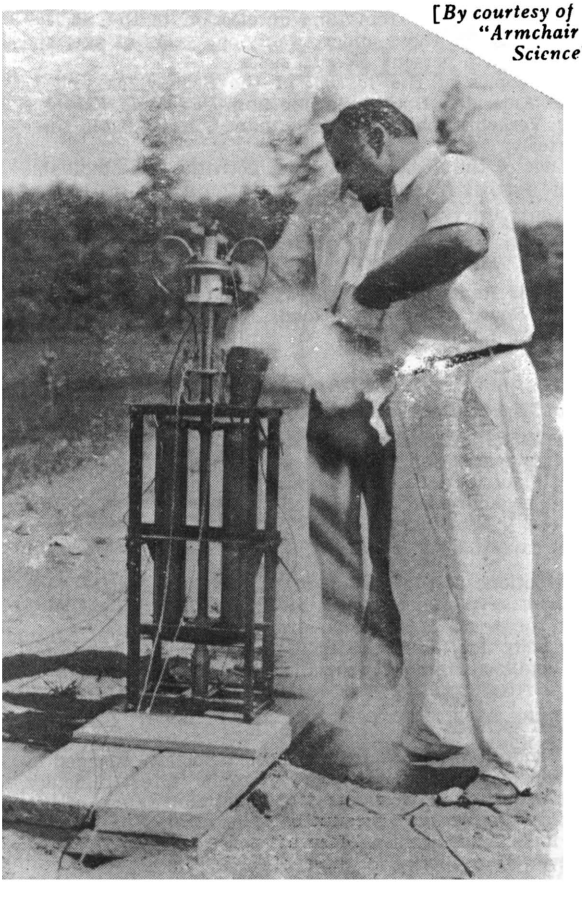
JOURNAL

OF THE

British Interplanetary Society

JUNE, 1936

[*By courtesy of "Armchair Science"*



A small experimental rocket of the American Rocket Society being filled with liquid oxygen

PRINCIPAL CONTENTS

THE BRITISH INTERPLANETARY SOCIETY

DEVOTED TO THE CONQUEST OF SPACE

The annual subscriptions for the three classes of membership are: Fellowship, £2-2-0; Membership, 10/6; Associate Membership, 5/-. All subscriptions may be paid quarterly by arrangement, and date from time of election to the Society. Associate Membership is essentially for those under twenty-one years of age, and all classes of membership are open to persons of both sexes.

All members receive free copies of the *Journal* of the Society, as well as copies of *Astronautics* of the American Rocket Society and *Das Neue Fahrzeug* of the E.V. Fortschrittliche Verkehrstechnik (the German Society). All these publications are issued quarterly.

Full particulars of meetings of the Society and other activities are obtainable from the Hon. Secretary.

* * *

OFFICIAL LONDON REPRESENTATIVE:

J. H. Edwards, Esq., c/o The 362 Radio Valve Co., Ltd., Stoneham Works, Stoneham Road, Northwold Road, Upper Clapton, E.5.

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THE RESEARCH FUND.

The Research Fund has been established for the purpose of financing rocket and other astronautical research in the British Isles. All contributions and requests for further particulars should be addressed to the Hon. Secretary-Treasurer.

* * *

C. H. L. ASKHAM, Vice - President and Founder Fellow of the Society, operates radio station G6TT

The Council invite contributions to the *Journal* of the Society. Matter must be typewritten or in clear script. Preference will be given to first-hand accounts of actual experimentation or theses on theoretical astronautics.

Neither the Society as a body nor the Editor hold themselves responsible for the statements made or the opinions expressed by contributors to the Journal.

* * *

ON THE COVER OF THIS ISSUE

is portrayed Mr. G. Edward Pendray, of the American Rocket Society, engaged in filling with liquid oxygen a model rocket on the proving stand. Great difficulty is usually experienced in this operation on account of the low temperature of the liquid oxygen, about -183 degrees Centigrade. Often after the tank has apparently been filled with the liquid it is found that most of it has evaporated in the process. Mr. Pendray, however, is a specialist in his difficult avocation.

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THE JOURNAL—Published quarterly by the British Interplanetary Society.
Editor: L. J. Johnson.

JOURNAL

OF THE

BRITISH INTERPLANETARY SOCIETY

"Founded for the stimulation of public interest in the possibility of interplanetary travel, and to promote research in all problems pertaining to the conquest of space, with the aid of the rocket motor or by any other means."—*Constitution of the Society.*

No. VIII. JUNE, 1936 Vol. 3. No. 2

All communications for the Society should be addressed to the Hon. Secretary, 46, Mill Lane, Liverpool, 13, England, or to the Local Official Representative

EDITORIAL

Members of the Society, who have read the Supplement to the *Journal* in *Ralph Stranger's Science Review*—of which more later—will be aware of recent changes that have been brought about in the production of Society publications. In future, issue of all publications and notices will be directly supervised by the Council of the Society, and passed by them prior to presentation in the name of the B.I.S. to members and to the general public. This has led to the appearance of a *Journal* larger and better illustrated than ever before, and it is confidently expected that it will be possible to maintain a regular quarterly issue.

With this issue an attempt has been made to introduce commercial advertising in an effort to make the *Journal* self-supporting. If this proves successful, it will free the Society of a very heavy financial burden, and will leave us in a better position to inaugurate a programme of experimental work. As Advertisers can be expected to renew their announcements only on production of definite results, members are urged to support all those who are good enough to aid the Society in this manner.

Hitherto practical research work has been denied us by an unfortunate lack of the necessary funds. At a recent meeting, the Council expressed their opinion that the Society should, by September, be in a position to commence elementary experiments. These will consist of a study of trajectories and the problems of parachute release, probably employing a catapult device and "dead" rocket models. In such manner a study can also be made of different rocket shapes and the use of fins. The problems are both diverse and complex and Officers of the Society feel that a good deal of useful work can be done in the manner outlined. It is hoped that such efforts will lead in due course to research in more important problems of the liquid fuel rocket.

