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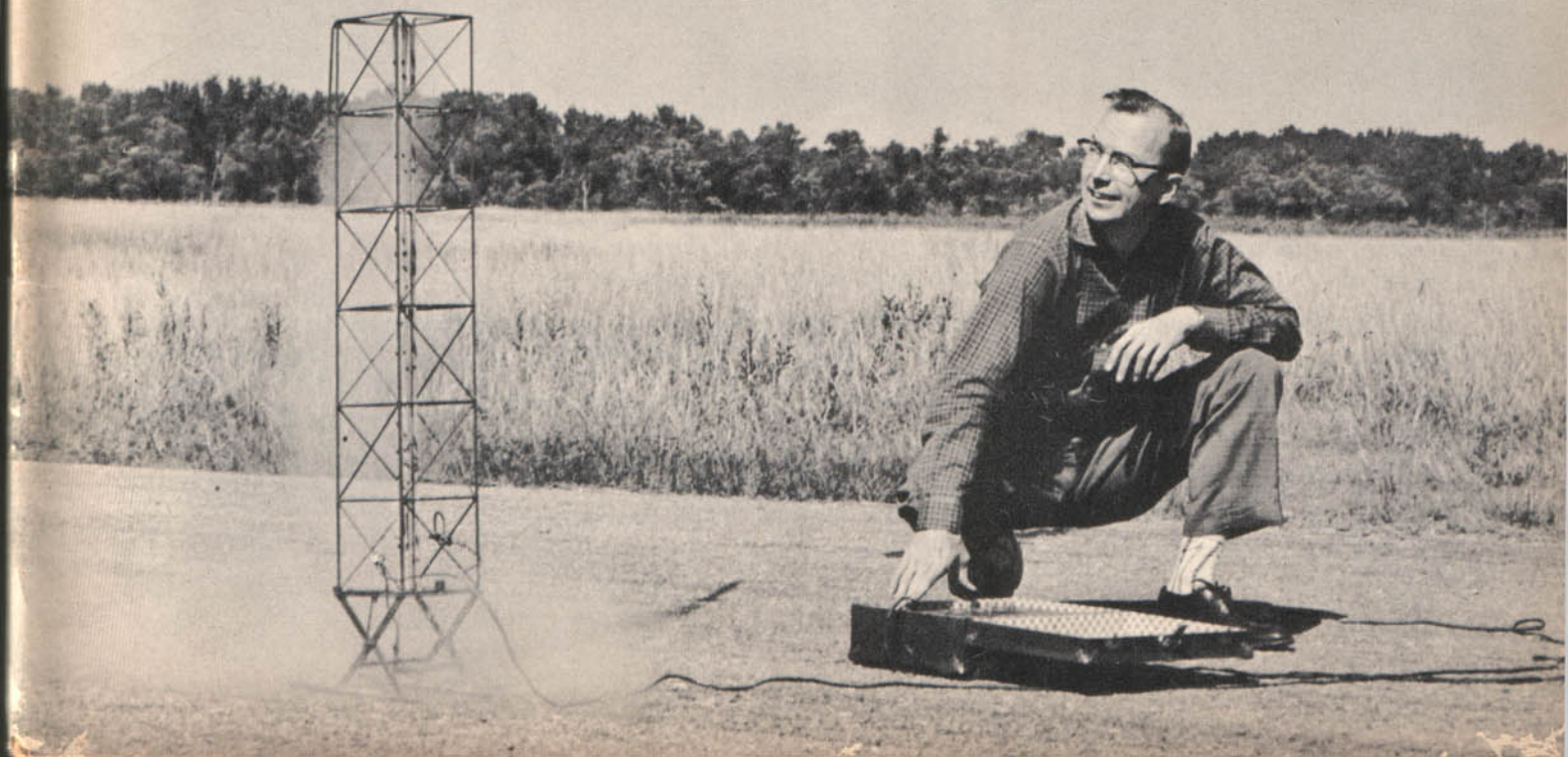
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## The Do-It-Yourself Rocketeers

By G. HARRY STINE

■ This is the Space Age with Sputniks and Muttniks whizzing around the earth, ICBM's arcing in their long flights over oceans and continents, and rocket-powered aircraft climbing ever higher into the thin upper air.

