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SCIENCE NEWS

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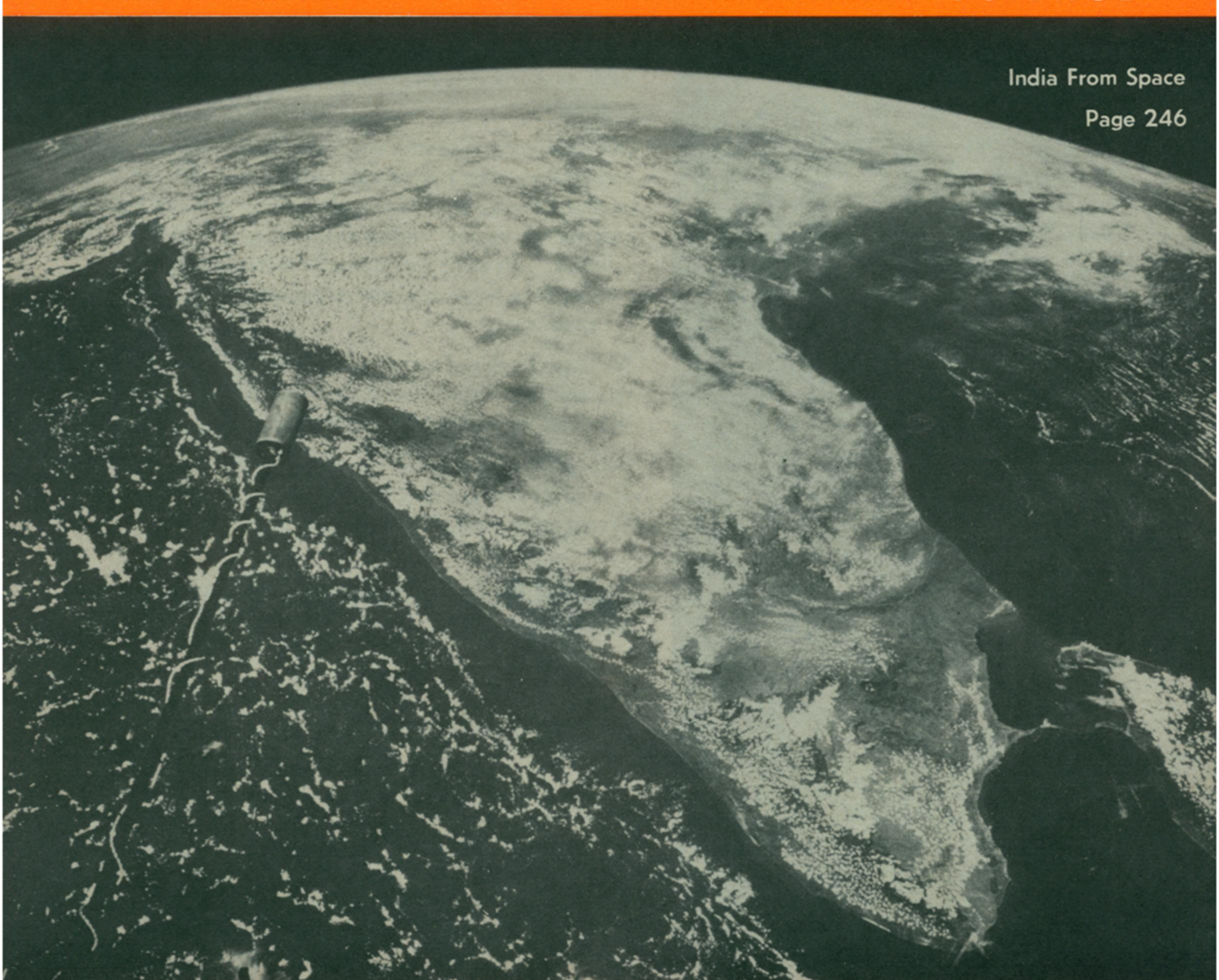
THE WEEKLY SUMMARY OF CURRENT SCIENCE



