

**Model
Rocketry**



**Key to
Tomorrow**

**Why
Model
Rocketry**



This booklet is dedicated to the elimination of dangerous practices in non-professional rocketry and to the extension of the educational and recreational use of the safe forms of youth rocketry.



Published in the interests of public safety
by
Estes Industries, Inc.,
Box 227,
Penrose, Colorado
© Estes Industries, 1964

Further information on model rocketry and its practical applications is available on request from Estes Industries.

Non-professional Rocketeers

Come in Three



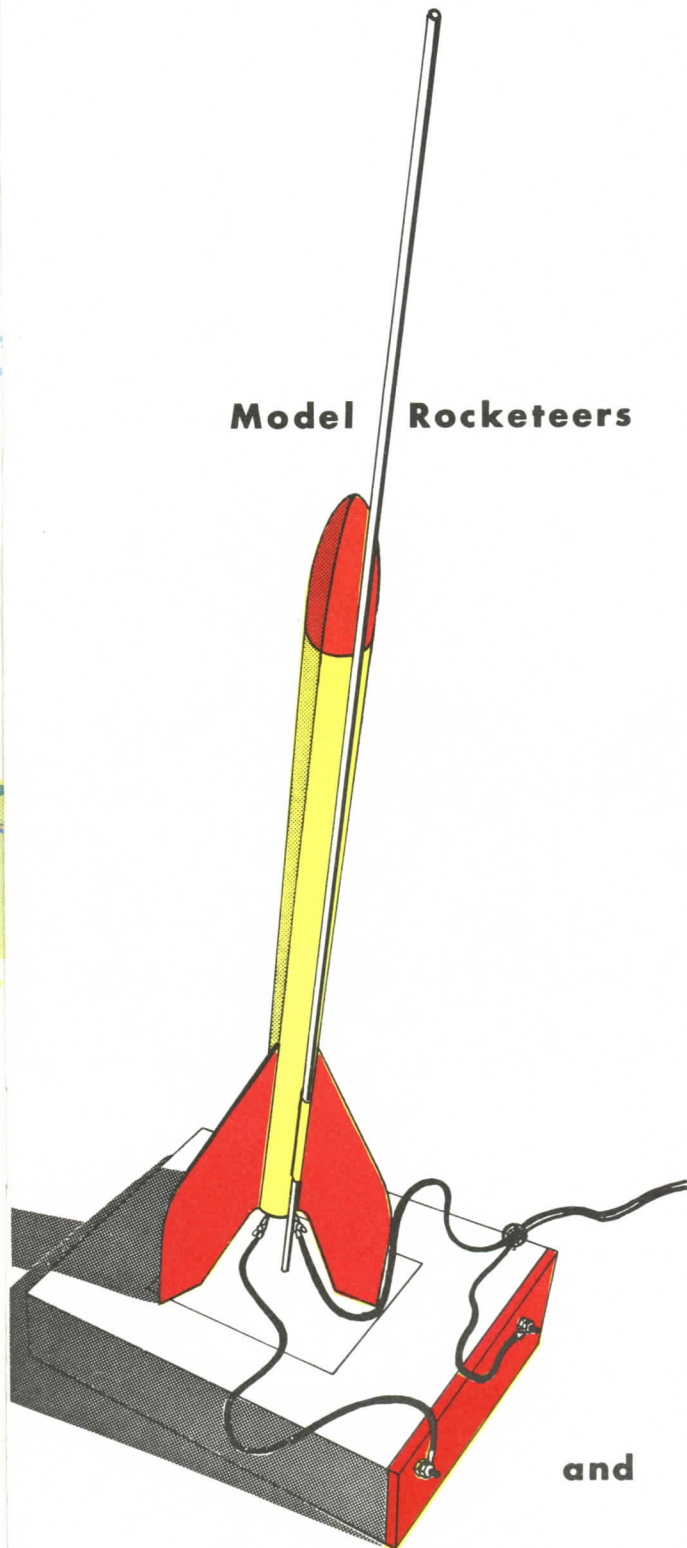
Main Types

1998.40.797

**Professionally
Supervised
Amateur Rocketeers**



Model Rocketeers



and

It is estimated that between 7 and 14 per-cent* of the nation's junior rocketmen were injured or killed during 1958 in attempts to build and fly home-made rockets.

Surgeons Strive to Save Life of Rocket Victim

Funeral Set for Fri

Rocket Blast Fatal to Boy

Boys' 14, Badly Injured In Celler Rocket Blast

Rocket Experiment Warns Against 'Grocery' Fuel

Boys' 10, Hurt In Rocket Experiment

But who was involved?

