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MAJOR VICTORY FOR SOVIET SCIENCE
NEW DATA ON THE INVISIBLE SIDE OF THE MOON

PRESS RELEASE

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MAJOR VICTORY FOR SOVIET SCIENCE

NEW DATA ON THE INVISIBLE SIDE OF THE MOON *

Excerpts from an
Article from the Newspaper
PRAVDA, No. 228 (17 181), p.3
MOSCOW, 17 August 1965

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SUMMARY

While this paper's object is to give detailed description of of Soviet achievements since the inception of Moon programs by Luniks it gives a description of the latest feat, namely the photographs by the space station "Zond-3". Present here are only excerpts.

* * *

The space station "ZOND-3" was launched on 18 July 1965. It was designed for the investigation of physics of remote interplanetary space, and of the work and test of various on-board installations. There was, in particular, a special apparatus for planet photographing and for the transmission of images from remote distances, reaching hundreds of thousands of kilometers.

Upon start from AES orbit with a velocity exceeding the second cosmic velocity and moving along its heliocentrical orbit, ZOND-3 passed near the Moon 33 hours later. The available phototelevision apparatus was then used to take images of the Moon heretofore unknown. The phototelevision apparatus allows multiple transmission of every exposure with its decomposition into 1 100 lines (vs 625 in a standard TV) and with a sharpness equal to 860 elements along the line.

Since the TV installation was computed for the transmission of exposures from distances through hundreds of thousands of kilometers, and transmission of a single one took 34 minutes.

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* KRUPNAYA POBEDA SOVETSKOY NAUKI. Novyye dannye o nevidimoy storone Luny.

The transmission of the obtained images of the Moon was made in the centimeter band using the airborne narrow-directional parabolic antenna. During communication sessions this antenna is directed toward the Earth with a high precision owing to an orientation system. The transmission itself is commanded from ground.

The photographing lasted 1 hour 9 minutes. It began at a distance of 11.6 thousand kilometers from the Moon's surface and ended upon passing the minimum distance (somewhere below 10 000 km). During photographing the position of ZOND-3 relative to the Moon changed by 60° in longitude and 12° by latitude.

The transmission of the obtained pictures to Earth began on 29 July from a distance of 2,200 000 km from Earth, when the angle of Earth's visibility became sufficiently small for a precise homing of the airborne antenna. Subsequently similar transmission will be handled from substantially greater distances.

The disposition of the trajectory relative to the Moon was so chosen that at orientation of phototelevision installations at the Moon, the most interesting regions of the far side of the Moon hit their visual field.

The choice of distance between the probe and the Moon's surface is optimum, for, on the one hand, there was a possibility of encompassing by photos a significant part of the Moon's surface and on the other, to obtain photos of sufficiently large scale. As the probe moved along its trajectory, portions of the far side of the Moon, not photographed in 1959, appeared in station's visual field. The region photographed extended to the boundary of the dark part of the Moon.

The morning terminator, that is the boundary of the dark and lit side of the Moon's disk were on 20 July 1965 – day of photographing – the edge of the region of the reverse side photographed earlier. By the same token, the newly obtained photographs practically encompass the heretofore unknown part of the Moon's surface. Certain photographs overlap with the visible side of the Moon, and others — with the 1959 photographs of the concealed side.

During photographing the Sun was at zenith above the northern edge of the Riccioli crater mare. In this way the well known portions of the visible side, mainly needed for identification purposes, were in the least

favorable position. But the greatest number of objects situated over the unknown part of the Moon's concealed side were lit by oblique rays of the Sun, particularly favorable for enhancing the peculiarities of the relief.

The station "ZOND-3" photographed the so-called Eastern mare, which is the most characteristic formation on the eastern limb of the invisible hemisphere. As many other lunar maria, the latter has an oval shape and is edged by two ridges of mountain ranges Cordillera and Rokka, between which are disposed dark planes of the Autumn and Spring maria. Only the edge of the Eastern mare can be seen from Earth, with its gulfs the "Bol'shoy Romb" and "Malyy Romb". It has now been ascertained that the Spring mare sets at the North behind the boundary of the visible side of the Moon, while the mountain ranges border the Eastern mare from all sides.

