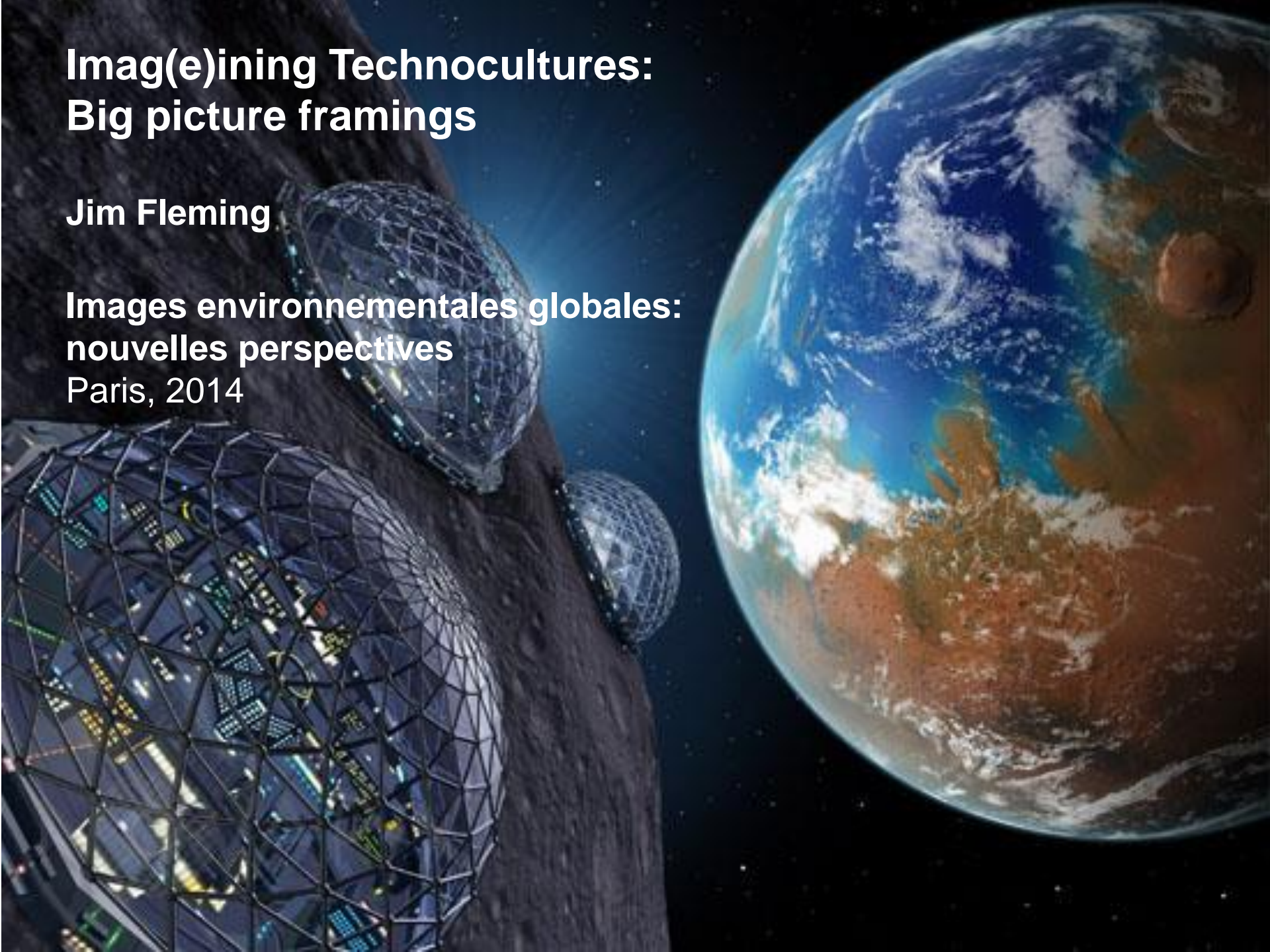


Imag(e)ining Technocultures: Big picture framings

Jim Fleming

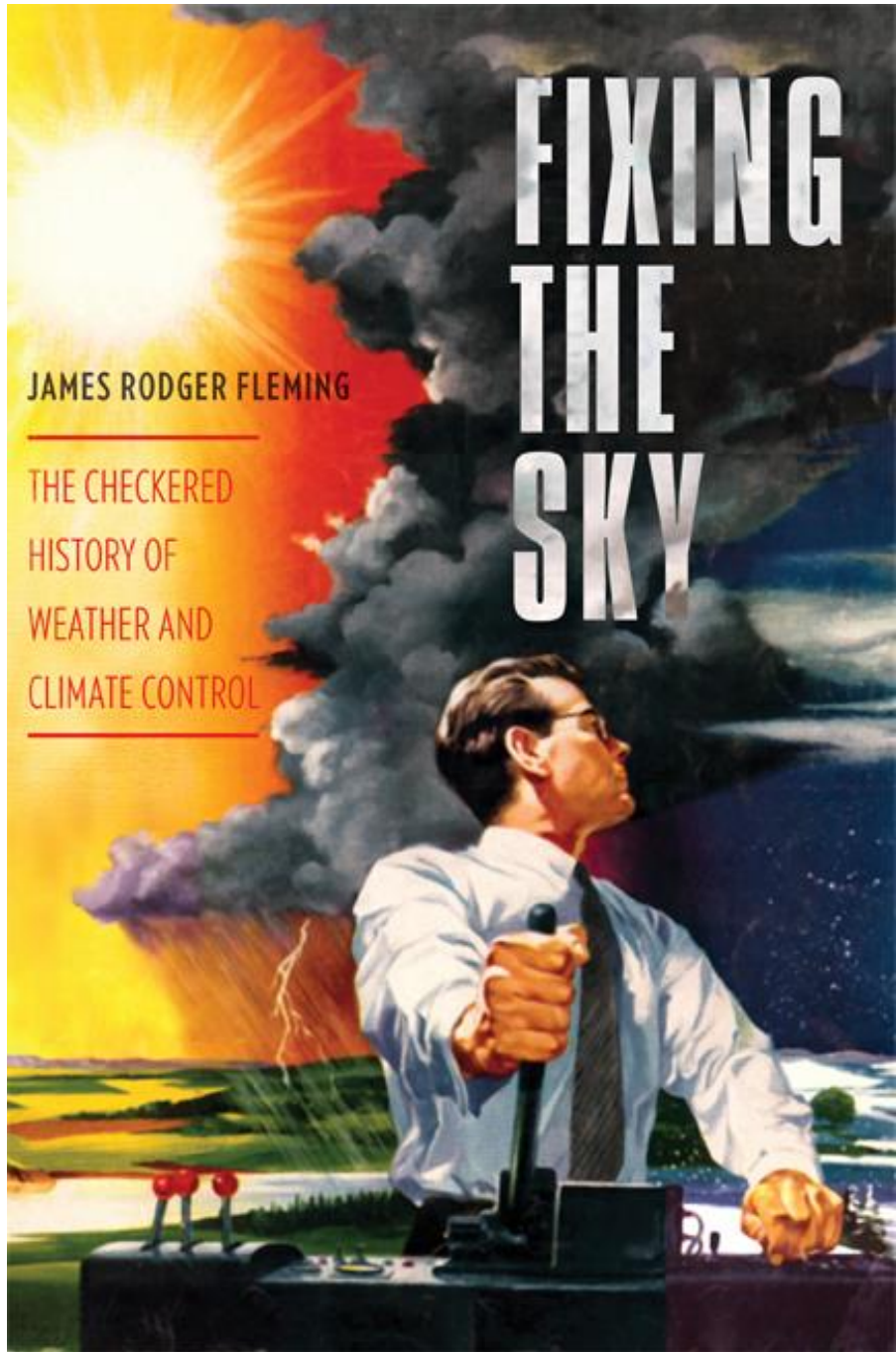
Images environnementales globales:
nouvelles perspectives
Paris, 2014



JAMES RODGER FLEMING

THE CHECKERED
HISTORY OF
WEATHER AND
CLIMATE CONTROL

FIXING THE SKY



Technology

An ancient, complex, multifaceted, ever-changing, and essential set of human activities.

Tools, machines, and implements fabricated by humans to meet specific needs.

A system of tacit and explicit knowledge, techniques, and materials utilized in using, making, or repairing the human-built world.