Professor A. M. Low and Mr. Ralph Stranger are names of no little consequence in the world of scientific endeavour. The former has

long been an active Honorary Fellow of the Society, of inestimable value to us as a member from the earliest days of this organisation. It gives us great pleasure to announce that henceforth Professor Low, who has been very aptly described as "one of the most vigorous personalities in modern Science," will assume Office as a Vice-President of the Society. In reality, the honour is the Society's in having as an Official a man of such ability as our new Vice-President. A biographical note concerning Professor A. M. Low appears on page 22 of this issue.

Mr. Ralph Stranger, who has recently accepted the Honorary Fellowship offered to him at our annual general meeting, is a well-known figure in radio circles, and serves the World-wide Radio Research League as Hon. Secretary. Naturally, he has a whole-hearted belief in the value of the work and aims of the B.I.S., while the organisation with which he is connected deals in great measure with problems in which we have a common interest. *Ralph Stranger's Science Review* —organ of the W.R.R.L.—is a compendium of knowledge for the prospective astronaut. Not only does it deal with problems of radio, rocketry, astronomy, etc., but it also contains a monthly Supplement to this *Journal*, which will enable members to keep up-to-date in all matters of interest in our various spheres of activity. By founding the W.R.R.L. and producing such an invaluable monthly as *Science Review*, the Council are of the opinion that Mr. Stranger well merits his place amongst the distinguished Honorary Fellows of the Society.

It is pleasant to note that this year's increase in membership has far exceeded the total increment for last year. Such support is sufficient encouragement and reward for the hard task devolving upon the Officers of the Society in their work of organisation and the production of the *Journal*. It is easy to trace this welcome additional support directly to the recent publication of our President's book, *Rockets Through Space*. This excellent volume, both of itself and through subsequent Press notices, has done much to stimulate public interest in our cause. As a result of this, and in view of possible experimental work later this year, 1936 promises to be a landmark in the history of the British Interplanetary Society.

A THREE-YEAR-OLD MYSTERY

By RALPH STRANGER
(Hon. Secretary, The World-wide Radio Research League)

When the first space-ship triumphantly encircles our satellite, radio engineers will be proud to point out their own particular share in the achievement, for the study of radio and of all types of radiation will play an important part in the conquest of space.

The following article, reprinted from "World Radio" by kind permission of the Editor and Mr. Ralph Stranger, illustrates merely one phase of the study of cosmic radiation in which the W.R.R.L. is conducting invaluable research work.

An exceedingly interesting development of the work of the W.R.R.L. is the rapid growth of well-equipped laboratories which are springing up all over the country, designed solely for work in connection with our problems. Many of them possess recording instruments, so that the number of such records flowing into our files is rapidly increasing. One of the best is that of Dr. Hopwood, in Cornwall, as I could judge from the description and the photographs he has sent me, which I am sorry space does not permit me to publish here.

Those of our members who possess such laboratories, and others who can afford the necessary equipment, may be interested in a three-year-old mystery which, at the time, excited considerable comment everywhere, but has lately been forgotten. I am referring to the discovery of Dr. Karl G. Jansky, of the Bell Telephone Laboratories of U.S.A. This discovery was described by Dr. Jansky in his paper, "Electrical Disturbances of Extra-terrestrial Origin" published in the *Proceedings of the Institute of Radio Engineers of America*, 21, 1387, 1933.

Dr. Jansky, during his study of electrical disturbances and interferences—a study in which he used a very sensitive multi-valve receiver and a long aerial system, so designed that it could be turned in any given direction—discovered a high-pitched hiss of unknown origin. For a long time Dr. Jansky tried to find out where this hiss was coming from, turning his directional aerial every possible way and measuring the intensity of signals received. Suddenly, with a certain position of the aerial the signals reached a maximum. The next move in this highly exciting game was to carry on with night-to-night observations throughout the year in order to find out the behaviour of the source of disturbance and discover if it is subject to any seasonal changes. At the end of the year the directional aerial had shown, by arriving at its original position of a year ago, in following the maximum signals, that the source, whatever it may be, has been going round, and took precisely a year to complete the whole circle.

This promptly suggested astronomical considerations, and calculations have shown the source lay in the direction of the Milky Way,

pointing near a portion of the sky which is assumed to be the centre of our galactic system. The direction from which the "signals" came also approximates to the direction in which the whole solar system is rushing headlong at the rate of nearly 11 miles per second.

The signals in question were, naturally, due to some electro-magnetic radiation sent out by the mysterious moving source. Is it possible that some distant star is radiating in this peculiar manner? The signals were received on the 14.6 metres (20,548 kilocycles per second). If one star is capable of producing such a hiss in a short-wave receiver, are there other stars that do so on the same or other wavelengths? A hiss suggests an unmodulated "carrier," so that there is no question of some "inhabitants of a distant planet"—of whom the scientific fiction writer is so fond—trying to communicate with us. It looks as if the radiations occur all the year round.

Here is an excellent problem for those who like excitement in their experiments, a problem which we should adopt officially as part and parcel of the W.R.R.L. investigations. Those members who live in the open country and who possess a reasonably good short-wave receiver which will work on 14.6 metres, should erect a long directional aerial which can be turned about its axis, and see if they can repeat Dr. Jansky's experiment and capture the hiss in question. In the first place it is necessary, having obtained the hiss, to carry out a continuous 24-hour observation to ascertain how the direction of the incoming signals varies with the diurnal rotation of the earth. As the earth and with it the observer rotates, the direction of the incoming signals should change, if the signals come from a "fixed" point in space. This should be followed by nightly observations always at the same sidereal time, throughout the year and for a number of years.

The receiver must be exceedingly sensitive. A number of short wavelengths should be tried, but, at first, the experimenter should concentrate on the 14.6 metres. I should like to hear from those who are in a position to attempt this ambitious experiment. I fully realise that our members have not the resources of the famous Bell Laboratories, but stranger things have been achieved with purely amateur gear. One never knows!

In the meantime let us see what stars there are available and how far they are from us. There are millions of stars in space. Some of them are single stars, some are double stars, some are collected into globular clusters, and many are to be found inside distant nebulae. It is quite possible that our own Universe would look from outside like one of these nebulae with the Milky Way defining its edges. The astronomers have discovered over a million nebulæ, so it is probable that there are over a million universes such as ours.