To the South of the Eastern mare,* two more unknown small maria are found; they are divided by a mountain range.

Attention is drawn by the analogy between the Eastern mare region and the one, opposed to it on the visible side by the Mare Crisium. Both maria are oval and surrounded by mountain ranges, similar in their structure and disposition, amongst which small ribbon-like maria — "Peny", "Voln" i "Zmei", that is Mare Spumans (Foaming Sea), Mare Undarum (Sea of Waves) Mare Serpentis (Sea of Snakes) * *. Moreover, both are bordered by very clear continental regions.

Disposing of data on the surface of both hemispheres of the Moon, one may obtain a good representation of the distribution of dark maria and clear continents of our satellite. While the northern half of the Moon's hemisphere, turned at the Earth, is mainly occupied by maria, the northern part of the concealed side appears as a gigantic continent. This continent exceeds significantly its antipode, that is, the southern continent of the visible hemisphere. Meanwhile, there exist on the continental space of the invisible side broad depressions, strongly disintegrated by superimposed craters, reminding of the Delambre (?) region of the visible side. The formations indicated, with 200 — 500 km diameters, are comparable in their dimensions with maria, but lack the dark shading characteristic of them, and differ also by the structure.

* Mare Orientalis

** the last denomination is questionable, and is the present translator's version.

When reviewing the far side of the Moon, one cannot fail to be suprised by the abundance of major, superimposed craters (see photos). Their total number on the far side can be characterized by the following figures] Over a territory of some 5 million km^2, encompassed only by a single exposure, 4 craters, of 200 and more km in diameter are counted; there are nearly 20 craters from 100 to 200 km in diameter, 60 with diameters from 50 to 100 km, 100 with diameters from 20 to 50 km and more than 400 craters with diameters from 10 to 20 kilometers. The numerous craters, characteristic for the Moon, may be seen in the attached photographs; they show central peaks and clear beams.

The most interesting of the again discovered formations, not encountered on the hemisphere visible from the Earth, are the numerous chains of small craters, of hundreds of kilometers in extent, apparently diverging from the clear continental region near the Mare Orientalis, and also the earlier mentioned enormous mare-like formations on the continent (tallasoids).

