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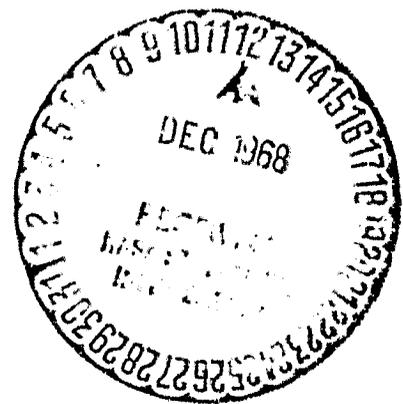
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" Z O N D - 6 " TAKES PHOTOGRAPHS

(Press Release)
TASS



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" Z O N D - 6 " TAKES PHOTOGRAPHS

From Newspaper "PRAVDA"
No.336 (18323)
Moscow, 1 December 1968

Communique TASS

SUMMARY

Photographs taken in flight by "ZOND-6" in the course of two sessions are published and are described. The aerophotocamera used had a 400 mm focal distance and the cadre format was 13 by 18 cm.

* * *

Upon orientation with respect to the Sun and the star, the station ZOND-6 was so deployed that the optical axis of the photcamera be directed at the center of the Moon, at about the boundary between its visible and far sides. The station's position is shown in the sketch of Figure 1. The first session was devoted to measurement of photometric characteristics for the photographing of the Moon's illuminated surface and to the determination of its dimensions and shape. The second session concentrated on obtaining photographs on the largest possible scale so as to effect photogrammetric measurements and cartography of the far side of the Moon. Then the optical axis of the photcamera was oriented so as the visual field hit also the Earth (see Figures 1 and 2).

Photo No.1 was taken at the beginning of the first session at 0400 h. Moscow time on 14 November 1968 at a distance of about 11,000 km. This photo shows the entire "visible" disk of the Moon, bounded by meridians 10° and 170° Western longitude, that is, the Eastern sector of the far side of the Moon and part of the western sector of the visible side. One may easily recognize (1) The Ocean of Storms (Oc. Procellarum), on the surface of which craters Aristarchus and Kepler, respectively (2) and (3) are seen as clear spots. Crater Copernicus is clearly seen (4) on the eastern boundary of the lunar disk. A dark spot in the SW part of Oc. Procellarum is the Grimaldi cirque,

(*) by "visible disk" we understand the part of Moon's disk visible from the station.

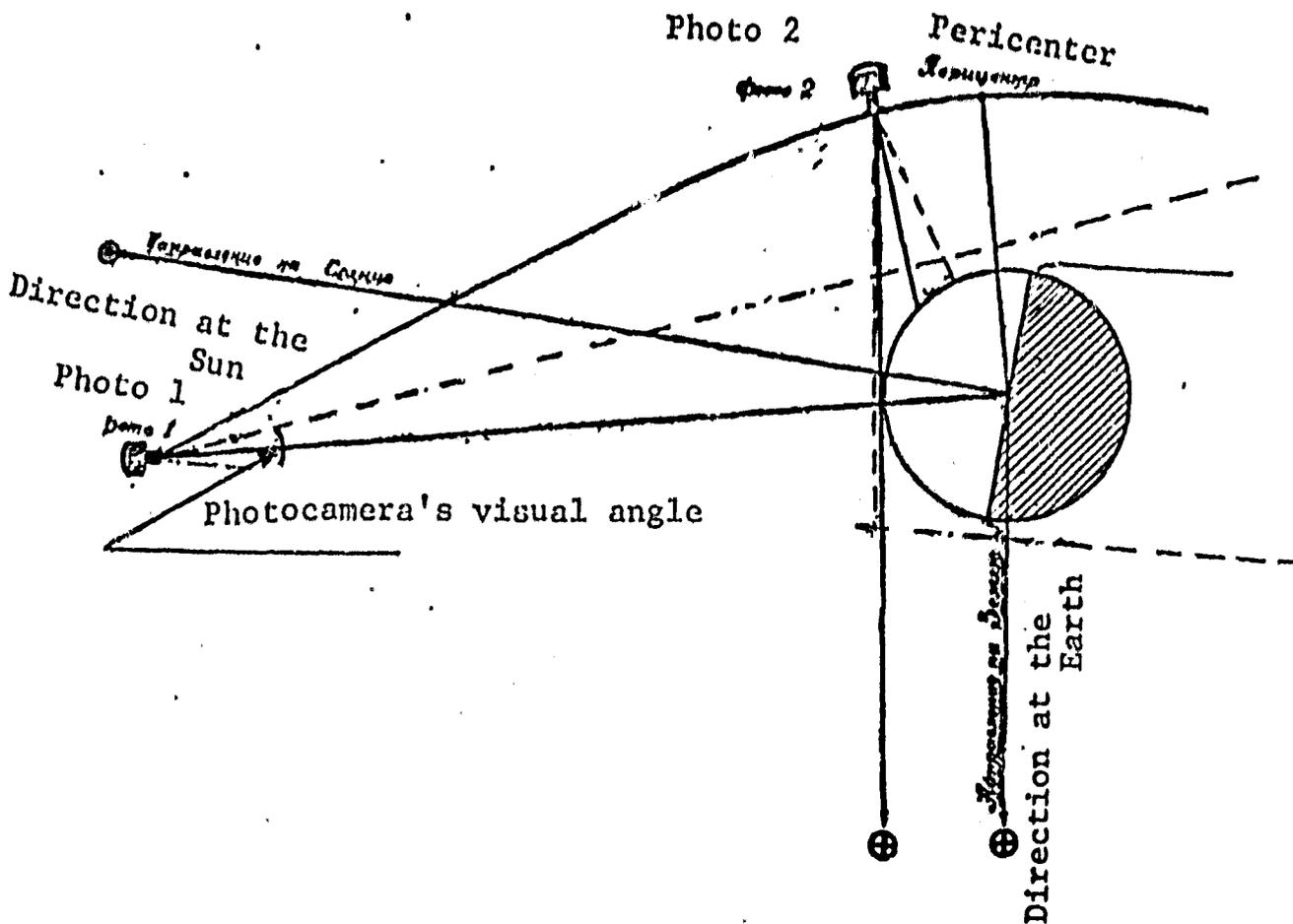


Fig.1

Sketch describing the flight of "ZOND-6" and showing the photographs taken in flight

