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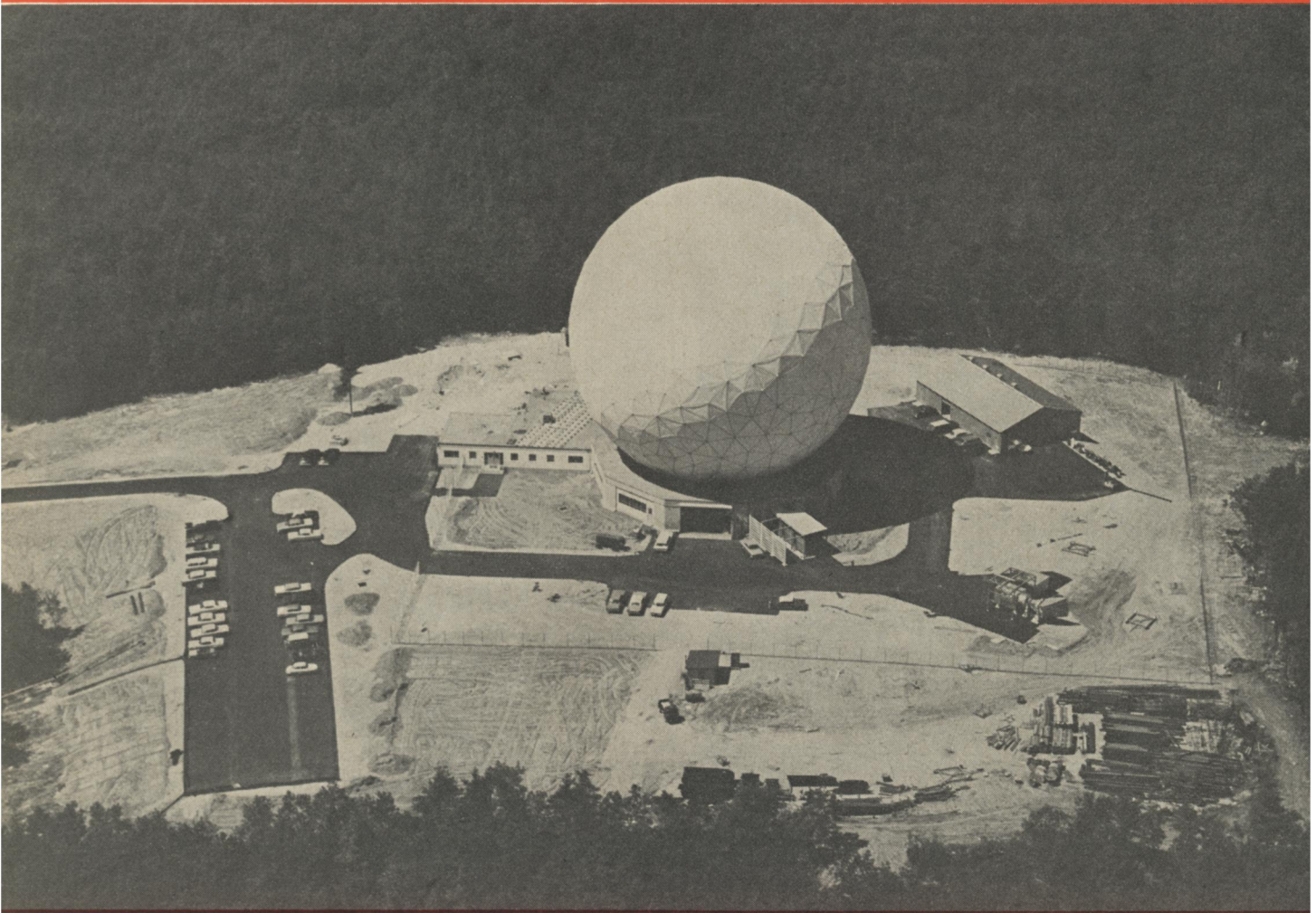
December 4, 1965

VOL. 88, NO. 23 PAGES 353-368

# SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



MIT Lincoln Laboratory

**Versatile Haystack**  
See Page 356

A SCIENCE SERVICE PUBLICATION

## Automotive Turbine Research —from the beginning

Thermodynamics. Fluid flow. Heat transfer. Metallurgy. Stress analysis. Dynamic balancing. Combustion.

