A S T R O N A U T I C S

Official publication of the American Interplanetary Society, 147 West 86th Street, New York City

No. 28 New York March 1934

CONTENTS

* * * * * *

A MESSAGE FROM PRESIDENT MANNING

It is almost four months since the last "Astronautics" was published (No.27-October). The delay was made advisedly for two reasons: First, every possible cash resource of the Society was reserved for possible expense entailed by the program of rocket building. Happily enough, these have not been very costly after all. Second, it was felt that the entire time and energy of the active members of the Society should be devoted to designing and creating the rockets.

As a result we feel our members can be proud of this issue of "Astronautics". It contains, true, little theory and no wild appeal to the imagination. Instead here are photographs of rockets actually built and lacking little of completion. In March or early April these rockets will be tested and shot into the air.

(continued on page 8)

THE SOCIETY'S NEW ROCKETS NEAR COMPLETION

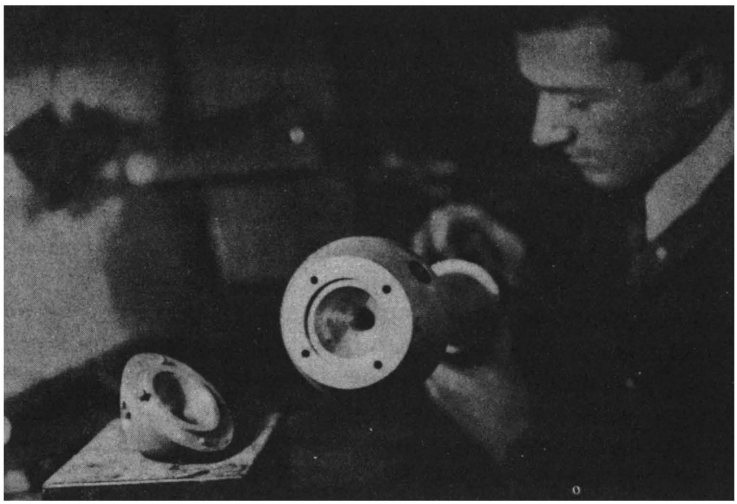
Some time early this spring -- perhaps in March or April if matters progress as rapidly as they now promise the American Interplanetary Society may make the dramatic demonstration for which all rocket enthusiasts have been waiting; a perfect vertical ascent of more than a mile with a liquid fuel rocket, plus a descent and safe landing with the aid of efficient landing apparatus. We are dealing with problems about which there is little practical experience; anything may go wrong and spoil the experiment, but if care and attention to detail, coupled with venturesome and ingenious departures in design can solve the fundamental difficulties of rocketry, the forthcoming AIS rockets ought to set a new record for liquid fuel rockets and pave the way for designs that will give us assurance in building real high-altitude rockets next year and thereafter.

Experimental Rocket No. 3

The rocket being constructed by Bernard Smith, G. Edward Pendray and Alfred Africano is a single-nozzle, concentric-tank rocket, equipped with a thrust augmenter and a new type of parachute. The blast chamber is located in the nose of the rocket, and a long, flaring nozzle conducts the flaming gases to the rear, where they are discharged into the mouth of the thrust augmenter. (See "Astronautics" for October, 1933).

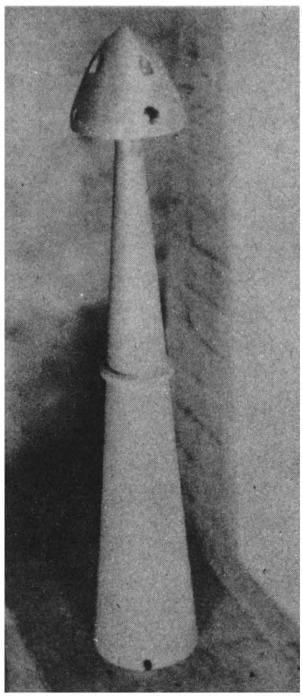
The fuel tanks are arranged concentrically around the nozzle. The gasoline tank is nearest the nozzle, it being the plan of the designers to cool the nozzle with the gasoline, the heat absorbed in turn improving the combustion of the fuel. Next to the gasoline tank, and surrounding it, is a nitrogen pressure tank, which will contain the gas needed to force the gasoline into the blast chamber. The liquid oxygen tank is farthest from the nozzle, and surrounds the nitrogen tank. All seams are to be welded. The rocket will be made entirely of aluminum, except the fittings.