Teacher Killed In Rocket Explosion

Boy's Hand Mangled In Rocket Explosion

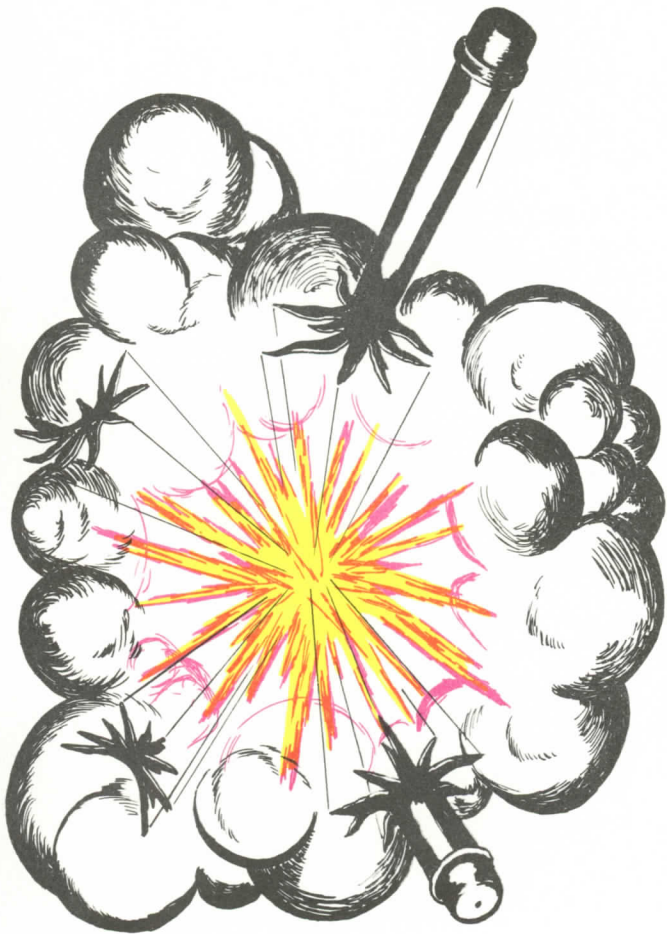
Homemade Rocket Blast Hurts 2 Boys



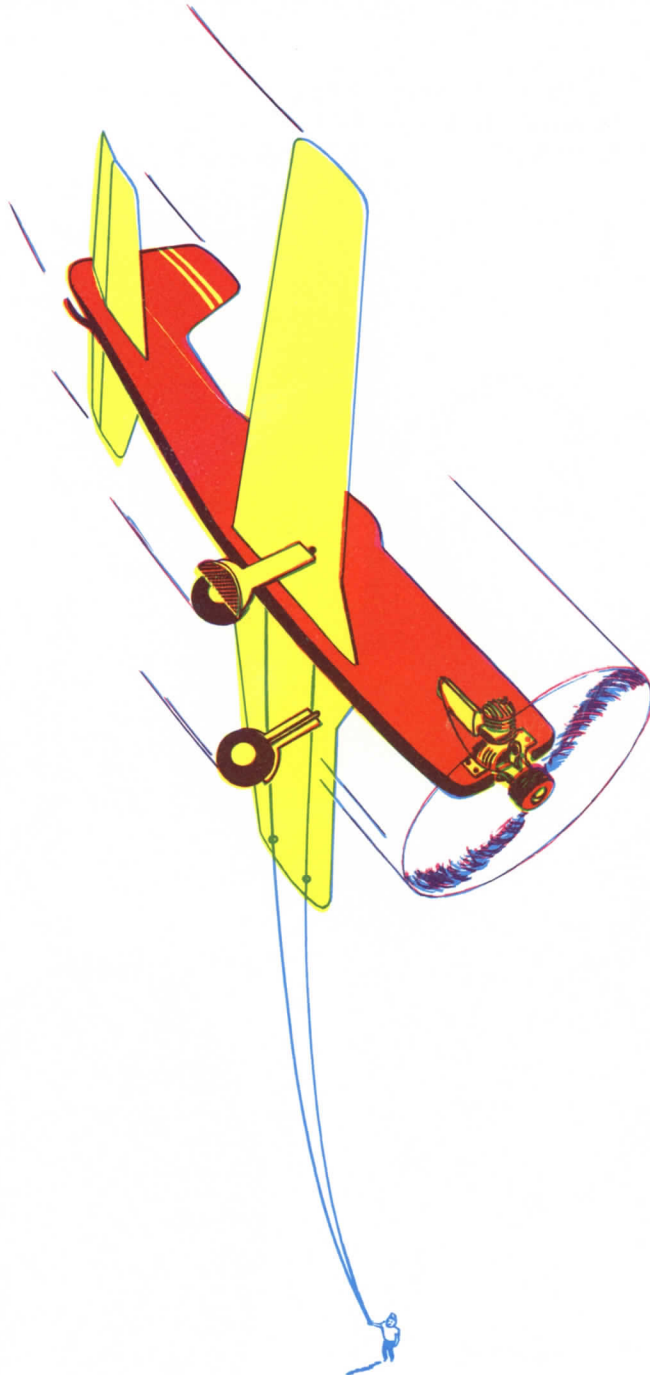
Basement Bombers!