A mechanical engineering syllabus? No. An outline of a gas turbine engine research program.

It started about 20 years ago when GM Research began studying all aspects of gas turbines and their operation. Turbines were successful in aircraft, but automotive vehicles presented an entirely new challenge. We had to go clear back to fundamentals.

Research on fluid flow characteristics led to new methods for designing compressors, turbines, and diffusers.

To learn more about combustion and to measure combustion efficiency, we had to sample and analyze elusive dynamic gases. A chromatographic gas analyzer was developed to do it.

There was no reliable way to measure temperatures of moving gases. We developed the techniques to do so. Further heat-transfer research produced a new parameter for describing conduction-convection processes.

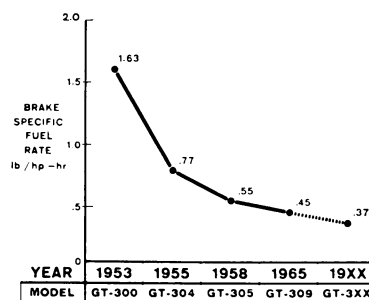
Materials research yielded the first castable nickel-aluminum-titanium turbine bucket material—forerunner of many of today's high temperature alloys.

Engines evolved too. In 1953, our GT-302 powered the XP-21 Firebird, the first gas-turbine automobile built in the United States. It provided baseline data for further research. Improvements in efficiency, performance, and engine braking followed. Latest experimental installations: GT-309's—in Chevrolet's Turbo-Titan III, a heavy-duty truck; and GMC's Turbo-Cruiser II, a transit bus.

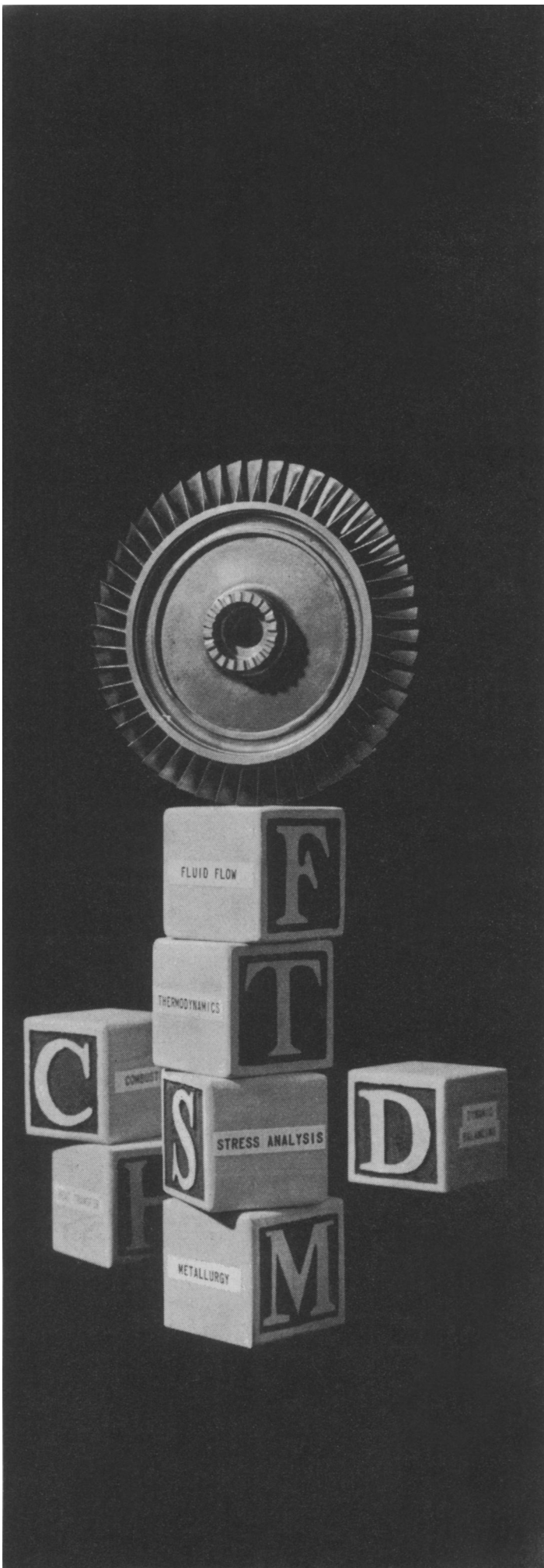
Out of research . . . the scientific advances of today, the engineering for tomorrow.

