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THE JUNIOR ASTRONOMICAL SOCIETY

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THE JUNIOR ASTRONOMICAL SOCIETY

The Season's Message from our Patron. Books for Christmas.

I expect many of you will be saving your money this Christmas to buy some book or other on astronomy, and if that is your intention I do hope you will seek the advice of one of the officers of the Society as to the best book to purchase. It is easy enough to rush off and obtain the first one you see, but the cheapest books are seldom the best, and it does pay you in the long run to buy a good one while you are about it. May I suggest three books of quite different types? There's the best of all Star Atlases—" Norton's Star Atlas," published by Gall and Inglis, Ltd., Edinburgh and London; then a really first-rate textbook, Baker's " Astronomy," published by Van Nostrand; and I would like to recommend Cecilia Payne-Gaposchkin's " Stars in the Making," published by Eyre and Spottiswoode, which is a fascinating modern account of stars and nebulae, with a magnificent collection of some of the best star photographs ever taken.

But whatever book you buy, do use it with a bit of sense. I am always coming across people who believe that everything that is printed is absolutely and strictly true. They believe, for instance, that all the figures that are given in books for the orbits of the planets are exact, and can be used to calculate distances and angles—or even to work out the best orbit for a space ship. They forget that these figures are merely averages—they are the ground-work for our calculations, just a convenient set of values from which to take measurements. They correspond exactly to the idea of measuring heights from sea-level. If your house is 75 feet above sea-level, you don't expect to find the sea 75 feet below it, do you?

Here's another example, just to warn you against taking things too literally. All the books give the synodic period of Mars as 780 days. Now the opposition of Mars this year took place on June 24th. The next opposition will be 1956, September 10th, and the interval between the two is 809 days. This, another case of averages, being wrong. The synodic period is worked out on the assumption that both the earth and Mars move in circular orbits, but as the orbit of Mars is really quite an eccentric ellipse, the intervals between oppositions can vary very widely. But very few books tell you that!

So try to pick a good book—read as many as you can, and you will soon get to know the authors who know their subject,

and are not just copying from someone else. And if you can't afford these books (and good books are not cheap) then try to get them at your local Public Library. The Librarian is generally glad to hear of good books and will try to get them for you.

Anyway, I hope you have a very Happy Christmas, with all the nice things that you are hoping for, and some nice bright weather to show you the winter stars. There will be no Moon to interfere on Christmas Night, so you can take the family outside and show them Orion and Gemini and the bright planet Jupiter shining below Castor and Pollux. And with a pair of binoculars or a small telescope, you can find Uranus close to Jupiter. Have you ever seen Uranus? Well, there's something to look for—good hunting, and all good wishes to every one of you.

J. G. Porter.

The Total Eclipse of the Sun, 1954. June 30th. By Lt.-Col. C. J. Aston.

AS A MEMBER of the British Astronomical Association, I was fortunate to be one of those who saw this eclipse from the West coast of Sweden north of Gothenburg, at Lysekil (45 miles) and at Strömstad (90 miles), the latter less than 10 miles north of the central line of totality. The weather was kind to us and much cloud cleared just before totality commenced. The duration of totality is always of a few minutes only; the maximum possible at any eclipse being 7.5 minutes: at Strömstad it was 2.5 minutes and at Lysekil 2 minutes, which seemed to us all too short. I was at Strömstad.

Before and after totality the eclipse was, of course, only partial rather like what was seen from England, the Moon's disk moving across the solar face from west to east as it must always do; but on the central line the lunar centre passed exactly across the Sun's centre. And so the brilliant crescent gradually disappeared, almost complete darkness descending quite suddenly. The unobscured Sun is more than 500,000 times as bright as the full moon, and so a slender crescent of area 1/1000th of the Solar disk will shed as much light as 500 full moons. This is quite a lot of light, as anyone who has seen 500 full moons will agree! But during totality practically the whole of the light seen originates from the corona, which is only about half as bright as a full moon. It took less than 10 seconds for the last 1/1000th part of the photosphere to vanish, and the rapid reduction of light from 500 times to half a full moon was most dramatic. Swiftly and silently the total eclipse was on. The corona flashed out and other phenomena appeared in the course of this unforgettable 2.5 minutes. The following is what I saw:—