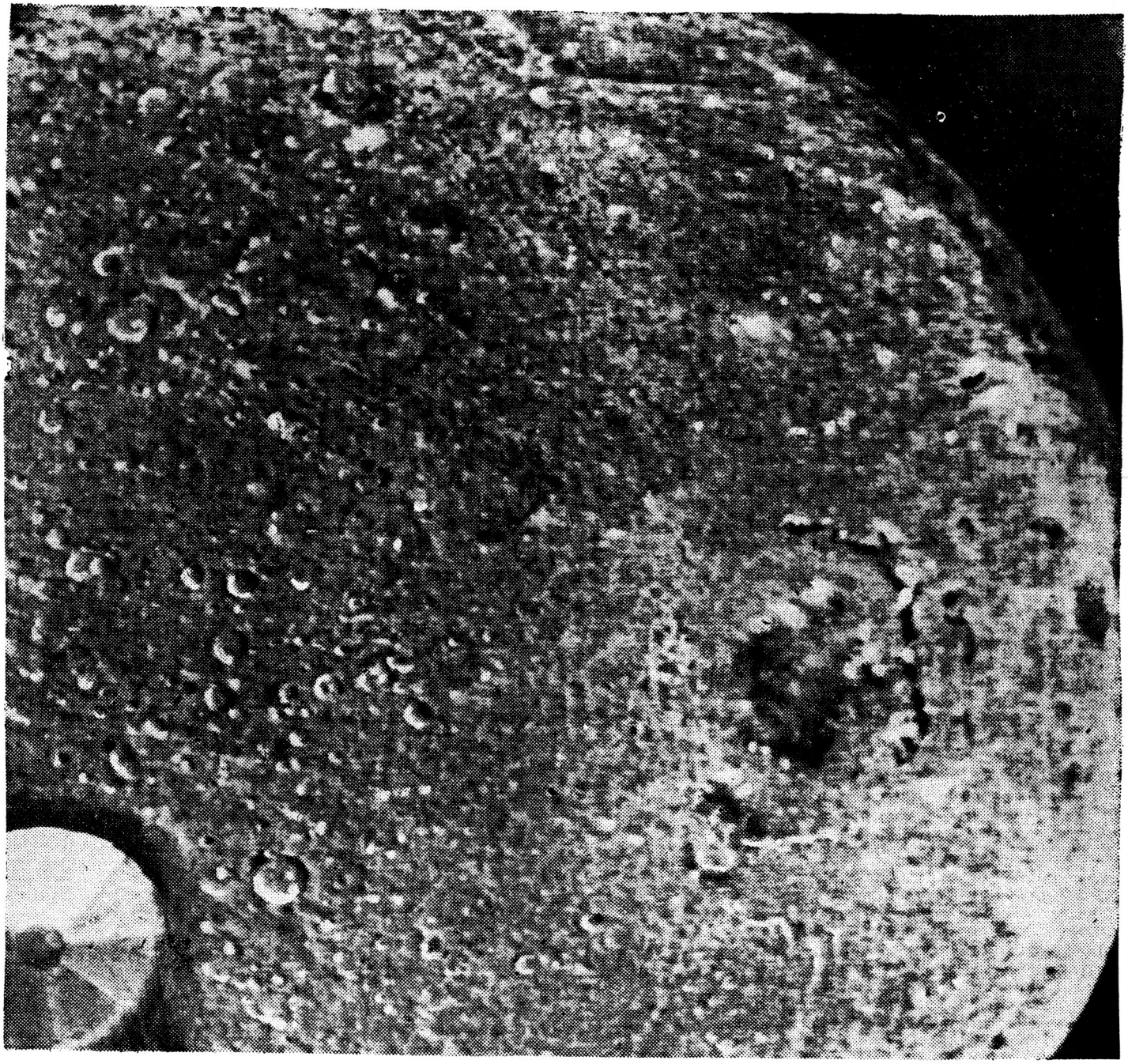
After careful processing of the photographing material of 1959, conclusions were derived about Moon's asymmetry relative to the plane, dividing it into the visible and invisible parts : comparatively few maria on the far side, and all of it is of brighter tone, clearly more mountainous Opportunately, identical asymmetry is known to exist in the terrestrial globe. The Pacific Ocean, the deepest parts of which subsided by more than 10 kms, while the average depth is 4 km, occupies 50 percent of the water surface and is almost entirely situated in the Western Hemisphere. The density of crater disposition on the far side of the Moon is found to be higher and so forth. These conclusions are fully corroborated by the present photographs by the "Zond-3" probe.

Currently, the new photographs of the far side of the Moon are being carefully studied and a preliminary catalogue of formations is in the process of compilation.

Thus, the material from the experiment carried out by "ZOND-3" has an important scientific significance. The far side of the Moon ceased to be an enigma.