*Based on figures published by the American Institute of Aeronautics and Astronautics (formerly the American Rocket Society).

It wasn't the modelers, nor the professionally supervised amateurs.

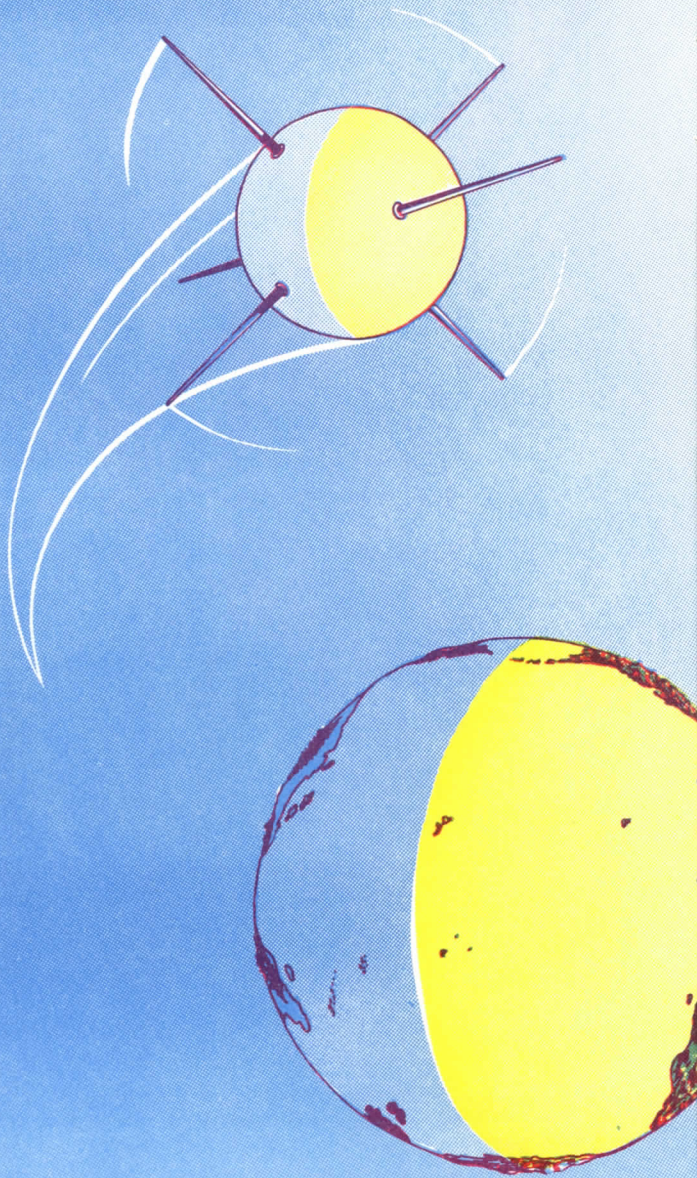


Instead, it was the Basement Bombers.



