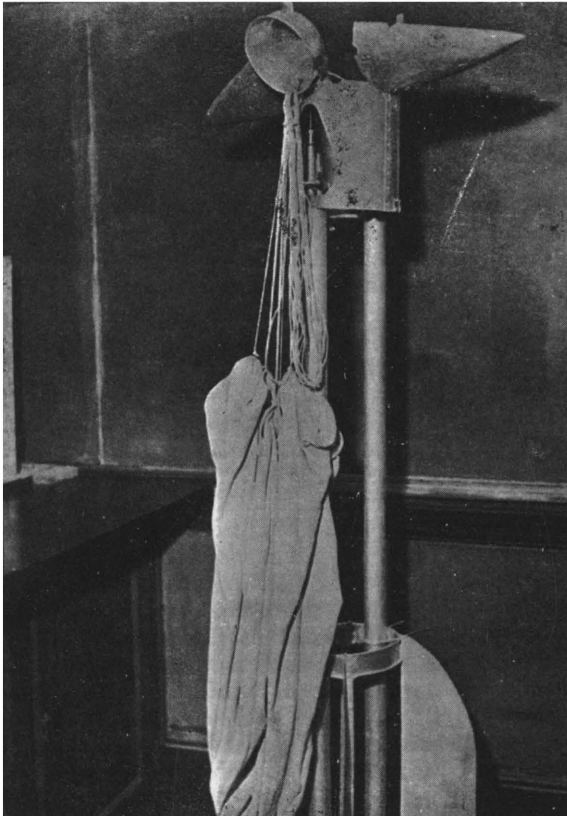


# Journal of the British Interplanetary Society

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Courtesy

The American Rocket Society

**Experimental Rocket No 1 of the American Rocket Society**  
[See *Why Not Shoot Rockets?*]

## EDITORIAL

By P. E. CLEATOR

SOME little time ago a lecturer (was he Mais?) was describing the discoveries he had made during a study of the American people. An important difference between Americans and Englishmen, he said, was this: When confronted by any suggestion of a revolutionary character, an Englishman immediately asked "Why?", while an American, with equal promptitude, enquired "Why not?"

As if in confirmation of this epigrammatical definition, Mr. G. Edward Pendray, writing in this issue, has entitled his contribution *Why Not Shoot Rockets?* It seems to me, and I venture to assert, that there can be but one reply to Mr. Pendray's question—an echoing "Why not?"

I am convinced—and I think all members will agree—that what has been, and is being, done in other countries in the way of rocket experimentation can also be done here. In the past, it has not been a lack of faith in, or a disinclination to conduct, practical research work which has been responsible for the Society's inactivity in this respect. On the contrary, I have yet to meet with a member who is not most anxious to participate in such work. No; the sad truth is that, right down to the present, our slender financial resources have been constantly drained by the demands of a few essentials—such as the *Journal*, other literature, and postal charges—without which the Society could hardly have continued to exist at all.

Thanks, however, to a steady, if slow, increase in membership, we shall in future be assured of successfully meeting the demands which have proved so burdensome in the past. There is now every prospect that we shall soon be in a position to begin the vital task of translating theory into practice. To this end, members will gladly learn that an Experimental Committee is being formed, and a research programme drawn up. A Research Fund has also been established, and contributions thereto will be gratefully received and acknowledged by the Hon. Secretary.

I need hardly add that full advantage will be taken of the generous offer of co-operation with which Mr. Pendray concludes his letter. Nor do I think that it is too much to hope that we shall soon be engaged in the suggested co-operative research programme. Indeed, such a course is essential, if needless and wasteful duplication of effort is to be avoided.

The day will surely come when we are in a position to undertake an experimental programme of a far more ambitious nature than that to which we humbly aspire to-day. For we have progressed steadily; we are still progressing steadily; and we shall continue to progress steadily. My only regret is that during the period of growth that is to follow, the pioneer members of the past, the present, and the immediate future, will be temporarily denied the advantages which posterity will provide.

## WHY NOT SHOOT ROCKETS ?

An Open Letter to the Editor of the *Journal* of the British  
Interplanetary Society

By G. EDWARD PENDRAY

(President of the American Rocket Society)

MY Dear Mr. Editor,

Several months ago you were good enough to ask me whether I would write an article for your publication. Needless to say, the proposal flattered me, and I should have complied long ago, except for one thing: What is there left to be said about rockets, in a general way, that has not already been said, and well said, half a dozen times ?