A profession such as crafters, engineers, or machinists.

A total societal enterprise, with vast consequences.

A human cultural activity, grounded in ingenuity and shaped throughout history by social and natural forces.

Technologies

Shape the material world and define the social practices that both constrain and inspire each generation.

Protect us from harsh environments, create new environments, and, writ large, are having increasingly measurable impacts on the global environment.

Have differential “impacts,” both across societal borders and on the natural environment.

Transform the planet [for good or ill] as well as the ways we live, work, and play.

The Future?

Predicting breakthroughs — Almost impossible

Forecasting innovations — Challenging in the long term

Projecting trends — Necessary in the short term

Generalizing from case studies often misses nonlinear and unexpected developments.

Trends and patterns may be destabilized by changes in social, economic, and technical factors.

What can the history of technology tell us about the future?

I have but one lamp by which my feet are guided, and that is the lamp of experience. I know no way of judging of the future but by the past

– Edward Gibbon

**Lewis
Mumford**

***Technics and
Civilization***

1934



Paleolithic

ERA	ENERGY	MATERIALS	ARTIFACTS	METAPHOR
40,000-10,000 BC	Muscle	Stone/Bone	Stone tools	Survival



Eotechnic

ERA	ENERGY	MATERIALS	ARTIFACTS	METAPHOR
10,000 BC -1750 AD	Water Wind Animals	Metals Wood Cloth/ Leather	Clipper Ship Water Wheel Violin	Agriculture Artisans



Paleotechnic

ERA	ENERGY	MATERIALS	ARTIFACTS	METAPHOR
1750-1930	Steam	Coal Steel	Railroads Factories	Industry Pollution



Neotechnic

ERA	ENERGY	MATERIALS	ARTIFACTS	METAPHOR
1930-2000	Electricity Oil	Aluminum Plastics	Automobiles Airplanes	High-tech Mass Consumption



Ecotechnic?

ERA	ENERGY	MATERIALS	ARTIFACTS	METAPHOR
21st C?	Renewable Solar/ Wind	Recyclable Biodegradable	Less is more	Sustainability



Biotechnic?



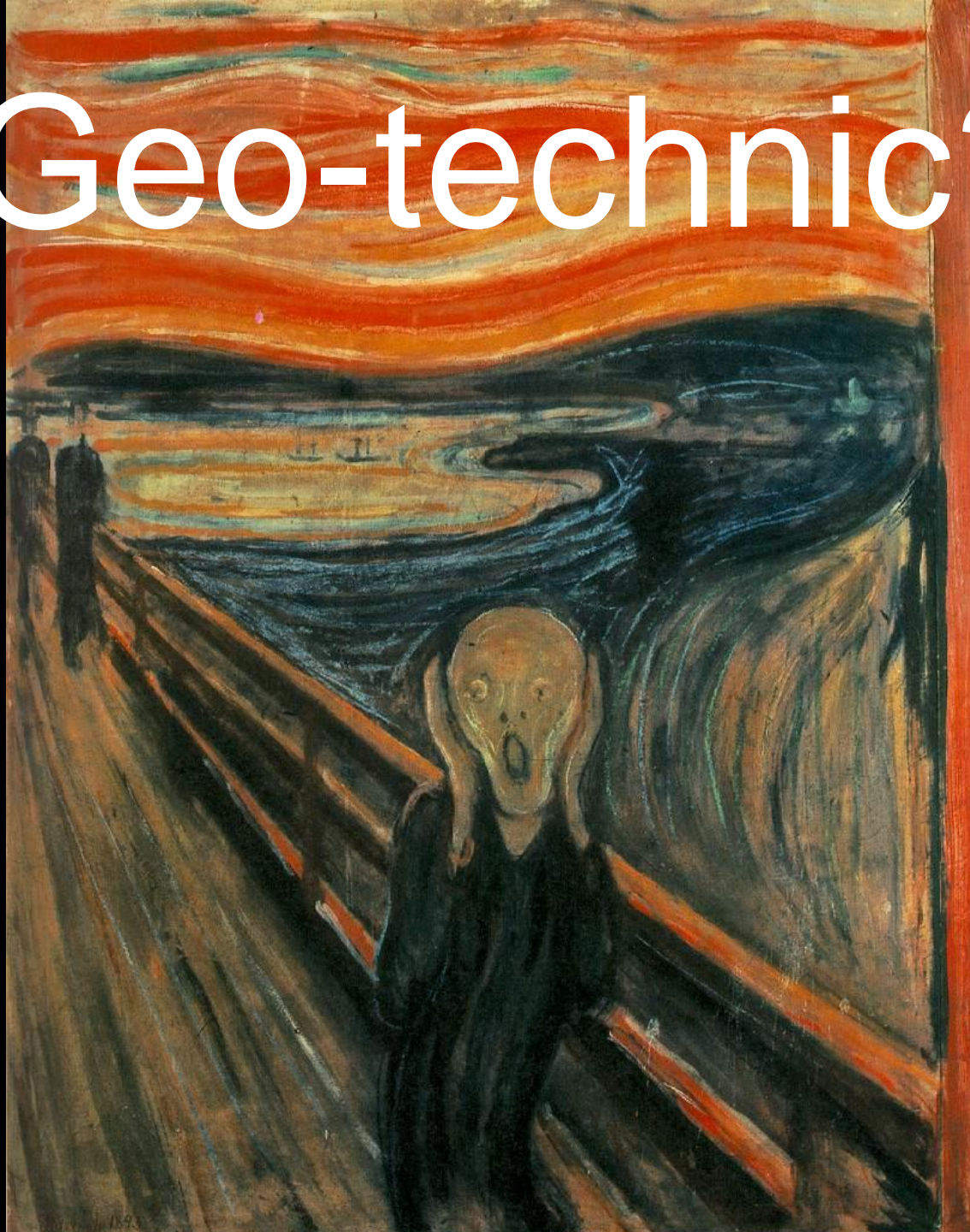
A 3D visualization of a carbon nanotube, represented by a red hexagonal lattice structure. Inside the tube, numerous water molecules are depicted as blue and white spheres. The scene is illuminated with a blue glow, creating a sense of depth and highlighting the molecular structure. The text "Nano-technic?" is overlaid in the center in a white, sans-serif font.

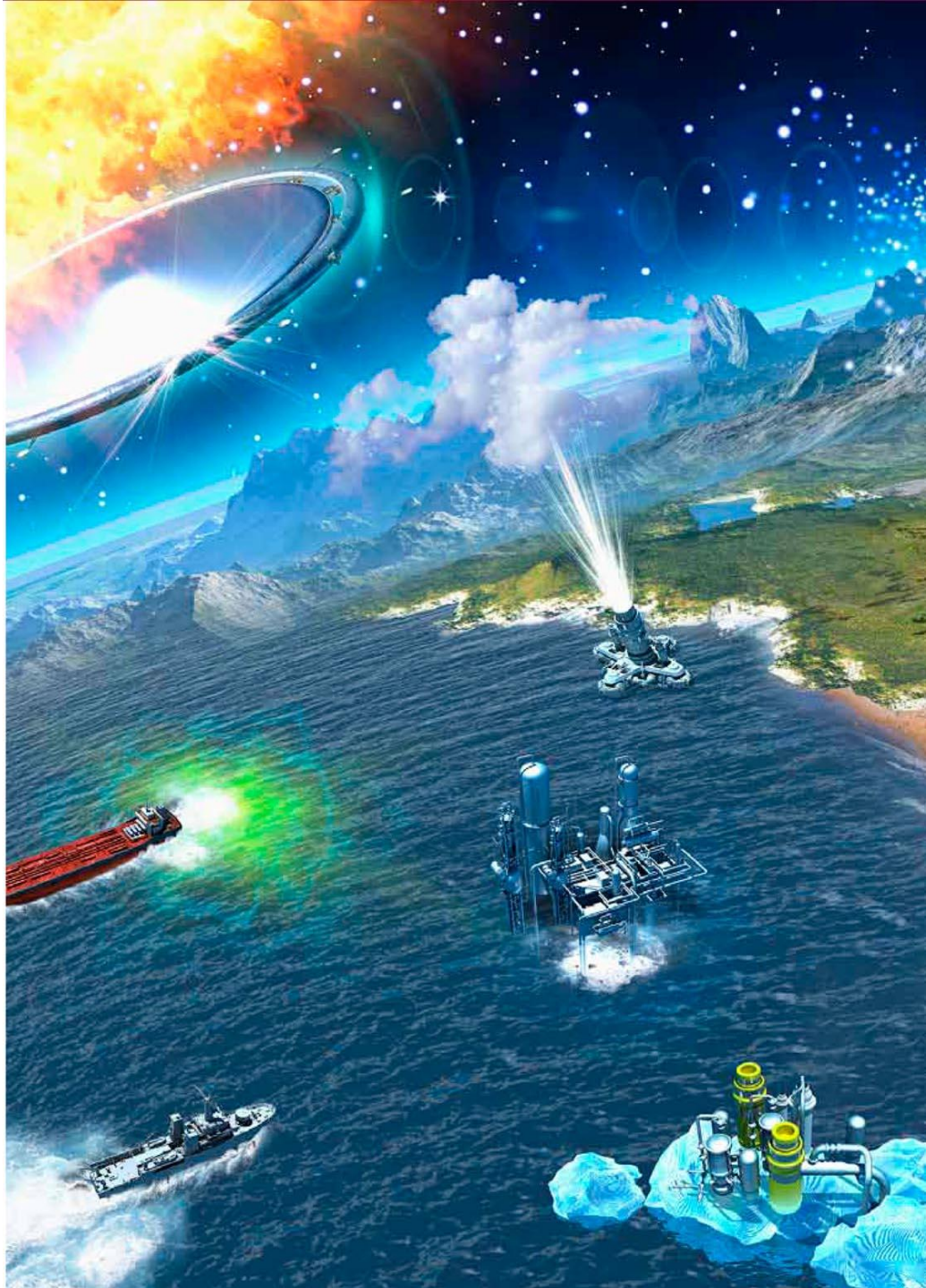
Nano-technic?