Thus, it seems that unless each star is radiating electro-magnetic waves and does so on a wavelength of its own, you may be getting a hiss caused by electro-magnetic waves which, in their effect, represent

[Continued at foot of Page 21.

CURRENT ASTRONOMY

By T. SALISBURY (Member, St. Helens)

[*By courtesy of "Armchair Science"*

The beginning of an eclipse of the sun taken with an ordinary camera in conjunction with a small telescope.

The domain of the rocket-ship is interplanetary space, and all who take an interest in the attempt to realize interplanetary travel should have some knowledge of the principles of astronomy. The birth of Man's interest in the stars is lost in the mists of the distant past, for throughout the ages the heavenly bodies have held his attention, impressing him by their lofty calm and serenity. To-day, despite the fact that our knowledge has increased beyond all seeming, the heavens still retain their majestic air of mystery.

But now a new thing has crept into our consciousness. It is becoming increasingly evident that the planets, at least, are by no means beyond the realm of our activity. Experimental and theoretical research, by a steadily increasing number of enthusiasts in different parts of the world, is making it clear that the reaction motor holds out great promise for the conquest of space.

The prospects of an actual penetration of the void (even if not possible of immediate fulfilment) should serve to attract the attention and co-operation of a number of very able and practical persons, for whom the science of astronomy, its preoccupation with enormously remote objects, its meaningless distances and its colossal hordes of fiery suns, previously held no attraction whatsoever. Not for so very long, however, shall we be confined to peering through our telescopes in the still watches of the night, to conjecturing on the possibility and nature of life on neighbouring planets. By means of the rocket-ship, Man shall one day explore the solar system without recourse to such optical aid!

In the meantime, it behoves us to increase and confirm our astronomical knowledge, as the part it will play in the ultimate conquest of space can hardly be over-estimated.

THE SOLAR ECLIPSE

There should be a considerable extension of our knowledge of solar phenomena as a result of observations on the forthcoming solar eclipse on June 19th. At intervals along the whole track of totality, groups of scientists of various nationalities are preparing their apparatus in readiness for the brief period of obscurity, no favourable point being without its party of observers. In this way, unfavourable conditions at any one place may be offset by clear skies in another, as it is extremely unlikely that cloudy weather will prevail along the whole route of totality, having regard to the different latitudes in which it lies.

The shadow of the moon will strike the earth in the Mediterranean, and will pass, in about 2½ hours, to a point in the Pacific, travelling by way of Greece, Turkey, the southern part of Russia, Siberia and Japan. In England, the eclipse will only be partial, the sun rising just before 4 a.m. already partly obscured. The spectacle will thus be robbed of its chief glory for an observer in this country. But a knowledge of what is actually transpiring in the heavens will be sufficient to impress the most casual observer with the grandeur of extra-terrestrial phenomena.

By a curious but fortunate accident, the moon and the sun, as viewed from the earth, are both of the same apparent diameter. The sun, although about 400 times as distant as the moon, is also about 400 times larger, with the result that when the moon passes between the earth and the sun, the bulk of the moon is just sufficient to hide the brilliant body of the sun. Thus the solar atmosphere is left visible as a kind of halo all round it, being normally hidden by the blinding glare of the sun.

This is the event known as a total eclipse of the sun. The reason why it does not occur very frequently is explained by the fact that the orbit of the moon around the earth is inclined slightly to the orbit of the earth round the sun, and it so happens that usually the moon passes just above or below the critical alignment with the sun necessary to produce an eclipse. A partial eclipse is, of course, of more frequent occurrence, but is of comparative unimportance.

The spectroscopic study of the solar atmosphere during totality is of the first importance to astronomers. The gas, helium, was isolated by spectroscopic means in the solar prominences by Sir Norman Lockyer in 1868, nearly 30 years before Sir William Ramsey was able to pronounce that the same element was present in certain minerals on earth. This was outstanding proof that spectroscopic methods are indeed a true indication of the nature and substance of the stars.

And now an element has been detected in the solar corona, and named coronium, which so far has not been identified on earth. Investigation will be made during the forthcoming eclipse with a view to solving the nature of coronium. It is probable that it will turn out to be some quite familiar substance rendered unrecognizable by

the unusual conditions existing in the sun.

The solar corona, which appears to be intimately related to the sun's eleven year sun-spot cycle, will be photographed at many points on the line of totality, and comparisons made to determine what changes in shape—if any—it has undergone during the time it is visible. The displacement of light from stars in the same general line of sight by the gravitational field of the sun (the phenomenon predicted by Einstein) will also receive attention.

Altogether, we can quite reasonably expect a decided increase in the body of solar knowledge, and incidentally of the nature of stars and the construction and behaviour of matter as a result of these investigations.

THE "DELPORTE OBJECT"

Discovered by Dr. Delporte, a Belgian astronomer, the little planetoid known as the "Delporte Object" (and officially as 1936 CA), which came so unpleasantly close to the earth in February last, is now happily many millions of miles away, and receding rapidly. It is an angular mass of rock about half-a-mile in diameter, and had the distinction of coming nearer to the earth than any known celestial body with the exception of the moon, approaching in fact to within 1,500,000 miles of us.

Had it struck the earth, a catastrophe of unprecedented magnitude would have resulted, but fortunately, the plane of its orbit is slightly different from that of the earth. This fact, coupled with the planetoid's velocity of about 20 miles per second, was sufficient to carry the little visitor harmlessly by.

Despite the small size of the Object and the consequent difficulty of observation, it was in view long enough to enable astronomers to deduce the path of its orbit, which was found to be remarkably eccentric. The planetoid, in its path round the sun, sometimes approaches the luminary as closely as Mercury, from which its path swings out almost as far as Jupiter. As its year is found to be equal to something over 2½ of ours, there is little danger of it again coming near enough to collide with the earth for almost a thousand years.