India From Space

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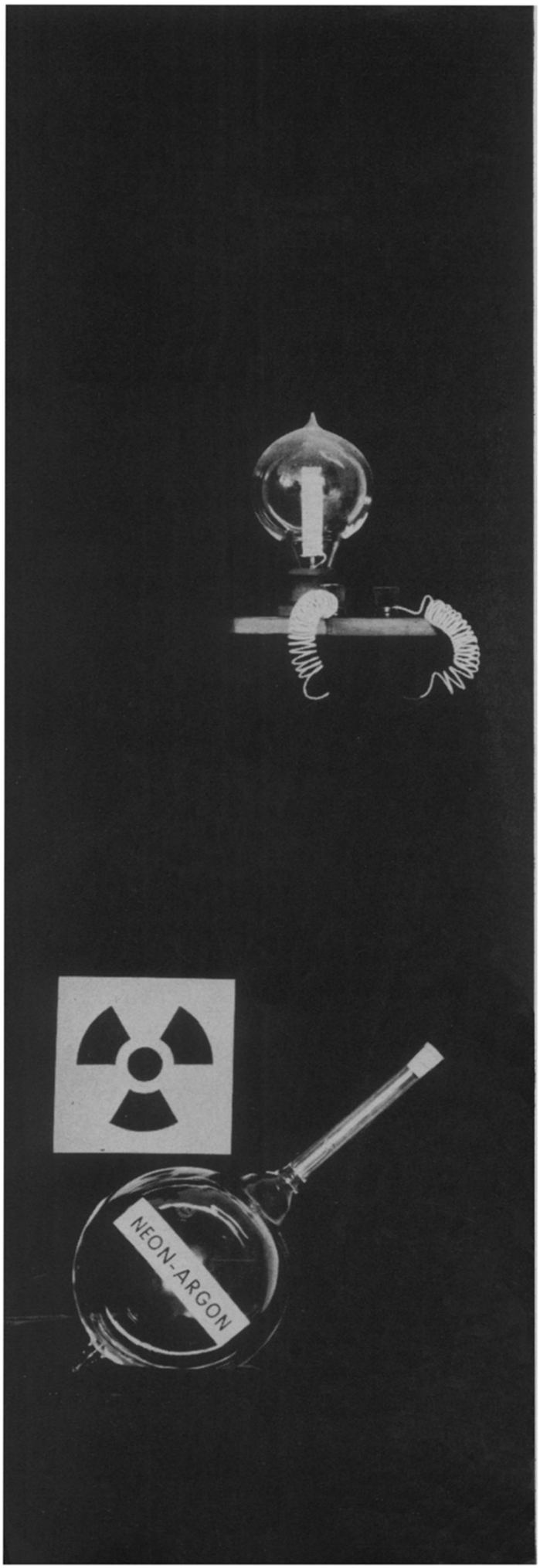


One of a series briefly describing GM's research in depth

A Noble Approach to an Old Problem

Edison was first.

He converted heat to electricity in a vacuum tube back in '83. But there was a barrier. We're knocking it down.

In a gas-filled thermionic tube, electrons can be boiled off of an emitter and directed to a collector, giving current flow. But only briefly. Then a cloud of electrons forms in the path . . . a space charge inhibiting further flow.

One way to get rid of this barrier is to neutralize it with positive ions, charged atoms of some gas. Many experimenters use vaporized cesium. But its atoms impede electron flow, requiring close interelectrode spacing. So GM Research physicists chose some of the noble gases—argon, neon, and xenon. They offer less impedance.

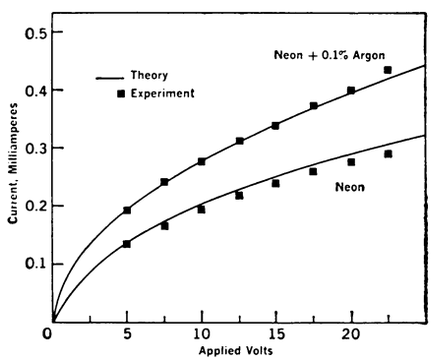
Our experimental emitter is a mixture of fissionable material and good electron-emitting material. Exposed to a neutron barrage in a reactor, the emitter gets hot from its own nuclear fission, sending electrons toward the collector. This same fission produces fragments that bombard the noble gas, generating ions to counteract the space charge.

We have developed a theory to predict the ion generation rate and have experimental data that backs it up. We think we understand why and how things happen.

General Motors is in the energy conversion business. The direct conversion of heat to electricity, with a device having no moving parts, interests us.

General Motors Research Laboratories

Warren, Michigan



Characteristics of tubes filled with gases ionized by fission fragments. Resulting current is a function of ion generation rate, which is increased greatly (from 1.8 to 2.6 x 10^{16} ions per cm^3 per sec) by small addition of argon.