Cyber-technic?

Geo-technic?





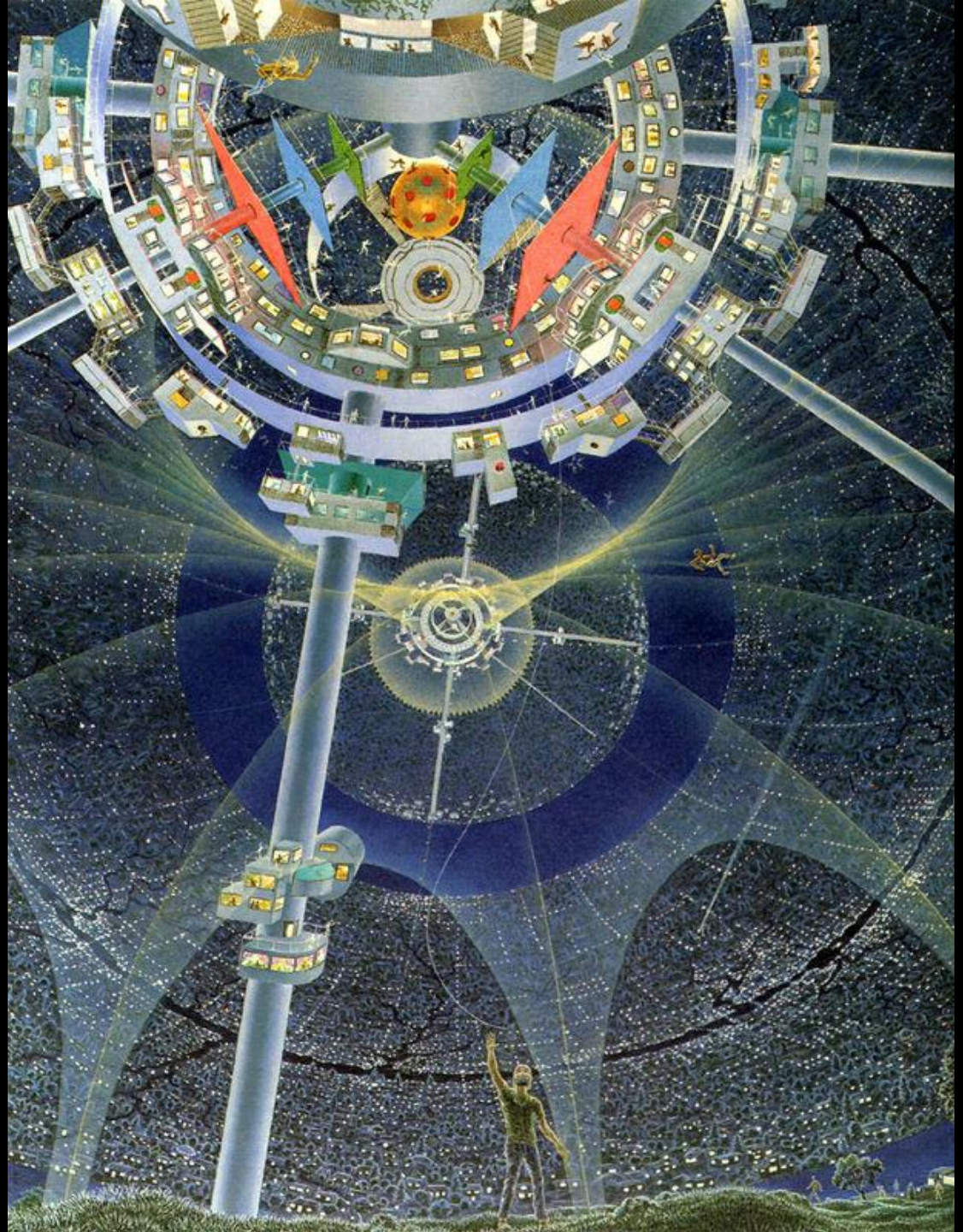
J.D. Bernal

**The World,
The Flesh,
and the Devil**

1929



The World
physical
transcendence



The Flesh

physiological
transcendence



The Devil

psychological
transcendence



Psychological forces inhibit the coming of the new world and the new flesh.

An evolutionary split between the humanizers and the mechanizers?

The complacent 90% and the adventurous 10%

The grounded masses and the transcendent elite.

The proletariat and the party.