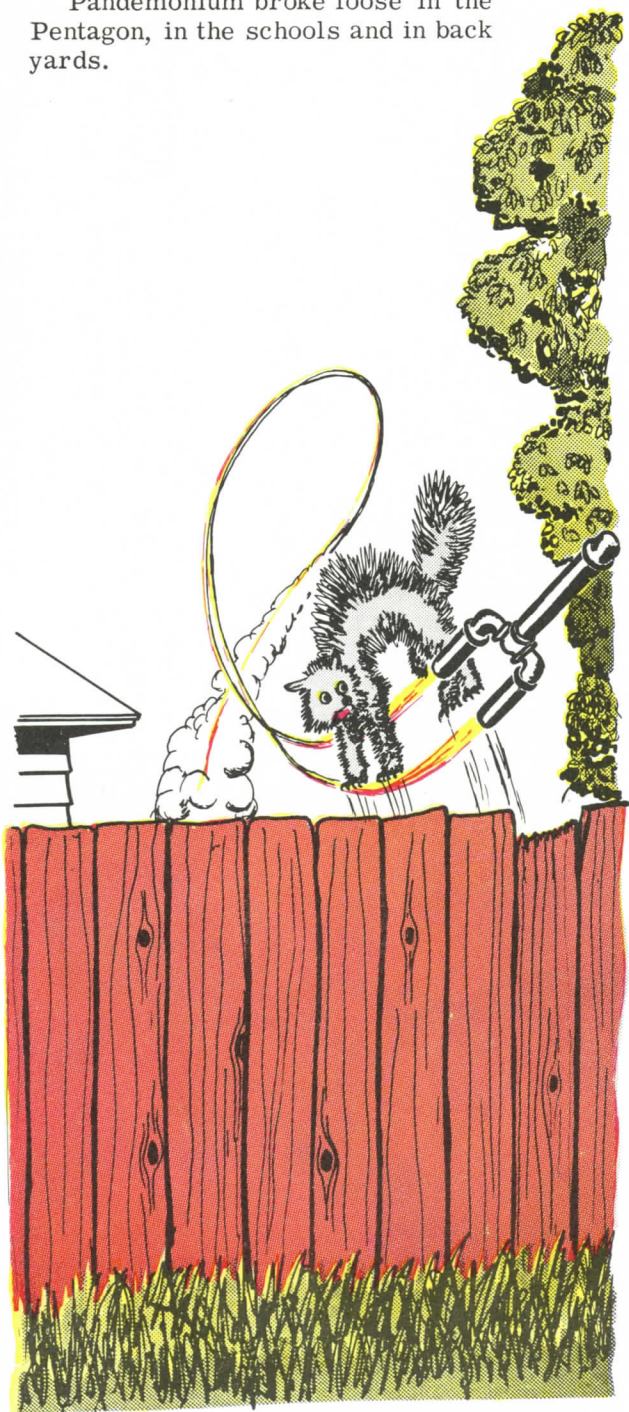
These accidents would not have happened in 1940 because boys were not interested in rockets.

