

JAMES SCOTT, THE SELKIRK MASON-ASTRONOMER.



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## JAMES SCOTT, THE SELKIRK MASON-ASTRONOMER.

By JOHN LINDSAY.

**H**E wonders of the heavens have attracted inquiring minds of all countries and in all ages, but comparatively few have possessed the genius and mechanical skill to enable them to reproduce, by means of models, the intricate movements of the heavenly bodies. The early Chaldæans, who were in all probability the first students of astronomy, are known to have used the astronomical gnomon or pillar for finding the altitudes, &c., of the sun and stars, as well as other mechanical inventions, in the pursuit of their favourite science. To come down to much later times, the planetarium of Huyghens and Römer, showing the motions of the heavenly bodies, and the "satellite machine," as it was called, to illustrate the movements of Jupiter's moons, were also much used by the astronomers of some two hundred years ago. These two scientific models are now represented by the more modern orrery. But such inventions were, as a rule, the handiwork of skilled astronomers. As an example of what may be called the non-professional worker, the name of James Veitch of Inchbonny, near Jedburgh, is at once recalled. To read the story of this wonderful self-educated man, as related by Mrs Gordon in "The Home Life of Sir David Brewster," her father, one

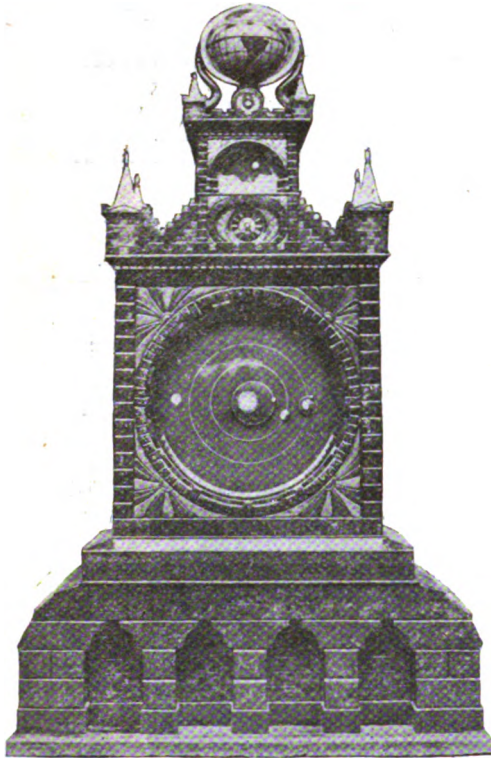
cannot but marvel at the skill exhibited in the construction of his telescopes, microscopes, timepieces, and astronomical inventions of various kinds.\* It may, therefore, be considered not out of place if the name of James Veitch, the ploughmaker-astronomer, is here bracketed with that of James Scott, the mason-astronomer, though the former possessed advantages which the latter never enjoyed.

James Scott was born at Midleburn, Roxburghshire, a few miles from the town of Selkirk, on the 13th of May, 1844. His father, William Scott, followed the trade which was afterwards adopted by his son, James, namely, that of a mason. The members of this trade, by the way, seem to have been at that time rather numerous in Midlem. In a most interesting article which appeared lately in the "Scotsman," descriptive of this place,† it is said that "half a century ago there were, besides other artisans, over twenty masons resident in the village." James Scott's mother was Ann Sturrock, sister of the Rev. David

\* For an account of the life-work of James Veitch of Inchbonny see also three papers by Mr George Watson in the BORDER MAGAZINE for 1900 (vol. vi. pp. 15, 34, 45).

† "A Border Village and its Church," in the "Scotsman" of July 24, 1908.

Sturrock, minister of the Original Secession Church at Midlem. The history of this congregation of Seceders, dating from 1744, "the solitary representative of its denomination in the Border country," forms quaint and curious reading. Besides James, an elder sister was the only other child of this union, when the mother died, and the father married a second time. As most men of genius are said to owe



their gifts to their mother, perhaps James Scott has inherited his talents also from this gentlewoman, the sister of the Midlem Secession minister. His schooldays at the village school, where Mr Robert Muir was then the schoolmaster, were short and uneventful; and at the age of fourteen he left home for Galashiels, there to be apprenticed to his trade. Twenty years in all were spent in this town, in the pursuit of his daily calling. From his earliest years an ardent lover of Nature, he still found opportunities here for enlarging his acquaintance with birds and beasts and flowers. As yet there was no special liking evinced for the science which was afterwards to occupy so much of his thought and labour by night and by day.