**John Von
Neumann**

**“Can We Survive
Technology?”**

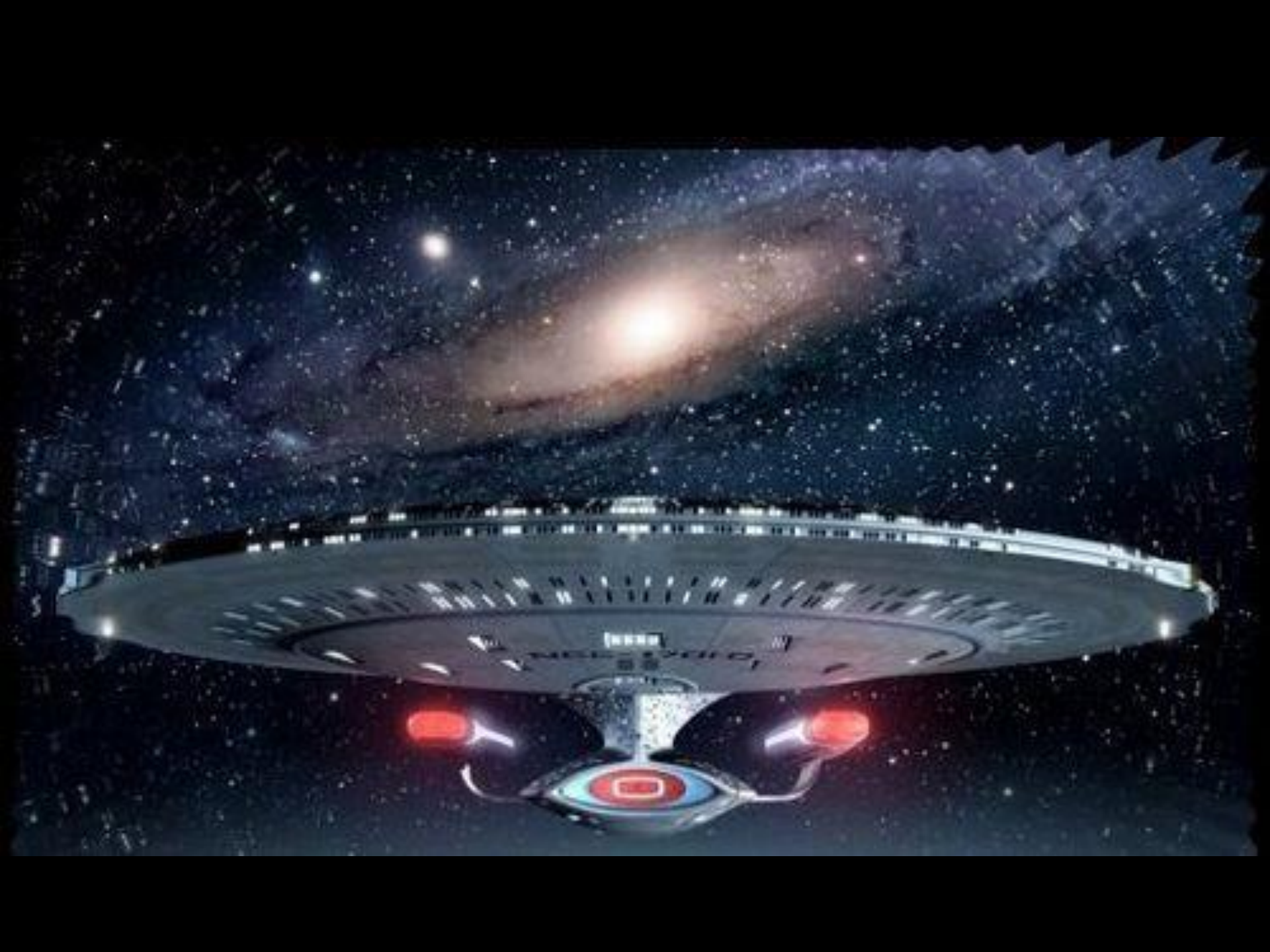
1955



Present awful possibilities of nuclear warfare may give way to others even more awful. After global climate control becomes possible, perhaps all our present involvements will seem simple.

Intervention in atmospheric and climatic matters will unfold on a scale difficult to imagine at present. This will merge each nation's affairs with those of every other, more thoroughly than the threat of a nuclear or any other war would have done.

John von Neumann 1955





What can we say about the Future?

We must live within the limits of the environment.

We must abandon Paleo-technic and Neo-technic assumptions.

Technology and society will be very different.

The Future [hopefully] will be Eco-technic.

The Future may also be Bio-technic, Nano-technic, or Cyber-technic, but hopefully not Geo-technic.

We can't survive the future *without* technology.

**But we need our inventions to be more than merely
“improved means to an unimproved end.”**

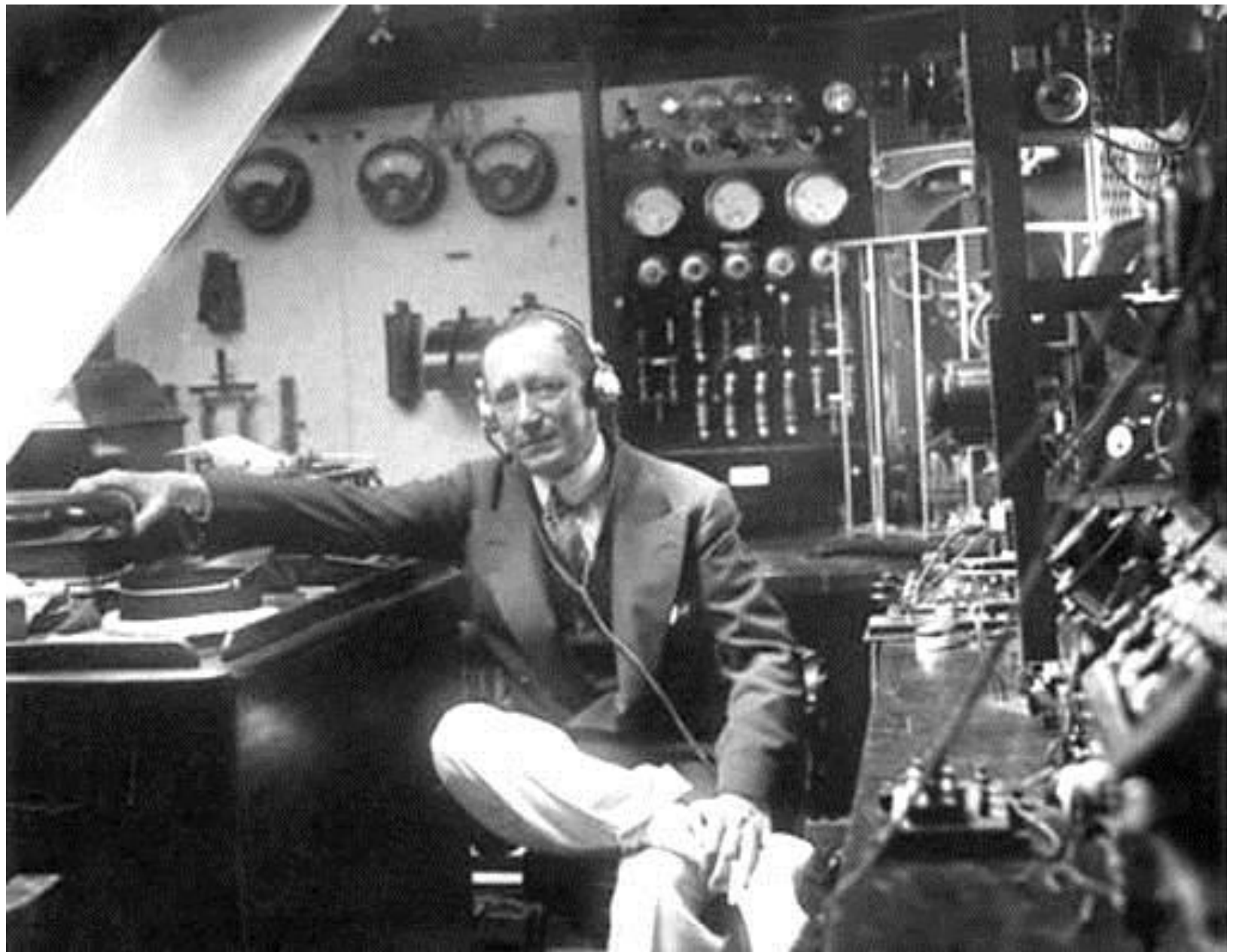
We may already be living in the Anthropocene, and we really need to think about that.

