking up the study of Persian, and was delighted to be able to read Omar Khayyam in the original language. His character was open, sincere, and generous, he was always anxious to befriend and help anybody whenever he could, and he never shirked any trouble or work to answer inquiries even from people who had no claim on his time. He will be remembered with warm affection by all who had more than a passing acquaintance with him.

He was elected a Fellow of this Society on the 9th of January 1874.

[The Council are indebted to Dr. J. L. E. Dreyer for the above obituary.]

JOHN DANSKEN was born at Glasgow in 1836, and educated at the Athenæum and Glasgow University. His profession, in which he became well known, was that of a surveyor; in later life he took a considerable share in public affairs, and was placed on the Commission of the Peace for Lanarkshire. He was an enthusiastic amateur astronomer, and built for himself an excellent private observatory containing a 13-inch reflector, several refractors, and a transit instrument. He also formed a valuable collection of astronomical books.

He was elected a Fellow of the Society in 1892, and died suddenly on the 1st of November 1905.

ADAM STOREY FARRAR was born in London in 1826, and educated at Oxford, taking his degree in 1850. At Oxford he won the Arnold prize for history in 1851 and Denyer's theological prize, and was elected to a Fellowship at Queen's College, which he held from 1852 to 1863, holding also a Tutorship at Wadham College for some years. In 1862 he was Bampton Lecturer. In 1863 he married, and shortly afterwards accepted the Professorship of Divinity and Ecclesiastical History in the University of Durham, which he held for forty years. He became a Canon Residentiary of Durham in 1878, and in 1902 was elected to an honorary Fellowship at his old Oxford college.

Astronomy formed but one of many interests which he kept up with undiminishing zeal until his death. It is doubtful if he ever used a telescope, but he was very keen for any observation that could be made with the naked eye. He was moreover an enterprising and critical reader of astronomical works, new and old, and delighted to beguile his leisure by posing his friends with many a crooked question.

He was elected a Fellow of the Society in 1858, and died on the 11th of June 1905.

EDMUND BECKETT, first Baron GRIMTHORPE and fifth Baronet, was born at Carlton Hall, near Newark, on the 12th of May 1816. He was the eldest son of Mr. Edmund Beckett, M.P. for

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