

No. 496

A Science Service Feature

Dec. 12

? WHY THE WEATHER ?

By Dr. Charles F. Brooks  
of Clark University.

THE ATMOSPHERIC TIDE

To the ocean tide of a few feet, and to the land tide of about one foot, one must add the atmospheric tide, to complete the list of the direct effects of the moon on the hydrosphere, the lithosphere, and the atmosphere. As the moon rises in the sky it pulls the atmosphere very slightly to its side of the earth. This effect is enough, when the moon is highest, to increase the pressure at London, for instance, by the equivalent of 0.01 millimeters of mercury (0.0004 inch) or about 1/75,000th of the average total pressure of the atmosphere. That is, the gravity of the moon offsets by this small fraction the earth's attraction of the portion of the atmosphere nearly under the moon. Similarly, on the opposite side of the earth the atmospheric pressure is equally very slightly increased because the moon is pulling on the solid earth a little more than on that part the atmosphere which is farther away. Thus, as the earth rotates, there are two high and two low atmospheric tides in the lunar day, just as, and for much the same reason that, there are two oceanic high tides and two low tides.

This minute variation of pressure was found only by tabulating the hourly pressures with respect to the position of the moon over a period of several decades. The daily heating of the atmosphere produces a pressure oscillation equivalent to the weight of several hundredths of an inch of mercury, while our ordinary storms bring us barometric changes of half an inch to an inch. Thus the lunar tide in the atmosphere has but 1/100th or 1/1000th or less of the amplitude of the changes accompanying our usual weather oscillations. It is not difficult to appreciate, therefore, that the direct gravitational effect of the moon on the earth's atmosphere must be insignificant as a factor in weather.

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(Tomorrow: Winter Housing)  
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