In the wake of these timely items has come news of the rocket-minded teenagers who build and fly their own rocket-powered missiles. Well, sometimes they fly, that is.

It may come as somewhat of a surprise to learn that this sort of backyard rocketry has been going on in America for years. As a matter of fact, the modern science of rocketry started with a group of starry-eyed tinkers who built rockets in their basement and fired them from local parks. Many of these original pioneers who built their missiles with Sears Roebuck basement shops have become top rocket and space flight scientists.

And in their footsteps are following thousands of young Americans intent upon sending their hardware high into the sky under rocket power.

There are (at last count—the number grows daily) 16 organized amateur rocket societies in the United States, all of them with their own rocket research programs. By far the most active is the Reaction Research Society and the Pacific Rocket Society, both of California.

These are groups of young men and adults whose main joy in life is flying rockets—and rocketry is just as thrilling and fun-filled as free flight model airplanes, U-control, model boating, and the rest. They've built some pretty big rockets, some of them larger and more complicated than the ones built by the original pioneers.

There is only one trouble: When the first rocket amateurs went on to become

professional rocketeers, they didn't take the time or the trouble to tell the upcoming generation how to do it.

Well, in the first place, these original amateurs are pretty busy.

However, this practice of ignoring the rocket amateur has forced him to rely on trial-and-error methods. There is plenty of rocket literature around, but it is so highly technical that it is difficult, if not impossible, for the amateur to decipher into useful information. As a result of being ignored, using trial-and-error, and having no good information, many an amateur rocketeer isn't getting the kind of results he wants. He works with the wrong tools, the wrong methods, the wrong techniques, the wrong materials . . . and just seems to do everything the hard way. You can't blame him, either, because rocketry is a complex subject.

Still, he manages to succeed sometimes. Rocket buffs have sent some healthy payloads to some mighty impressive altitudes. However, it is much more common to have the rocket explode on the launcher.

The amateur may also work with highly explosive mixtures for rocket propellants—again, because nobody who knows anything about it has told him anything different. He pounds strange mixtures into steel pipes . . . then wonders what happened as he picks steel fragments out of his body. Nobody has ever told him that you don't need to

use high explosives or metal rockets.

What can be done about this, particularly when more teenagers are getting the rocket bug every day?

Three things can be done, are being done, or will be done in the very near future. We contend:

1. The amateur rocketeer needs a commercially-available line of solid propellant rocket power plants which are reliable, safe, and inexpensive. He should be able to go into his local hobby store and get the motor he needs to do the job.

2. More information of real use to the amateur rocketeer needs to be made available. Once the rocket motor problem is solved, the amateur can go on to the other necessary things he hasn't had a chance to work on yet—rocket aerodynamics, materials, weight and balance, payload miniaturization, design and ground testing, firing range instrumentation, and others. He needs information to correct some of the misconceptions he has been working with. He needs information in order to build safe missiles.

3. Because amateur rocketry can be dangerous if not approached and handled correctly, a stringent safety code needs to be published, followed, and enforced if necessary. Model aeronautics has safety codes—line pull tests for U-control, for example. If the person who wants to fly rockets does not voluntarily follow this safety code, law-making agencies will step into the act to protect lives and property . . . and the amateur rocketeer won't like the results one little bit! The safety code is necessary not because model rockets are dangerous, but because they are so new that very few people have any notion of what the safety rules are!

See page 44 for registration form if you wish to be counted as a rocket model fan.

Author G. Harry Stine of Model Missiles, Inc., noted science writer, former big missile engineer, loads Rock-A-Chute missiles (left) for firing (below).

So what is being done about these three points? Number One is being taken care of, and you will read more about it later. There is absolutely no reason in the world why model rocketry can't be just like model aeronautics. If somebody wants to build a model airplane, he goes to the store and buys what he needs, including the motor. The same should and will be true for model rocketry.