### General Motors Research Laboratories

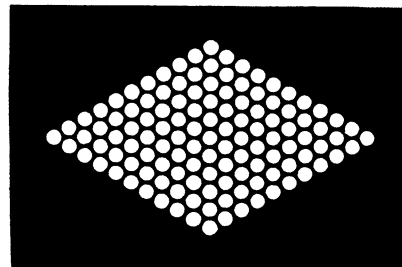
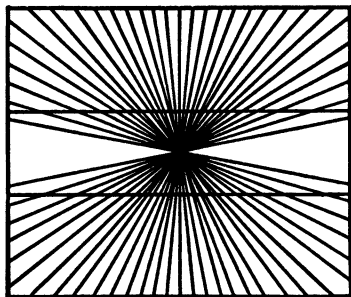
Warren, Michigan



Turbine Engine Progress—  
from a recent paper.



"Op" art . . . magic tricks . . . circles that are not round. They are all explained in Dover's . . .



# VISUAL ILLUSIONS: Their Causes, Characteristics & Applications

By M. Luckiesh

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"Seeing is deceiving." So begins this intriguing excursion into the realm of optical illusions. And by the time you have read through its pages and studied the dozens of illusions it illustrates, you will undoubtedly agree.

This new Dover reprint is a masterful summary of most of the phenomena observable in conjunction with visual illusions. Sticking to static illusions only and subordinating theory to facts, Luckiesh, a lighting engineer whose published works reveal a broad interest in everthing from engineering aspects of lighting to the psychology of vision and the aesthetics of light and color, takes us through chapter after chapter of exercises that strain our credulity at what we see. At the same time, he never becomes too involved with complex theory.

### 100 drawings, photos, diagrams, etc.!

The author's introduction, which deals with "illusion" vs. "hallucination," types of visual illusion, general causes, and the early scientific study of illusions, and his first two chapters (on the visual process and the structure of the eye) provide you with enough background to enable you to turn right to the main part of the text. Here, he describes and briefly explains geometrical illusions, perspective illusions, equivocal figures that seem to change as you look at them, the influence of angles, illusions of depth and distance, color illusions, lighting effects, and illusions in nature, and shows the applications of these ideas in painting, decoration, architecture, magic, and camouflage.

Throughout all of these chapters, 100 drawings, photographs, and diagrams show us the principle types of

optical illusions in uncanny tests of your ability to perceive accurately—real eye openers as to how easy it is to fool the senses.

Published with a new introduction to post-Luckiesh developments prepared for Dover by William H. Ittleson of the Department of Psychology at Brooklyn College, New York, this book is far more than simply a valuable text for psychology students of perception, although it is in this field that it has established itself as a classic. It is also a book for general readers aroused by the modern school of "op" art, interested in why they see as they do, or just plain curious.

Unabridged reprint of 1st (1922) edition. New introduction by William H. Ittleson, Psychology Department, Brooklyn College. 100 figures. Index. Bibliography. xxi + 252pp. 1930. Paperbd. \$1.50

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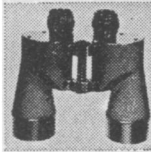
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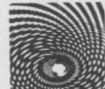
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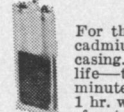
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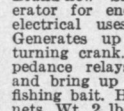
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