(a) The Corona; this feature appeared pearly white in colour, being brighter at the periphery of the dark body of the moon and extending radially, fading out at about one-fourth of a radius from the lunar limb. Faint streamers extended on each side, in the direction of the Sun's equator, these fading out to invisibility at a distance of approximately 2 radii. At Strömstad some thin cirrus cloud prevented us from witnessing the full glory of the coronal structure. The Lysekil observers were more fortunate, as with a clear sky they were able to see the tufts of light at the Sun's poles and the equatorial streamers extending to about four radii. Generally, the corona was exactly as expected for 1954, a year of sunspot minimum. At maximum it is usually more extensive radially but less extended along the equator. Altogether circumstances did not hide to us this truly fascinating scene.

(b) A Prominence was seen immediately on the left of the Moon's limb. It was shaped like an equilateral triangle and estimated by me to be at least 1/5th radius high, i.e., about 90,000 miles. Its colour was scarlet. A little later a further one appeared, this time at the right and of about 1/10th radius, whilst still later a third, though smaller one, showed up.

(c) The Chromosphere appeared on the right as totality ended. This was a wonderfully exhibited arc of crimson light deepened in tone with violet. Altogther this arc extended about 90 degrees along the limb. The colour was probably due to glowing Hydrogen, plus Calcium vapour, as those who know the Sun's spectrum will realise. This crimson became more intense as more of the chromosphere was exposed by the lunar right hand limb, until three intensely brilliant points of light showed these being known as "Bailey's Beads," quickly broadening into a dazzling crescent of light as the photospheric limb came back into sight The eclipse was over. Bailey's Beads are caused through rays of sunlight passing between lunar mountains, valleys and passes along the moon's limb.

(d) Unfortunately I did not see a chromospheric arc nor Bailey's Beads at the commencement of totality, though no doubt at all they were visible. I was watching the approach of the lunar shadow over the countryside, shading my eyes from the Sun's direct light in order that I would be able to see the corona to advantage when it appeared, so that the sudden onset of totality took me by surprise. From the air the lunar shadow is seen in all its splendour,

but from the ground it looked like a black thunder cloud sweeping at speed from out of the west. After totality the reverse occurred, as the shadow departed on its way.

(e) In a total eclipse the Moon's angular diameter must, of course, be larger than that of the sun; in this eclipse it was about 2 per cent. greater. This small difference was, however, noticeable at the phase just before totality, when the small part of the photosphere was shaped more like a short segment or arc of a circle than a crescent formed by the intersection of two equal circles.

(f) Many people saw Venus during the eclipse, but I heard no one say they had seen Mercury or any stars. We were all too engrossed in eclipse observing to spare time for star-gazing. This eclipse was perhaps noteworthy in that Jupiter was so nearly at conjunction that it was hidden. Thus the four bodies Jupiter, Sun, Moon and Earth were in a straight line, whilst Mars was almost on this same line.

(g) In conclusion, here is a quotation (the author is not known), "Of all the spectacles of Nature, a total eclipse "of the Sun must surely take first place; neither pen nor "brush is adequate to express its majesty. The darkened "sky, the hushed atmosphere, the onrushing shadow, the "narrowing crescent, the Bailey's Beads, the wingéd "corona suddenly outlining the black lunar disk! Small "wonder that the sight has inspired awe and fear through-"out the ages!"

Appendix.—We had been looking at the sunshine on the sea just before the Eclipse began, and this somehow reminded me of the well-known poem "The Walrus and the Carpenter," which I venture to mis-quote with apologies to "Alice."

The Sun was shining in the sky,
Shining with all his might:
He did his very best to make
The weather fine and bright.
And this was odd, for soon it was
The middle of the night:

The Sun was black as black could be,
The sky was grey as grey.
You could not see the Sun, because
The Moon was in the way.
And this was odd, because it was
The middle of the day.

Early Days in the Martian Canal Controversy II, by Richard Baum.