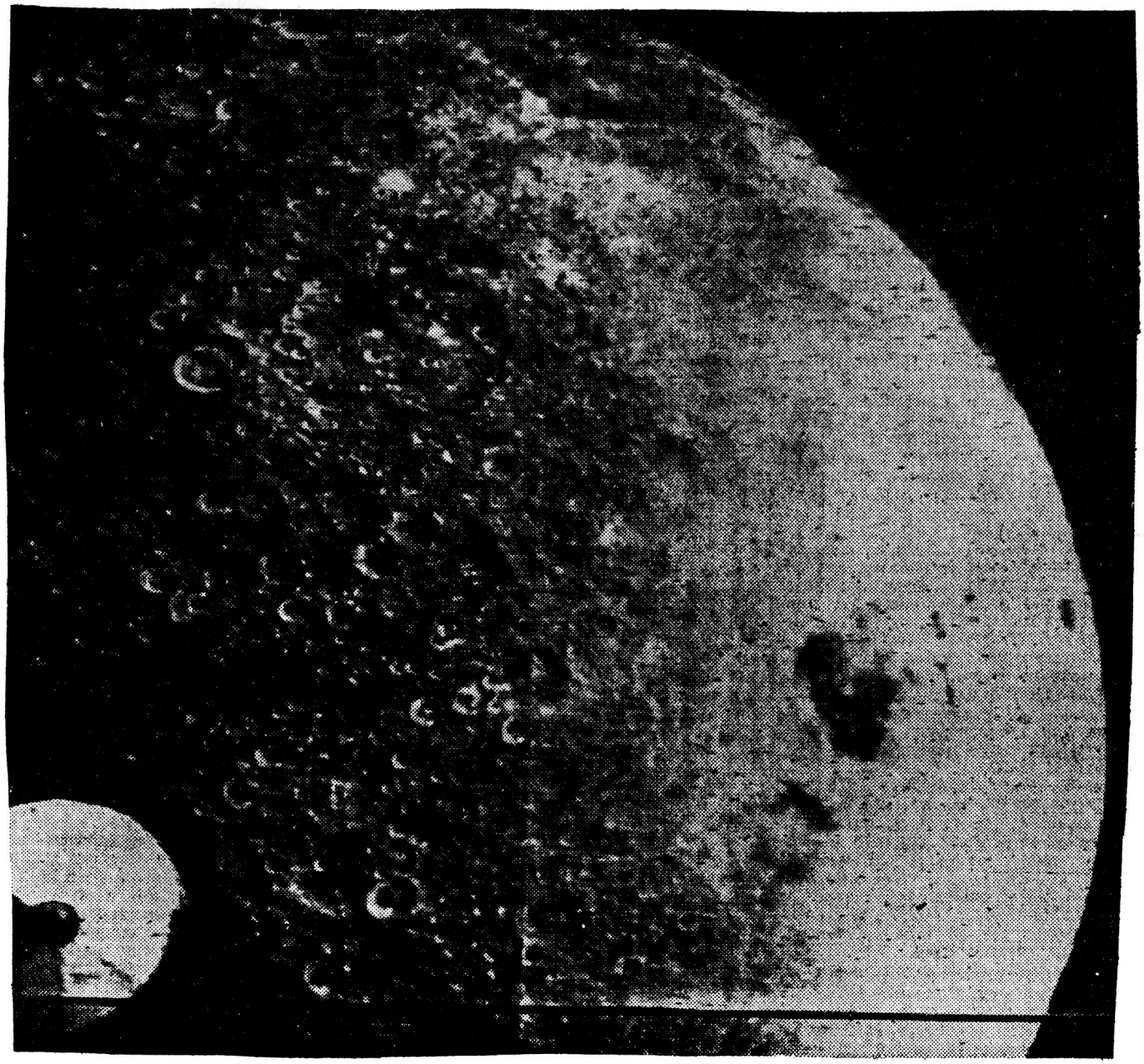
*** THE END ***

Fig. 1



Photograph of the far side of the Moon transmitted by the probe "ZOND-3" This photograph, taken on 20 July 1965 at 05 16 hours Moscow time, shows the equatorial region of the far side of the Moon, contiguous to its eastern edge. The large dark spot constitutes the Mare Orientalis.

