

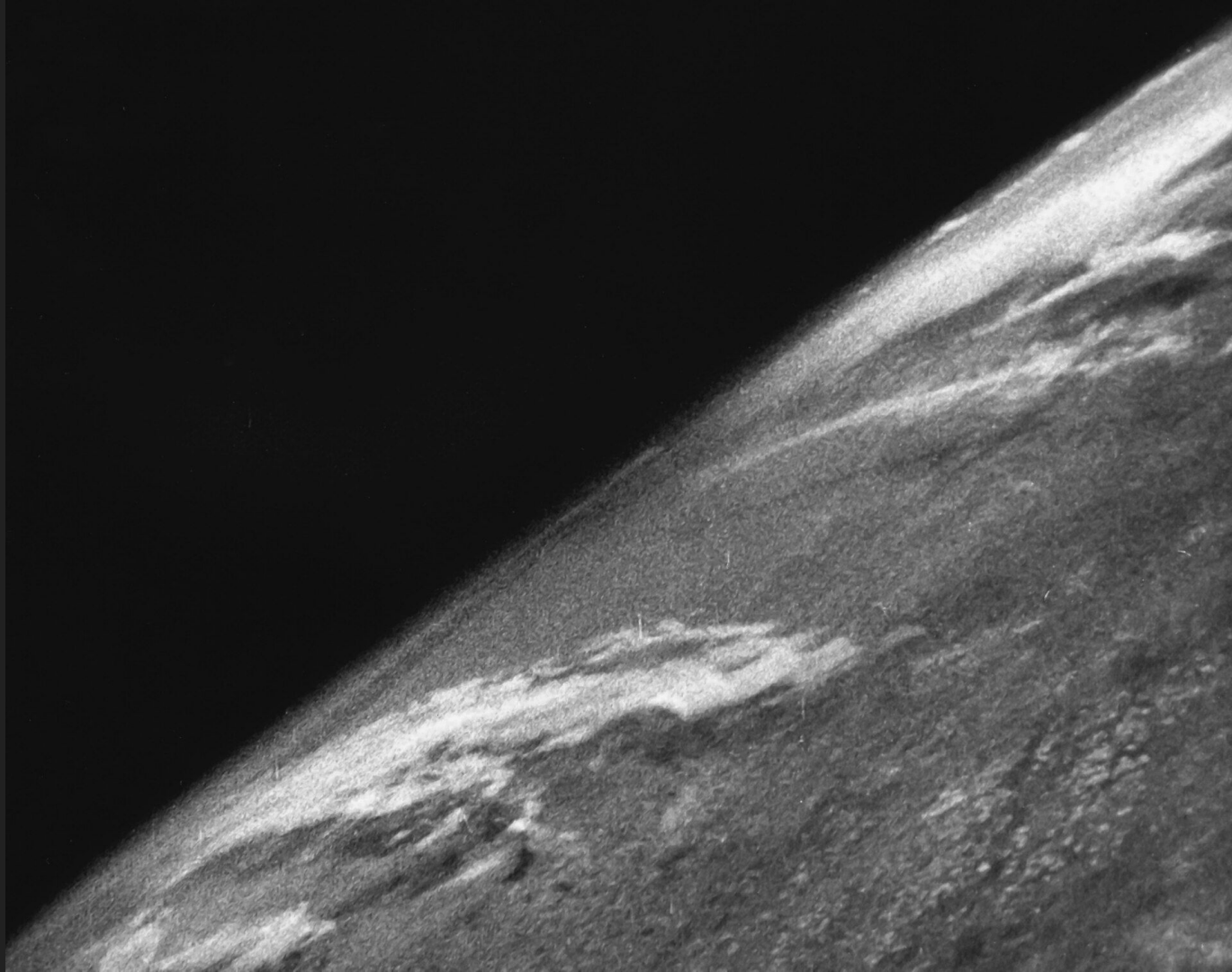
Enter
Chuck Moore













Some of the scientists and illustrators who took part in Collier's symposium (left to right): Rolf Klep, Willy Ley, Dr. Heinz Haber, Dr. Wernher von Braun, Dr. Fred L. Whipple, and Chesley Bonestell

The Heavens Open

By Dr. FRED L. WHIPPLE

Chairman, Department of Astronomy, Harvard University

Once above the atmosphere which blindfolds our scientists now, a revolution will take place in astronomy. Man will, for the first time, get a good, clear look at the universe

IN MANY respects, today's astronomers might as well be blindfolded in a deep, dark coal mine. The earth's atmosphere, even on a perfectly clear day or night, blankets out many of the secrets of the universe. Details of the surface of the moon, planets and star groups disappear in a dancing blur because the atmosphere is never really quiet. The extremely significant far ultraviolet light, the X rays and gamma rays of space are indiscernible because the atmosphere permits free passage only to the visible light rays.

