28 January 1957

Orville H. Carlisle
420 Norfolk Avenue
Norfolk, Nebr.

Dear Mr. Carlisle:

I am intrigued with the "Rock-A-Chute" you have developed, and so are my colleagues here at White Sands. There has been a crying need for a safe, reliable, easy-to-handle true rocket for rocket enthusiasts; thus far, these enthusiasts have had to satisfy themselves with Jetex (which has a poor thrust-to-weight ratio for missile work), the Park water-propelled rocket (which has no recovery system), or home-made rockets (which are extremely dangerous).

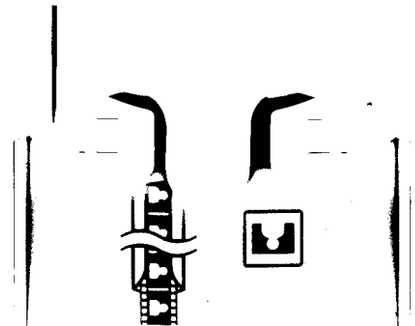
I would be very pleased to have you send me a unit, a kit, or both. Although I am experienced only in certain phases of rocketry, I have among my acquaintances here at WSPG some of the world's finest rocket men. We have, for many years, constructed hobby rockets of our own, commonly called "goombah's". In a like vien, we've had some little experience professionally and otherwise with solid propellants, rocket flight testing, and parachute recovery systems.

So I'd like very much to see what you have. Perhaps those of us at WSPG could offer you some suggestions, although you appear to have done an excellent job of engineering already.

Rocket propellants are not, in some cases, classed as "fire-works". Nitrocellulose or double-base propellants (nitro-cellulose plus nitroglycerine) can be shipped as "explosives". Black powder rockets can also be shipped as explosive material. You might check into the methods used to ship ammunition, as well.

From a safety and ease-of-shipping point of view, I would urgently suggest you use a separate igniter which is packed apart from the booster assemblage and inserted only when the rocket has been loaded on the launcher prior to firing. In addition, I would also suggest, from the safety standpoint, that some provision be made to render the booster units non-propulsive until ready for use. In professional rocketry, this is accomplished by means of a detachable head cap; solid rockets are shipped without an igniter and with the head closure off. A non-propulsive unit is sealed with a light-weight diaphram over the head closure and with a thin plastic nozzle closure; these serve to seal the unit against moisture.

I urgently recommend you consider these safety measures with Rock-A-Chute. Public acceptance of your unit will be improved through use of as many safety measures as possible.



Briefly, these might be summarized as follows:

1. Non-propulsive provision. Head cap screws off for shipping and storage.

2. Sealing against moisture. A thin paper or plastic diaphram in the nozzle and over the head to prevent moisture for affecting the burning characteristics of the propellant.

3. Use of a separate igniter which is packed separately and inserted only when the rocket is ready to fire.

4. Use of electrically-initiated igniters, if possible. This is a positive method and can easily be safetied electrically. The igniter can then be a short piece of nichrome wire imbedded in a plastic container of black powder. Igniter leads are kept twisted together and shorted, thus preventing anything from setting it off during shipment or storage.

5. Use of propellant material which is stable and does not change during storage, and use of material which can be safely and easily made in the home. Black powder is not a good rocket propellant since it changes state if exposed to ambient environment factors; in addition, it has poor structural qualities. Potassium permanganate and sugar form an excellent high performance propellant which is stable and strong. Double-base propellants are extremely difficult to prepare without extensive training.

I also suspect that your rocket can be improved aerodynamically with a considerable improvement in performance and lightness. When I get a unit, I'll have some of the aerodynamic men run a weight-and-balance analysis; I am fairly certain that the size and weight of the fins can be reduced without sacrificing the rocket's stability.

Your work is certainly impressive. I'd like very much to give you some help with it. There are a million little tricks of the trade which are generally unknown which will, I am certain, be of help to you.

My new book, ROCKET POWER AND SPACE FLIGHT, was written with the rocket enthusiast in mind, and contains more information than I have set forth above. It will be published by Henry Holt & Co. this coming August, and I

am having them send you a complimentary copy as soon as it is available.

And if you'll send me additional information, I'll forward it to Mechanix Illustrated. I know they will be extremely interested in it and may give you some publicity.

I also assume that you have your manufacturing and distribution outlets and facilities all set up. However, if that is not the case, I can recommend several interested parties who are looking for something such as this. You are in an excellent position right now to take advantage of next Christmas' toy season.

At any rate, how about letting me see what you have. We can tell a lot more about it then.

And thanks for writing and sending the pictures. Please pardon the general sloppiness of this letter. I felt I should reply to you as soon as possible, so I wrote the foregoing at my desk between missile firings.

Cordially,

G. Harry Stine