shown by a dark spot and which is one of the largest craters. A spot of lesser dimensions is seen to the NW of it, which is the Riccioli crater (6). The dark spot on the SE limb is Mare Humorum (7), to the west of which one may see a clear spot with diverging rays - the "Burgi" crater (8). Outlines of Mare Orientalis (9) and those of the "Spring" (10) and "Autumn" maria, edging it respectively from NE and E, and also those of ranges "Ruk" (12) and Cordillera (13) are clearly perceptible in the southern part of the photo. The bright spot seen near the center of the photo is the "Buffon" crater (14), with the "Shternberg" crater to the NW of it (15) showing rays running in the NW and NE directions. Crater "Kondratyuk" (16) with crater "Kibal'chich" (17), with the outgoing characteristic chains of tiny craters "Gird" and "Rnin", so called in honor of Soviet technologists working on rocketry, are situated on the western border of the lunar limb. The Langeven" crater (18) can be seen between the former two, and a number of other craters are clearly discerned. (*)

(*) The Russian names for craters have been put in quotes and transliterated, pending their approval by the International Astronomical Union.



Figure 2

- Photograph No.2 taken in flight by "ZOND-6"
- (1) Moon's limb photographed from a distance of 3.3. thousand km
 - (2) View of the Earth from 388,000 km
 - (3) Shternberg crater; (4) Lorenz; (5) Langevin
 - (6) Rynin crater; (7) Buffon crater



Figure 3

Photograph No.1 taken in flight by "ZOND-6".
The references to the various numerals can
be found in the text of this communique.



Figure 4

Photo #3

This photograph shows a portion of lunar surface of its far side with the dual crater Vavilov (so named in memory of the brothers Vavilov) in its center. This crater discloses terraced walls characteristic of crater Copernicus. Mountains in central part characterize both these craters. This photo shows also (2) crater Lowell, (3) crater Etves and (4) crater Van Gu. A multitude of other craters and roughnesses can also be discerned on this photograph, with width of 200 m and more (N. B.) In the photograph transmitted from Moscow to New York Times, and reproduced in their yesterday's edition (3 December 1968) the name "Brothers Vavilov" is said to be blurred during transmission. Incidentally, it cannot be seen in this "Pravda"-published photograph either.

Shown in photograph No.2 is the edge of the Moon (1) (Fig.3) from a distance of about 3.3 thousand km and the image of the Earth (2) from a distance of about 388,000 km. These pictures were obtained at 0548 hours Moscow Time.

In this photograph one may clearly see the eastern sector of the far side of the Moon, bounded by meridians 90° to 130° western longitude. Clearly seen are craters Shternberg (3), Lorenz (4), to the west of the former and the Langevin crater (5) to the southwest. In the lower part of the photograph one may see the Rynin crater (6) and in the equatorial part on the Moon's limb, to the east of the Rynin crater the Byuffon crater (7). Our own planet Earth is seen from the side of the eastern limb of the Moon. At time of photographing the Earth's terminator passed along the 45° meridian of E.longitude. The greatest part of the surface of our planet is covered by clouds. Only to the SE one may perceive the eastern seaboard of Australia to 120° E.longitude.

Finally, the third photograph shows a portion of the lunar surface around the dual crater of Vavilov Brothers (Fig.4). Its width is of about 100 km (62 miles). One may clearly perceive the terraced walls of the crater and the wavy structure of its bottom. Crater Lowell (2) can be seen in the upper part of the photograph, with Etves (3) to the West and Van Gu (4) to the Southwest. A multitude of other craters and roughnesses with widths up to 200 meters and less can be easily seen.

The interesting fact about this successful performance is the possibility to fully utilize one of the best means of memorizing and preserving the information. Note that in the interval between black and white tones the best television systems transmit up to 12 tones (gradations) . Up to 60 gradations may be utilized by means of human eye, while utilizing devices more than 100 gradations may be used. A phototelevision system transmits 3 to 5 pairs of black and white strokes over a portion of one mm. width (resolution of 3-5 lines per mm). The photographing system may transmit 10 to 20 times more, while geometric distortions are substantially reduced.

The photographing from automatic stations of the ZOND series does not differ in principle from aerophotography using aircrafts. In both cases

the optical system is "focused" at infinity, and the photographing takes place automatically. The correlation of velocity, photo scale and exposure time permits in most of the cases to neglect the image shift on account of motion. In the instrument compartment of the station the temperature and pressure are pre-assigned and the vibrations are absent. In this regard the photographing conditions are better than from an aircraft. The new element is the fact that in outer space the photographic devices operate in conditions of weightlessness.

Since the contemporary cartography uses for the initial material a photograph, when photographing from crafts returning from outer space one may use the whole arsenal of well processed means and methods of aerophotography, photogrammetry and cartography.

In this respect, pictures taken during the flight of ZOND-6 around the Moon will yield a very valuable information for diversified scientific investigations.

**** T H E E N D ****

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Translated and summarized
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