The establishment of a telescope and observatory in space will end this era of blindness. It will be as revolutionary to science as the invention of the telescope itself.

The sun, for example, photographed from the space station by X rays, will be an amazing sight. Astronomers have deduced that it very probably will look like a mottled, irregular sunflower. And what we now see as the sun's disk will, in all likelihood, prove to be only the central core of a large fuzzy-looking ball. It will be covered with bright specks and pulsing streaks, while the usually invisible corona will show up as the main source of light.

Similarly, familiar star constellations may look very strange when photographed from the space station or space observatory with plates sensitive to all the wave lengths of ultraviolet light.

Stars send ultraviolet as well as visible light. Some, however, radiate mostly ultraviolet. These appear weak to the eye but will be exceedingly bright to the special camera. Those which send out very little ultraviolet light will hardly show on the special photographic plates. The Milky Way itself might be markedly changed—I wish I knew just how.

What is even more fascinating to the astronomer than acquiring "full vision" is the fact that space travel will permit him to change position in space. For instance, there is our moon, relatively near and under observation since the first telescope was built. But the moon always turns the same side toward the earth, and almost one-half of its total surface has never been seen by man.

Specially designed round-the-moon ship hovers 200 miles above lunar surface as space scientists take close-up photographs. One-way journey from station in space will take five days to cover 239,000 miles. Never-seen face of the moon is to right. Trip will have to be timed so that sun lights hidden side

PAINTING BY CHESLEY BONESTELL

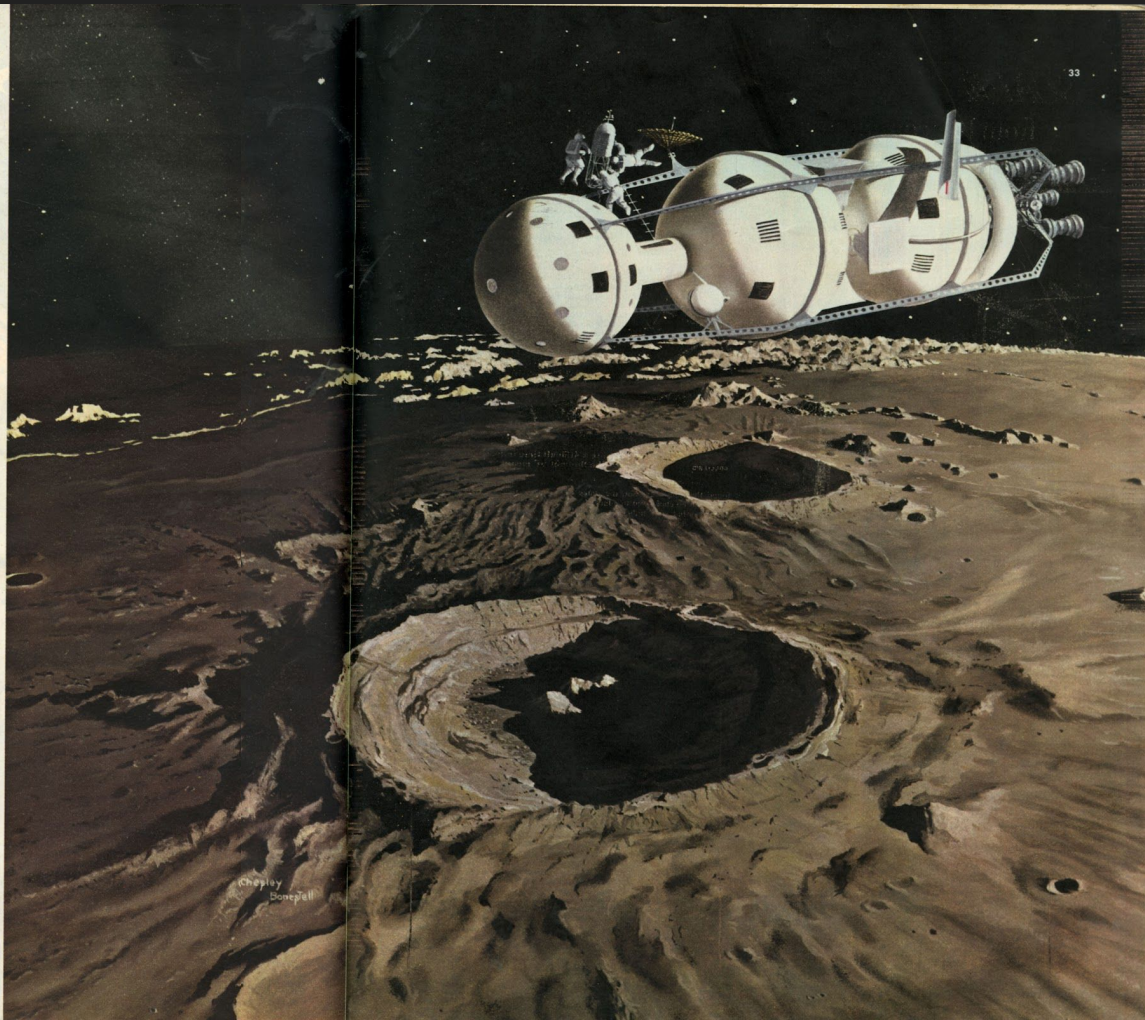
What are the first astronomers who make a round-the-moon journey going to see on that completely unknown portion? Will they find mountains, plains and craters like those we see on the side visible to us now? Or will they find a plain, serrated with jagged canyons—or a landscape unmarked by anything? And were the moon's gigantic craters formed by some type of volcanic action or are they a result of collision with flying mountains from covering the moon's surface? Observation from a space ship will give us conclusive answers to all these questions.

