several repetitions, however, it may become necessary to grab the fish and shake it, or, in short, threaten it with injury. We have tried several specimens —more than a dozen over a period of several weeks—and they all react in the same way. First the fish gives a honk, which from the subjective view sounds very sad. As one student said, "That fish says 'I've had it!' " Immediately thereafter the fins stiffen, the operculum distends to a maximum, and the gills themselves are seen to be widely separated from one another. All in all, the fish has the appearance of one which has been asphyxiated or has died out of the water. Then the fish begins to pale all over and rapidly loses its color, to such an extent that it becomes yellow. This state lasts from several seconds up to 2 or 3 minutes. Finally the fish gives a convulsive gasp and revives. The fish recovers its color slowly, and even for a period of several minutes to a half hour afterward, a fish which has undergone the cataleptic experience has a pale appearance.

It would be interesting to find out whether related shrimp and fishes of the same genus have similar behaviors. Various other interesting questions arise, such as the rate of heartbeat change, the possible connection of this state in the toadfish with the well-known ability of this fish to live in water of low oxygen content, and the cause of the color changes themselves. We have no plans to carry these studies further and wish to call attention to the fact that this material is available along most of the East Coast of the United States.

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Spectrum of Venus in the Violet and Near-Ultraviolet

Abstract. Recent observations of the spectrum of the planet Venus, with spectrographs of low and high dispersion at the Georgetown College Observatory, show that a wide, continuous absorption band is present in the violet and near-ultraviolet. The band begins near wavelength 4500 A and extends to the short-wavelength limit of our spectrograms near 3800 A. It is similar in structure to the strong absorption, reported by others, for gaseous nitrogen tetroxide.

In his book on the planetary atmospheres Kuiper (*1*) suggests the need for further observations of their spectra in the ultraviolet. Recently we obtained, with the 1-prism Reiss spectrograph of the Georgetown College Observatory, a spectrogram of Venus that shows practically no spectrum on the short-wavelength side of the H and K lines. During the current season, with Venus as an evening star, we have secured additional observations confirming the earlier result.

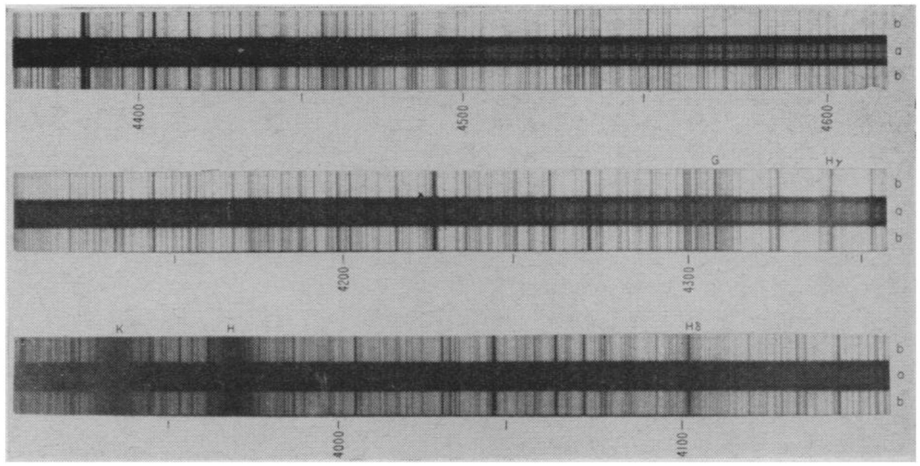

Fig. 1. High-dispersion spectra of Venus (*a*) and the Moon (*b*). Note the shift in spectra between the spectra due to the motions of Venus and the Moon relative to the Earth.

For the later observations we have used a concave grating of 21-ft radius. It was ruled with 30,000 lines per inch by the late H. G. Gale of the University of Chicago and is now the property of the National Geographic Society. It is set up in a Wadsworth mounting, at the Georgetown Observatory, and gives a dispersion, in the first order, that varies from 2.5 to 1.7 A/mm, according to the spectral region. With it an exposure of about 100 minutes is sufficient to record the spectrum of the planet, whereas an exposure of about 30 minutes is ample for the Moon when it is near full phase.

Figure 1 shows our results. The spectrum of Venus, beginning near 4500 A, declines steadily in intensity toward the H and K lines, beyond which little or no spectrum is visible to the short-wavelength limit of our plates near 3800 A. This is in agreement with Kozyrev's (*2*) observations at much lower dispersion, in which he reports a decrease in the albedo of Venus from 0.63 at 4600 A to 0.12 at 3800 A. However, there is no evidence on our spectrograms for the selective absorption that he reports at 4372 and 4120 A, nor do we find any evidence of selective absorption by the molecules suggested by Urey and Brewer (*3*) as probable sources of the absorptions reported by Kozyrev.

Part of the effect revealed by our spectrograms is attributable to loss of reflectance by the grating, as may be noted by comparison with the juxtaposed spectrum of the Moon. The general effect, however, is real and is similar to that observed in the spectrum of Jupiter by Kiess and Corliss (*4*) and reported by them to the American Astronomical Society at the recent meeting in Rochester, N.Y. This structureless, continuous absorption is practically identical with that described by several investigators, notably by Harris (*5*) and by Hall and Blacet (*6*) for nitrogen tetroxide, N_2O_4, the molecule polymerized at low temperatures from the molecule NO_2. The presence of this absorber in the atmospheres of Jupiter and Venus may thus account for the failure to detect molecular oxygen in them; and depending on conditions of temperature and pressure, it may account for the color effects. As may be seen from our illustration, the Doppler shift toward shorter wavelengths of the spectrum of Venus relative to that of the Moon is adequate to separate lines of planetary origin from their terrestrial counterparts, such as those of O_2 and H_2O; but no such lines, although sought, have been observed by us in the spectrum of Venus (*7*).

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Reference and Notes

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