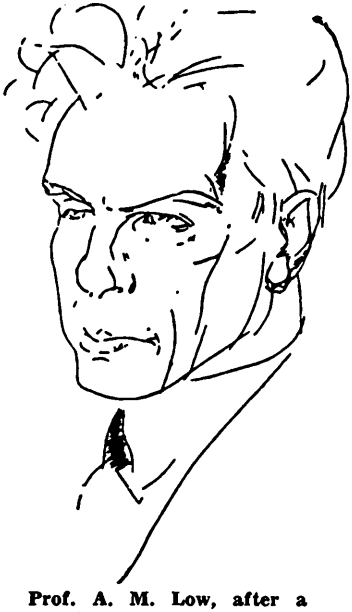
A Three-Year-Old Mystery (continued)

the sum total of stellar radiations. It may be that the skies as a whole are "broadcasting" on 14.6 m. all the year round.

Now let us look at the distances. If the Sun were the guilty party, its electro-magnetic radiation would reach us in approximately eight minutes. The nearest star to us, the alpha-Centauri, is 4½ light-years away. Sirius' "announcer" would not be heard on earth for nine years, the "speaker" on Vega would be thirty years older by the time we heard his signal and, if he happened to be on Betelgeuse, in the constellation of Orion, he would be dead and gone hundreds of years before we heard his voice, as the signals would take several centuries to reach us.

There is another interesting star from this point of view, the so-called Plaskett star. It would take *only* 10,000 years for a signal to reach us from this particular luminary. Thus you may be sure that if you get any electro-magnetic radiation from one of the distant stars you will hear "signals" that were generated some time ago, and in many cases very long ago—long before we were a civilised nation.

ANOTHER VICE-PRESIDENT FOR THE SOCIETY



Prof. A. M. Low, after a drawing by Alfred Wolmark *[By courtesy of "Armchair Science"*

Early in 1934, when the Society was proud of a membership reaching double figures, Herr Willy Ley, formerly Vice-President of the Verein für Raumschiffahrt E.V., thoughtfully provided us with a list containing the names and addresses of those in England who had either been members of or had enquired about the German Society.

Amongst others on this list was the name of Professor A. M. Low. On being informed of the existence of the British Society, this eminent physicist, who had long been interested in the possibilities of interplanetary travel and jet propulsion, at once communicated to us his appreciation of the work and aims of the B.I.S. Having expressed a desire to be associated with the Society, Professor Low was offered an Honorary Fellowship in deference to his position and many achievements in the world of science and invention. This he honoured us by accepting.

Subsequently, he has been of invaluable service in innumerable ways, and through the medium of *Armchair Science*, with which publication he is connected as Editor, he has done much to interest the public—and also men of science—in the problems of the conquest of space, and consequently, in the aims of the B.I.S.

At the last annual general meeting it was resolved that Professor Low be approached with reference to his possible acceptance of a position as a Vice-President of the Society. It was the opinion of the meeting that our distinguished Honorary Fellow sustained such a keen interest in the work of the Society as to warrant a closer connexion with the actual administration of its affairs. The Hon. Secretary, on a recent visit to London, enquired of Professor Low his attitude towards this request of the members and, as has been announced, he had no hesitation in thus associating himself more intimately with our efforts.

Professor Low's history of achievement is far too lengthy to detail in the space at our disposal. It is sufficient to record that he has been responsible for over 100 inventions, and amongst his 30 secret patents during the war, when he was in command of the Royal Flying Corps experimental works, were those for wireless torpedo controlling gear.

[Continued on Page 34.

NOTES AND NEWS

"Can a Rocket Escape the Earth?" is the title of an article of astronautical interest, by P. E. Cleator, which appeared in the April, 1936, issue of *Armchair Science.*

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Members of societies with an international scope should consider the advantages of learning the International Language Ido, the key to European Languages. Particulars from the Hon. Secretary, International Language (Ido) Society of Great Britain, 8, Kings Avenue, Woodford Green, Essex.

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The American edition of *Rockets Through Space*, published by Messrs. Simon and Schuster Inc., of 386, Fourth Avenue, New York, N.Y., U.S.A., is now available at the price of $2.50. Bound in a black natural finish with a brilliant silver label, this volume differs slightly from the British edition.

Enquiries should be made from the Publishers or from the Secretary, the American Rocket Society, 31, West 86th Street, New York.

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It is now generally admitted by all astronomers of note that a greater problem than was solved would be raised if it were discovered that the famous and mysterious red spot of Jupiter was a gargantuan copy of **Chambers's Twentieth Century Dictionary**—the Dictionary for the Scientist.

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All members and others interested in the **British Interplanetary Society** should note that the official address of the Society is now **46, Mill Lane, Liverpool, 13, England.** Matter should be addressed to the **Hon. Secretary** of the Society.

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The Council wish to acknowledge with thanks receipt of the following publications:—

Liquid-Propellant Rocket Development, by R. H. Goddard; *Astronautics*, by the American Rocket Society; *The Quarterly Journal*, by the Indian Air Mail Society; *Ido-English* and *English-Ido Dictionaries*, also the *Monatala Letro* by the International Language (Ido) Society of Great Britain; *Das Neue Fahrzeug*, by the E.V. Fortschrittliche Verkehrstechnik; and copies of *Centerbladet*, *Ralph Stranger's Science Review*, *Armchair Science* and *Novae Terrae* by the Publishers.

Printer's Blocks: Numerous blocks from Mr. E. F. Russell and a block of the Society's badge from Mr. Ralph Stranger.

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The Society is anxious to obtain copies of issues of the *Journal* prior to May, 1935. Will any readers willing to part with these particular numbers please communicate with the Hon. Secretary?

THUNDERSTORM CENSUS

By W. T. EYTON (Member, St. Asaph)

In aviation, the study of weather conditions will ever play an important part, and exact information will ever be a desideratum. In this respect, interplanetary communication and terrestrial rocket transport will have much in common with their sister science. Members will do well to lend whatever aid lies within their power to such a worthy cause as the T.C.O.

