1922Obs....45...77.

Sir William Henry Mahoney Christie, K.C.B., F.R.S.

(See Plate, facing p. 65.)

On Friday, January 13, Christie was in his regular place at the dinner of the R. A. S. Club, of which he was the oldest member, and which he had attended with unfailing regularity since his election in 1871 (while Sir John Herschel, one of the founders of the Club in 1820, was still alive). He said that he was going to Morocco, partly for reasons of health and partly (though this was only half serious) to escape correspondence with boating men on his suggested design for a racing-eight. He embarked on this journey a few days later, but on Tuesday, January 24, the *Times* contained the announcement of his death. Apparently gastric trouble developed very rapidly, and he died on Sunday, January 22, and was buried at sea.

Christie was Chief Assistant to Sir George Airy from 1870 to 1881, the closing years of a great career, during which it was only natural to regard the foundations of the Greenwich work as well and truly laid, and the whole duty of the staff as that of building steadily upon them without deviating into extensions.

We may quote a few paragraphs from Airy's Report to the Board of Visitors in May 1870:—

> Adverting to the selection of the classes of observation, the care for the preparation of fitting instruments, the personal organization necessary for the advantageous use of them, the orderly labour of observing, reducing, and publishing the observations, I express my opinion, and I almost reckon on that of the Visitors, that the Royal Observatory has maintained its place well as an Observing Establishment.
>
> There can be no doubt, I imagine, that these are the first and necessary duties of the Observatory; and that these must be secured, at whatever sacrifice, if necessary, of other pursuits.
>
> Still the question has not unfrequently presented itself to me, whether the duties to which I allude have not, by force of circumstances, become too exclusive; and whether the cause of Science might not gain if, as in the Imperial Observatory of Paris, for instance, the higher branches of mathematical physics should take their place by the side of observatory-routine.
>
> I have often felt the desire practically to refresh my acquaintance with what were once favourite subjects—Lunar Theory and Physical Optics. But I do not at present clearly see how I can enter upon them with that degree of freedom of thought which is necessary for success in abstruse investigations.

We thus see the situation just before Christie came. Airy had thought of possible developments, but only doubtfully and hesitatingly. Moreover, they ran in the direction of mathematical investigations by himself. Let us now compare a few sentences from the next Report but one (1872), when Christie's influence had had time to work. There is no mention of any such influence or advice: it was not Airy's way to make such acknowledgments; but when we compare the two statements, made before and after Christie's advent, we can draw our own inferences:—

> The criteria which, as it appears to me, may be properly adopted in the selection or rejection of subjects of observation, are these. Observations which

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1922Obs....45...77.

can be made at any convenient times, which do not require telescopes of the largest size, and which do not imply constant expense, ought to be left to private observers. Observations which demand larger telescopes, and especially observations which must be carried on in continual routine and with considerable expense, can only be maintained at a public observatory. The claims of each subject must be separately considered; but there can be no doubt that a very powerful demand for attention is made, when private persons have been induced to continue observations for a long time at considerable current expense, and when plausible evidence is given of the connexion of results thus obtained with other cosmical elements.

I think that these considerations exclude measures of double stars at the Royal Observatory, but they leave an opening for the scrutiny of nebulæ, planets, &c, and possibly (but I speak in doubt) of solar spectroscopy. But I have no doubt that they fully sanction the undertaking a continued series of observations of solar spots . . . . . .

Accordingly the introduction of double-star observation into the Greenwich work had to wait for many years: Airy himself did work at his Numerical Lunar Theory; but we may give Christie credit for the introduction of the spectroscope and the Kew photo-heliograph almost immediately on his appointment as Chief Assistant—a very considerable achievement for a young man in such a place and at such a time. For it may not unfairly be said that there were signs of stagnation in Astronomy. The Lick Observatory and its noble successors were as yet neither born nor thought of: the spectroscope and the photographic plate were at work indeed, but only in the hands of a few enthusiasts and were doubtfully regarded by official astronomers: and (perhaps most important of all) mathematicians looked upon astronomy as a worked-out mine: the investigations of G. H. Darwin, when they came a few years later, were considered to belong to some other science.