Among ourselves, haven't we already *talked* enough about rockets and their possibilities, in all conscience? If you will examine the old material, as I have been doing lately, you will see that it contains precious little information about rockets; it is compounded primarily of conjecture, theory, imagination and hope. The fact is that we know almost nothing about the subject. We have all been too busy writing, speaking and talking about rockets to learn anything practical about them.

I know it is heresy to say such things. When I first made remarks of this kind at meetings of the American Rocket Society (then the American Interplanetary Society) a storm of objection was raised. When we actually began to consider experimenting, a number of our older members dropped out—thin-skinned creatures, evidently, who could not even stand the thought of putting our sacred declarations of faith to the test of the proving stand and the launching rack. Most of the objectors declared that it was not within the province of a society to carry on experiments—that was the work of lone, daring heroes. Our task was to encourage such private ventures, but not initiate them.

Others said that the society could not experiment because the cost would be too great. It was actually estimated that a small experimental rocket would cost more than \$1,000, whereas the society's treasury at the moment boasted somewhat less than \$50. Some said what many thought but left unsaid: that rocket experimenting is dangerous. Several of us might get hurt. While all were willing to see private experimenters abroad martyr themselves in the cause, none wanted to take the chance himself.

Now, of course rocket experimenting is dangerous, and quite probably it could be very expensive, too, but in a world of free spirits endowed with curiosity, imagination and will, there are ways of overcoming all such obstacles. It is because I suspect that your society is now going through some such phase as ours was then (about 1931) that I venture to tell you about our early experiments, and how we overcame the many serious difficulties, including lack of money, data and experience.

In those days nothing of a concrete nature had been published. It was first necessary for one of us to make a trip to Germany to see what experimenters were doing there. This pleasant task fell to me, and I did make such a visit (at my own expense) in 1931. When I returned my enthusiasm was sufficient to swing a portion of the society with me, and we established our first Experimental Committee.

At the beginning we had only some notes and drawings I had made in Germany, and a general understanding of the mathematics and physics of the problem. I drew plans for what I thought would be a suitable motor. Mr. H. F. Pierce, a young engineer, spent some time with me in planning a suitable experimental rocket that would be inexpensive to make, but which we hoped would at least attract attention to the value of the programme.

Well, to make a long story as brief as possible, Mr. Pierce made a wooden pattern from my motor drawings, and from that we had the Aluminium Company of America cast three rough motors of a duraluminium alloy which the engineers of the company thought would be best for our use. We also purchased two pieces of standard aluminium tubing, two inches in diameter and six feet long. Mr. Pierce threaded the ends, and screwed caps into them, using litharge and other plumber's materials to make the joints leak-proof. Through the upper caps went holes for the feed tubes, fill valves and other simple gadgets needed to fuel the rocket, supply it with gas pressure, provide for safety, and turn it on from a distance at the proper time.

The motor was mounted on a tie-rod connecting the upper ends of the two tanks. It was to be cooled with water. The fabrication of the waterjacket gave us some difficulty until we discovered that the motor would fit nicely into a one-quart aluminium cocktail shaker which was just then being given away as advertising by a chocolate-drink concern.

The rocket was now complete, except for vanes, a parachute container and a parachute. Mrs. Pendray (Leatrice Gregory) made the parachute at home, from silk material purchased at a departmental store, and after a pattern devised by herself and Mr. Pierce. They studied a large man-carrying parachute at an airplane exhibition to see what the shape should be, and by a simple application of mathematics decided that the proper size for our fifteen-pound rocket should be four feet in diameter. The parachute container in the rocket was a small aluminium saucepan minus a handle. It was purchased at a knick-knack store for ten cents, and supplied with a spring for ejecting the parachute. Over it was a hood-like contrivance in two parts, which Mr. Pierce made by spinning the metal on a rented lathe. The rocket was completed by adding hoops of aluminium at the lower end, to which were fixed four light fins cut from sheet aluminium.

By midsummer of 1931 the American Interplanetary Society had a rocket, and a good one, too. The next problem was to test and shoot it. In the neighbourhood of New York there are no fields large enough to set off such an unpredictable projectile. Moreover, we had not the haziest idea what would happen when we filled up the tanks and set the rocket off. News of disastrous explosions abroad had filled us with apprehension.