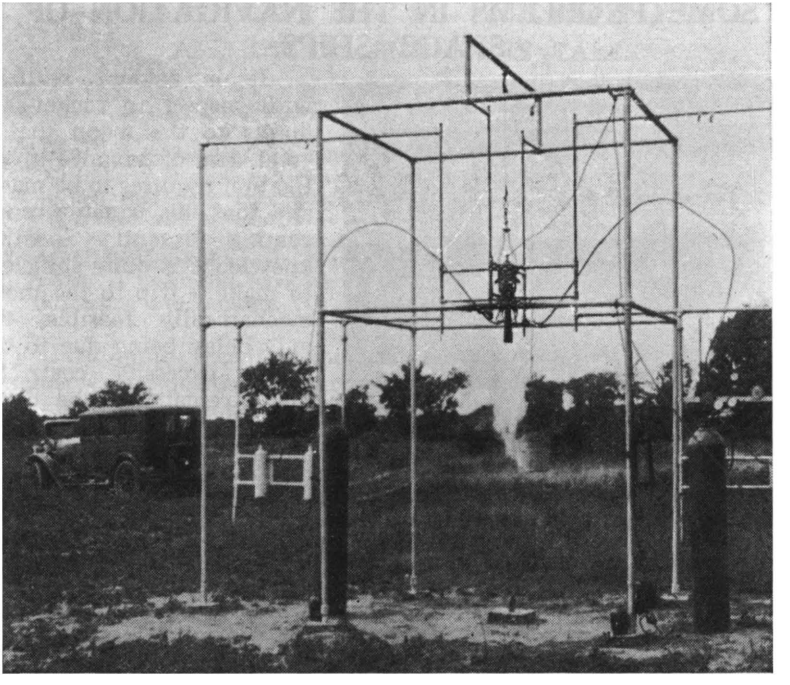
The Thunderstorm Census Organisation undertakes a complete survey of thunderstorms in the British Isles, and in this respect is carrying out much valuable research work. Already it has done much to increase our knowledge of thunderstorms, and with the increasing use of aviation, radio communications, etc., it is very necessary that this valuable work should be continued.

For this purpose, the Organisation has observers stationed all over the British Isles. The more observers there are the more carefully can be studied the vicissitudes of each storm throughout its course. Therefore, will anyone who reads this, and is interested in the relationship of thunderstorms to aviation or radio please help by sending us observations on such weather conditions.

The T.C.O. is not a society and, therefore, there is no subscription, but contributions towards stationery costs, etc. are most welcome. Specially printed post cards are provided free for the purpose of reporting on storms.

The Organisation is governed by a committee of the Royal Meteorological Society, and is directed by Mr. S. Morris Bower.

Will anyone who would like to send us reports, please write to me, William T. Eyton, at Plas-yn-Cwm, St. Asaph, Flints., and I will be pleased to provide them with further particulars of the Organisation and send their names to the Hon. Director of Survey.



[*By courtesy of "Armchair Science"*
A Rocket Motor of the Cleveland Rocket Society during a Firing Test.

CLEVELAND EXPERIMENTS

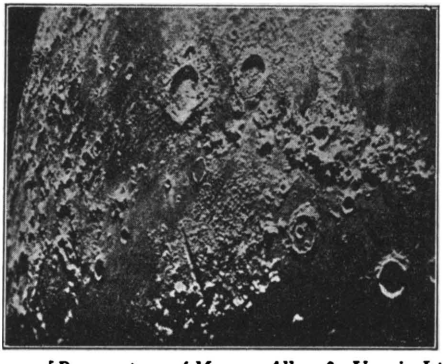
One of the best-equipped rocket-testing grounds in existence is that of the Cleveland Rocket Society, U.S.A. The proving stand (as shown) consists of a twelve-foot steel structure on which is mounted the rocket motor to be tested. The cylinders on the ground supply the necessary fuel and combustion-supporting gas to the combustion chamber.

When the stand is in use, observations are conducted from behind the safety of a control trench about thirty feet way from the framework, and six feet deep, seven feet wide and 23 feet in length. The whole is covered with a solid roof of 500 square feet.

Experiments of the Cleveland group are directed at the present time towards the perfection of the rocket motor as the result of numerous firing tests carried out at this proving field.

Although as yet no rocket of the Cleveland Rocket Society has taken to the air, the satisfactory completion of the necessary tests will lead inevitably to the flight of their first rocket-driven projectile.

SOME PROBLEMS IN THE NAVIGATION OF SPACE-SHIPS



[*By courtesy of Messrs. Allen & Unwin Ltd.*

"It is advisable to investigate echoes from the Moon." A portion of the Lunar Surface.
—from Mr. P. E. Cleator's "Rockets Through Space"

It is seldom realized with respect to rocket-ship flights to the moon that a great deal of advance investigation requires to be made, and that this is **actually becoming urgent.** Existing knowledge is quite sufficient to make a trip to the moon mechanically feasible, the only delay being due to the rather excessive cost. So much remains to be done, however, in investigating navigational problems that it is **improbable that sufficient navigational information will be available in time.** Much of the work that requires to be done (such as the construction of acceleration integrating instruments, and the calculation of orbit charts) is essentially work for specialists, but a lot requires to be done in the way of radio work on which any members with a knowledge of radio could be most helpful.

In the first place, it is essential that the space-ship should be in constant communication with its base station. In this connexion it is advisable to investigate echoes from the moon. The wavelengths at which they occur most markedly should be noted, the angle of elevation of the moon from both transmitting and receiving stations, the angle of arrival of the reflected waves, the plane of polarisation, and also the effect of reflectors.

In the second place, the possibility of measuring the velocity of the space-ship by the variation of a heterodyne frequency should be investigated. This is probably the most accurate method of determining the velocity of a space-ship. The main point in this work is to design a receiver of exceptional stability of heterodyne frequency. Most crystal controlled transmissions should be sufficiently stable, but if an exceptionally good receiver can be made, it might prove worth while designing a special transmitter to work with it. Actual tests could be carried out on moving vehicles, as the instrument should be able to detect a velocity difference of 20 m.p.h.

I shall be pleased to give technical advice and circuit suggestions to any member engaging on this work.