FOLLOWING THE RECOGNITION of the germination or doubling of the canals, the next discovery to be made in connection with them was that of the " oases," small round, dark spots at the meeting place of several canals. These were apparently first seen during the opposition of 1892 by Professor W. H. Pickering who was then the Harvard College Observatory's astronomer at that Institute's Station high up on the slopes of the Andes at Arequipa, Peru.

At the next opposition, in 1894, an entirely new chapter of Martian telescopic history was commenced, probably the greatest in the whole of the Mars fable. With this epoch one name alone is synonymous that of Professor Percival Lowell. The advent of this observer's work immediately dispelled the old hypotheses relating to the Red Planet and established an entirely new order. An order though romantic and still fiercely clinging to the old concept of an inhabited world, that nevertheless pointed to the true state of affairs existing on Mars. It can also be said that this period marked the last great outbreak of the " Martian Fever "; whilst giving birth to a more liberal attitude towards the canals and their phenomena

Born to an illustrous Boston family on the 13th March, 1855, Lowell was destined to carry on the traditional eminence of his ancestors and contemporary relatives, though not in the field of scholastic endeavour common to his clan. After graduating from Harvard in 1876 Lowell travelled extensively, at a later date embarking upon a successful business career. The year 1883 found him the Foreign Secretary of the Korean Embassy to the United States of America as a consequence of which he was given licence to travel freely throughout the countries of the Far East, especially Chosen and Japan. Upon these journeys Lowell wrote many articles and books, so that long before his fame as an astromoner was broadcast he had made his mark on the literary world, a position that was later to stand him in good stead during the eventful days of his Martian contributions. A point that must always be borne in mind when one considers Lowell the astronomer, is, that he was not a professional worker but essentially an amateur. Of course, if it had not been for the fact that he was a wealthy person, the whole course of the Mars discussion might have gone other ways. Nevertheless, it remains that as a financially and observationally gifted being, Lowell was able to establish, equip and staff a first-class observatory that to-day ranks as the world's foremost professional Institute of planetary astronomy. Whilst in its early days he acted as its director, manager and chief astronomer. Tasks many another would have hesitated to tackle.

Lowell commenced his astronomical studies in 1876, and in the following year, strangely enough, the year in which Schiaparelli discovered the canals, the young American student spent many evenings atop a roof observing the Red Planet with a small telescope, an instrument that to-day hangs in a place of honour at the Lowell Observatory.

During his stay in Japan he continued his observations with a 6-inch refractor, additionally carrying on a correspondence with the great Italian master of Martian discovery. Probably it was this latter acquaintance that set Lowell on the track that was destined to take him to Mars Hill in the Arizona desert and later to high astronomical fame and regard, in spite of his controversial theories. It was whilst in the East that Lowell learnt of Schiaparelli's failing eyesight and the foreshadowed end of the long-continued Milan records. Immediately the American returned to his homeland, determined to carry on Schiaparelli's work. To this end he set about the task of surveying various sites throughout the world whereon to erect an observatory dedicated to studying Martian phenomena and those exhibited by the other planets in the solar system. After examination of places in Europe and parts of North Arica, Lowell finally settled upon a small plateau near the lumber town of Flagstaff, in Arizona Territory. There it was found that seeing conditions were entirely conducive to the forwarding of the research Lowell had in mind, and accordingly the Lowell Observatory was founded, the year being 1894. Some time beforehand, Lowell had ordered of Alvan Clark the famous firm of optical engineers, a 24-inch refractor, but upon the founding of the observatory this was not complete so that as a stop-gap a fine 18-inch objective was set up. Within a short time the 24-inch arrived and has ever since remained in constant use.

Premier observations on Mars were commenced in May, 1894. From the start many interesting observations and discoveries were made, chiefly by Lowell and two other well-known American observers, A. E. Douglass, who had been an assistant at the Harvard College University, and Professor W. H. Pickering, also from Harvard. Others to be associated with Flagstaff at this time were Professor E. Story, and later the Slipher brothers, who to-day are in charge of the station. E. C. Slipher being its director and the world's leading authority on Mars.

