

# SCIENTIFIC AMERICAN

Established 1845

CONTENTS FOR MARCH, 1954

VOL. 190, NO. 3

Copyright 1954 in the U. S. and Berne Convention countries by Scientific American, Inc. All rights reserved.

## ARTICLES

- THE NATIONAL SCIENCE FOUNDATION** by Lawrence P. Lessing  
The first federal agency for the promotion of basic science in the U. S. looks back on three years of shockingly meager support and forward to a new era in which its growth may be sustained, substantial and healthy. 29
- THE LIFE CYCLE OF A VIRUS** by André Lwoff  
What happens in the time between the infection of a cell by a virus and the appearance of a new generation of viruses? The evidence of bacteriophages suggests that the process involves the concept of the provirus. 34
- THE EPIDEMIOLOGY OF MENTAL DISEASE** by Ernest M. Gruenberg  
From the Dancing Mania of the Middle Ages down to the high incidence of schizophrenia in modern slums the study of the distribution of mental illness may yield control measures, just as we control germ epidemics. 38
- MODERN COSMOLOGY** by George Gamow  
Man's recent theories of the Universe have ranged from a "steady-state" one to the more generally accepted expanding universe. Gamow suggests all the elements were created in about half an hour five billion years ago. 54
- THE PERU CURRENT** by Gerald S. Posner  
This oceanic river running along the western coast of South America is paradoxical. It shrouds a parched land in fog; it is cold yet rich in life. Occasionally it wreaks havoc by disappearing under warmer water. 66
- MUSCLE AS A MACHINE** by A. Katchalsky and S. Lifson  
By imitating in synthetic gels the chemical reactions causing living muscle to expand and contract, a laboratory in Israel has contrived a crude engine capable of converting chemical energy directly to work. 72
- BIRD SONAR** by Donald R. Griffin  
A species of South American bird living in caves and prized for its oil is discovered to guide its flight in the dark by a system of echo-location similar to that of bats, but utilizing sound audible to human ears. 78
- THE KLYSTRON** by Edward L. Ginzton  
This vacuum tube, which bunches electrons by a resonating method, has come out of radar to be the most versatile tube in the microwave area. It is finding wide variety of applications in technology and science. 84

## DEPARTMENTS

LETTERS	2
50 AND 100 YEARS AGO	10
THE AUTHORS	18
SCIENCE AND THE CITIZEN	44
BOOKS	92
THE AMATEUR SCIENTIST	100
BIBLIOGRAPHY	108

Board of Editors: GERARD PIEL (*Publisher*), DENNIS FLANAGAN (*Editor*), LEON SVIRSKY (*Managing Editor*),  
ROBERT EMMETT GINNA, ALBERT G. INGALLS, LAWRENCE P. LESSING, JAMES R. NEWMAN, E. P. ROSENBAUM  
Art Director: JAMES GRUNBAUM  
General Manager: DONALD H. MILLER, JR.  
Advertising Manager: MARTIN M. DAVIDSON

# SCIENTIFIC AMERICAN



OCEANOGRAPHIC INSTRUMENTS

**FIFTY CENTS**  
SEVENTY-FIVE CENTS OUTSIDE THE AMERICAS

*March 1954*