The 362 Radio Valve Company, Ltd. have produced several special valves for the radio amateur which would be particularly suitable for

[Continued at foot of Page 33

APPLETON'S INFERNO

AND OTHER GRIM FAIRY TALES

By P. E. CLEATOR

The Editor, on reading the following controversial article (with the aid of "Chambers's Dictionary"!) was greatly astonished to learn of the various forms of hell that have been given credence throughout history. True, he was acquainted with certain forms (and he expected at least one prolonged experience in, he hoped, the far distant future), but he was by no means prepared for such a widespread variety as is described. Mr. Cleator's views on the subject, which at first sight have no connexion with the B.I.S., will be found both interesting and amusing.

Until quite recently, the inventing of hells has remained the exclusive and jealously guarded privilege of hierophants and other traders in eschatological pish-posh. And even in these days of pagan enlightenment we continue to be entertained by their glowing accounts of torrid Things To Come. The reason is not far to seek. To the charlatans who so desperately strive to perpetuate these pious frauds, such a threatened warm welcome is an essential feature of their gloomy ponerology—hence the puerile solemnity with which it continues to be invoked against all who temerously thumb the nose at their bogus thaumaturgy. A humble, truth-seeking agnostic myself—i.e., an infidel, an unbeliever, a pagan, a barbarian, an utter scoundrel, a godless renegade (once a near-octogenarian virgin, so-called, publicly denounced me as the Devil himself in terrestrious disguise, commanding me the while to get me behind her !)—I have been the subject of every zany rite of anathematisation ever heard of. In all, my supposedly wayward, hypothetical soul has been earmarked for somewhat prolonged spells—ranging from a mere 21 days to duration, ever and ever, and all eternity—in no less than 153 of the better class centrally-heated hells, irradiant infernos, and picturesque purgatories which, it has long been affirmed, infest the interior of This Ball. My promised *post-mortem* itinerary includes such well known thermal regions as Gehenna, Erebus, Hamistagan, Sanjiva, Drujo-demana, Kalasutta, Samghata, Roruva, Tapana, Avichi, Pratapana, to name but a few. Neverless, I still don't believe that Jonah swallowed the beluga, or that the burning of tortoise fat causes storms, or that Zoroaster's seed ever floated on a sacred lake, or that an amorous prakriti ever pursued, to her undying shame and everlasting disgrace, a reluctant and would-be virtuous purusha. Epigrammatically, I'm damned if I do—and I'm damned if I don't!

But am I alone in my sinfulness and turpitude ? To ask the question is almost to answer it. Open disbelief in the various hell mythi, for instance, was surely never so evident in the past as it is to-day. And if a moronic minority yet profess to credit the pyromanical postulations of the priests, this minority, you may be sure, owe their otherwise

inexplicable credulity to some ulterior motive. No sane man who claims to believe in hell entertains for one moment the fantastic notion that *he* will ever go there. But the reason for his incredulity may well take the form of a mother-in-law, a rich and miserly uncle, or a successful and envied business rival. In such circumstances, I might be sorely tempted to believe in hell myself. But it will be obvious that to-day hell as a theological threat compares with space in the matter of emptiness—to the disadvantage of space. This sad state of affairs, I incline to believe, results from a cardinal error which was made when the important matter of the location of hell was considered. After the conception of the fraud, there would remain to be enacted the ceremony of choosing and consecrating a suitable site. And as every student of ghostly pathology well knows, those entrusted by the various gods to perform this sacred rite one and all found regions subterrestrial an irresistible lure. There, surely, was a situation providently provided. Not only was it conveniently near to hand, but it was undeniably and quite easily demonstratively hot. Here I pause reverently to admire the ineffable wisdom, the irrefutable logic, the incontrovertible evidence of divine guidance thus disclosed. Hell is hot; so is the interior of the earth; *ergo*, there lies hell! No theological theorem could hope for a proof more indisputable.

It was the discovery that this earthly paradise, this geocentric gem of the cosmos, was in reality an insignificant, life-infested ball cast in a mould of Satanic sphericality which, I submit, has all but extinguished the fires of hell. For there must inevitably have been realised that no finite sphere could be expected safely to house an interior population of an unlimited number. The Devil's Domain must of necessity be doomed to become fatally overcrowded, lamentably incapable of accommodating the soul of another sole. Once this danger was realised by the archimages, I suspect that their secret desire was immediately to have done with the fraud. True, quietly to abandon hell after all the centuries devoted by their worthy and no less inspired predecessors to keeping its fires burning, suddenly to confess that it was just another Grim Fairy Tale, would hardly be an action conducive to the preservation of their bogus prestige. But is not this danger more apparent than real, in view of the fact that the whole history of their mumbo-jumbo consists of an unbroken series of no less damaging admissions? I believe that it is, for what, after all, is the confession of yet another holy lie? On the other hand, imagine their having to admit that Darwin, far from spending eternity submerged to the neck in boiling pitch, as he so justly deserves, is at this moment sitting at ease on a marble slab, gaily strumming on a harp with the elect! Or that Nietzsche is even now flapping his wings in preparation for yet another heavenly glide! Or that H. L. Mencken, the Baltimore Beelzebub, is destined, when the hourly prayers for his decease at last receive attention, to be presented with a halo instead of a tail, and elected an archangel forthwith! No; if only for Mencken

alone, hell must be preserved in all its ancient fury—nay, stoked up and quadrupled in its fury!

I do not here propose to weary you with an account of the desperate efforts made by the archdruids of the ninety and nine one and only true cults to explain away the old hells, and at the same time convincingly portray new and even hotter ones. The colossal extent of their failure in this laudable endeavour is surely plain for all to see. Even the announcement that branch or sub-hells would be inaugurated in Mars and Venus, and in time in all the planets, in order to relieve local congestion, failed to solve the problem. And, ultimately, as is well known, the suggestion was squashed from within —in this country by the British Hells for British People movement, and elsewhere by the Anti-alien Hell Union of Terrestrial Bipeds.