After three months of roving about the countryside, during which we inspected army fields, grasslands, waterfronts and even the dumping grounds for ashes and refuse in an outlying portion of the city, we found an old farm about 100 miles out of the city that could be used for our purpose. By this time the remaining members of the society had been thoroughly aroused to the adventure of shooting our rocket, and fully a score of them turned out to help dig trenches, build a wooden launching rack, and otherwise make themselves useful. Three week-ends were spent in preparation. Through our eloquence we succeeded in inducing the Air Reduction Company, one of the largest of the American liquid air companies, to provide us with fifteen litres of liquid oxygen without cost. We purchased a second-hand oxygen container for \$15 through the company (they cost about \$100 new), and the Air Reduction Company also shipped a tank of compressed nitrogen across New Jersey to our proving ground, charging us only the expressing cost.

The success of that first test is now history, which can be read in the old Bulletin of the American Interplanetary Society. It marked a turning point in the history of our society, and, I am boastful enough to believe, in the history of rocketry as well. We have been told by distinguished European experimenters—and I think it is true—that the experimental programme of the American Rocket Society is now the largest and most forward-looking of any in the world. We have attracted many new members to replace the old ones who were frightened by the thought of experimentation. Our new members are men of importance and training. We now have an engineering and scientific society instead of a debating society. We have attracted the attention of engineering groups, and have, with a few inexpensive experiments, “sold” the rocket idea to men of high standing and influence, who previously thought the whole notion absurd. I think you may be interested in this little tabulation of the cost in cash of our first rocket experiment:

THE ROCKET		\$
Motor castings (3) ... ..	...	4.50
Tanks (standard tubing) ... ..	...	3.00
Fuel tubes, etc. ... ..	...	1.00
Valves, etc. ... ..	...	.50
Sheet aluminium ... ..	...	1.50
Machine hire (for special work, etc.)	...	10.00
Parachute material ... ..	...	5.00
Parachute case ... ..	...	.10
Incidentals (est) ... ..	...	5.00
Total ... ..	...	\$30.60

\$30.60

THE TEST		\$
Material for Test Rack (wood) ... ..		10.00
Nitrogen (express) ... ..		1.20
Gasoline ... ..		.10
Batteries, wiring, etc. for remote control		2.50
Oxygen (Contributed) ... ..		
Incidentals ... ..		5.00
	Total ... ..	\$18.80
	Grand Total ... ..	\$49.40

These figures do not include the cost of the oxygen container, which was in the nature of a permanent acquisition. Nor do they cover the personal costs incurred by members for meals and lodging near the proving ground before and during the tests. Those are expenses, however, that must be put down to education and entertainment, and none who saw the experiment considered that they had received too little for their money.

Now, I should like to suggest that British rocket enthusiasts ought to start experimenting as soon as possible, if only to begin partaking of the fierce joy to be derived from personal participation in such work. There are so many problems to be tackled, and so few of us now engaged in the work, that no matter where you begin, you are bound to turn up new information.

An entire summer's programme, for example, might be devoted simply to dropping dummy rockets off a high cliff or bridge, to master the problem of parachute or wing release and control. A simple catapult device might be constructed to study the problems of aerodynamics as they affect rockets. A great many tests remain to be made in the development of efficient liquid fuel rocket motors, in the search for suitable metals, in cooling the motors, in the proper method and point for the injection of the fuels, in nozzle construction and other factors.

Experimentation is the only road to the development of the rocket, and rocket societies are to-day the only hope for extensive, well-informed and useful programmes. If your group has a single member who can use a lathe, and others with training in mathematics, physics and aerodynamics—or even if it has a small inner circle of enthusiastic and adventurous persons who are willing to apply themselves to the mastery of these fields—you should delay no longer in organising your experimental project. For the cost of a postage stamp, you have at your disposal a good little fund of preliminary information, and any additional suggestions, plans or formulæ that the American Rocket Society can give. What a fine thing it would be for the rocket if these two English-speaking organizations were to join hands in a co-operative, well-rounded research programme!

Yours sincerely,

G. EDWARD PENDRAY.

## ANALECTA

Lack of space has necessitated the omission of the usual list of new members. Since the publication of the previous *Journal*, eight new members have been elected. Their names will be given in the next issue.

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Professor Nikolas Rinin, Ing. Friedrich Schmiedl, and Herr Willy Ley, three of Europe's leading rocket experimenters, have recently been elected honorary members of the American Rocket Society.

\* \* \* \*

The coming publication of Mr. P. E. Cleator's book, *Rockets Through Space*, by Messrs. George Allen and Unwin Limited, promises to be an event of no small importance in the world of rocketry. Further details will be found in the Publisher's announcement on page 14.