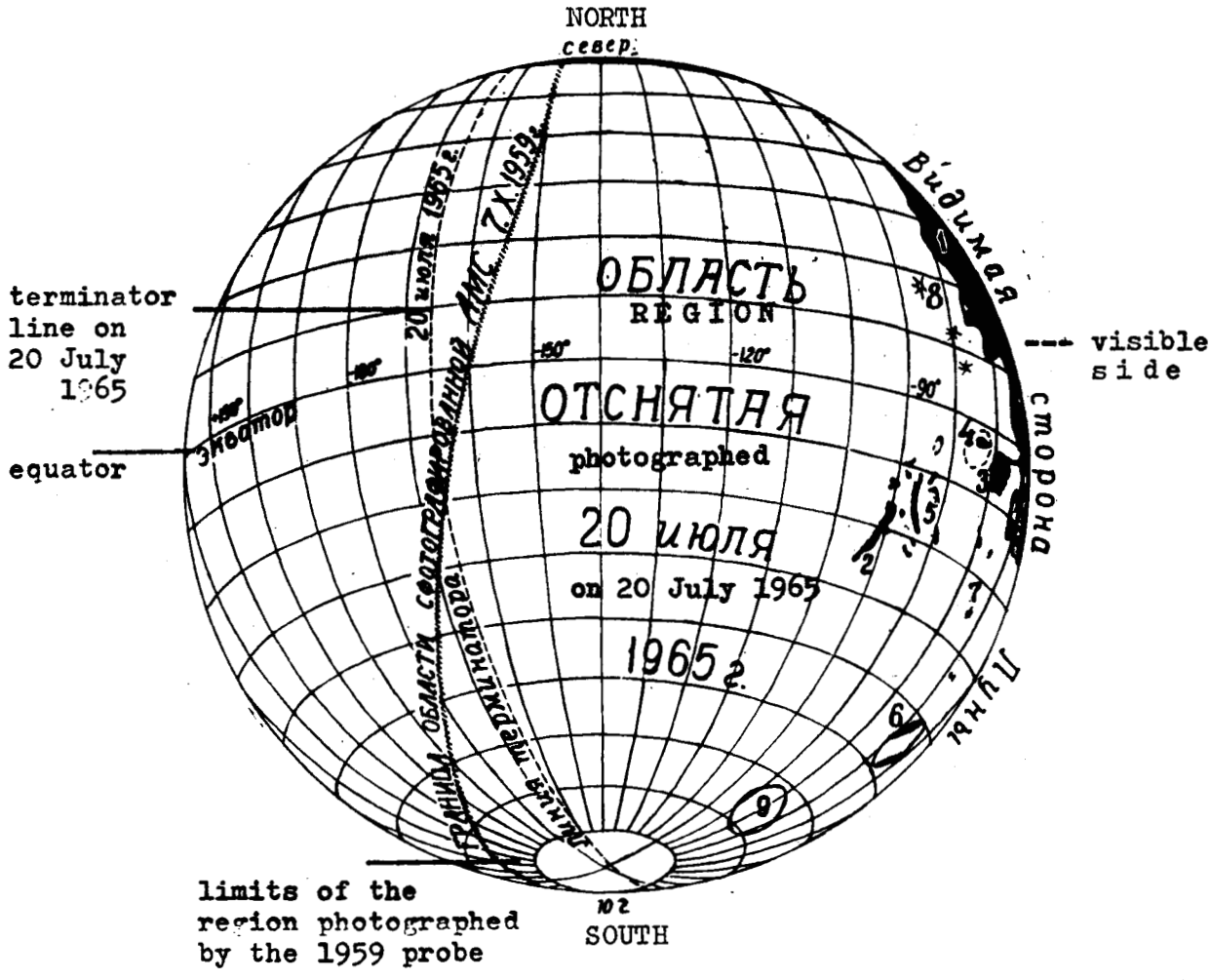
Fig. 2



Photograph of the far side of the Moon, transmitted by the USSR probe "ZOND-3"

This photograph was taken on 20 July 1965 at 05 25 hours Moscow time. It shows the equatorial and the northern part of the far side of the Moon up to the limits of the illuminated region.

Fig. 3



Sketch showing the position of the region photographed by the USSR automatic station (probe) "ZOND-3".

The part of the visible side of the Moon, having come out on the photos obtained by "ZOND-3" is situated to the right of the meridian with – 90° longitude.

