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A.C. Clarke

Editorial.

We are very glad to announce that after several delays we have succeeded in completing arrangements for the next General Meeting, which will be held at the Royal Aeronautical Society's headquarters on the first Tuesday in June. Full details of the meeting are given on page 7, and we hope to see a record attendance. In particular we shall be very pleased to welcome those many new London members who have joined the Society during the past few months. This meeting will be one of the most important that the B.I.S. has yet held, so in your own interests you are strongly advised not to miss it.

Plans for the next "Journal" are now well under way, and much of the material will be in the hands of the printer in a week or two. Although we cannot give any definite date of publication, we hope that the next issue will be in your hands before the end of July.

Recently we had the pleasure of a visit from Messrs. Burgess and Cusack of the Manchester Astronautical Association, and the question of a joint research policy for the two societies was carefully considered. The arrangements made to prevent duplication of work will be given in the "Bulletin" shortly.

We read in the "Sunday Express", at the end of an article on Sir Ambrose Fleming, the famous physicist, that he was the man who "finally showed interplanetary travel to be impossible". It is a great pity that this information has come so late in the day; had they known it a few years ago it would have saved the Technical Committee so much trouble.

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Lunar Changes

by

S.M.Green, F.R.A.S.

(We are glad to be able to follow up last month's note on "Lunar Vegetation" with an authoritative article by a B.I.S. member who has made a special study of the subject.)

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The question of changes on the moon is by no means new; indeed, it is almost as old as the discovery of the telescope. However, only observations made during the last century are worthy of careful consideration.

The changes described can be put into four classes:

1. Those due to volcanic activity. Many instances have been reported, but few, if any, are sound, the older descriptions and maps show too many errors to be held as evidence in most cases. Further landslips can scarcely occur, as there are no slopes greater than 30 degrees, the angle of rest for loose rubble.

2. The appearance of mists, etc. These demand the existence of some slight atmosphere, and this question should be of interest to any who intend to land on the moon. Occultations of stars and planets afford evidence against any considerable atmosphere, and this is supported by theoretical considerations. However, it can be demonstrated that an atmosphere sufficient to reduce small meteors to dust could exist without our being able to detect it. Further observations such as those Mr Barker has cited, and perhaps the photography of such phenomena, provide the best means of attacking the problem.

3. Changes in the size, shape and intensity of certain dark spots. Professor Pickering has

discovered a large number of cases of periodic changes, where dark markings may vary in size and intensity in a regular sequence during a lunar day. The effect of shadows must be carefully eliminated in this work.

Pickering has suggested vegetation as a working hypothesis for explaining the changes, and experiments by the writer have shown that certain low forms of life could withstand the extremes of temperature occurring on the moon. But it is not necessary to assume that such life would be terrestrial in form, as it would have adapted itself to existing conditions. Since the changes occur with perfect regularity, many people favour the idea that they are due solely to changes of lighting, and in some instances this is undoubtedly the case.

The moon's surface is almost entirely covered with pumice rock, excepting for a small sulphur patch near Aristarchus, and it seems doubtful from this whether mining would provide any useful materials.

4. Changes in the brilliancy and size of certain bright areas. Such changes occur on certain isolated mountains such as Pico and Piton, and are suggestive of ice and snow, implying the existence of water. One theory holds that the moon's surface is completely covered with ice.

Colour changes have also been described, but have not been generally confirmed. The only solution lies in amateur observation, and Robert Barker has built up an active group of expert amateur workers in England. It should be emphasised that the changes are within the reach of the smallest instruments, and persistent effort is more important than large instrumental equipment.

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The next item on our programme will be rocket tests. NOT, you will observe, FREE rocket tests, for on this point we are absolutely convinced that, spectacular as they may be, the possibility of them adding to our knowledge of anything (except perhaps criminal proceedings) is infinitely remote.

A proving stand is being constructed for the Society, and when completed will be used to establish data whereby we shall be in a position, for the first time in the history of the art, to design rockets whose possible performances may be forecast with some degree of accuracy. The importance of this must surely be self-evident.

By studying the performances of commercially produced rockets, we have every hope of obtaining information as to what governs the rate at which they release their energy and what effect chamber pressures, orifice cross section, and expansion ratio have on their performance. We shall discover the greatest efficiency to be expected, and how to obtain it, and we will then be in a position to test some very interesting fuels we have as yet been only in a position to putter about with. We have far too much respect for the safety of our own persons and our reputations as the most advanced living authorities on the subject to attempt combustion under anything approaching optimum conditions without having first obtained this information.

When we get to the end of the first explorative stage of our experiments we have to consider what is the most effective way of bringing them to the notice of the public. Much will depend upon the choice of the intended demonstration, and if rightly chosen we can look for a considerable amount of outside assistance. We must guard, however, against the temptation to attempt what is generally expected of us, just because we find some difficulty in convincing others that the usually accepted view is not necessarily the correct one.

It may well be that we shall find it possible to make an attempt to set up a new speed record for aircraft. At the present time we are inclined to the view

that this is not only easier and more likely to be successful than an attempt on the altitude record, but also far more likely to afford us an opportunity of demonstrating the outstanding peculiarities of this means of propulsion.