The astronomers in the space station will also have a very practical job awaiting them. When the sun becomes temperamental, as it frequently does, it develops gigantic storms on its surface, emitting excessive amounts of ultraviolet light and X rays, and even ejecting high-speed atoms. Although they cannot be observed directly, these emanations knock out our long-range radio communications, cause transcontinental teletypes to go berserk and sometimes even burn out long-range telephone and power cables.

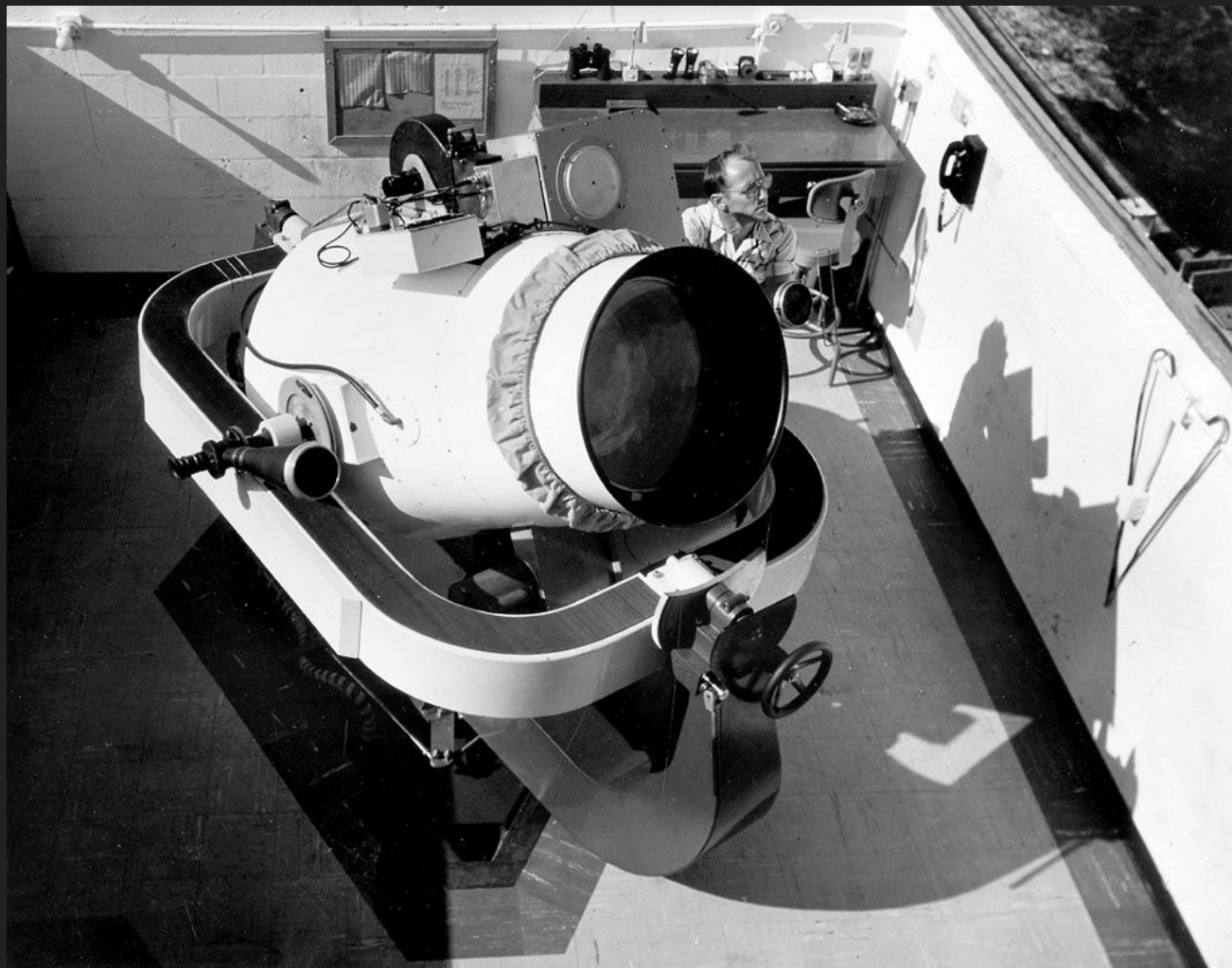
There is little doubt that our space station astronomers, maintaining a 24-hour surveillance of the sun and all its radiations, not only will find the explanation for these solar storms but will learn to predict them in advance. Preparations could then be made to protect our electronic equipment.