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What is said to be the first transportation by rockets of animate objects is claimed for Mr. S. H. Smith, our new Calcutta member. On June 29th last, Mr. Smith successfully shot a rocket over the Damodar River containing two live birds and nearly two hundred letters. A detailed account of this, and other, experiments by Mr. Smith is to be found in the *Star of India*, dated July 1st, 1935.

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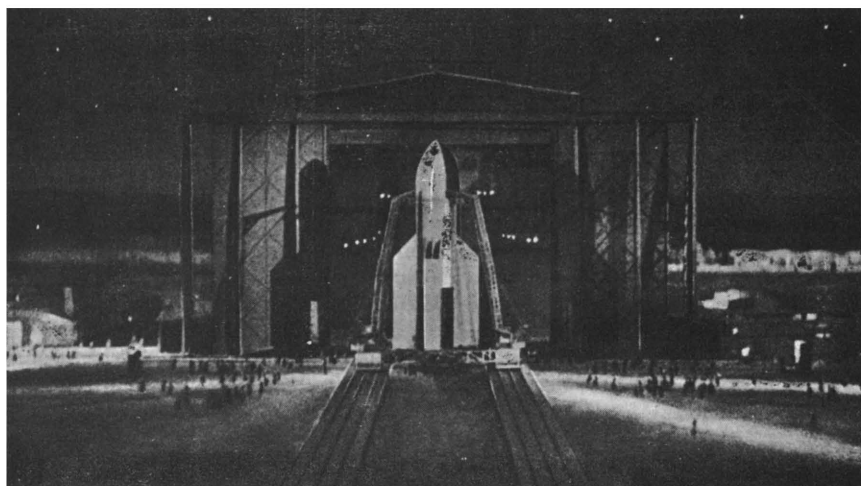
Members are reminded that Society notepaper may be obtained from the Hon. Secretary at a nominal charge of 2/6 per 100 sheets, post free.

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Just as the coming of the aeroplane has added to our vocabulary, so rocket research, as it progresses, necessitates from time to time the coining of new words, or imparts new meanings to existing words. The following examples are taken from a list which was recently published in *Astronautics*, the official publication of the American Rocket Society:

- ASTRONAUTICS—the science of extra-terrestrial navigation.
- BLAST CHAMBER—the part where fuels are burned.
- CHOKE—narrowest part of nozzle.
- FIN—wing-like device for stabilising flight.
- FLARE—rate of expansion of nozzle.
- FUEL PORT—fuel entry point into blast chamber.
- LAUNCHING RACK—device for launching rockets.
- MOUTH—widest part of nozzle.
- NOZZLE—constructed opening through which hot gases escape from blast chamber.
- PILOT—apparatus for guiding rocket flight.
- ROCKET MOTOR—blast chamber and rocket assembly.
- ROCKETEER—one who experiments with rockets.
- SHOT—a rocket flight.
- THRUST—the "push" of a rocket or rocket motor.
- THRUST AUGMENTER—a device for increasing the thrust.

Eventually (who knows?) these, and other astronomical terms, may be found in **Chamber's Twentieth Century Dictionary**, the Dictionary for the Scientist.



Scene from the Ufa Film, *The Girl in the Moon*, showing the space-ship ready for launching. The vessel was designed by Professor Hermann Oberth, famous pioneer rocket experimenter.

The above is an illustration taken from a book entitled *Rockets Through Space*, which is shortly to be published. It is by P. E. Cleator, and it is certainly the most comprehensive work yet written in English on astronautics, the science of space travel.

The book begins with a survey of extra-terrestrial aspirations, ancient and modern, and describes how the rocket came to assume the vital role of a means of propulsion effective in a vacuum, and of the early efforts to produce a reliable form of the device for this purpose. Then follows an exhaustive analysis of the many problems, difficulties, and dangers which must inevitably attend an attempt at a journey through space. And in a final summing up of these problems, the possibilities, and the most probable manner, of their solution are thoroughly examined.

The early efforts to translate theory into practice next receive attention, and then a detailed account of the world-wide experimentation which is in progress to-day is given. This is followed by a prediction regarding the progress of to-morrow, including an outline of the many epoch-making achievements which will herald the ultimate conquering of space. The final chapters concern the far-reaching consequences to which the acquisition of other worlds may quite conceivably lead.

*Rockets Through Space* is an immensely stimulating work which stands quite alone in its field. It will find a very wide and interested public, but we imagine it will be of particular significance to members of The British Interplanetary Society, and all British scientists.

(The publishers, George Allen Unwin, Ltd., hope to have this book ready in December next. It is fully illustrated and the probable price will be 7/6. The book will be available in America).