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A Science Service Feature

? WHY THE WEATHER ?

By Dr. Charles F. Brooks
of Clark University.

GASES OF THE HIGH ATMOSPHERE

Aviators ascending to record heights find a decidedly thin atmosphere, yet from such samples as balloonists have collected its composition is essentially the same as that we experience below. This general homogeneity in the lower seven miles, is evidently owing to continuous mixing of upper and lower levels attending convection. Above a height of about seven miles, or somewhat less in the polar regions and a few miles more over the equator, however, such vertical mixing seems to be lacking, and there, presumably, the atmosphere begins to depart radically from its composition at the bottom. The heavier gases, with their slower moving molecules, are held down by gravity to such an extent that they cannot rise to such great heights as can the lighter gases, with their faster molecules. Thus, while in the region of life, nitrogen and oxygen together constitute nearly the entire atmosphere, at 60 miles and higher they are virtually absent. The lighter gases, helium and hydrogen, thin though they are at such heights, stand head and shoulders above the heavier ones and practically alone form the high atmosphere.

At these great heights a meteor at its enormous velocity compresses the rare gases to such a point that they become intensely hot and the meteor begins to volatilize, leaving a train that may endure for seconds, or even minutes, which is long enough for photographing with the aid of a spectroscope. Four of the six lines of the spectra of one meteor showed the presence of hydrogen, while five of the thirteen lines of another were identified with those of helium. This indicated prevalence of hydrogen and helium is what computations have lead us to expect, but not quite a proof of it, as the meteors may have brought these gases with them.

(Tomorrow: Climate and Architecture)

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B and 21st Sts.,
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