I can mention only a few more projects which will fascinate the astronomers of space. Among them: (1) the mysteries of the superhot and exploding stars; (2) the composition of the atmospheres of other planets, such as Mars; (3) details of the surfaces of other planets (which may offer evidence concerning possible life there); (4) analysis of the great dust and gas clouds of the Milky Way, where stars are born; (5) mapping of similar regions in other great galaxies comprising billions of stars. They should discover important clues regarding the expansion of the universe, its dimensions and its nature.

The astronomer will no longer be limited to seeing as "through a glass, darkly." The universe will spread out clearly before him. ▲▲▲

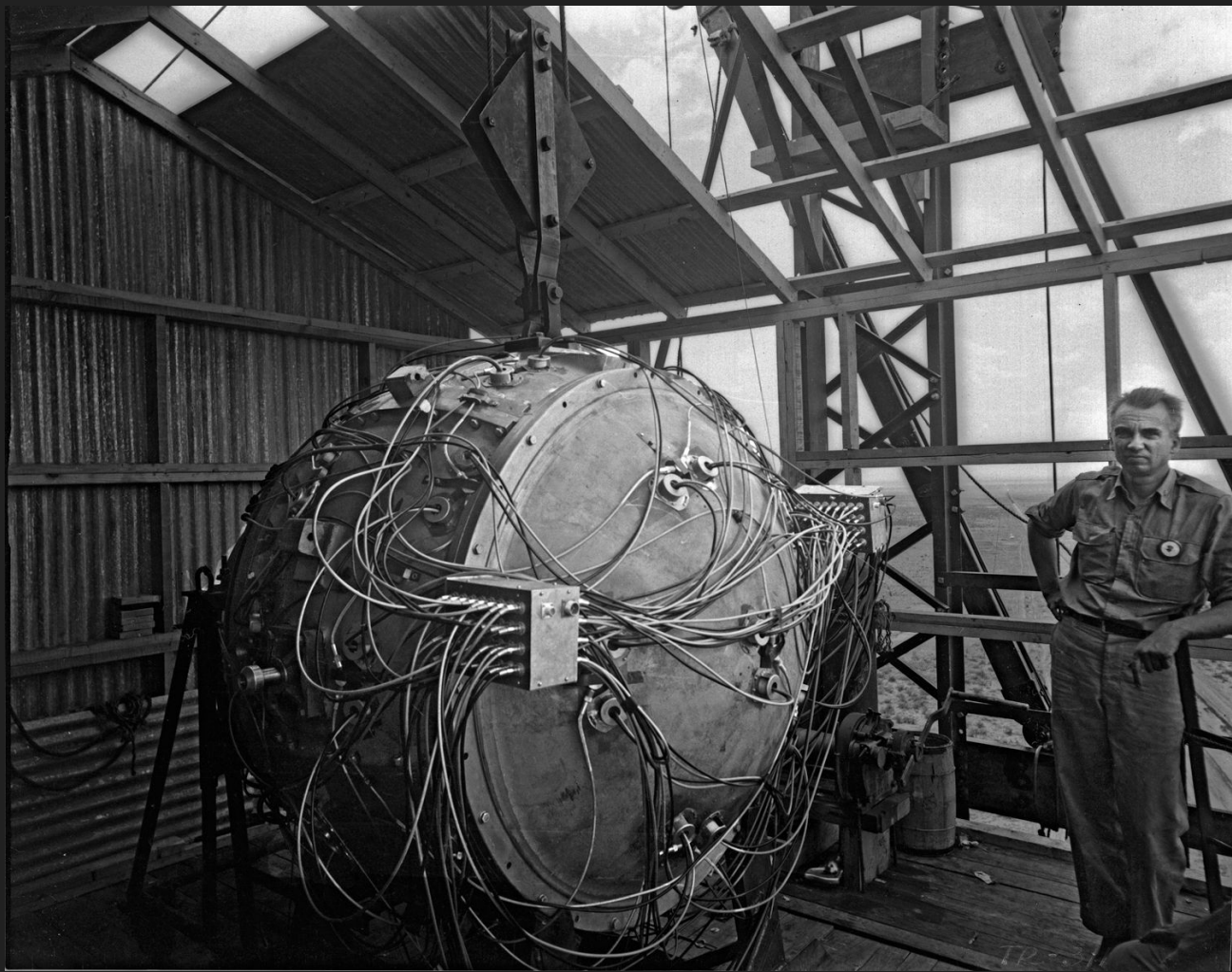






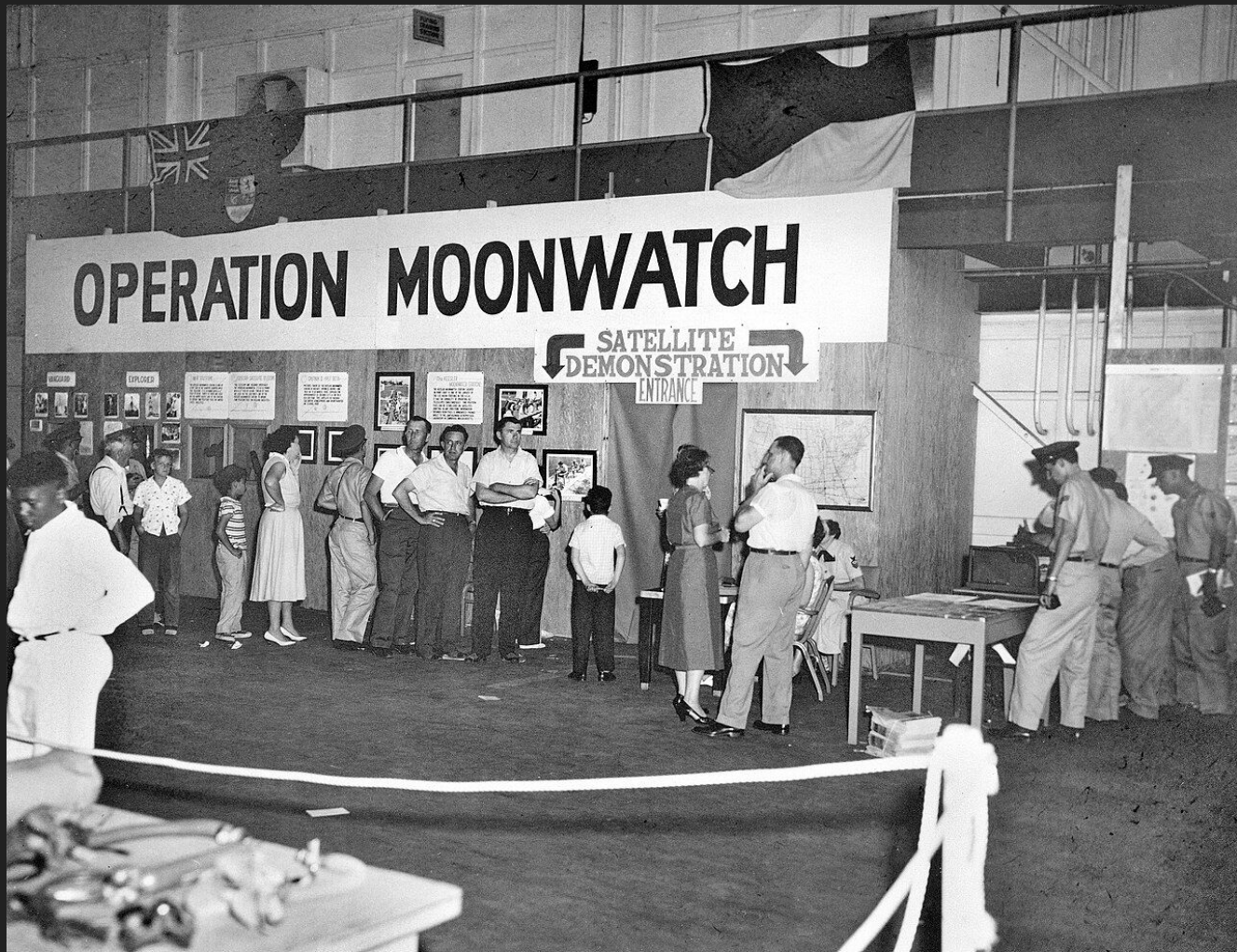
Predicting the position and motion of the space station itself will be one of the most difficult problems ever encountered in celestial mechanics, or the science of predicting the positions of astronomical objects. The earth's doorknob shape, with a bulge of several miles at the equator, combines with the changing direction of the moon's attraction to alter slightly but continuously the nearly circular orbit of the space station. Until recently, the calculation of such an orbit would have taken a good computer a considerable number of hours. But the orbit of the space station will change by an infinitesimal amount in the short period of each 2-hour swing. Therefore, unless the computer can calculate this new orbit in less than the 2 hours necessary for the space station to make one journey around the earth, it is obvious that his calculations can never keep abreast of the space station, let alone predict its position in the future.