Number Two requires a nationwide model rocketry organization. Not the kind of loosely-knit kind of federation of local clubs that now exists, but a tightly organized national group with leadership from a national level. In other words, something like an Academy of Model Aeronautics for model rocketry. This is in existence already; it is called the Model Missile Association and is growing daily. More about this is forthcoming issues of *American Modeler*, too.

The safety code is already in existence and use, too. It is part of the Model Missile Association, and it is tough. It forbids many kinds of extremely dangerous experimentation and literally forces the model rocketeer to use his head by having to do extremely careful design with allowable materials.

All of this is an attempt on the part of model rocketeers to bring the hobby up to par with model aeronautics where it belongs. It is a continuing fight to prevent amateur rocketry from being quashed on grounds of safety, to gain a respected niche for amateur rocketry, and to encourage the hobby.

A generation ago, just about every American boy built model airplanes. From these model airplanes, he and his pals learned aerodynamics, power plants,

(Continued on page 43)

## National Registry of Student Rocketeers

The Rocket Research Institute, incorporated, has established a National Registry of Student Rocketeers so as to coordinate and advise on a national level the safe preparation by students of rocket training devices.

Students are requested to send to the Institute their name, address, age, school attended, and name of science teacher. This information will be correlated into the national registry and will make available to educators, the rocket industry and members of the Rocket Research Institute throughout the nation the names of students seriously interested in rocketry, so as to enable the coordination of advice and instruction to these future scientists and engineers.

Parents of the students will be advised as to the necessary precautions required for safe rocket construction and encouraged to form with other parents, educators, and members of Rocket Research Institute, groups within a given area so as to pool resources and provide for the establishment of local proving grounds and firing sites.

Educators are invited to join the Rocket Research Institute, Inc., so that they may be supplied with information, blueprints, materials, etc. to enable them to guide and advise these student groups in the methods and procedures of safe rocket operation.

The enormous increase of student interest in the rocket sciences in recent months has necessitated a revision of the Institute policy of only encouraging training programs in areas where Institute sections, staffed by personnel with industrial rocket experience, have been organized. The new policy will enable educators who join the Institute to supervise student training programs wherever Institute sections are not established and to work with RRI sections wherever possible.

"Rocket Building For Students," the Institute's new elementary basic training manual, will be available to educators and students at a cost of \$1. This completely revised book, first issued in 1948, under the title "Rocket Building for Modelers" will enable students to safely construct and launch training rockets capable of altitudes of between 500 and 1,000 ft.

The training and scholastic progress of National Registry Students will be followed by the Institute. If a student's progress has been satisfactory, upon request, a letter of recom-

mendation will be forwarded to the industry and upon reaching the age of eighteen, he will be recommended for membership in the Rocket Research Institute.

The Institute wishes by means of the registry to help provide guidance for students seriously interested in the rocket sciences. Rockets are inherently dangerous without a knowledge and respect of the materials involved. The RRI does not encourage nor approve the use of rockets as toys or as a hobby-like pastime.

The Rocket Research Institute was founded January 6, 1943 under the name Southern California Rocket Society. This name was changed to Glendale Rocket Society; then Reaction Research Society; and finally in 1949, the present name was conceived to more clearly define the organization's educational nature. An offshoot of the Institute retained the name "Reaction Research Society" and is still active in Southern California as a "teen-age" Rocket Society. The Institute, incorporated as a non-profit organization on December 19, 1957, has its national office in Glendale, California.