**BUT IN 1957 THE
SPACE AGE ARRIVED**

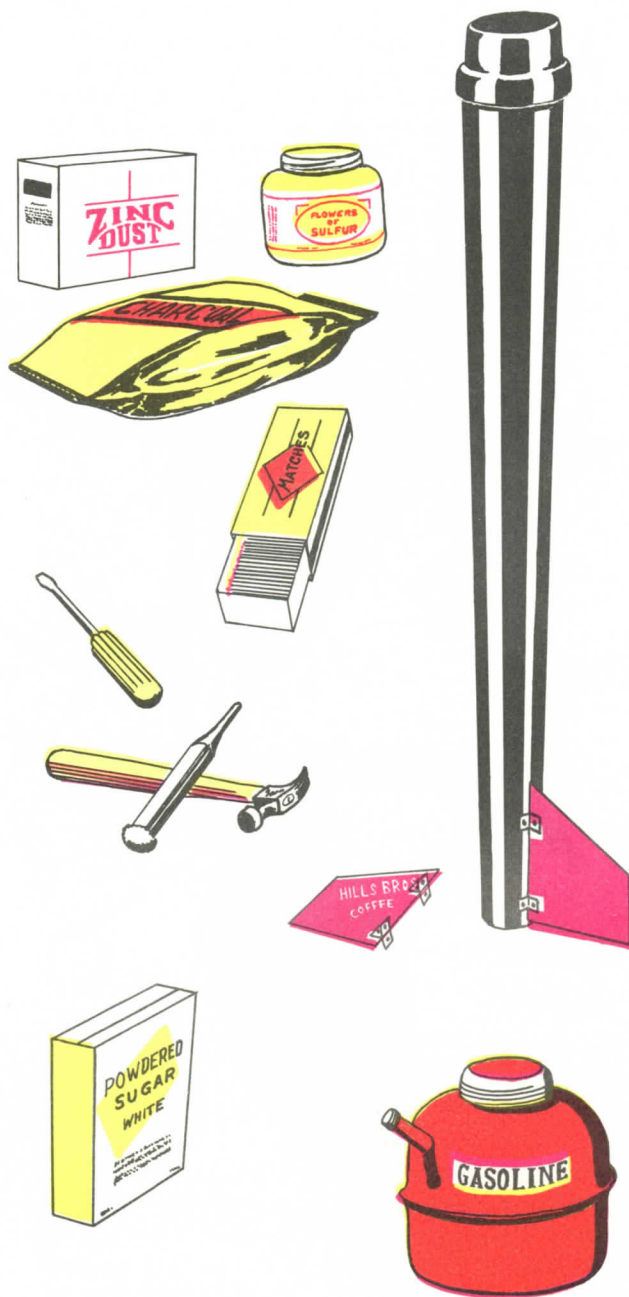


Along with it came the excitement. . .and the natural desire among science-minded young people to join the space race and build their own rockets.

Pandemonium broke loose in the Pentagon, in the schools and in back yards.



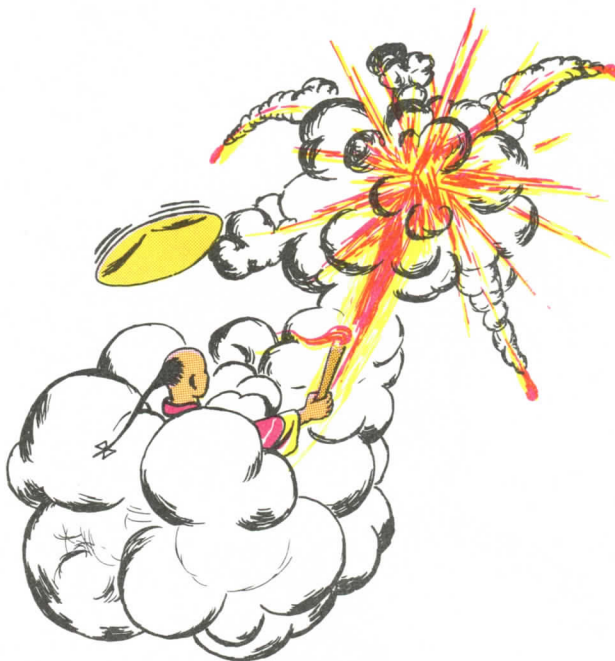
Left to his own inadequate knowledge and household materials, the young scientist began to build.



The simple combination of the heads from kitchen matches and an empty carbon dioxide cartridge of the type used to propel model cars, boats and airplanes was very popular. Sometimes it would make a rocket, but just as often it would make a very lethal bomb--frequently exploding during loading, when the young rocketeer attempted to ignite it, when dropped or in the air during "flight."



Among the survivors the search did not stop here. Water pipe, electrical conduit, drugstore chemicals and garden fertilizers were appropriated in a furious search for a "more powerful fuel." The junior chemist concocted exceedingly strange mixtures with even stranger properties--such as igniting when shaken, dropped, on contact with water or on contact with air. He also managed to repeat almost every mistake made in rocketry since Wan-Hu disappeared in a cloud of smoke.

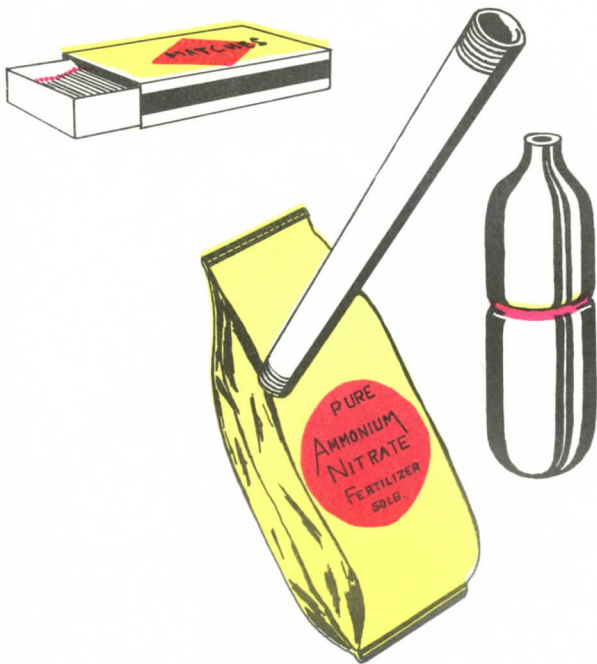


Thus a situation existed in which the professionally supervised amateur wasn't having accidents because he carried out his studies in a professional manner. Model rocketeers were not having accidents. In fact, model rocketry had not yet been developed.

