

# THE OBSERVATORY,

## A MONTHLY REVIEW OF ASTRONOMY.

VOL. XXXVI.

NOVEMBER, 1913.

No. 467.

### *The Rev. William Rutter Dawes.*

THE Rev. W. R. Dawes, whose letters to Mr. George Knott were published in *The Observatory*, vol. xxx. 1910, may be described as probably the best astronomical observer in England in his day. Born in 1799, March, he seems to have inherited a love for Astronomy from his father, who was mathematical master at Christ's Hospital and afterwards Governor of Sierra Leone.

The subject of our notice began his observing career at an early age, his first telescope being a 1·6 in. refractor. In later years this was superseded by a  $3\frac{3}{4}$  in. Dollond, and in 1846 Mr. Dawes acquired a  $6\frac{1}{2}$  in. Merz refractor, in 1854 a  $7\frac{1}{2}$  in. Alvan Clark, and in 1859 a  $8\frac{1}{4}$  in. Alvan Clark.

In the summer of 1839 he undertook the charge of Mr. George Bishop's Observatory at Regent's Park, and conducted work here for  $4\frac{1}{2}$  years with the 7 in. refractor.

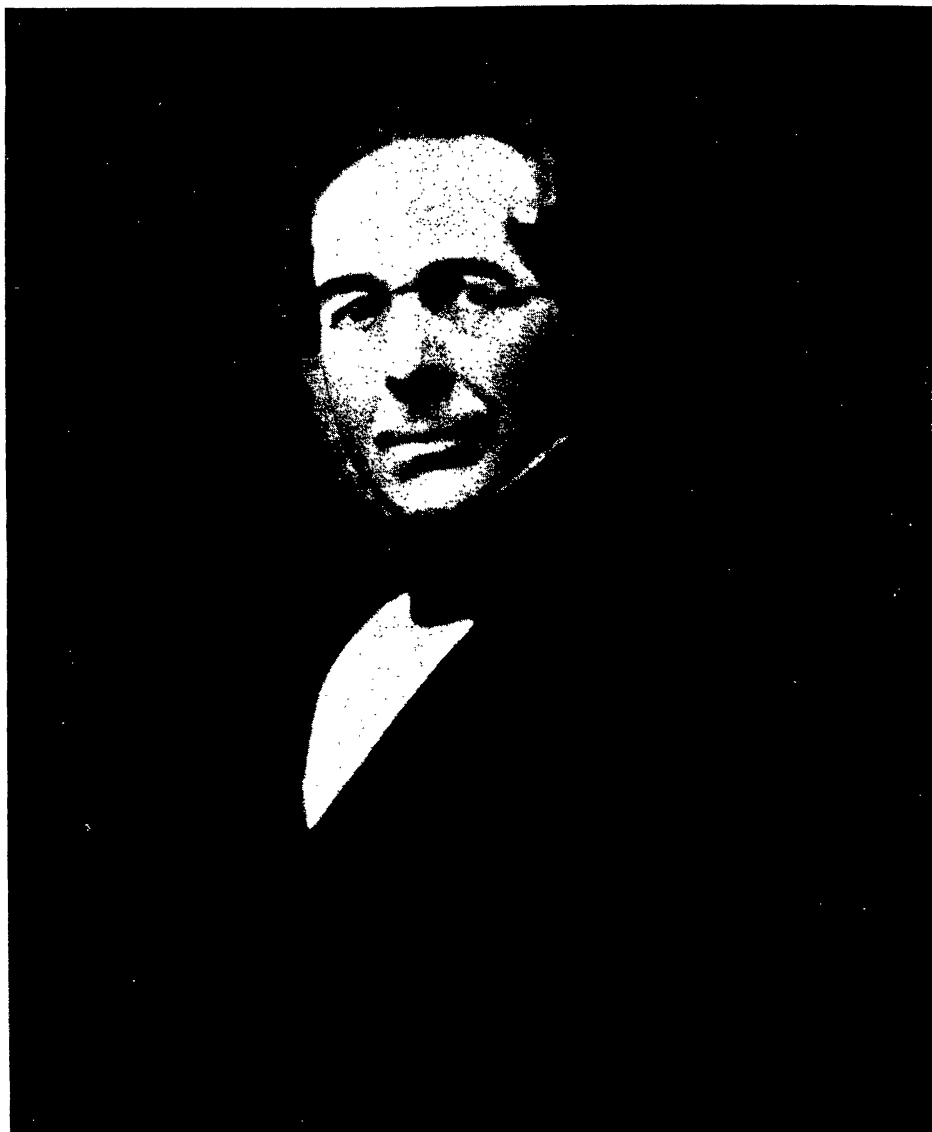
Though designed for the clerical profession, he found difficulties in accepting some of the tenets of the Church of England and directed himself to the study of Medicine, afterwards taking his degree and practising at Haddenham, Berks. His religious tendencies, however, prompted him again to engage himself in Christian work in later years.