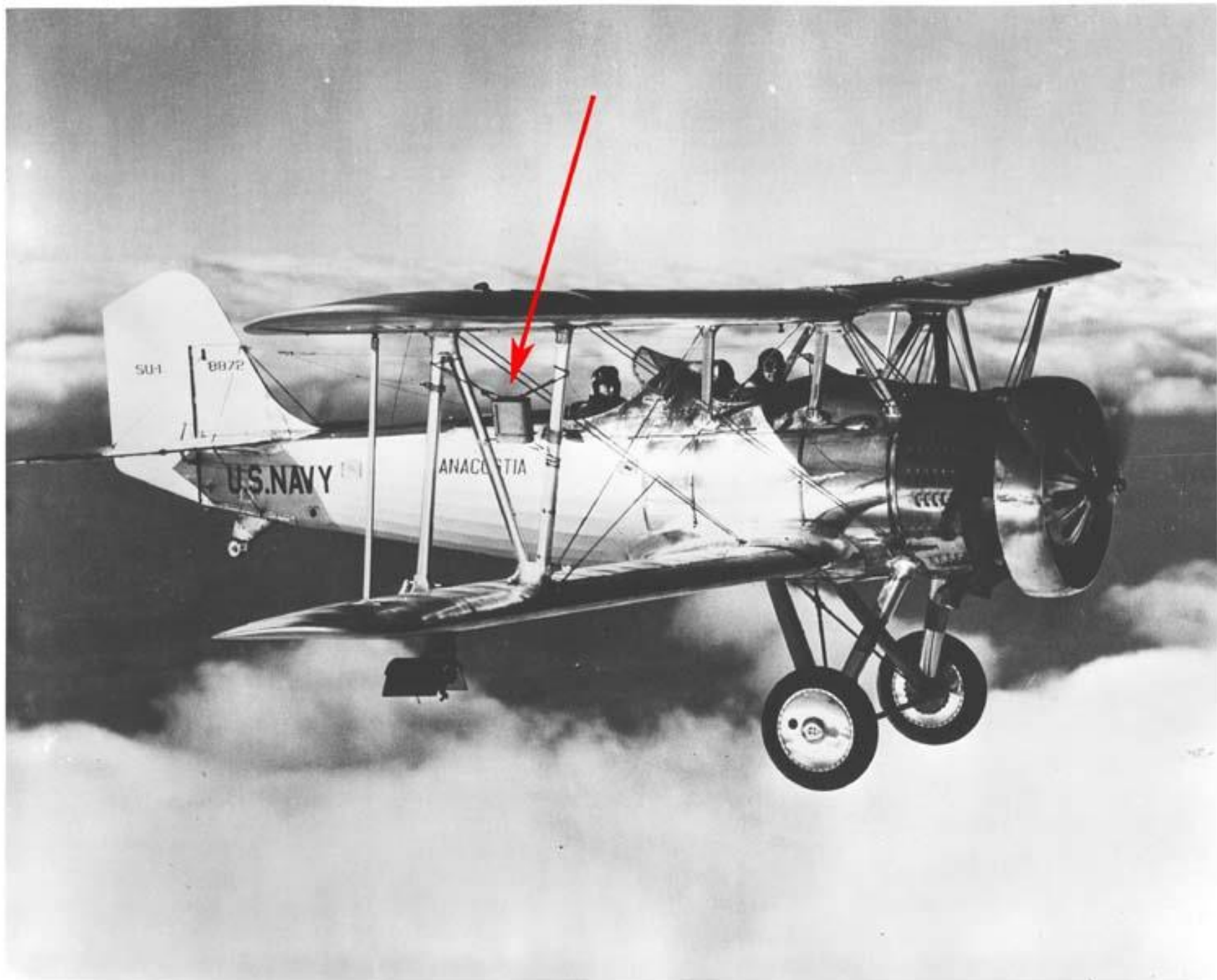
Everything Atmospheric, Everywhere, Always

Entrepreneurs of Atmospheric Research 1900-1960

Jim Fleming









Examining the meteorograph: C.G.A. Rossby, K. O. Lange, Daniel C. Sayre.

Radiosonde and Radio Receiver



RADAR





Bumper V-2 and WAC Corporal, 24 July 1950



Atmospheric Nuclear Testing

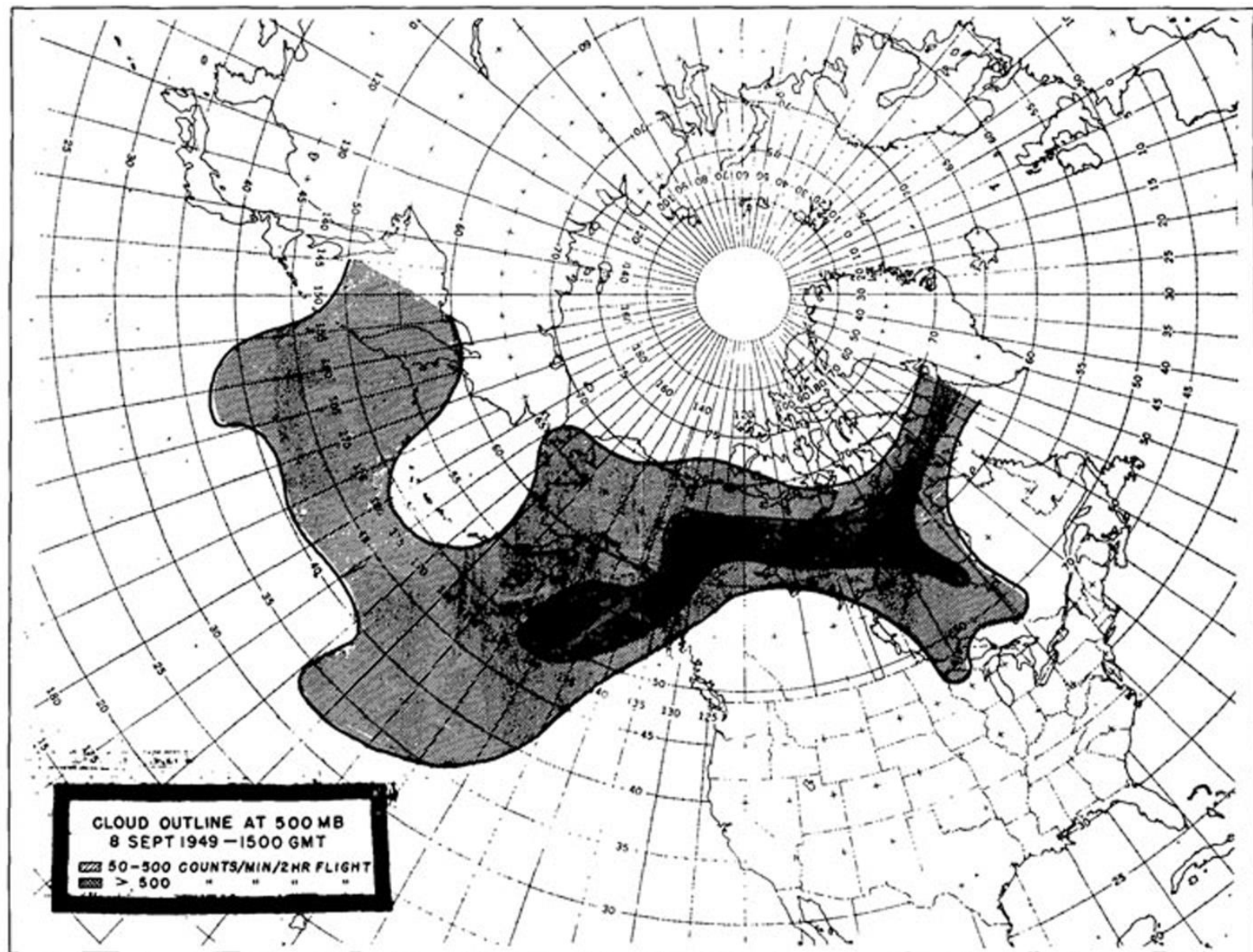


FIG. 5. The geographical distribution of particulate radioactivity on the 500-mb surface at 1500 UTC 8 September 1949.