Accordingly, while the other matters are being investigated we intend to attempt to design a rocket propelled aircraft which will place the record forever beyond the reach of propeller driven craft. This is not so impossible as might be imagined, for aircraft designers are well aware that the limit of the existing methods is uncomfortably close.

The problems associated with this project are far more a matter of designing a machine capable of withstanding the enormous strains and forces involved, than of producing a rocket motor which can deliver the power required. We believe that this research into design will give us results of great value to space-ship construction, in spite of the differences between the two techniques.

I would like to take this opportunity of asking those of our membership who have knowledge of aeronautical engineering to consider this matter and to inform me whether they would be interested in cooperating in the study of this subject, at the same time saying what sort of assistance they would be prepared to give.

By the time we have succeeded in obtaining answers to the aeronautical problems involved, I am more than certain that we shall have progressed sufficiently with our other research to be able to design the motor required, and I am equally sure that this project will arouse sufficient interest to justify the work involved.

Please let me have your preliminary views on this matter as soon as possible, no matter what they may be. Providing that they are intended to be constructive, suggestions will be more than welcome. Lists of the difficulties we may expect to encounter will also be acceptable - as long as they do not involve the Society in charges of extra postage on account of excess weight.

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Announcements.A new Fellow of the Society.

We have great pleasure in announcing that the Council has elected Dr. Otto Steinitz to be a Fellow of the Society in recognition of his services to the science of Astronautics. During his recent visit to this country we had the pleasure of meeting Dr Steinitz and we are sure that our members will join with us in wishing him every success in America.

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A Midland Meeting

We would like to inform members living in and near Staffordshire that a meeting of Midland members has been arranged near Birmingham on Saturday, March 25th. The meeting will take place at 25, Throne Crescent, Rowley Regis, at 6.p.m., and has been arranged by Mr G.Richardson. We hope that all those members who are in the district will turn up and make the affair a success.

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Ways you can help.

Members have often told us of their willingness to assist the Society in any way possible - if we will tell them what to do. Here, then, are a couple of ways in which you can help us:-

Firstly, please keep a watch for references to the B.I.S. in the Press, and send your cuttings to Headquarters for filing. Although we probably see most of the references to us in the national papers, there are probably many cuttings from local papers which would be otherwise missed by us.

(Cont. on p. 12

The Manchester Interplanetary Society.

Some of our members will already have heard of the winding up of the Manchester Interplanetary Society, details of which have just come to hand in a Special Notice issued by the Society. The M.I.S. has been wound up largely for two reasons - lack of financial support and, more serious, lack of helpers in running the Society. Since there were no branches in other towns to take over the work of organising the Society, it was decided that swift euthanasia was preferable to slow disintegration. The Notice winds up with an appeal to its members to join the B.I.S. - a gesture for which we would like to thank Mr Turner.

As you will remember, the M.I.S. started literally with a bang, and in its relatively short life did a good deal to bring the subject of interplanetary travel to the public eye. It has always worked in close collaboration with us, and we had hoped that it would have been able to help us with certain aspects of our research work. However, this was not to be.

Astronautics is still represented in Manchester by the Manchester Astronautical Society, under the leadership of Eric Burgess, who belonged to the M.I.S. in its early days but later left it. Mr Burgess is visiting London shortly to confer with the Technical Committee on the problems of space-ship design.

The fate of the M.I.S. will serve to remind us that no society run by voluntary officers in their spare time can be certain of a permanent existence, unless it is very large. When there is a danger of key workers and essential supporters being forced to withdraw their aid, any organisation such as ours must beware of making too ambitious plans for the future. Fortunately, the B.I.S. has been lucky in this respect. It would be extremely difficult to find anywhere a more devoted band of officers than this Society possesses, for they think nothing of sacrificing their private arrangements, their sleep and most of their spare time when the exigencies of the Society demand it. Indeed, they would willingly sacrifice their jobs if it were not for the

books on every avenue of science from chemistry to psychology, from astronomy to biology. Hoping that he had not heard my remark, I turned and pretended to look for knowledge among his bookshelves. I noticed "How to be a Yogi", "How to Prolong Life", and the "Complete Limerick Book". I found that I already knew most of the verses in the latter, only with different last lines. A book titled "While Paris Laughed" caught my eye; I yanked at it, and lo! a dozen others came with it. They were all just dummy backs joined together, and they swung away to conceal a hidden compartment behind.

I looked round furtively. Mr Edwards was just arriving, muffled up to the nose in a red scarf. "I'b god 'flu", he was saying. "Cardn't stob long". While the others sympathised, I took a peek into the secret compartment. There were several more books there, and I observed "Gentlemen Prefer Blondes", "How to Do Your Own Laundry" and "Memoirs of a Little Monkey". Before I could investigate these intriguing volumes Mr Janser approached, and I shut the secret panel hastily and pretended to be absorbed in "A Textbook on Dynamics".

"This is an interesting one", said Mr J., arriving, and pointing to "The Meteoric Hypothesis". I snatched at the opportunity. "Yes", I said gravely. "I have always thought the Nebular Hypothesis purely hypothetical". "Some do, some don't", said Mr J., and vanished into a certain curtained recess.