But--young persons lacking the resources of safety equipment, material and knowledge possessed by the full-fledged amateur were maiming and killing themselves with grim regularity.

An outcry to pass laws to stop the carnage arose. But simply passing laws to prohibit rocketry would not solve the problem--

ILLEGAL?



who would vote for a law banning kitchen matches, fertilizer, metal pipe and carbon dioxide cylinders? Yet these were used in over 90% of the injury-producing missiles.

Excessively restrictive laws could only stop the qualified, safety-conscious, professionally supervised experimenters. But such laws would have no effect on unsupervised basement and backyard experimenters. All safe, productive and educational experimentation would be stopped without reducing the number of deaths and injuries.

At this point some deeply concerned and farsighted individuals realized that something practical had to be done to stop the carnage. Why not replace a dangerous activity with a safe one?

Several facts soon became apparent:

FACTS

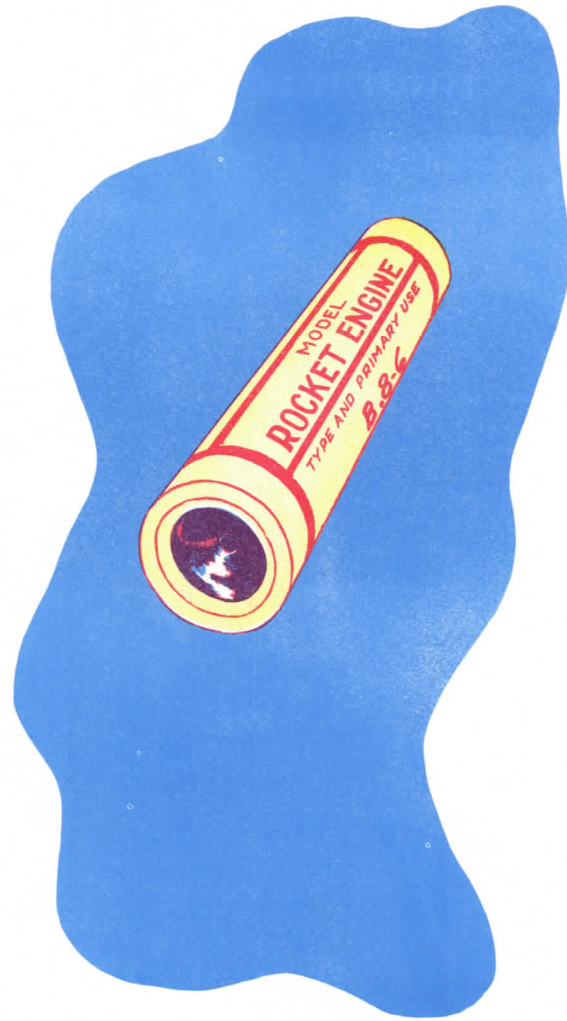
Accidents occurred when homemade or home loaded propellants were used in rockets.

The accidents were most severe when home-brewed propellants were used in metal casings or metal rockets.

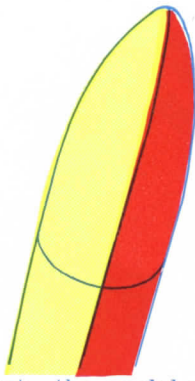
When two or more rocketeers come together they tend to form a "rocket society."

Rocket experiments offer a rewarding opportunity in scientific education.