The first Greenwich spectroscope was made by Browning; but a new design (the "half prism") was produced later by Christie himself. The soundness of its principles has since been questioned, but criticism of pioneers in the light of knowledge acquired later is fairly easy. In the simple but effective methods of measuring the positions and areas of sun-spots, Christie was more fortunate: they have stood the test of half-a-century remarkably well, and the Greenwich record has taken its place as the standard elementary summary of the Sun's surface, on which many valuable investigations have already been based.

When Airy retired in 1881 (at the age of 80) Christie was appointed to succeed him as Astronomer Royal, thus vacating his position as Chief Assistant, and he was faced with a decision, not only critical at the time but fraught with consequences which have not diminished in importance in the subsequent history of the Royal Observatory. The Staff would naturally have preferred the promotion of one of their own body into the vacant place; and they were encouraged to hope for this solution by the amiable but perhaps incautious temporary expedient adopted by Christie himself. He crowned the long and faithful observatory career of Mr. Edward Dunkin by promoting him to the office of Chief

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1922Obs....45...77.

Assistant for his last three years of service, seeing that this breathing space would give him time to look for the traditional young mathematician from Cambridge. At the moment he perhaps did not sufficiently recognize the danger of the precedent, which was naturally utilized by the Staff when the three years were over. But Christie stuck to his plan of appointing a Cambridge mathematician, and as the best means known to him of finding the man he wanted, he offered his services as examiner for the Sheepshanks Exhibition at Cambridge, which resulted in my being first elected Sheepshanks Exhibitioner and ultimately Chief Assistant at Greenwich in 1884.

Perhaps I may be forgiven for some anxiety to make clear that more than a personal issue was involved, deeply grateful though I am for my own share in the consequences.

It has already been remarked that about this time Astronomy and Mathematics had lost touch—and the names of Sheepshanks Exhibitioners provide a good illustration of this fact. The first ten names in the list are all of distinguished mathematicians (the third, for instance, being that of the late Lord Rayleigh, and the tenth Sir J. J. Thomson), but have not subsequently been associated with Astronomy. Then follow H. H. Turner, F. W. Dyson, G. T. Walker, P. H. Cowell, E. T. Whittaker, &c., &c. But for Christie these names, though they might have been the same, would probably, like their predecessors, have been associated with other departments of Science. He might have let the Chief Assistantship at Greenwich go as the Staff wished.

To show the possibility of some such course, let me recall the utterance of a great colleague of his, even much later. Writing in 1897 an earnest letter to a young man who sought his advice about an astronomical career, Sir David Gill expressed himself as follows:—

> There is no good school of astronomy in England. At Cambridge you can have the necessary outfit of mathematics, and no doubt at Oxford also—in fact, you have probably enough of mathematics to take up the rest for yourself.
>
> For practical work the Greenwich system (tell it not in Gath) has never made an astronomer. The chief assistants are selected as young men with a sound mathematical but no practical training. They enter into chief positions where they have to superintend men who know much more about practical work than they do, and they have to pick up what they can of a hard and fast hide-bound system—which they are taught to regard as unquestionably superior to all others.

In this statement there is undoubtedly much that is true enough; and we must not overlook the fact that it is further the statement of an advocate who was urging a particular course of action, as may be seen from the context ('David Gill,' by G. Forbes, p. 233). But it seems also clear that if Christie had held similar views, he would probably have yielded in 1884 or, if not then, perhaps later when the question of a second Chief Assistant came up for decision; and that (for instance) Eddington

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1922Obs....45...77.

might have been lost to Astronomy. We need not measure a man, but we very often remember him by the opportunities he seizes or misses. Of Airy, in spite of an immense amount of good work, it has never been forgotten that he lost Neptune for us. Dyson, in addition to much good work past and future, will surely be remembered as having risen to the great opportunity of the Einstein eclipse in 1919. (I venture to think that he must himself constantly remember it with huge satisfaction.) Christie deserves to be remembered—by mathematicians, at any rate—as having saved for them a vital link with astronomy, when he could have had an easier life by letting it go; and, in spite of obvious embarrassments, in spite of the fact that many excellent friends on the Greenwich staff must necessarily take a view quite different from my own, I have decided to draw the attention to this point of some younger men who perhaps only knew Christie in later life when his energies were not at their best.