The answer to the computing problem lies, of course, in the huge "electronic brain" calculating machines which we have today. Their use on the ground will be absolutely essential in plotting the motion of the space station. Following this man-made island in the sky continuously and precisely, these electronic machines will be able to make exact calculations with much greater rapidity than the speed of the space station in its 2-hour journeys around the earth.



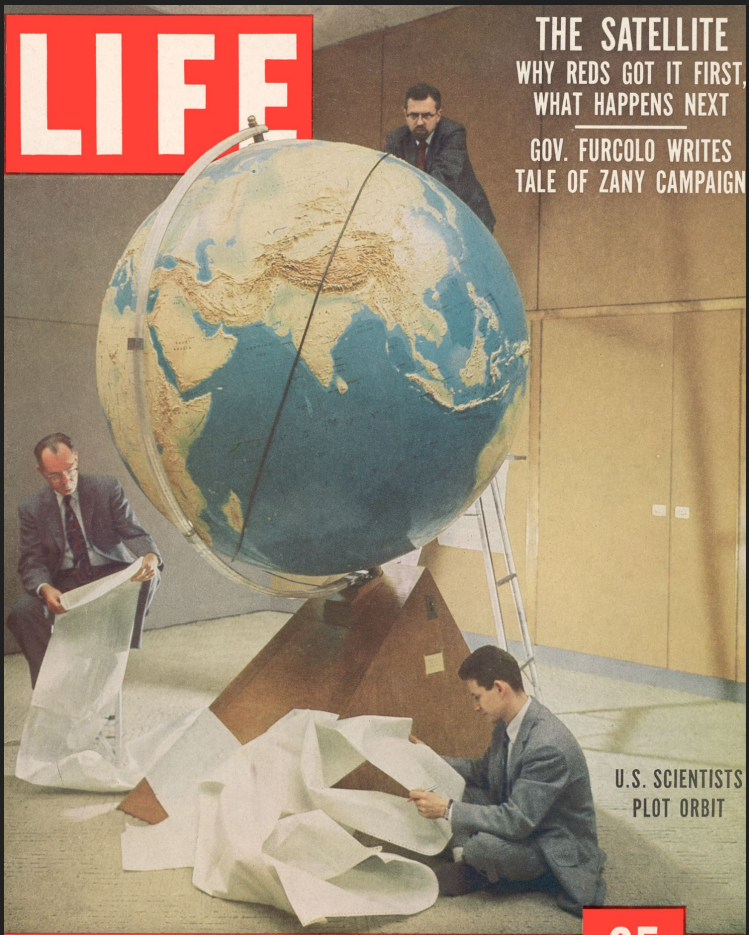
OPERATION MOONWATCH

SATELLITE
DEMONSTRATION
ENTRANCE



LIFE

THE SATELLITE
WHY REDS GOT IT FIRST,
WHAT HAPPENS NEXT
GOV. FURCOLO WRITES
TALE OF ZANY CAMPAIGN



U.S. SCIENTISTS
PLOT ORBIT

© U.S. PAT. OFF.