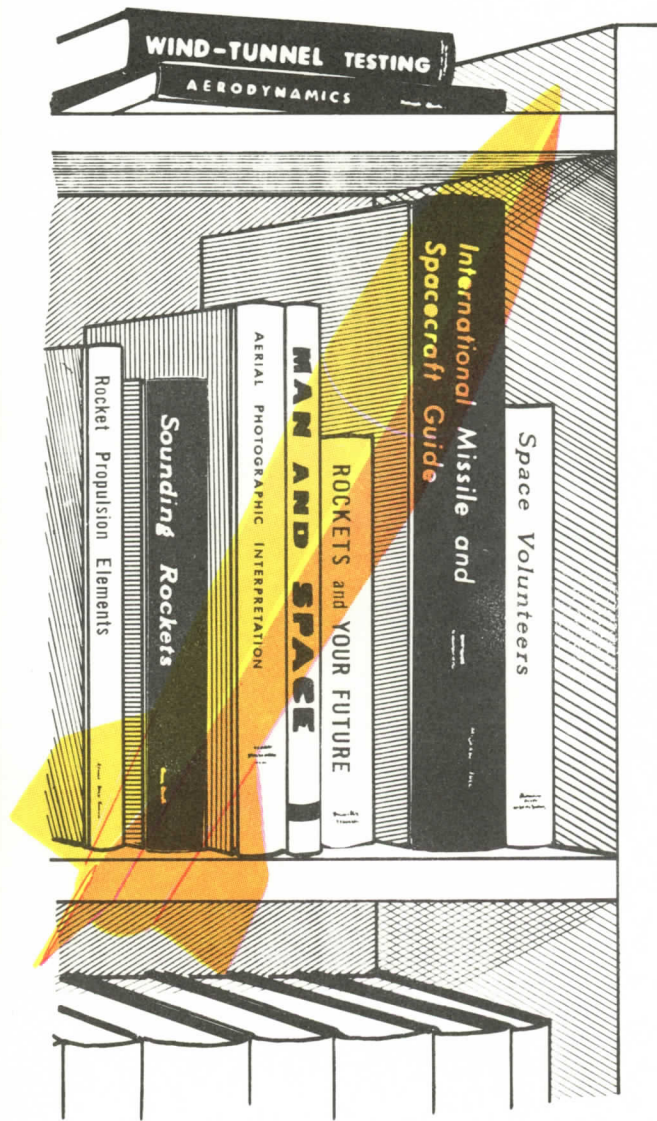
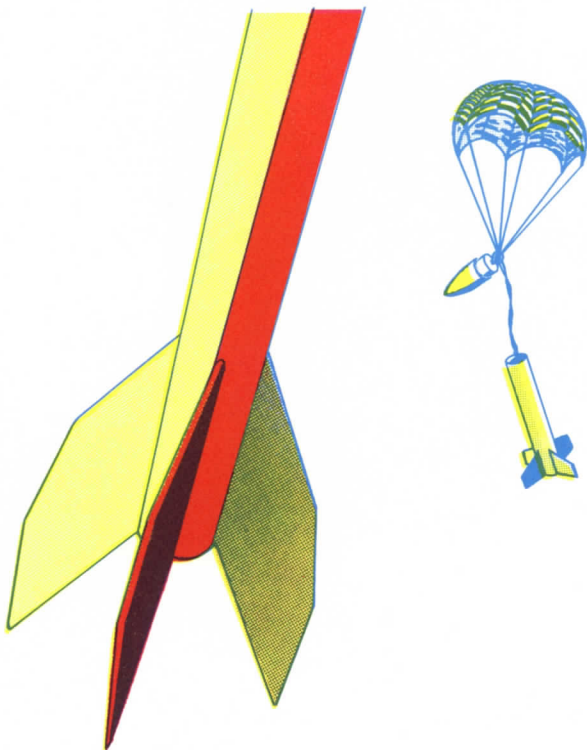
A program was initiated to develop safe, pre-loaded propellant devices to eliminate the hazards of home loading.



Since then over 2-1/2 million of these engines have been used in model rockets--with one of the best safety records of any youth activity.



A new type of rocket--the model rocket--was developed. The rocket did not contain any substantial metal parts. Instead, it was built of light-weight balsa wood and paper. It contained a reliable recovery system to bring it back to earth safely and gently.



The formation of educationally oriented model rocket clubs and societies was encouraged. Adult participation and supervision was also encouraged to increase the educational, recreational and safety values of the activity.

Additional safety was added by the development of an easy-to-follow safety code and by placing limitations on the size of model rockets and the materials with which they could be constructed.

ASTRON ROCKET SOCIETY SAFETY CODE

As a model rocketeer I will act in a mature manner with safety foremost in my mind in all my model rocket activities and will obey this safety code at all times.

1) I will not attempt to compound propellants or other combustible chemicals or tamper with pre-manufactured rocket engines. I will not use model rocket engines for purposes other than those for which they are recommended by the manufacturer. I will inspect each rocket engine before use and never use an engine which shows signs of physical damage, remembering that any rocket propellant can be explosive under certain conditions.

2) I will not smoke near rocket engines, launch my rockets in the presence of highly combustible materials, use flammable recovery wadding or engage in any activity which would present a fire hazard.

3) I will never use any metallic rocket engines, will not construct my model rockets with substantial metal parts in the area of the engine, and will not launch any rocket over 16 ounces in weight or containing more than 4 ounces of propellant in compliance with Federal regulations.