I wandered back to the main body. They were discussing "Weights". "Does anyone know a shop that sells weights?" asked Clarke. "I do", I said brightly. "I usually get Woodbines, but they sell Weights". They ignored me. It seemed that the proving stand was now finished and ready for delivery. They wanted to buy a cheap set of weights, up to 50 lbs., to use on it (see diagram, Jan. "Bulletin") Mr Janser returned, and showed us his home-made set of chemical weights carved from odd sheets of zinc. For no reason whatsoever, Mr Smith went on to describe how he had been lecturing on astronomy to Boy Scouts and introducing the B.I.S. space-ship to them. "Catch 'em young - that's the way", he said.

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Mr Janser vanished again, then suddenly returned with tea and cakes. The company helped itself and seated itself, and began to discuss the altimeter. Or rather, Mr Edwards began to discuss the altimeter. He had been making it, and described just how. This was a rather elaborate process, carried out with two expressive but empty hands and a patch of empty air. A swift circular sweep in the air meant "a wheel", a corkscrew wiggle "a spring", and a Nazi salute "about so high". Once "a long lever" nearly carried a vase off the mantelpiece. All this semaphoring was accompanied by a machine-gun fire commentary by Mr Edwards, somewhat indistinct from his cold ("two spriggs attached to thad chaid"). I thought supposing a foreigner came in now, and Mr Edward's explanation was unintelligible to him - wouldn't he think Mr E.'s **frantic** catching of invisible flies rather funny? At this moment, Mr E. stuffed his mouth full of sausage-roll, and his explanation did become unintelligible, and it was funny.

Apparently the altimeter wouldn't behave. Sometimes when it was supposed to indicate the exact height to which it had been lifted, the indicator shot back past zero and pretended the thing was buried in the ground. Mr E. pointed out how embarrassing this would be if it happened at a public demonstration. "We could always tell them that that proves space is curved", rapped out Clarke smartly, and everyone guffawed. Except me, who couldn't work out how it proved that.

Someone suggested we scrap the altimeter and use an egg-timer in the space-ship instead*. It would be the regular duty of one of the crew to keep turning

* This isn't as silly as it sounds. If S is the amount of sand in the bottom reservoir, & f the acceleration,

$$\frac{dS}{dt} = k.f, \quad \therefore S = k.v + C.$$

So you could use the timer to give your velocity.

Ed.

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it over. I volunteered at once for the post of Egg-Timer Watcher. "I place my entire knowledge of the Nebular Hypothesis at your disposal", I said, with emotion. They ignored me.

Instead, they talked about designing a rocket-acroplane to be used as a super-fighter. It was to have the ability to put on a sudden spurt of 700 m.p.h. which would carry it out of any awkward corner of a dog-fight before any of the enemy pilots had realised it was gone. One difficulty, Mr Smith said, was that in such a spurt the pilot would overtake his own machine-gun bullets and shoot himself. Clarke said no, they would slide down their respective barrels.

Messrs. Smith and Edwards went into the wing design of this plane at great length and detail, and the rest of us, after sundry attempts to bring the conversation back to normality, let it go on. It went on. Clarke awoke me at 11 p.m. by chucking my coat at me. "Home", he said. "Oh, but regarding that Nebular Hy--" I began. "The higher the fewer", he interrupted enigmatically, and sent me on ahead to buy the fish and chips for supper.

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The Manchester Astronautical Association.

At a recent meeting of representatives of both societies it was decided that in future the Bulletin of the M.A.A. should be incorporated in this "Bulletin", thus avoiding unnecessary duplication of work. For the benefit of members of both societies, details of all meetings held in any month will be published during the previous month in the "Bulletin", which will thus be a comprehensive record of astronomical activities.

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The B.I.S. Library.

The B.I.S. now has a Library, which although a very small one, contains several of the most important works on the subject of astronautics. It is our aim to build up from this nucleus a comprehensive collection of books covering every branch of the science, so that if you have any surplus text-books which you think may be of value to us the Librarian will be very glad to hear from you. All donations will be acknowledged in the "Bulletin", and as the collection grows revised lists will be issued.

With this "Bulletin" you will be receiving a Library Requisition form as well as a Library List. The use of the form will reduce clerical work to a minimum - a very important consideration. If you wish to borrow a book, the form should be filled in and sent to the Librarian with the appropriate remittance, which may be in stamps (not of higher value than 1½d!) Every effort will be made to supply books as soon as possible, but it will be realised that in some cases there may be a considerable waiting period.

As the postage on the average volume is 4d - 6d, we are compelled to charge 9d or 6d (according to weight) for books borrowed by provincial members, though members who are able to attend meetings, and who inform the Librarian of their requirements beforehand, will be able to borrow books at 6d or 3d as the case may be. We regret, however, that it is not possible to send books abroad. The period of loan is one month, and members are particularly requested to return borrowed books as promptly as possible.

All profits derived from the loan of books will be used to increase the collections, and a Library Fund has been set up for the purchase of new volumes.

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