OCTOBER 21, 1957 **25** CENTS

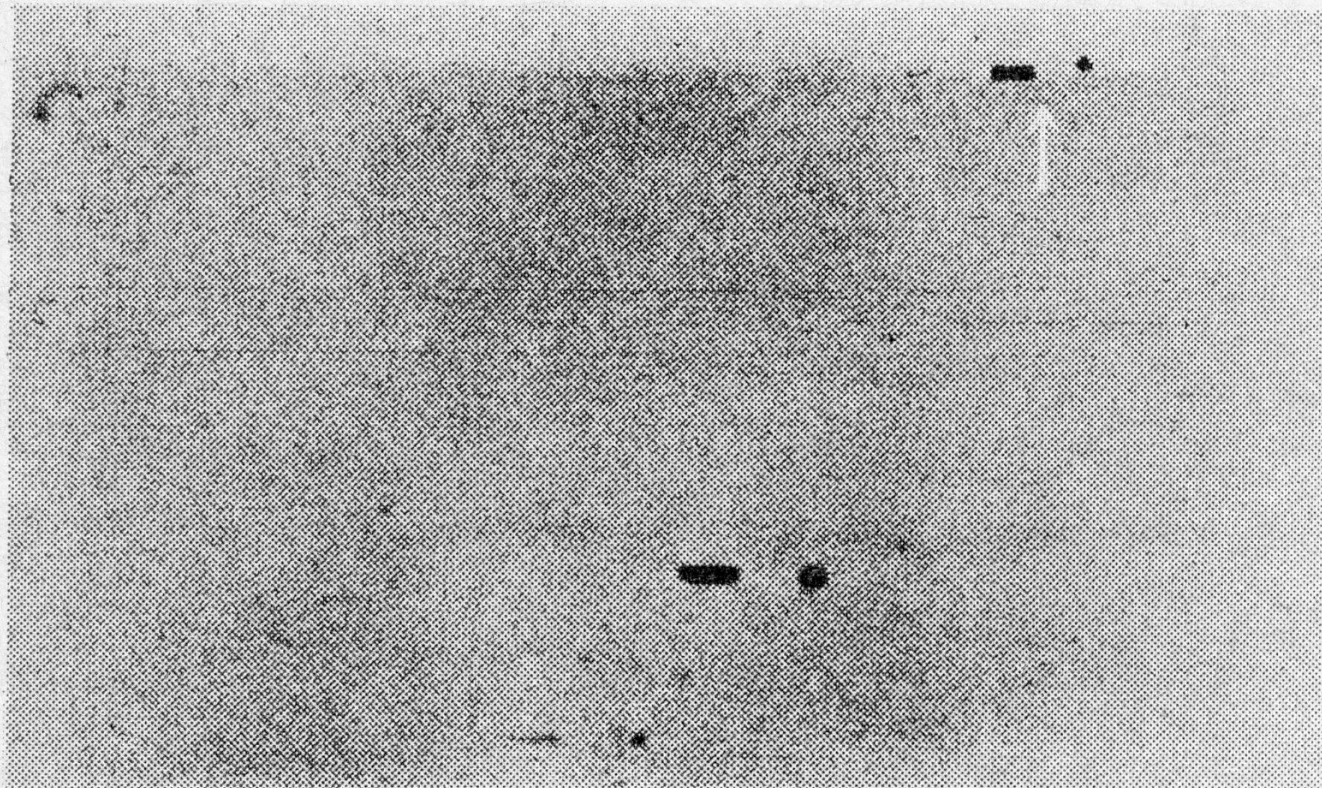


Fig. 4. First Baker-Nunn film of Sputnik 1.

FRIDEN AUTOMATIC CALCULATORS

Accurate Figures in a Hurry



Friden Automatic Calculators are Sold and Serviced by a Factory trained personnel in over 250 Company controlled Sales Agencies throughout the United States and Canada.

FRIDEN
CALCULATING MACHINE CO. INC.
FACTORY AND HOME OFFICE - SAN LEANDRO, CALIF.

While thus t
cables hot
pool in whic
side. Before
went into th
acting on th
ciates, took
considerable
money he ha

The \$40,00
ence such t
its assets of
only to come

In 1935,
divorced, a
manage Bo
months ago.