In the year 1878 James Scott took up his residence in Selkirk, and eight years after there occurred the great event which was to form the turning-point in his career. This event was a remarkable display of meteors which took place during the time of the General Election in November, 1886. Like many others at that time, he gazed with amazement at these "products of the dissolution of comets," but, unlike the generality of onlookers, he began to ask himself what was the cause of such "showers," and not finding any immediate reply, he forthwith began to study the matter for himself, and was thus led on to the observation and elucidation of other wonders in the starry heavens. Much of this study was carried on privately and without help, for he had neither books to refer to nor teachers to guide him in his researches. Richard Anthony Proctor, the celebrated popular lecturer and writer on astronomy, had at this time contributed various articles on his favourite subject to the scientific paper founded by him, and still held in public esteem, namely, "Knowledge." These were lent to Mr Scott by a friend, and were greatly prized and eagerly devoured by him. It was then that the idea occurred to him of constructing some piece of mechanism which would show the movements of the planets and the relative positions of the sun and moon throughout the year. He had always been fond of examining the interior of clocks, and had become an expert in taking them to pieces and putting the various parts together again, thus earning some fame as a "clock doctor." The knowledge acquired in this way was now of great value when, in the summer of 1887, he began to construct his first astronomical clock. Much observation of the planets, especially of Mars and Saturn, had already been made, and their movements had been worked out on the floor of his room by the simple device of strings radiating from a common centre. A little book entitled "The Apparent Movements of the Planets for the Year 1886," by Mr Wm. Peck, was found to be of much service at this time, when at last he came to understand its maze of "swirls," as he himself puts it. During winter the outdoor work of a mason has usually to be suspended, so this was an excellent opportunity for constructing the clock—no fewer than five winters in all being taken to complete it. A description of this clock, which is eight feet in height and five feet in breadth, may here be given:—

"The clock, which is driven by a single weight,

keeps correct time, and supplies the motive power for the various systems of which it is the centre. Below it is a series of concentric dials, which, revolving independently, are timed to indicate the revolutions of Mercury, Venus, and the earth and moon round the sun, and the moon's revolutions round the earth, showing the correct position of any of these bodies at any hour of the day. The accuracy of this clock is such that it works to the fraction of a second in the year. One of the sections is slow by a second in five years. There is a wheel regulating the eclipse dial, which takes 18 years 224 days to revolve. It has only revolved once since the clock was made. The outer rim of the circle in which the movements of the planets are represented is marked with the days of the month, and a pointer shows the date as this rim revolves. Over the clock face is another ingenious device. It shows the rising and setting of the moon in all its phases. Another feature of interest in the clock, rather high to be within easy reach of inspection, forming as it does the final of the entire mechanism, is a globe which shows the earth's daily revolution; and which oscillating in accordance with the earth's eccentric movement, also indicates from day to day and hour to hour the portion of the globe which is in darkness and that which is lit by the sun. In this way the shortening and lengthening of the day in any part of the globe is indicated, with the duration of daylight in the various seasons. With the examination of these features the versatility of the clock is not exhausted. On the right side is another model system with the sun and planets in their relative positions, the latter revolving so as to show when and at what part of our globe eclipses are to be looked for. In the corresponding position on the other side is a dial showing sidereal time."

The labour in connection with the making of such a complicated piece of mechanism as this may be imagined, but cannot be adequately described. The mere construction of it, in such a highly ornamental fashion, with the imperfect tools which he possessed—for most of these tools were made by himself, some of them out of ordinary table-knives—was a tedious piece of work; but the planning of the whole must have cost many weeks and months of hard thinking.

It was not long, however, after the first clock had been finished that another one was resolved upon. The planet Jupiter, with its attendant satellites, has always had a wonderful fascination for observers of the heavenly bodies. This planet has been termed, indeed, "a miniature of the Solar system," seeing that "the little worlds revolve round the planet as the planets of the Solar system revolve round the sun." So Mr Scott now essayed the construction of a "Jupiter clock." The first-fruits of Galileo's telescope were the four moons of Jupiter discovered by him in 1610; but it was not until 282 years after that—namely, in 1892—that a fifth moon was noticed, followed

in 1905 by a sixth and then a seventh—all three being observed from the Lick Observatory, California. At the beginning of the present year (1908) an eighth moon was noted from Greenwich Observatory, while there are rumours of a ninth being in evidence. But when Mr Scott constructed his Jupiter clock, astronomers knew only of Galileo's four satellites or moons, and that, consequently, is the number shown in the model. The following is a description of the clock:—