VIEWS OF EXPERIMENTAL ROCKET NO. 3



Rocket Head and Blast Chamber

The Tanks in Place



Motor Assembly

The thrust augmenter is a new and as yet untried device which the designers expect will add to the thrust of the rocket at slow speeds and will give stability to flight at higher ones. It is shaped somewhat like a venturi tube. The hot gases from the nozzle are discharged into the big end of the tube, where they produce a suction effect on the surrounding air, drawing quantities of it through the augmenter and discharging it at the rear of the rocket with the gases. The proper curvature and proportions of the augmenter were calculated for the Society by Professor Alexander Klemin, director of the Guggenheim School for Aeronautics of New York University and internationally known authority on aerodynamics. Professor Klemin believes that this device will add 10 to 15 per cent to the thrust of the rocket.

The parachute is contained in the case of the thrust augmenter. When the height of the flight is reached, the falling off in air pressure operates a spring device which causes the outer shell of the augmenter to fall away simultaneously by releasing the umbrella-like ribs of the parachute. The parachute springs open and the rocket descends nose first. The device is simple and positive, and represents a considerable advance over ordinary parachutes.

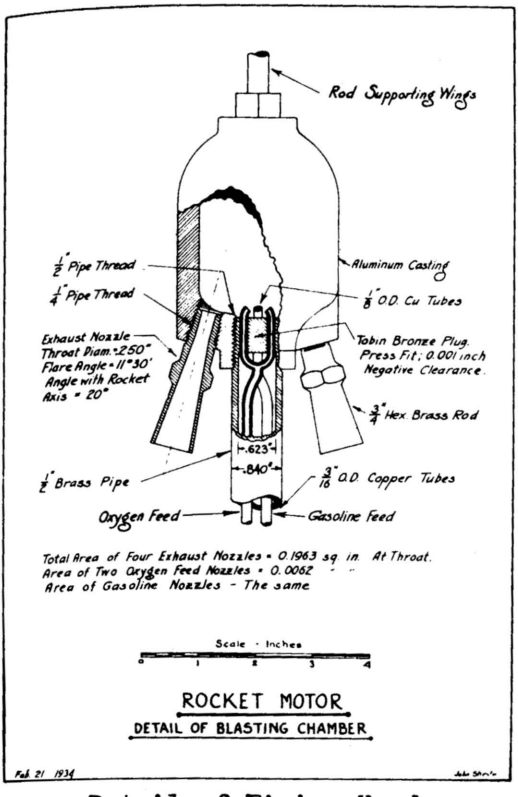
The rocket part of Experimental Rocket No. 3 is now nearly complete. The tanks are being welded, and only a few fittings are yet to be added. The thrust augmenter and parachute have not yet been constructed, but work will begin on these parts immediately.

Experimental Rocket No. 4

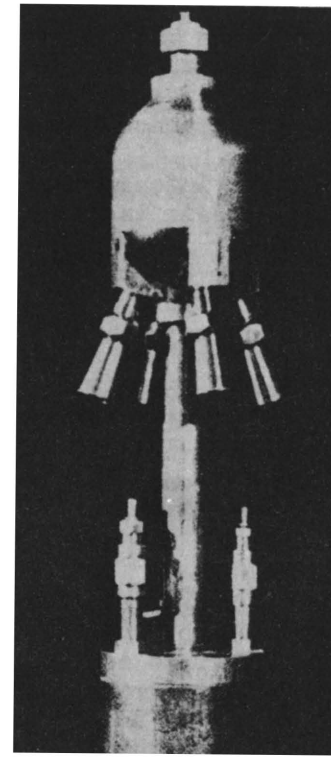
This rocket is rapidly nearing completion under the expert fingers of John Shesta, with the advice and aid of Laurence Manning, Carl Ahrens and Alfred Best. It is a multi-nozzle tandem-tank rocket, with an ingenious landing gear resembling the four-bladed wing of an autogyro. (See "Astronautics" for October-1933).

A few changes from the original design published in the October "Astronautics" have been found necessary.

