

# LETTERS

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**COVER:** Nearly half the stars in the central part of the Hyades cluster showed up as X-ray sources in a survey done by astronomers from Stanford University and the Jet Propulsion Laboratory with equipment aboard the Einstein Observatory satellite. This is a false-color diagram in which different colors correspond to different intensities of X-ray at the frequency of observation. This and other surveys by Einstein have found X-ray-emitting stars of all kinds and nearly all spectral classifications. For more examples see p. 280. (Photo: Robert A. Stern, JPL)

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## Perchlorate safety

The introduction of organic electrodes and electrolytes ("A salt and battery without any metals," SN: 2/14/81, p. 101) opens exciting new possibilities for solving the problem of building commercially useful high-energy, low-weight batteries. However, your readers who are not familiar with the chemistry of perchlorates should be warned that many perchlorates have a tendency to explode without warning. Having witnessed the destruction of a laboratory hood by the detonation of a small sample of tetrabutylammonium perchlorate in ethanol, I would advise anyone who plans to experiment with perchlorate compounds to begin by studying the procedures and precautions for the safe handling of perchloric acid and perchlorates. The reference cited<sup>1</sup> is available in most high school and college libraries.

Lawrence E. Moore  
Spartanburg, S.C.

<sup>1</sup>J. Chem. Ed.: 49, A463(1972)

## Railgun wrap up

Your article on "rail guns" (SN: 4/4/81, p. 218) awakened many memories of the late Dr. E. F. Northrup and his interest in propelling various objects by means of traveling electric and magnetic fields. Many of his thoughts about the electric gun principle and other subjects are discussed in his book *Zero to Eighty* under the pen name Abkad Pseudoman, published in 1937 by the Scientific Publishers Co. of Princeton, N. J.

The electric gun experiments were not conducted at Princeton, but one test was made at the Watertown Arsenal near Boston, Mass.

Prior to 1937, I was assigned to work for Dr. Northrup and was personally responsible for many of the experiments related to the transfer of energy by polyphase electric phenomena.

It might be well to note that Dr. Northrup was the inventor of the high frequency furnace for heating and melting of metals, without which the Manhattan Project would have been seriously delayed, and which now generates keen interest among scientists throughout the world, including Russia and China.

T. R. Kennedy  
Rancocas, N. J.

It is stated on p. 218 in the article on railguns by D. E. Thomsen that the earliest known railgun launcher was fired in 1937. I have a 1901 reference for you (copy enclosed). There must have been earlier attempts, and I am sure that you have heard from other readers who have even earlier references; however, I believe the enclosed report is worthy of note in that a corporation was established to manufacture such launchers.

A. J. Dessler  
Houston, Tex.

(The full statement in the article was that Northrup's test firings were the earliest known to Prof. Kolm. In the previous sentence we had stated our own suspicion that experimentation with these devices had gone since the time of Lorentz. Thanks for confirming our suspicion. —Ed.)

In reference to the article "Railguns: Will they give the best shot?" by Dietrick E. Thomsen, there must be some error. If 1,000 tons (2 million lbs.) can be boosted to a velocity of 12 kilometers per second by a machine costing only \$10 million, why did we spend \$8 to \$10 billion for the space shuttle, which can only deliver 65,000 lbs. to space? This would be the deal of the century! Even if the system cost \$10 billion instead of \$10 million, it would be a good deal if it can continuously boost payloads of 2 million lbs. into orbit or elsewhere.

What are the true figures in this case?

W. Homer Ballard Jr.  
Colonial Heights, Va.

(The government was convinced that a reusable space vehicle would save money in the long run. No electromagnetic mass driver that could lift such loads exists now, and any figures about its probable cost are hypothetical —Ed.)

Your article on railguns points out some charming properties and a few potential uses for this sort of device, but I am appalled by the gullibility of anyone who could consider using a railgun for human propulsion, as the final paragraph suggested. Mr. Kolm may propose an arrangement 7.8 km long launching a payload at 12 km/sec, but he fails to mention that the launch would take 1.3 sec at an average acceleration of 950 gees! This is a splendid example of technology gone mad.

Spencer Young  
Terre Haute, Ind.

(Kolm does not propose to accelerate people at any such rate. Passenger vehicles would be restricted to safe gee levels. Most of the people moving proposed here would be short trajectory, earthbound flights, such as getting fire fighters to a roadless part of the forest. This kind of flight can be quite leisurely by spaceflight standards —Ed.)

Corrections: In "Ballooning Science" (SN: 4/11/81, p. 237), "balance penalty" should have read "ballast penalty" and "Like the troposphere" should have read "Unlike the troposphere."

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