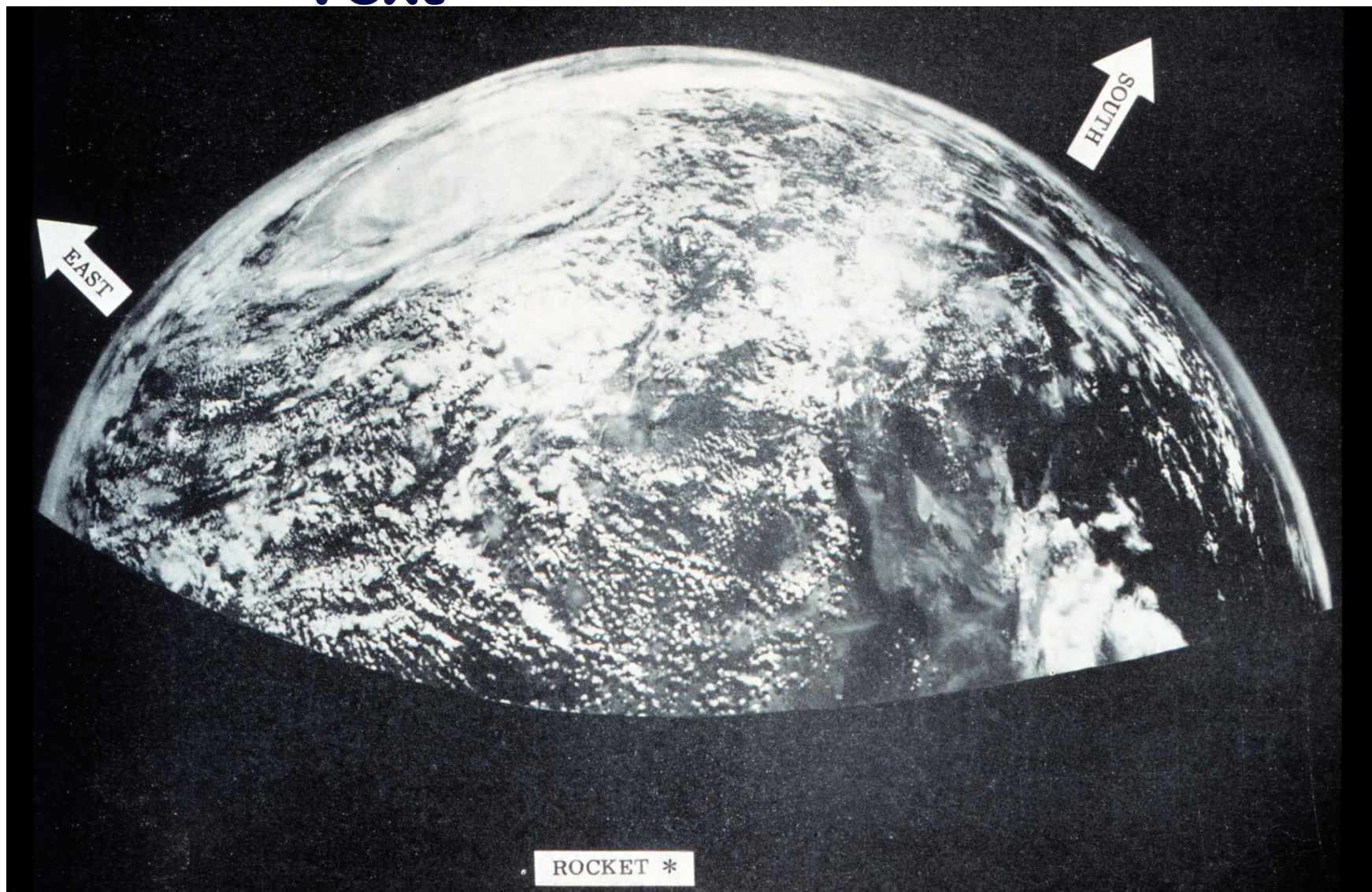


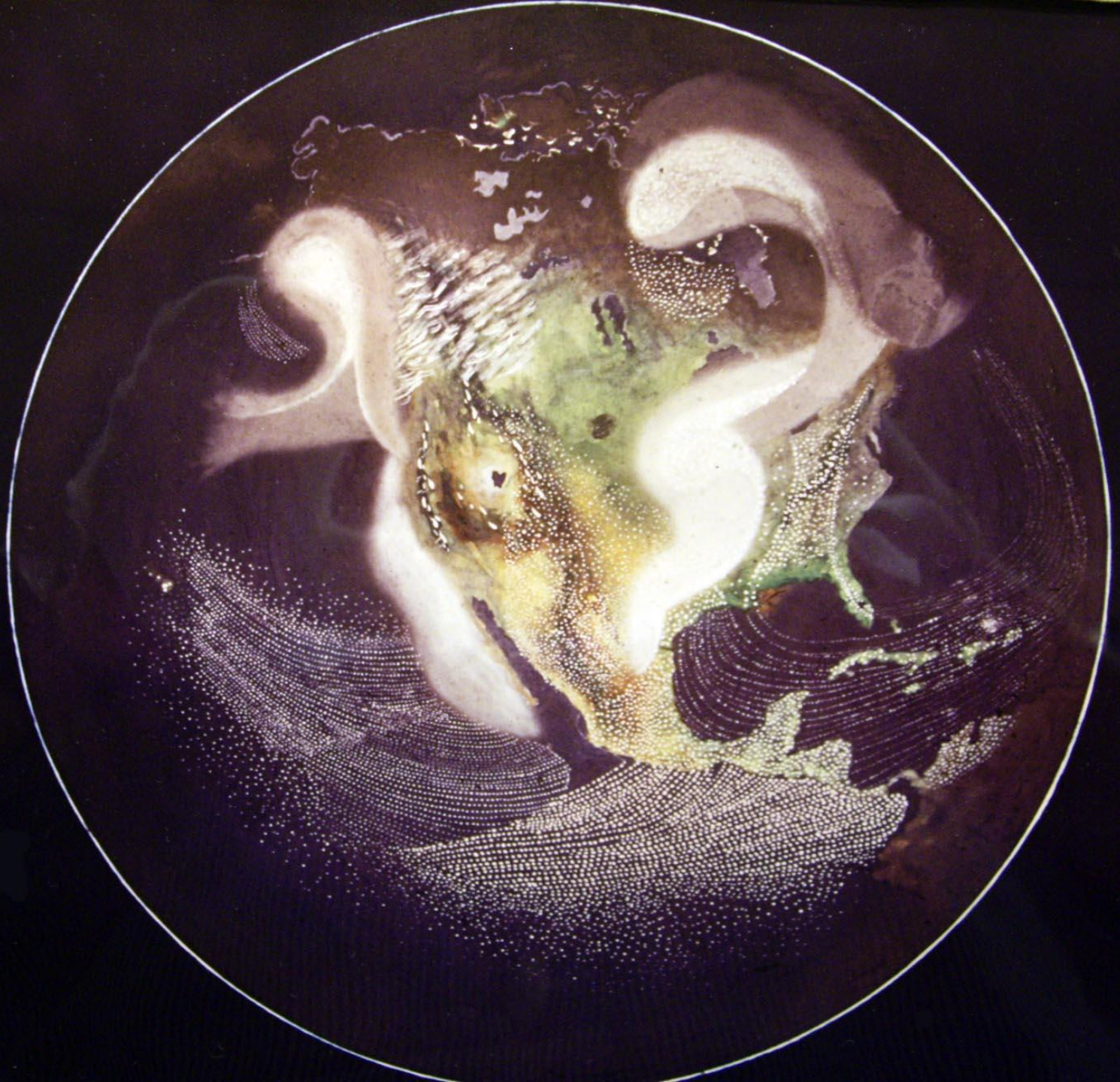
Photo taken in front of the ENIAC, Aberdeen Proving Ground, April 4, 1950, on occasion of the first numerical weather computations carried out with aid of a high-speed automatic computer.

H. Wexler, J. von Neumann, M. H. Frankel, J. Namias,
J. C. Freeman, R. Fjørtoft, F. W. Reichelderfer, and
J. G. Charney

Aerobee rocket image reveals tropical storm, 1954.

Text



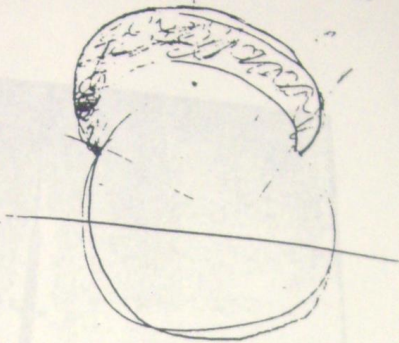


• Explorer 1, Jan. 31, 1958



Ernie Ray #1/5/58

NOTE:



1958 γ

DATA

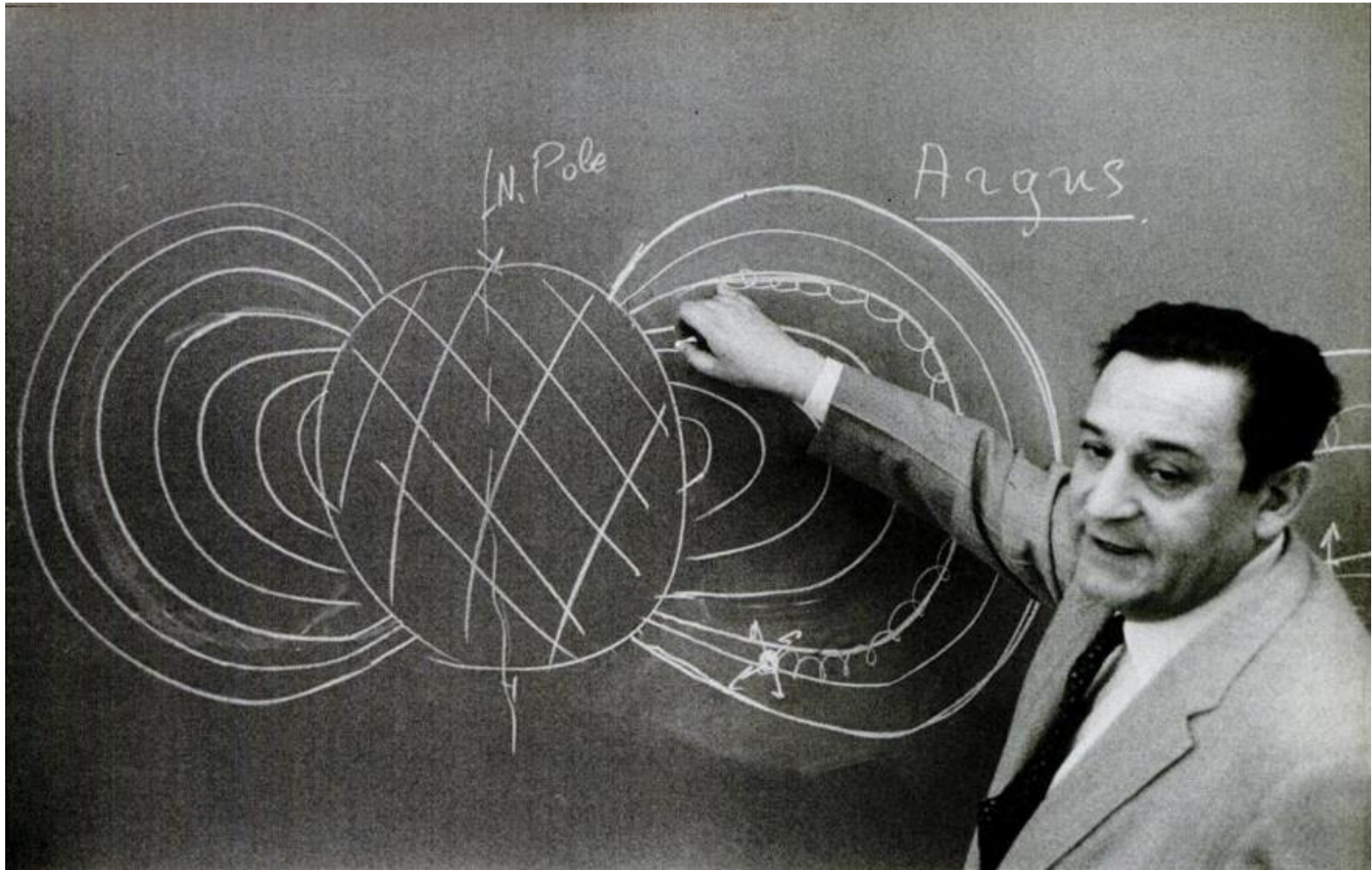
SPACE IS
RADIO ACTIVE

4/3/58

64
707 } ~ 60%

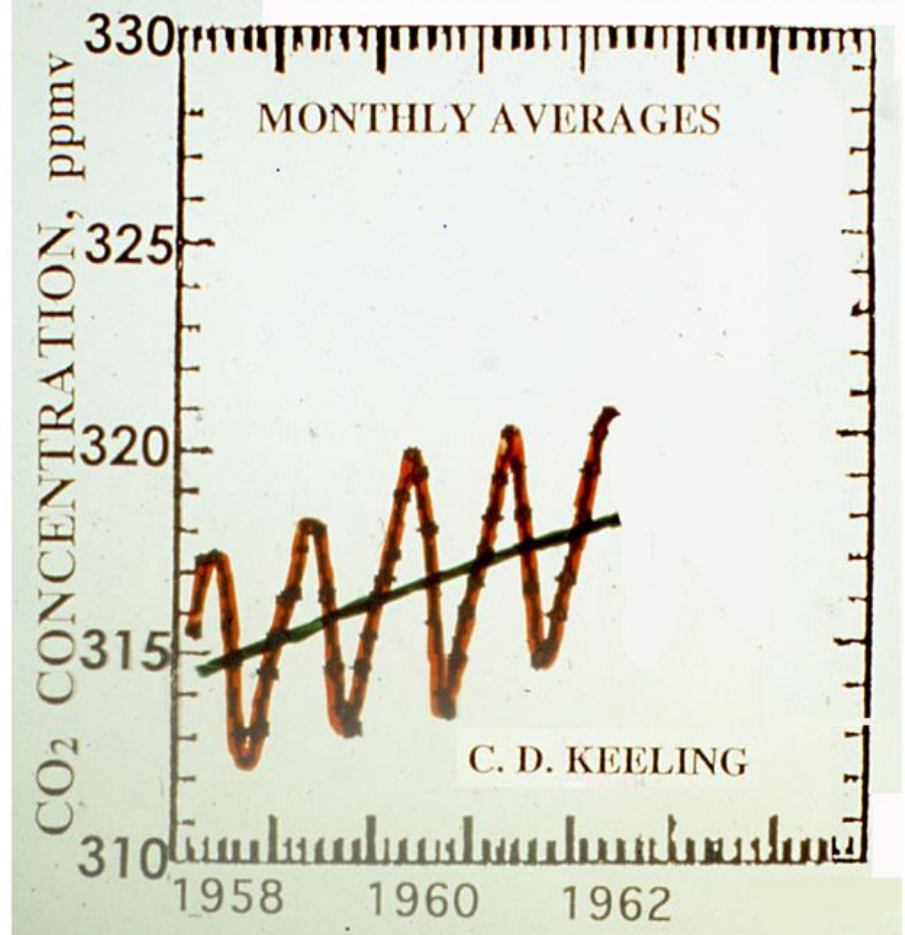
Ernie Ray's note on Van Allen's door, ca. April 2-5, 1958. See George Ludwig, *Opening Space Research*. AGU, 2011, fig. 12.3, p. 335.

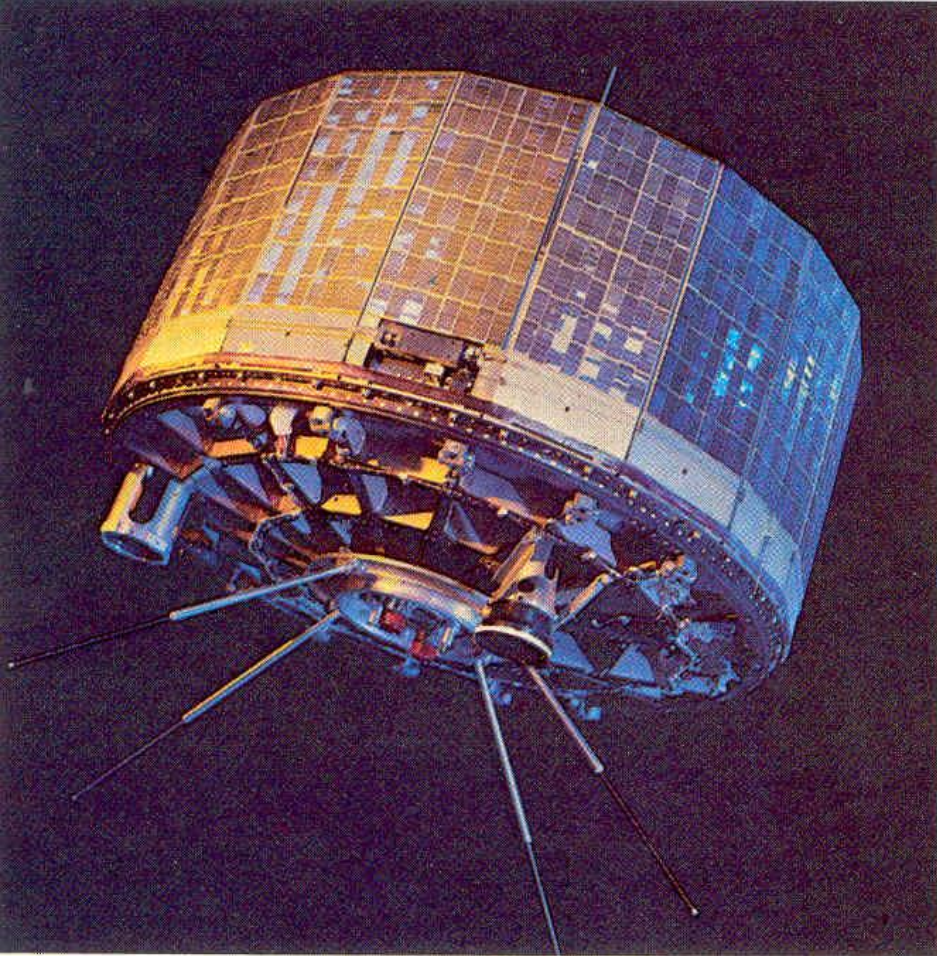
Discovering and disrupting the magnetosphere