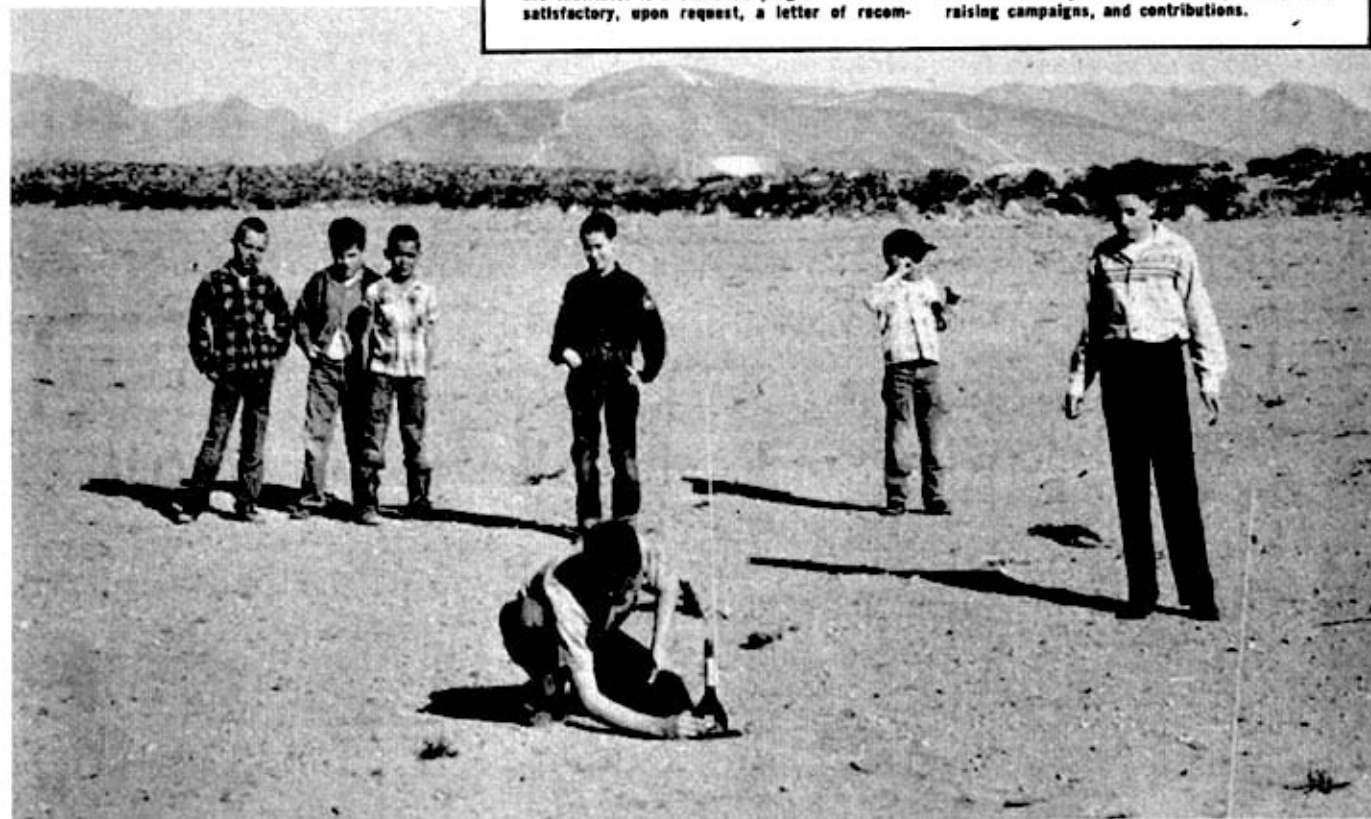
The Institute holds many civilian rocket records; originated the Micro-grain (zinc-sulfur) solid-propellant training rocket concept in 1943; has conducted four demonstrations of rocket mail; and has the distinction of having been one of the first groups in the United States to work on solid-liquid rocket systems.

The most recent rocket mail demonstration was on July 1, 1957, at which time five thousand special letters for stamp collectors were carried a distance of one and one quarter miles from Douglas County, Nevada to Topaz, Mono County, California by five, fourteen-foot long by three-inch diameter, solid propellant rockets, in commemoration of the start of the International Geophysical Year.

Funds derived from the July 1, 1957 IGY commemorating flight were used for the development and successful testing on December 1, 1957, by the Sacramento Section of the Institute, of the Spark 1a, 400-lb thrust, liquid oxygen and alcohol, rocket engine which was designed specifically for advanced college-level and industrial group training programs.

The most active Institute section is located in Sacramento, California. Other sections are under formation in Florida, N. J. and M. M.