Mr. Dawes's vision was very keen in telescopic work, his judgment sound, and he invariably showed a scrupulous regard for accuracy. His planetary observations were much esteemed and his drawings of detail on Mars, Jupiter, and Saturn, published in the *Monthly Notices*, were considered the best made up to that period.

His principal work, however, consisted in the micrometric measurement of double stars, and he obtained a valuable and extensive series of results between 1831 and 1844, though his instrumental means were small. He continued this work in succeeding years with more powerful means, and the 'Memoirs of

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THE REV. WILLIAM RUTTER DAWES.

the R.A.S.' vols. viii., xix., and xxxv., containing catalogues of his measures, afford ample testimony of his zeal.

On the night of 1848, Sept. 19, when Mr. W. Lassell discovered, simultaneously with Prof. Bond in America, the eighth satellite of Saturn (Hyperion), Mr. Dawes was visiting him at his observatory, "Starfield," near Liverpool. Mr. Dawes therefore shared in this important discovery, and is so credited by Sir John Herschel in the last edition of his 'Outlines'; but it appears that Mr. Lassell first called attention to the minute point of light representing the satellite, and so Mr. Dawes could only claim to have been the first to corroborate the discovery.

In November 1850, he independently discovered the dusky interior ring of Saturn, sharing the honour with Prof. G. P. Bond. Among his original observations may be mentioned the detection in 1851 of the dark nucleus often apparent in the umbra of a sun-spot. He also constructed an eye-piece (1852) of elaborate design, which, while it diminishes the danger associated with solar observation, greatly facilitates the study of details in the photosphere.

There were few objects which could elude the piercing scrutiny of Mr. Dawes. Mr. Proctor, in his 'Saturn and its System,' p. 73, very justly remarked that "Mr. Dawes's extraordinary vision supplements the powers of his telescope." Among the more difficult or unusual feats he accomplished may be mentioned:—

1849, February.—Markings on Jupiter's Satellites III. and IV.

1857, January 11 and 14.—A white spot on Saturn in S. lat.  $40^{\circ}$ – $45^{\circ}$ .

1857, December 4 and 11.—The Satellite of Neptune.

1860, March 21.—Saturn's inner Satellite Mimas.

1857, December.—Remarkable white spots in S. hemisphere of Jupiter.

1857, November 27.—The great Ellipse on Jupiter.

1864, March 24–25.—The companion of Sirius.

The drawing he made on 1857, Nov. 27, of the ellipse on Jupiter (*Monthly Notices*, vol. xviii. p. 50) probably represents the first recorded view of this curious object during its modern presentation. Schwabe had seen and figured the hollow in the S. equatorial belt in 1831 and subsequent years; but it seems to me that Mr. Dawes was the first to distinguish the spot which has now been certainly visible, though undergoing many changes of aspect, during 56 years.

In 1863 and 1864 the solar photosphere attracted great attention chiefly from Nasmyth's alleged discovery of a "willow-leaf" structure. Mr. Dawes, in spite of his affliction, engaged in a searching scrutiny of the solar envelope with a view to ascertain its real aspect in detail, but in the result he differed from those who affirmed either the "willow-leaf" or "rice-grain" analogy of

the filaments causing the mottled aspect of the surface which is so familiar to all observers.

The "eagle-eyed Dawes" is an expression which has been frequently applied to the subject of our notice. This simile related, of course, to his telescopic vision. The eagle, and apparently the whole of the falconine family, are marvellously long-sighted and can single out their quarry when hovering at marvellously long distances, but Mr. Dawes was very short-sighted. There was something about his eyes which struck one as being very unusual—a bright and impressive intellectual glow or "luminosity," as one of his relatives described it. As suggestive of its power the following anecdote may be mentioned:—He was visiting at a house where a dog was kept which was always ferocious when chained up, and Mr. Dawes was warned to keep at a safe distance from the animal. However, he walked straight up to it, looked into its eyes, kept his gaze fixed on them, and drove the dog step by step back into its kennel, quite cowed. He then took hold of its collar and dragged it out, patted it, and made friends with it.

The Rev. Arnold D. Taylor\*, of Padstow, who is a great nephew of Mr. Dawes, says of him: "He was a charming man of very wide sympathies and full of interests in all sorts of causes—philanthropic and scientific. He was a great lover of dogs and horses, and had a marvellous fund of anecdotes illustrating the sagacity of those animals. He also, I have always understood, edited and, in part, wrote 'Scott's Commentary on the Bible,' which was a standard work among the Evangelicals of his day. He was the delight of us young people when he visited us in Berkshire. His work was done in the face of much ill-health and suffering."

Mr. Dawes was twice married, first to Mrs. Scott, the widow of his former tutor and friend. In 1842 (his former wife having died at Ormskirk several years before) he married the widow of Mr. John Welsby, a solicitor of that town. She died in 1860. Mr. Dawes left no family.