Having at last reluctantly given up hope of ever encountering even a remotely plausible solution to the problem, I have recently gone to the trouble of devising one myself. Believing it to be my duty to my fellow men, I pass it on freely, and ask in return nothing more than a slight measure of reciprocative redemption. My prescribed 90,000 hell-years in Milhakupa might be reduced, say, by half. Or by a third, even. I am a city man, and my proboscis is somewhat sensitive to certain odours bucolic. At all events, the prospect of being immersed in a bog of dung as food for worms—the punishment concerned—is not quite so pleasing as the thought of being slowly hacked to pieces, which awaits me in Sanjiva, or of being knocked about with red hot clubs—one of the pleasures of Kalasutta. But to return to my theory, evolved only after days of copious prayer and deep meditation. It is my modest claim that it completely solves the whole burning question. My hell is capable of unlimited accommodation, the reality of its fires is beyond dispute, and it is within easy reach of all. Moreover, old beliefs are not discredited, challenged, or even questioned. My theory, on the contrary, actually confirms them.

Beginning with the subterrestrial hell of old, it may be safely assumed that thanks to the sphericality of This Earth, conditions did eventually become not a little congested below. Hence the plague of London, the death of Queen Anne, the fall of Rome, prohibition, the Salvation Army, the Baldwin misgovernment, and other unmistakable signs and portents of demiurgic displeasure. The damned became so jammed, indeed, that old tenants were handed back their bowels, scraped clean of brimstone and sulphur, and, after being carefully extinguished and deodourised, told to get to heaven out of it. Naturally, there was much discontent amongst those who remained. It was at this point, unless the visiting angels have misled me, that Satan decided that hell must be moved into more commodious quarters—the site of his choice being the emyprean. And so it came to pass that for six days and six nights there was an unceasing transmigration of lost souls into the stratosphere. The exact date on which the daemonic exodus began, originally revealed to me after incessant

prayer, and since confirmed by laborious calculations, was Friday, March 13th, 1933. As will readily be evident, at least to all theologians, this is conclusively proved by the fact that the earth moves round the sun, and that the square of the earth's radius does not equal that of the base of the Great Pyramid, even when multiplied by seven times seven.

So much for theory. And now let me reveal that this hell-in-the-heavens has actually been detected, though hitherto it had remained unrecognised as such. I refer to the recent discoveries of Professor E. V. Appleton, whose amazing revelations surely outrival those of Dante, St. John, and Arta-i Viraf combined. This modern apocalypt has disclosed the astonishing fact that old fashioned ideas have been swept completely away. Hell, indeed, has been modernised throughout. Customers are no longer bathed from head to tail in boiling pitch. They suffer a continuous bombardment of electrons instead—winter noon concentration, 310,000 electrons per cubic centimeter of hell; summer noon ditto, 570,400. Even the temperature is kept under scientific control, it being standardised (in summer at noon) at about 1,000 degrees Centigrade. And the threat of overcrowding, of course, no longer exists. Space offers infinite scope for expansion. Doubtless it all seems very amazing, but in reality it is as simple as A.B.C., or at any rate no more complicated than D.E.F.—Region F being the official designation of this heavenly hell.

And the consequences? There can be no doubt but that the earth, deprived of its calorific core, will grow steadily cooler and cooler, and it may be prophesied that snow will fall next winter, probably at the Poles. In the meantime, it has been triumphantly announced (*vide* the *Daily Mail*) that ultra-short waves cannot be of real use for broadcasting, and that man will never be able to fly to the moon. Alas! subscribed as I always have to the belief that it will be necessary to move heaven and earth in order to promote even a modest lunar journey, it would now seem that I shall be called upon to affirm that such an undertaking will also necessitate the moving—or at least the raising—of hell. But I am forgetting. *I don't believe in hell!*

THE AUSTRALIAN ROCKET SOCIETY

A third unsuccessful attempt was made by the Australian Rocket Society recently to launch a rocket-mail across the Brisbane River. The attempt was made from the Moggill side of the river, facing Riverview.

The rocket, which was five feet overall, with a diameter of 15 inches, was of metal. Enclosed in the nose was a compartment in which had been placed 400 letters and 100 postcards. Five charges were inserted with fuses, but the weight proved too much for the charges used, and the rocket plunged into the river.

Efforts are being made by the B.I.S. to establish communication with the Australian organisation, and members will be informed in due course of the result of these enquiries.

AIRMAIL BY ROCKET ?

The following article is reprinted by kind permission of the proprietors of the "Scientific American." Further details of this and subsequent experiments, in which Herr Willy Ley played a prominent part, are obtainable from "Ad Astra" (Supplement to the "Journal" in "Ralph Stranger's Science Review," "Astronautics," and from an article by Herr Ley, himself, which appears in the June issue of "Armchair Science."

An unsuccessful but noteworthy attempt to send airmail by rocket plane was recently tried between Greenwood Lake, N.Y. and Hewitt, N.J., a distance of some three miles. The rocket was to carry mail with full authorisation of the Post Office Department, and beautiful stamps had been specially printed for the flight.

The wing and tail surfaces of the rocket mail plane were built of duralumin. The wing span was 25 feet and the fuselage was 11 feet long. The rocket motor was mounted in such fashion that the thrust or reaction passed through the centre of gravity. A catapult was to be employed to launch the rocket plane into the air, at the same angle as the subsequent climb under the power of the motor, but in the trial flight, the plane did not take to the air. The motor contained no moving parts and there was no propeller. Two tanks were mounted within the fuselage; one contained liquid oxygen, which at the instant of evaporation has a temperature of minus 200 degrees, Centigrade, and the other a mixture of alcohol, gasoline and methane. A third tank contained nitrogen under pressure which was utilised to drive the oxygen and the fuel into the combustion chamber, which was a simple cylinder with a nozzle for the release of the gases.

Once the fuel was electrically ignited in the oxygen vapour, combustion should have continued for some 30 seconds, the products of combustion issuing rapidly from the nozzle providing the necessary thrust by simple reaction.

The undertaking was encompassed with many difficulties in the motor itself, in the stability of the rocket airplane, and so on, and the final trials were greatly hampered by the intense cold at Greenwood Lake. Regardless of the failure of the first flight, the undertaking is of real technical interest, and the result adds just that much more data to the files of the rocket proponents.—A.K.

