AN ATTEMPT TO FIND WEAK LUNAR ABSORPTION BANDS IN THE VISIBLE RANGE ON THE BASE OF UMOV'S EFFECT.

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FORMULATION OF THE PROBLEM. Existence of weak absorption bands in the lunar albedo spectrum was discussed many times. Recently one more attempt to study them was made [1]. Finding weak bands by spectrophotometric measurements is very difficult task because it is impossible to simultaneously measure object (the Moon) and light source (Sun) spectra with the same equipment. The necessity to use standard energy distribution of Sun spectrum leads to appearence of specific errors, which result from incomplete elimination of Fraunhofer's lines from the lunar albedo spectrum. As a result, albedo spectrum becomes jagged. Deviations reaching 5 - 7% are comparable to the intensity of the found bands.

We suggest another approach to the problem of finding of weak bands. As well known, the albedo of scattering surface strongly correlates with the value P of positive polarization (Umov's effect). Therefore we expect the weak bands in albedo spectrum to appear in polarization spectrum as well. Polarization measurements don't require comparison with Sun. That is why polarization measurements accuracy is higher then photometric ones. Taking this into consideration we made an attempt to find weak bands in lunar spectrum.

SPECTROPOLARIMETRY OF THE MOON was made with spectropolarimeter [2] mounted on the 60-cm telescope. Spectral resolution was 20 A. Phase angle was about 52°. Errors of polarization measurements in the wavelengths interval 0.48-0.56μm was estimated using many measurements of the same regions and turned out to be 0.03%. $P(\lambda)$ for four lunar region (see table) are shown in Fig.1.

TABLE

#	latitude	longitude
1	51.7°	-9.1°
2	-20.2°	-38.8°
3	-16.7°	-31.5°
4	23.8°	-47.5°

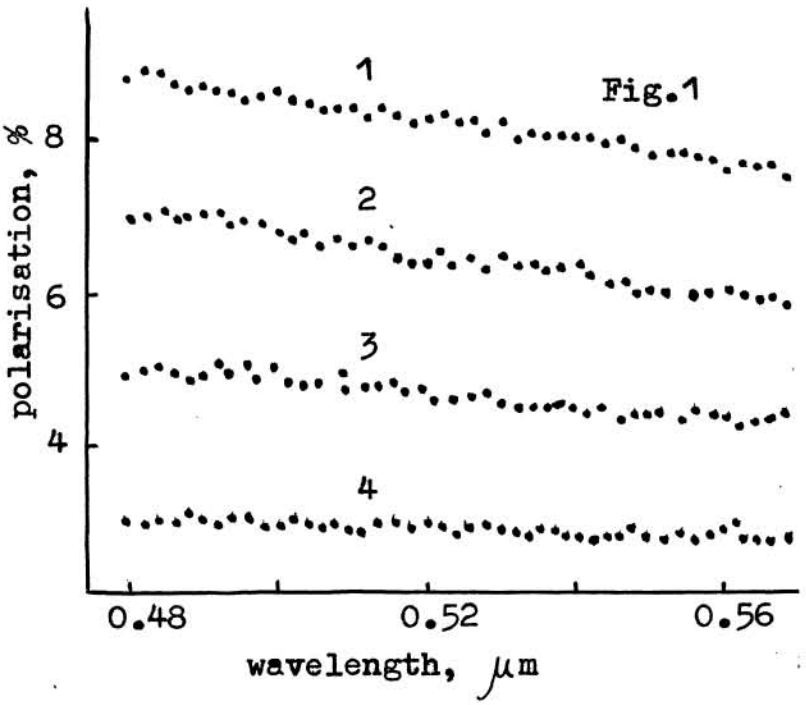

Fig.1

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Data presented in Fig.1 show the absence of statistically significant absorption features in the polarization spectrum within the limit of ≈ 0.1%. Contrary to this result, spectrophotometrical measurements of the same lunar regions reduced using the standard Sun data [3] display a set of false features in albedo spectrum (see Fig.2) which result from Fraunhofer's lines (see arrows on the Fig.2).

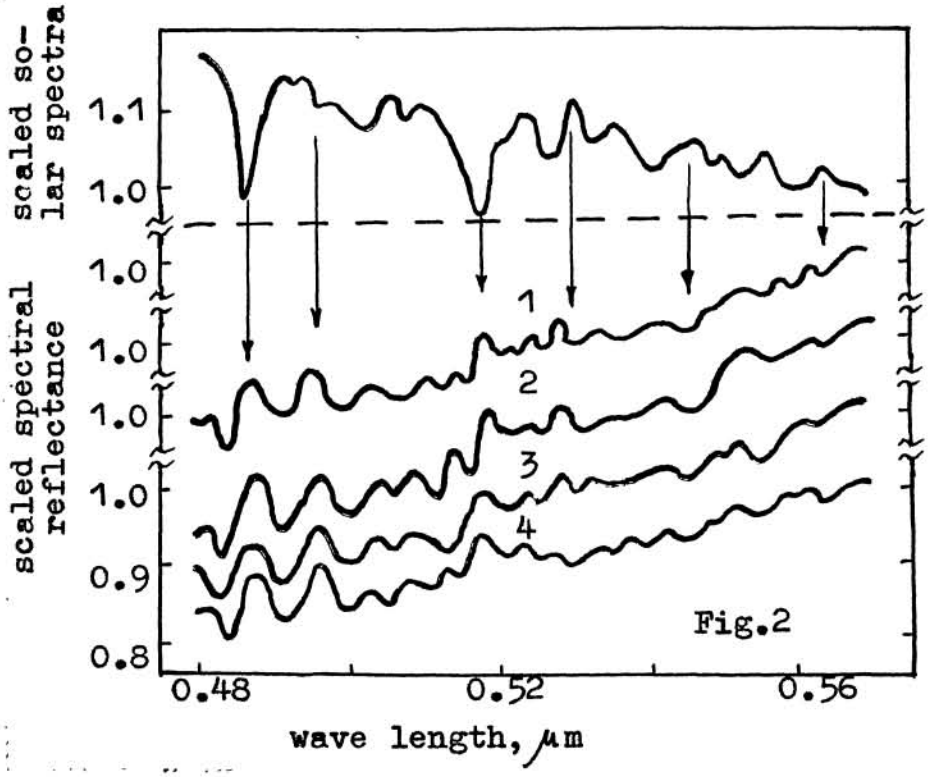

Fig.2

References.

1. Busarev V.V. *Astron. Circular 1988,no.1527,p.33-34* (in Russian).
2. Bugaenko O.I., Guralchuk A.L. *In: Photometric and polarimetric investigations of celestial bodies. Ed. Morozhenko A.V. Kiev: Naukova Dumka,1985,p.160-164* (in Russian).
3. Makarova E.A.,Kharitonov A.V. *Energy distribution in Sun spectrum and solar constant. Moscow: Nauka, 1972,p.288* (in Russian).