He was a great friend of Sir John Herschel, and the latter dedicated to him the Fifth Edition of his 'Outlines' (1858) in these words: "In availing myself of your permission to dedicate to you an edition of these 'Outlines,' enriched by accounts of several of your own recent discoveries, I should ill acquit myself to my own feelings if I did not add to the expression of that grateful sense of your many important services to our common science, which every astronomer must acknowledge, that of affectionate esteem and regard, the natural result of a prolonged and friendly intercourse."

Sir John frequently visited him at Cranbrook in Kent, where

\* I am much indebted to Mr. Taylor for some of the information contained in this paper.

he took up his residence in 1844, for the Herschels were then living at Hawkhurst, which is only a few miles south of Cranbrook. There also often went Sir John's sons ; and Sir W. J. Herschel, eldest son, recalling these visits says, in a letter written on July 15 last, that in Mr. Dawes's exquisite observatory he received much useful instruction and was led to acquire a high regard for astronomical instruments. He adds that "Mr. Dawes's manner of handling them, his unconcealed feelings of the debt we owed for the possession of such splendid means of studying the heavens, made me look upon that white dome as a very temple in charge of a priest, and not as a mere sentry-box. It completely reconciled me to the devotion of his later life and imparted a glory to it, which I have never failed to remember in connection with him. He and his charming wife always made us feel truly at home. Sir John, I know, had nothing less than reverence for him, as, in some way, unmatched in their common life. Mr. Dawes's countenance was a rare one, and I retain the most vivid image of its kindness and of its power in intellectual expression, to say nothing of its great beauty."

He was very fond of chess-playing and engaged in a number of correspondence games, each lasting many weeks, with a relative. His determination and perseverance were shown by his continuing his observations in spite of harassing headaches, from which he habitually suffered. At times, after hours of patient work, he would fall asleep from exhaustion, and found the clock-driven telescope some distance from his eye when he awoke.

Mr. Dawes had the conviction of the truth of recognition in the next life, and of the possibility of departing souls being able to carry messages with them when they died to those who had gone before.

He suffered from deafness, and, notwithstanding his wonderful observations, was so short-sighted that he would pass his own wife in the street without recognizing her.

Among the incidents Mr. Dawes used to relate concerning his dog, the following may be repeated :—

A fine retriever regularly accompanied him when he went to his observatory at some distance from the house, and used to carry the observatory key in his mouth. On his return home he would deliver the key to the housemaid. One night when Mr. Dawes was on his way home, a man came up and asked him if he would go and see a person to whom a serious accident had just happened. He agreed and, not wishing to carry the key with him, told the dog to take it home. Off the dog went obediently. Next day Mr. Dawes went to take the key from its usual place, but it was not there, and on enquiry he found the dog had arrived without it. This was awkward ; but, taking a bunch of keys from his pocket, he called the dog, held them up, and said "Key, Dash, Key !" The dog hesitated a moment, then ran off at full speed down the

garden, dug up the key which he had buried under a cabbage, and brought it back in triumph!

Mr. Dawes was a man of diverse capacities and possessed many excellent qualities. Whether he was observing the Sun, Moon, planets, or double stars, there was the touch of a master-hand about his work. He watched the total eclipse of the Sun in 1851, the Leonid meteoric showers of 1832 and 1866, and many other phenomena, which he described with an accuracy and attractiveness peculiarly his own. But for grievous attacks of illness his work would have been more extensive, and that which he performed would certainly have been done with more pleasure. Pain and weakness could not, however, overcome his dauntless spirit, so that, whenever not seriously ailing, he was to be found by the side of his beloved telescope taking measures of double stars or surveying the planets. The gold medal of the R.A.S. was awarded him in 1855 for his excellent all-round observational work. He died in 1868, February 15, and left a name revered in astronomical history like that of Herschel, Schroter, Olbers, Struve, Lassell, Bond, Hind, and other great observers of the past.

W. F. DENNING.

### *Double Star Astronomy.*

#### ON THE MAGNIFYING POWERS USED BY DOUBLE STAR OBSERVERS.

AN astronomical telescope consists essentially of an object-glass whose function it is to collect the light from an object and refract the rays in such a manner as to form an image of the object in the focal plane: and of an eyepiece or small microscope, by which the eye is enabled to view the focal image, and which suitably magnifies this image. Both parts have a share in producing the final magnification or "power," which is estimated by the value of the ratio

$$\frac{\text{Focal length of object-glass}}{\text{Focal length of eyepiece}}$$

Since for any astronomical telescope the focal length of the object-glass is practically a constant, the consideration of the magnifying power really depends solely upon the eyepiece. The magnification produced by the latter is, in theory, only limited by the skill of the optician in producing an eyepiece of extremely short focus; in practice, however, very short focus eyepieces are not convenient for observation, because they are uncomfortable for the eye, and they exaggerate the defects of the clock drive.