CORRESPONDENCE

[In future issues of the *Journal*, correspondence of general interest will be published under this heading. Should any members not desire their communications to be made public they should inform the Society to that effect].

A LONDON SECTION?

Dear Sir,—I have been making a few contacts since my last letter, and though a considerable amount of useful work may be initiated by putting individual members in touch with one another, a lot more would result from a London meeting, no matter how small. I am sure that the members would be glad to meet somewhere at their own expense, even if only unofficially. This could easily be arranged, and I would be glad to do any arranging necessary.

Members could be communicated with individually, and accommodation arranged for as many as were intending to come. By making it unofficial everyone would understand that it was at our own expense.

For other reasons, however, I think a permanent London Branch is advisable, if only in the form of a Local Secretary, who could collect subscriptions, etc., as I think this would appreciably increase the membership.

I have been doing my best to get new members (while limiting my activities to such as are likely to prove useful). I find that while it is easy to interest anyone and make them agree that they will join, it is another matter to get them to say "I will send off my subscription now." If there was someone available to take such subscriptions in London, it would be fairly easy to clinch the matter.

Further, with regard to finance, it is obvious that large sums will be needed for research and that it behoves any members who might be able to interest any money to do so. But I feel that he will be severely handicapped on asking someone to dub up a thousand pounds or so (with little hope of any advantage from so doing) if he uses the "Member's Notepaper." I can't help feeling that it looks more "Amazing Storyish" than like a serious scientific society.

Hoping that you will not consider that I am being unduly critical for a new member. I remain, Yours faithfully,

J. H. EDWARDS

c/o The 362 Radio Valve Co., Ltd.,
Stoneham Works, Stoneham Road,
Northwold Road, Upper Clapton, E.5.

[If sufficient support is forthcoming and satisfactory arrangements can be made, the Council will consider the formation of a London Section. Those interested in an informal meeting such as is proposed should communicate with Mr. Edwards when the necessary arrangements can be made. Mr. Edwards, in deference to his own request and his enthusiastic work in stimulating the interest of Londoners in the Society, has been appointed our Official Representative in the Metropolitan Area. We agree with the remarks concerning the notepaper, and at a recent Council meeting, it was decided to adopt a new, more dignified design for members' stationery. This will be issued when present low stocks are exhausted].

A **new design** of Society notepaper is now available for inter-member and other correspondence. Specimen sheets may be obtained on request. Price: 2/6 per 100 sheets (post free) in the British Isles (excluding the Irish Free State); 2/- per 100 sheets, **plus postage**, for all other countries. Members can have their name and address printed on the heading for a special extra charge.

NEW MEMBERS

The following new members have been elected since February last:—

Honorary Fellow

Ralph Stranger	Bexley Heath, Kent

Fellows

C. S. Cowper-Essex, B.A., J.P.	Hawkshead, Ambleside
H. H. Hudson	South Chingford, E.4.

Members

P. Bois	Farnham, Surrey
W. A. M. Burden	New York City
G. M. Buxton	Lee-on-Solent, Hants.
F. Coueslant, B.Sc., A.C.G.I.	London, W.7.
J. H. Edwards	South Chingford, E.4.
N. F. Ellison, M.B.O.U.	Wallasey, Cheshire
C. F. Hall	Grantham, Lincs.
R. Lencement, Ing. E.T.P.	Paris
R. A. Newman	London, S.W.1.
T. Salisbury	St. Helens, Lancs.
A. W. Vaisey, M.B., B. Chir.	Lichfield, Staffs.
G. Wilkinson	Bootle
E. Wood	Hednesford, Staffs.

Associate Members

B. G. J. Barker	Chadwell Heath, Essex
W. Heeley	Manchester
D. J. McLaren	Whitby, Yorks.
I. McNeil	London, N.W.11.
H. Morris	Forest Gate, E.7.
J. H. Plimsoll	Burton-on-Trent
G. Preston	Manor Park, E.12
C. A. Rumary	Portishead, Somerset

The following have been appointed to **Founder Fellowship** by the Council:—

From Membership

T. McNab	Liverpool

From Associate Membership

W. Dunbar	Birkenhead

The following has graduated from Associate Membership to **Membership:**—

H. I. Stroud	Belmont, U.S.A.

Some Problems in the Navigation of Space-Ships (Continued).

this work (for instance the RFP 15 and the RFP 60 are transmitting pentodes at reasonable prices), and would be prepared to make others if they were needed.—J. Happian Edwards (Member, B.I.S.), The 362 Radio Valve Co., Ltd., Stoneham Works, Stoneham Road, Clapham, E.5.

The New Vice-President (Continued)

In 1914, in London, he demonstrated and lectured upon the Low television system at the Institution of Automobile Engineers, this being followed, in 1918, by the accomplishment of infra-red photography. During the period 1919-22 he held the position offered to him by the Army Council of Hon. Assistant Professor of Physics at the Royal Artillery College. Professor Low is a world authority on the photography of sound.

As an author, he has been prominent when writing of the possible future development of civilisation, and in several of his books and articles he has dealt with the subject of rocket propulsion and interplanetary travel. Over 20 years ago, in one of his books, he suggested the use of the rocket for the conquest of space, and his more recent work, *Our Wonderful World of To-morrow* (Ward, Lock & Co.), contains a most interesting chapter on "Interplanetary Travel."

One of Professor Low's chief aims is the encouragement of original research work, and these aims have been made very evident in the support accorded by him to this Society especially in its earliest days. It is our earnest hope that our future development will justify such faith in an organisation, undertaking what is regarded by many as an impossible and fantastic project.

STOP PRESS

As this issue went to Press, we learned with regret of the temporary suspension of **"Ralph Stranger's Science Review"** and all W.R.R.I. activities following an unfortunate accident to Mr. Ralph Stranger. It appears that the May issue of **'Science Review'** will be the last until further notice. B.I.S. Supplements appeared in the April and May issues. We would like to express our deepest sympathies to Mr. Ralph Stranger, and our best wishes for a speedy recovery and the early resumption of his valuable work in the interests of Astronautics.