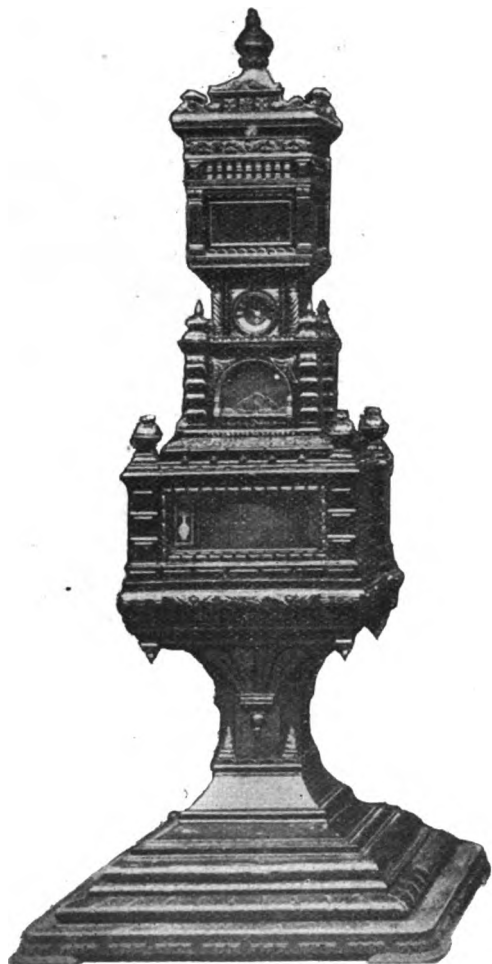
"The underpart shows the sun's path, and Jupiter's progressive and retrogressive movements among the stars of the Zodiac. Above that is shown the rising and setting of Jupiter, and its daily altitude above the earth's horizon. Above the clock dial is seen Jupiter with his four moons revolving round him. The height of this clock is about seven feet. It is wound daily, and shows remarkable skill in wood-carving, all done by the hand of the inventor. He has made the case from Philiphaugh beech, and one small portion is from an apple-tree that grew at the end of the house where the Ettrick Shepherd was born. The disc that shows the chief movements here takes twelve years to complete a single revolution."

After these two large models had been completed so successfully, one would have expected that a halt would have been called; but there was no thought of pausing or making an end. What had been already accomplished was undertaken simply in order to render more clear to the inventor himself the various celestial phenomena he had been studying. As further progress was made, new ideas suggested themselves, and so the next piece of mechanism was a solar clock. This clock is at once a marvel of simplicity and accuracy, for by simply turning a button to the precise date, the difference between solar time and Greenwich mean time on any day of the year is at once seen. The upper part of the clock shows also the phases of the moon, while the lower part indicates the sun's ascension and longitude.

The fourth and last model is the smallest one, and was made on the suggestion of Mr D. Fraser, of Knowepark School, Selkirk, in order to render more intelligible to children the causes of the seasons, as well as to show the line of light and shade, or the length of day and night, at different places of the earth throughout the year. The model serves these purposes admirably, and in a way which should be easy to the meanest capacity.

To interview Mr Scott in his home at Selkirk, and to have all these wonderful pieces of mechanism explained by himself, is a rare experience, not soon forgotten. A number of interested visitors have had this pleasure, and

amongst them the Rev. John Spence, F.R.A.S., who, in the course of a lecture on astronomy which he delivered recently in the ancient Border burgh, said that "he looked upon Selkirk, from an astronomical point of view, as a renowned town, for it had given to the world a most remarkable astronomical genius in the person of Mr James Scott, a stone-mason, who,



at the age of forty-two, without a knowledge of astronomy, began to make an astronomical clock which, with his other three clocks, was the admiration of scientific men, as well as of all others who had seen them." It was on the suggestion of the Rev. Mr Spence that these models are at present in the artisan section of the Scottish National Exhibition, where they will be examined by thousands who otherwise would never have had the opportu-

ity of seeing them, or even of hearing about them. Mr Scott was at first very unwilling to be parted from his beloved clocks, fearing that some mishap to them might occur in transit which he would be unable to rectify in his now enfeebled state of health. But his scruples were at length overcome, and the models have been conveyed from Selkirk without incurring the slightest damage. It may be added that the large clock and the Jupiter clock have to be wound up daily—a duty which is faithfully performed by an official of the Exhibition. Some of the tools used in the construction of the clocks are shown alongside.

Mr Scott, it should be explained, is not a man of only one idea. Though much of his leisure has latterly been spent in the service of Astronomy, Geology has received besides from him considerable attention. That he "looks on Nature with a poet's eye" is also evident from several of his poems which have appeared in various "Poets' Corners." As a sample, the following lines may be given from a poem entitled "A Souter's Welcome to the Summer Visitor," who is thus addressed:—

"Then hie thee away to some cool shady glen,  
The haunt of the wagtail, the robin, and wren,  
Where the daisy peeps out from a green grassy  
nook,  
Or nods to itself in the clear crystal brook:  
There revel at will 'neath the green spreading  
trees,  
Till your cares fly away on the sweet balmy  
breeze;  
Or climb o'er the slopes of those grand hills of  
ours,  
Where Nature has lavishly scattered her flowers,—  
The sneezewort and eyebright, and that gem of  
Parnassus,  
And heather galore, and rushes and grasses;  
Where linties and laverocks mingle their lays,  
Till heaven and earth resound with their praise,  
And the pure bracing air has nowhere its marrow.  
As that which blows freely by Ettrick and Yar-  
row."

On taking leave of Mr James Scott, one cannot withhold a meed of praise for his attainments, as well as for his dogged perseverance amidst many difficulties; while those who know him best admire him most, not only for his genius, but for his quiet, unassuming nature and his uprightness of character. The Forest should be proud of numbering such a man amongst her sons. For eight years now he has led a retired life, subject to nervous breakdown; while for twenty years he has been bereft of his partner in life. But in the home of a married daughter he is tended with loving care. May he long enjoy the calm that comes after strenuous labour.