The morning terminator, that is, the boundary between the lit and the dark parts of the Moon on 20 July 1965 is shown at left, along the meridian with –166° longitude. Noted also here is the boundary of the region of the far side of the Moon, photographed by "LUNIK-3" in 1959. This region, photographed by Lunik-3 stretches along 110° in longitude and emerges beyond the limits of this sketch.

CHARACTERISTIC DETAILS OF THE FAR SIDE OF THE MOON :

1. Oceanus Procellarum (Ocean of Storms) ; 2 — Mare Orientalis; 3 — Carter Grimaldi; 4 - Crater Riccioli; 5 - "Autumn" and "Spring" Maria; 6 — Schickard crater; 7 — "Birgiy" crater; 8 - Einstein Crater; 9 — "Bayi" Crater.

Fig. 4

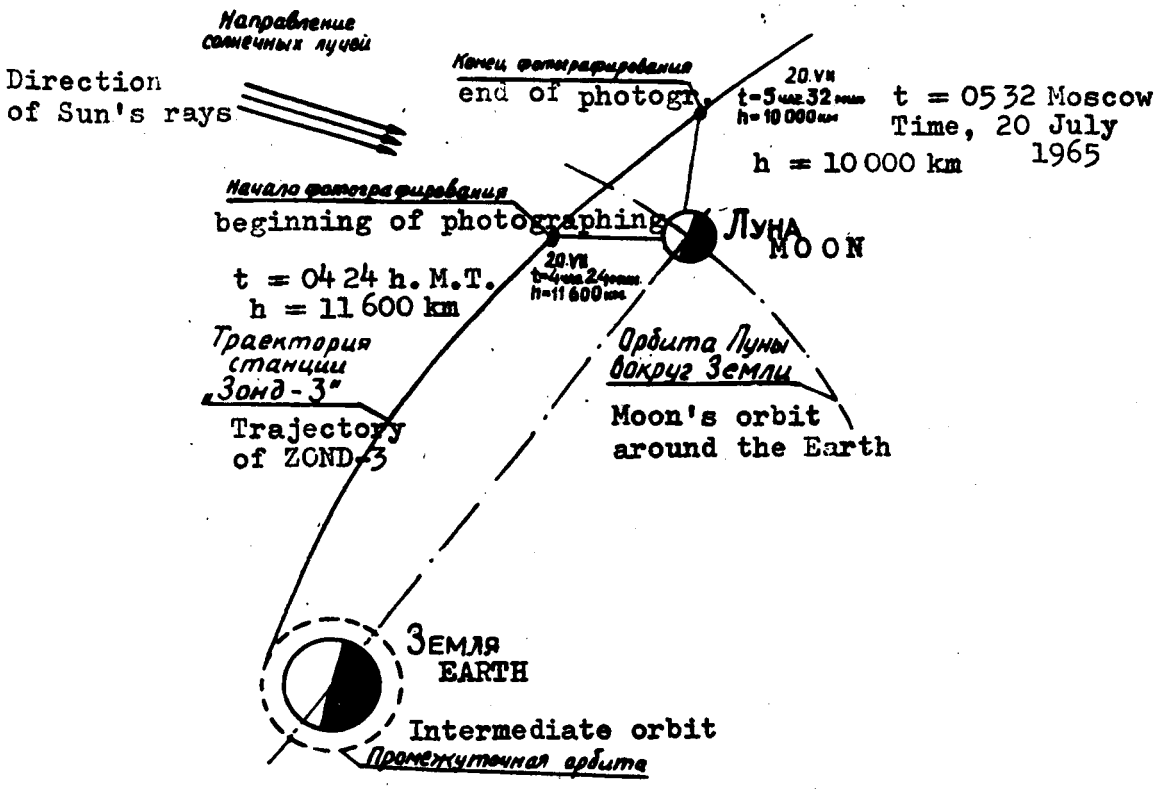


Схема движения станции «Зонд-3» около Луны при фотографировании.

Sketch showing the trajectory of "ZOND-3" near the Moon at time of photographing.

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Consultants & Designers, Inc.

Translated by ANDRE L. BRICHANT
on 20 — 21 August 1965

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