By far the most important discovery made in these early years was Douglass's observation of canals in the dark seas or maria. Until this announcement it had been imagined that the dusky regions of the planet represented extensive, shallow oceans, and the bright, orange hued stretches, deserts. However, though many had searched for the bright spot that would have been the solar image reflected in the waters of these seas, nothing of the

kind had ever been reported. With the detection of canals in the assumed liquid masses it was realised that permanent features such as these streaks could not possibly exist within their extent. Consequently the dark areas were regarded as fields of a lowly vegetation similar to lichens and mosses. And further that they probably constituted the beds of once mighty seas.

Another major innovation made at Flagstaff was the correlation of the melting of the polar caps with the visibility of the canals. It was found that as the snows melted with the approach of summer, so did the canals increase in visibility. In other words, " a wave of quickening " spread down over the planet, from the snow-bound poles to the maria girdled equatorial reaches.

With the passage of the years the Lowell school amassed thousands of drawings and photographs, many of the latter clearly confirming the former in as much as they showed definite traces of canaliform features. By 1909 over 700 canali had been mapped at the Lowell Observatory, truly a monument to the industry of that band of observers. Mars, towards the end of the first decade of the present century, appeared more like a cobweb-covered globe, so fine and regular showed the channels.

(To be continued)

The British Astronomical Association.—This body was formed in 1890 and now numbers well over 2,000 members, drawn from all parts of the world.

It is an association for amateur astronomers, for a mutual help and organisation into groups for specialised observations. There is, for example, an industrious section devoted to the study of the lunar surface formations, and others given over to the recording of planetary details, variable stars, the sun and meteors and comets. At the monthly meeting papers and developments in contemporary astronomy are discussed and are fully reported in the Journal.

We hope that J.A.S. members, especially those possessing small instruments, will be induced to join the B.A.A. and co-operate in their extensive observational programme. The address of the assistant Secretary of the B.A.A., to whom all correspondence about joining must be addressed, is Miss Lydia A. Brown, F.R.A.S., 303 Bath Road, Hounslow West, Middlesex.

Sky Survey Section Activity. Stellar Photography

THE DIRECTOR OF the Sky Survey Section has sent us some very interesting photographs of the Cygnus and Cassiopeia star fields that have been taken by one of his section members, Edward L. Barry, of 7 Tilston Road, Wallasey, Cheshire. Although we are unable at present to reproduce these excellent

photographs, it is thought other members may like a few particulars of the simple home-made equipment employed by Mr. Barry.

A very ingenious camera holder has been designed and constructed to allow for star following in a smooth and accurate manner during the time of exposure. An ordinary bellows camera with focusing screen and 2½ x 3½ plate holder was used. The lens being an ordinary camera lens working at f/4.5. The exposure time was 40 minutes on an Ilford Hypersensitive panchromatic plate. Practically the whole of the constellations of Cygnus and Sagitta are covered in the one film and the whole of Cassiopeia in the other. Stellar images down to the 6th magnitude are clear and even fainter ones are detectable at the centre of the field, a clear demonstration of the care and skill expended during the following. We hope that Mr. Barry will be induced to re-photograph these areas at a later date so that a comparison may be made and changes in brightness of certain variable stars made obvious. In addition, by that time, we hope to be able to reproduce copies of these truly praiseworthy prints.

E. H. Noon.

FORTHCOMING EVENTS

Member wishing to attend any of the following events are asked to communicate with Mr. E. H. Noon, Norman Cottage, Pond Piece, Sheath Lane, Oxshott, Surrey (Tel.: OX 297) and ascertain time and place of meeting.

1955.

Jan. 14.—Morley College Lecture Course Commences: "The Physical Universe."
Goldsmiths College. Dr. Ronan's Course Commences.
Man's Changing View of the Universe.

Jan. 15.—Visit to the Hampstead Observatory by kind permission of The Hampstead Scientific Society.

Jan. 28-30.—Kingsgate Residential College, Broadstairs, Kent. Week-end Course: "Recent Astronomical Discoveries."

Feb. 26.—The President Invites Members to Oxshott. "Telescopic Observation of Jupiter."

Mar. 12.—Visit to Science Museum, South Kensington. "Astronomical Instruments."

Mar. 17.—Kingston Astronomical Group. Open Evening. "Mars," by Patrick Moore, F.R.A.S.

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