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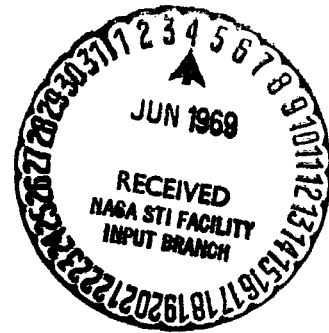
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RENDEZ-VOUS WITH VENUS

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RENDEZ-VOUS WITH VENUS

The Soviet Weekly "NEDELIYA"  
page 5,  
Moscow, 18 May 1969.

by

own correspondent  
N. Lazareva, according  
to Prof. V.K. Prokof'ev.

It is well known that the distance between the Earth and Venus is inconstant. The "morning" and the "evening" star either goes away from us by about 360 million kilometers, or returns again, approaching the surface of our planet by almost 50 million kilometers. At the present time Venus drifts away from the Earth and will return only in November of the next year. During the time of recurrent "rendez-vous" having taken place from February to April, a series of interesting observations were conducted at the Crimean Astrophysical Observatory AN SSSR; unique ultraviolet films of the clouds of Venus atmosphere were obtained, and the moment of its passing by the Sun was imprinted. Our correspondent, N. Lazareva, approached the famous prof. of Astrophysics, V.K. Prokof'ev to recount about this work.

\* \* \*

The photographs taken during the days of closest rapprochement of the Earth with Venus, may be considered as a great success. From the first of them obtained on 2 February, one can clearly see the dark "ultraviolet" cloud. It crosses the planet's image along the equator. After fourteen days another photograph was taken. There it may be seen how this formation is deflected toward the northern part of the disk. The appearance of such clouds was observed even earlier by our scientists as well as in the U.S.A. and France. However, photographs taken through the telescope were too blurred and with poor contrast.

It would seem that to obtain a contrast image a longer exposure would be the solution. But in this case the constant motions of the Earth's atmosphere, slur over the details of the process. In order to increase the contrast of ultraviolet photographs, scientific co-workers of our

observatory adapted for the first time in the world, a highly-sensitive television installation in combination with a telescope having a mirror of 0.5 meters in diameter, and an ultraviolet filter transmitting a narrow portion of the spectrum, about 3700A. This method was worked out by the candidate of Physico-Mathematical Sciences, V.V. Prokof'eva in collaboration with engineer A. Abramenko; it allows to decrease the exposure time to one second instead of several tens of seconds. Moreover, contrast increases considerably, the dark image details appear distinctly and the picture of the far-away processes is presented to us.

What is the nature of these clouds?

Unfortunately up to the present time it is unknown. It is possible though that from the lower layers of the atmosphere, some sort of gases rise with the ultraviolet absorption properties. They settle above the cloud cover, and perhaps they are complex compounds of carbon dioxide with other gases of Venus' atmosphere. French researchers attest that similar clouds appear almost regularly with a five-day interval.

Now, the second photograph. It was taken by our scientific co-worker, N. Orlova, at the mountain station of the Pulkovo Observatory in Kislovodsk. At that station a coronagraph of most original structure, created by the Soviet specialists, is installed. An image of planet Venus' by-passing (slightly higher) the Sun was taken on 9 April, precisely with its aid. As a matter of fact, at this moment of time Venus usually sinks in the Sun's bright halo. To observe the crescent of Venus in such conditions is possible only wherever the solar halo is attenuated (mountain conditions), and with the aid of an instrument with sharply decreased light scattering on optical details. This is possible only by means of a coronagraph. Investigations of the brightness scattering in the illuminated crescent of Venus, will permit us to draw conclusions on the nature of the upper atmosphere, and to study the so called "twilight" phenomena in the venusian atmosphere.

What else can optical observations of Venus yield?

In the first place they may yield new data on the properties of the upper layers of the planet's atmosphere and the characteristics of its

cloud cover. I must note that observations, for example, of ultraviolet clouds may be conducted with great success from the Earth. We may investigate the structure of the cloud cover, the dimensions of particles in it, and the displacement velocities.

And what is that we will never be able to know until man steps on the surface of "morning " star?

Recently, at our observatory a philosophical seminar was conducted on the theme of "what we shall never know". But the question cannot be raised in such a manner. One must bear in mind that technology and scientific ideas are developed at such a tempo and in such unexpected directions that to claim anything definite is rather risky. May it not be possible for the future cosmic spacecraft sent to Venus, to bring back some specimen of rocks taken from various depths? A seismograph, thrown on the surface of Venus could register volcanic eruptions (if there are any) and by the same token give us an idea about the internal structure of the planet. Perhaps some sort of apparatus will be made which will convey to Earth even cloud samples.

\* \* \* \* THE END \* \* \* \*

Crimea, Observatory.

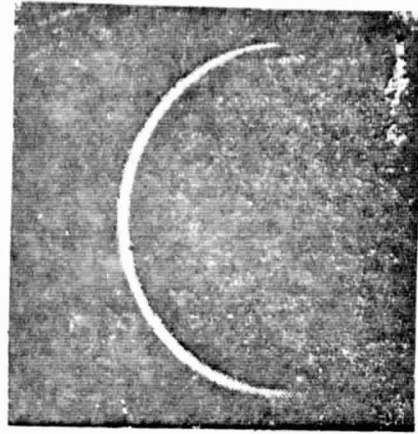
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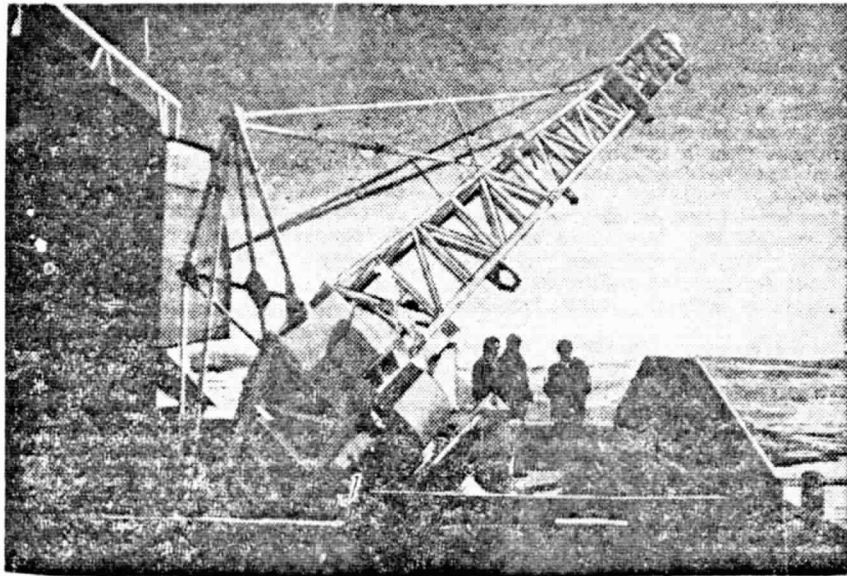
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Ultraviolet photograph  
of the cloud in the atmosphere  
of Venus



Crescent of Venus in the  
solar halo



Coronagraph on which the photographs of Venus  
were taken during the passage of the planet  
past the Sun