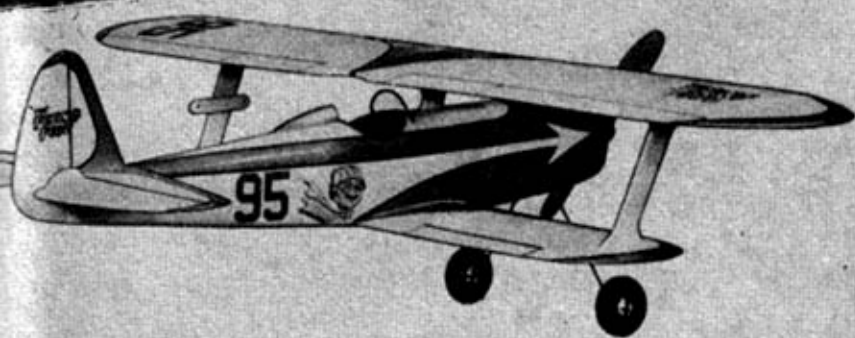
The Rocket Research Institute is a non-profit, unsubsidized organization which derives its funds solely from membership dues, fund raising campaigns, and contributions.



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It's also nice to be first up, if you can. The way those rules are set up you won't get much chance to feel your adversary out, so experience is your best safeguard. You'd better get your evasive and attack maneuvers down pat, 'cause if you must stop to think you've had it. That's why kids (14 thru 20) make the roughest combat men. They have their quickest reactions available, and they don't stop to think. Whenever we have combined Combat the winners are almost exclusively Juniors. Feeling old, Dad? In any case, it's practice and more practice.

On advising beginners I'd say, start with a conventional ship, profile, and build a couple of them. There's something about having a spare that brings out the best in you. Get someone who's had experience at team flying to work out with you until you get the feel of having another ship around. Learn to fly your job by feel so you can concentrate on keeping track of your friend. One thing I don't like about combat is that I seldom see my cuts and kills. Pure accidents mostly. And again the word practice. You may have a rough time ahead, since there are so many experienced combaters around. None of them are infallible tho, so just plow on. You can always catch up.

After flying the conventional ship in

competition for awhile, try a "Half Fast." In our opinion this is still the ultimate combat airplane. It won't fly like an ordinary ship. It's quicker on the turns and faster. It's also tougher. The fellows who have taken the time to get used to them are consistent winners. The people who have come out against wings probably don't understand what to expect from them. They must be built straight with no warps, and balanced correctly so that they fly easily. There is no reason built into their design to make them touchy. It's in the controls and their CG location. CG is more critical than conventional but once found you'll be quite happy with its superior performance. Don't take our word for it. Try one. If you cease to win with a wing, go back to the others. You're too slow to operate it. Some are, you know.

We are trying at present to sell some manufacturer on the ideal combat ship in kit form. It will feature covering with at least 14 patches of different colors, pre-cracked and glued spars and ribs, pre-chewed elevator trailing edge, 2 broken hinges, and a fuselage broken in 3 places. Directions will show how to bend your needle valve and skin up your engine. Leadouts will be pre-kinked and the rudder will be pre-shaped with rough scarred edges. Parts will be soaked in special synthetic stain which looks

like oil. This will 1) allow you to fly without worrying about the first crack-up and 2) make everyone think you're a veteran combateer.

Come to think of it, now that you know almost as much as I do about combat, I'd better take up other amusements.

Happy dueling!

## Rocketeers

(Continued from page 13)

control, and other things which allowed them to do on and build the world's most powerful air force and most efficient commercial airlines.

This is the Space Age, the Age of the Rocket. Already we are behind. The youth of today want to build model rockets. Well, let them! Get in there and help them! They will be the men who will fly the space ships! Let them learn about rockets by building them! Don't slap them down, because they are our one real hope for regaining technical superiority over the Russian rocketeers who are out to grab off the Solar System for you-know-who!

See next month's issue for additional data by Mr. Stine on model rocket operations, plus latest news in the miniature missile field!