4) My model rockets will be electrically ignited, using a launch system with either a switch protector or a safety interlock to prevent accidental ignition of the rocket engine, and I will remain at least 10 feet away from any rocket which is being launched. I will use only igniters of the type recommended by the engine manufacturer.

5) I will launch my model rockets using a launching rail or other suitable guide means aimed within 25 degrees of the vertical to assure a safe and predictable flight path, and will launch only rockets whose stability characteristics have been predetermined.

6) I will not fly model rockets in high winds, conditions of low visibility, in the vicinity of low flying aircraft, near tall buildings, near people not aware of the launching, or under any conditions which might endanger property or persons.

7) I will not launch rockets so that their ballistic trajectory will carry them against targets on the ground, and will never use an explosive warhead or other pyrotechnic payload in a rocket.

8) My model rockets will contain recovery devices which will deploy at an altitude of at least 50 feet to return the rocket safely and undamaged. To insure proper operation of my rocket's recovery system I will make a careful pre-launch inspection of all the recovery components with special attention to tightness of the engine and nose cone.

9) To prevent accidental eye injury I will always either place the launcher so the end of the rod is above eye level or cap the end of the rod with my hand when approaching it. I will not place my head or body over the launching rod.

10) When conducting research activities with unproven designs or methods I will, when technically possible, determine their reliability through pre-launch static tests, and I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.

(Revised 1/1/65)

A non-profit national organization* was formed to keep model rocketry safe, distribute technical information and hold competitive events.



* The National Association of Rocketry
1239 Vermont Avenue, North-west,
Washington, D.C. 20005

Model rocketry has come a long way since then. Today it is a major hobby. It has the support of N. A. S. A., U. S. A. F. and leading educators. Many of its adherents are young people aiming for a career in space. They find it invaluable as an aid to their studies.

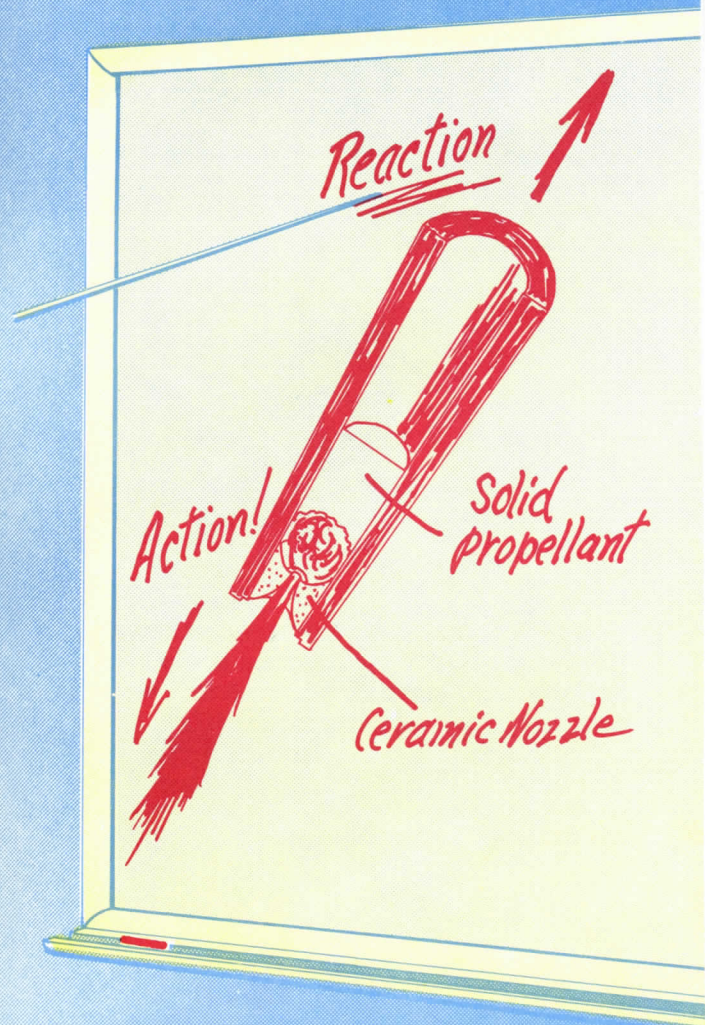
Astrophysics

**Space
Medicine**

**Aerial
Photography**

Communications

Navigation



Teachers have found model rocketry an ideal aid for science education. It allows them to illustrate space age principles with unsurpassed effectiveness. Many feel that model rocketry is the most practical form of non-professional rocketry because large firing ranges, bunkers, trenches and extensive safety precautions are not necessary.