If, however, for one reason or another, I overestimate the importance of this claim to recognition, there are fortunately others of considerable weight. The able writer in the *Times* puts foremost that to Christie "Greenwich owes its largest extensions in buildings and instruments"—and there is much justice in this view. He had, of course, good helpers in these works of construction and extension. Sir Howard Grubb, when put on his mettle, produced some excellent large instruments; and there was Mr. James Simms, at Charlton, always ready to employ his instrumental skill in the service of the Royal Observatory. When the want of a new Physical Observatory was vaguely felt, Christie was fortunate in finding in Sir Frank Crisp, at the Admiralty, a congenial enthusiast who produced a worthy design for it. And good luck came also in other ways, beginning with the present of the Lassell telescope in 1883, which, though it did not itself prove very serviceable, paved the way for other gifts and additions, such as the Thompson combined refractor and reflector, the latter being the work of the late Dr. Common. But such help and good luck would not have come without being largely deserved: nor could it have been utilized but for Christie's dogged perseverance in overcoming official doubts and difficulties. He could not perhaps be called brilliant in any direction; but he had a sturdy simplicity in thought which often made a good substitute for brilliance. His simple formula for connecting the magnitude of a star with the diameter of its photographic image has stood the test of time very well—yet it was original in a very real sense: most of us were working with logarithms when he put it forward. Especially may we notice the manner in which he would utilize the same notion in different connections. Almost his last thoughts were occupied, as mentioned in the opening sentences of this article, with the design for a racing-eight, based on the properties of the involute of a circle—the same geometrical notion which he applied thirty years earlier to design the dome for the 28-inch refractor at Greenwich.

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1922Obs....45...77.

In responding to the request of the Editors for this note, I have not considered it necessary or desirable to give a complete account of Christie's life and work—that will be fitly supplied elsewhere,—but rather to give a few personal impressions and recollections of him at a period which is almost foreign to our present thoughts and ideas.

The good ship Astronomy is now running so splendidly before a fair wind with every sail set that it is difficult to remember how but yesterday she was almost becalmed and at the mercy of cross-currents. Some careful steering was required, and, so far as Christie was called upon to steer, he held the helm with steady and devoted hand. Nowadays there is scarcely any need of a helmsman at all—the ship sails herself; but that need not render us forgetful of those who did good work in time of need.

H. H. T.

Observations in Japan of Meteors probably connected with Pons Winnecke's Comet *.

In Japan the latter half of June is the rainy season, popularly called "Bai-u." This circumstance made the meteor observers very anxious as to their success in catching the expected displays of the Pons-Winnecke meteors. Two observers from the Tokyo observatory went to Hokkaido, where interference from rain effect was thought to be least probable. Mr. K. Nakamura and the writer, from the Kyoto University Observatory, remained in the west. We searched for places of relatively good weathers locally and temporarily, and, based upon the daily study of weather reports provided by the local meteorological stations, several excursions were made about the neighbouring prefectures towards the end of June.

Mr. Nakamura has very sensitive eyes, being able to count twenty stars in the Pleiades; his ability enabled him to obtain extraordinary success. On June 25 and the following day, Mr. Nakamura stayed in Hachiman, about ten miles E. of Kyoto, expecting to have clear skies, following a cyclonic passage. Both nights were not free from clouds, through which some meteors were observed. Among these observations, he found 14 meteors on the latter night certainly connected with the comet. On June 27 he and the writer started on an excursion to the coastal districts of the Sea of Japan, and on their way the first night was spent at Fukuchi-yama, about twenty miles N.W. of Kyoto. On the next four nights we stayed at Tottori City, about 100 miles N.W. of Kyoto, of which the middle two nights were entirely clouded and accompanied by storms. Late on July 2 we returned to Kyoto, and subsequently Mr. Nakamura made the

* Details will shortly be published in a number of *Memoirs of College of Science* of Kyoto Imperial University.

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