Subsequer
line Cochran
also has had
She was org
Pensacola, F
she was ser
were in po
went to wor
age of 11 at
a beauty o
to be a nur
and got em
department

took up avia
tion records
12,000 kilom
attained a s
In 1938 she
tinenta trop
woman's na
year she fle

She owns
own right—
in New Yor

THE ORBIT WEAVES A WEB AS WHOLE WORLD WATCHES

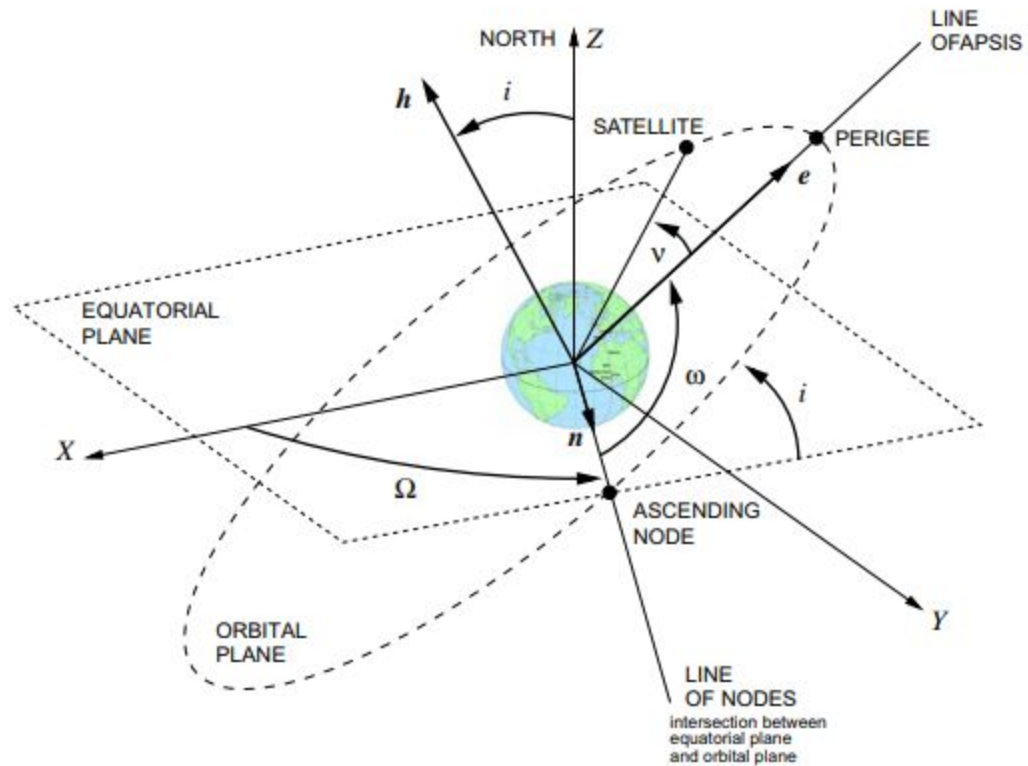


PATTERN OF ORBITS traced by Sputnik in typical 24-hour period is demonstrated by red bulb going around globe built by Robert H. Farquhar. Earth rotates from west to east (*left to right, above*)

and position of orbits (red lines) shifts west each time satellite goes around earth. At noon, orbit passes just east of Florida, going northwest to southeast. It appears 96 minutes later over western U.S.

After midnight when earth has turned around so U.S. is on reverse side of globe in picture, orbit goes from southwest to northeast, passing through Midwest and, 96 minutes later, through California.





Office Memorandum • UNITED STATES GOVERNMENT

TO : Mr. Charles Moore

DATE: May 15, 1958

FROM : Fred L. Whipple and
J. Allen Hynek

SUBJECT: Ephemeris IV

We have learned through Mr. Adams of your most excellent work in devising and programming for us the much discussed Ephemeris IV. We understand that this was done despite the press of your other work and that your Ephemeris IV rather than the one originally planned, and which is still under professional care, is now being used for daily predictions for our stations.

Your work on this program represents a considerable achievement and you are to be eminently congratulated on the success of this difficult program. You deserve our particular thanks for completing it at a most critical time when station predictions on an efficient and routine basis became an absolute necessity.

We wish you every continued success in not only your continued work on this project but in your academic work as well. We hope that your association with us will continue for sometime to come if, of course, this should fit in with your own plans.

Again please accept our sincere thanks for having done such a swell job for us.

Kay Lack

kay@kaylack.net