VIEWS OF EXPERIMENTAL ROCKET NO. 4



Detail of Firing Head



Motor Assembly

Assembling the Rocket

These are chiefly in the method of running fuel lines from the tanks into the firing chamber. Instead of four oxygen and two gasoline inlets as planned, there are now only two for each fuel. All four feed nozzles come up through the central connecting pipe into the blast chamber.

The interesting point is the form of spray such nozzles will create in the chamber. Experiment has shown that two opposing jets spread the fuels out in a broad, thin fan. Two sets of opposing jets -- one set at right angles to the other -- form a cone of well-mixed gases that should burn almost instantaneously.

Four nozzles are tapped into the blast chamber. The spray of fiery exhaust from the nozzles is inclined outward to avoid impinging upon the head of the gasoline tank. An additional precaution will consist of a shield of metal all around the upper part of the rocket, between the exhaust and the head of the tank.

The landing device will consist of four blades at the nose of the rocket, so arranged that during flight they will be held in a collapsed position along the axis of the rocket by air resistance. When the speed slackens away, the blades will be opened by springs, and the rocket will descend tail-foremost, revolving rapidly as the whirling blades break the speed of fall.

Experimental Rocket No. 5

Plans to build three new rockets, respectively Experimental Rockets No. 3, 4 and 5, were announced in "Astronautics" for October. Of these, Rocket No. 5 was of such radically new design that its proponents, H. Franklin Pierce and Nathan Carver, have undertaken a series of proving-stand tests to prove the value of its various parts before construction begins. A proving stand of new design has been completed and tests on the new rocket will soon begin. This rocket probably will not be ready for actual shots this spring. The plans of Messrs. Pierce and Carver have attracted much attention among our members and among rocket experimenters abroad. The outcome of their tests is expected to be of considerable importance to rocketry.

A DICTIONARY OF ROCKETRY NEEDED

Technical advances in rocketry make the invention of new words and expressions necessary, as in other lines of science and engineering. "Rocketry" itself is a coined word, first suggested at a meeting of the American Interplanetary Society in 1930 and since widely adopted. Why not a dictionary of rocketry? Here is a start:

Astronautics ---- science of extra-terrestrial navigation
Blast Chamber --- the part where fuels are burned
Choke ---------- narrowest part of nozzle
Fin ------------- wing-like device for stabilizing 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 ---------- constricted opening through which hot gases escape from blast chamber
Pilot ----------- apparatus for guiding rocket flight
Rocket Motor ---- blast chamber and nozzle assembly
Rocketor -------- 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

THE FORTHCOMING ANNUAL MEETING

The annual meeting of the Society will be held this year at 8 o'clock, Friday, April 6th, at the American Museum of Natural History. Two important items of business are up for action: election of a Board of Directors, and a vote upon whether the name of the Society should be changed to "The American Rocket Society". In the opinion of many members adoption of the more conservative name, while in no way implying that we have abandoned the interplanetary idea, would attract able members repelled by the present name. All active members are entitled to vote on these questions. The Nominating Committee has nominated the following for membership in the Board of Directors : G. Edward Pendray, Nathan Schachner, Dr. Samuel Lichtenstein, Laurence Manning, Alfred Africano, Dr. William Lemkin, C.P. Mason and Carl Ahrens. Only five are to be selected.

A Message From President Manning

(continued from page 1)

The results will be carefully noted, analized and published in "Astronautics". It is our hope that, as a result, enough data will be to hand upon which to base the design for a still larger and more efficient rocket -- one that can perhaps ascend as much as twenty-five miles into the air and so outdistance all existing feats of human endeavor in the field of altitude. And beyond that again -- who can say?

This is the program for which you, as members, have given your support and for which your monthly magazine has been temporarily sacrificed. The goal is now in sight and you may look for "Astronautics" No. 29 early in April and monthly thereafter.

Laurence Manning
PRESIDENT

Associate Membership in the Society at $3 per year may be obtained by sending the first year's dues to the Secretary, Dr. Samuel Lichtenstein, 147 West 86th Street, New York City. Information on other classes of membership may be obtained by writing the Secretary. Meetings of the Society are held monthly, except in summer, at the American Museum of Natural History, 77th Street and Central Park West, New York City.