CARBON DIOXIDE CONCENTRATIONS MAUNA LOA OBSERVATORY, HAWAII





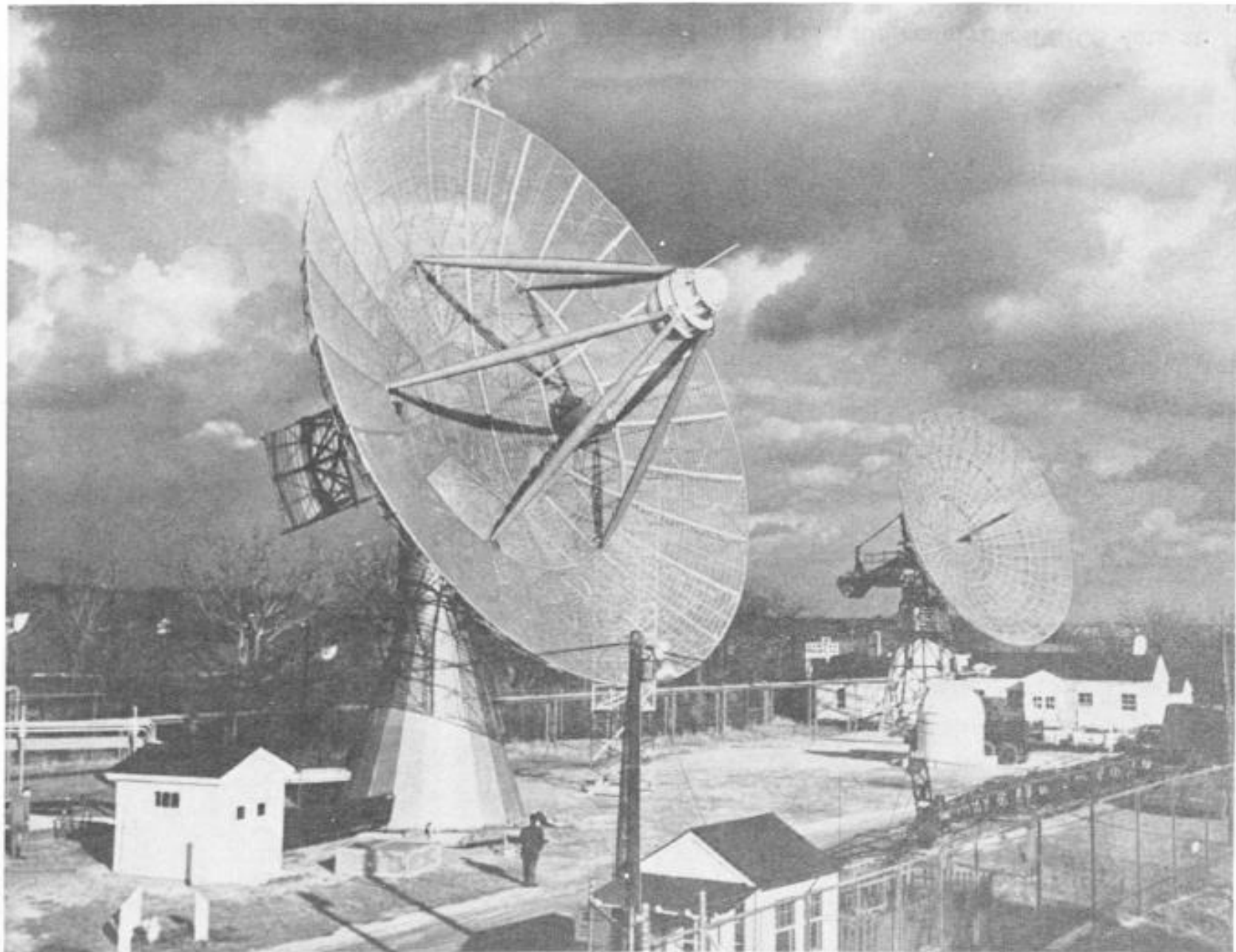
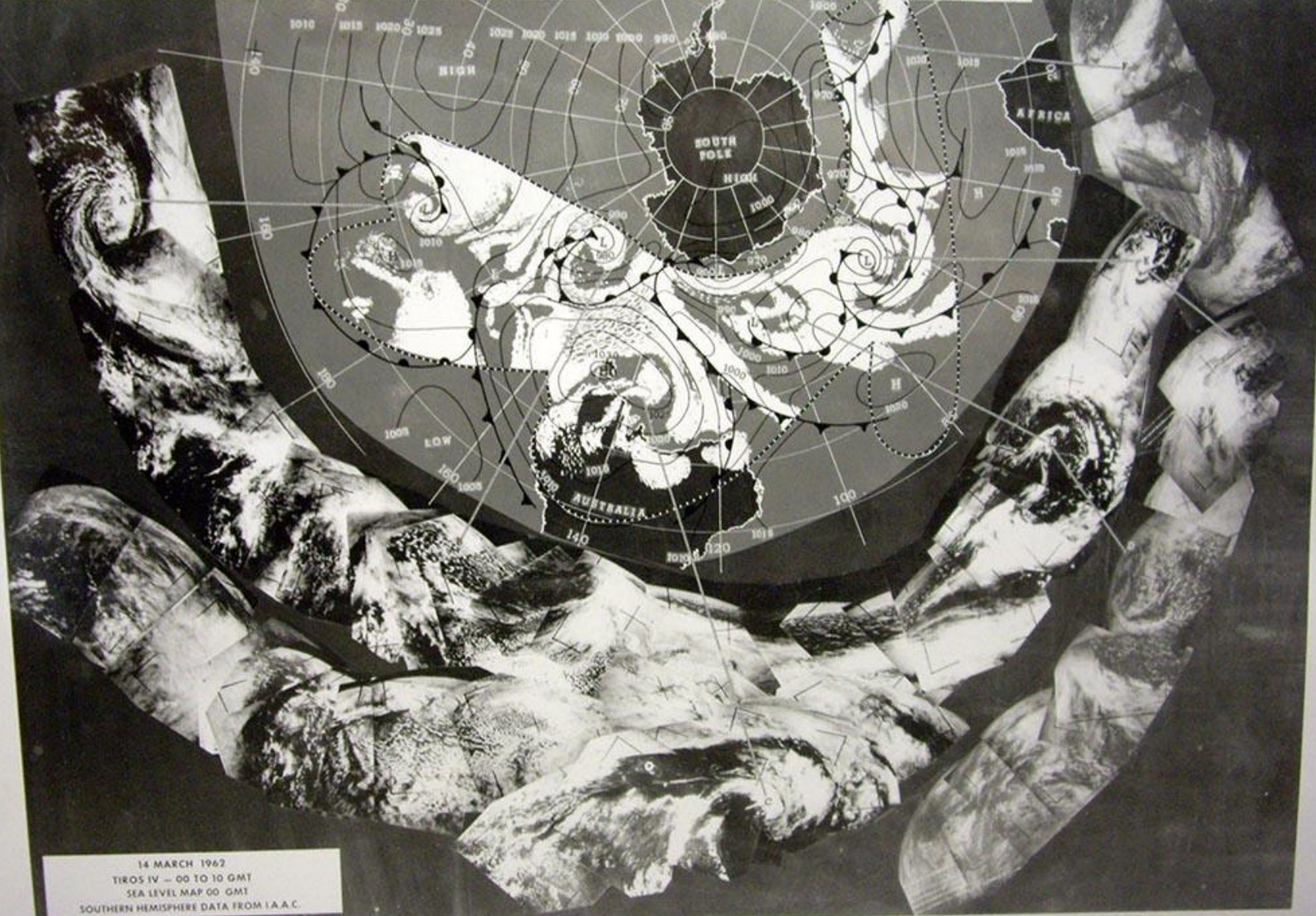


Fig. 74. Antenna used by the U. S. Army Signal Research and Development Laboratory, Belmar, New Jersey, for receiving TIROS I data.

TIROS FILLS A VOID FOR WORLD WEATHER WATCH



14 MARCH 1962
TIROS IV - 00 TO 10 GMT
SEA LEVEL MAP 00 GMT
SOUTHERN HEMISPHERE DATA FROM I.A.A.C.