distribution in the extreme ultraviolet solar continuum has been determined from the spectra obtained on April 19, 1960. The radiation temperature decreases gradually from 5000°K at 2080 Å, to 4700°K at 1750 Å. From 1510 to 1280 Å the level lies between 4700° and 4750°K. Below 1280 Å the continuum rises rapidly in the wing of Lyman-alpha as the line center is approached. The wings of Lyman-alpha are nearly symmetrical in terms of intensity, but not in radiation temperature. Shortward of Lyman-alpha the temperature level drops to a minimum of about 5100°K at 1180 Å, then rises gradually to 5800°K at 1000 Å, and this rise appears to continue throughout the region of the Lyman series, although only a trace of exposure was obtained. The Lyman continuum level from 912 to 880 Å was determined as $6680^\circ \pm 100^\circ \text{K}$. Smooth regions of slightly increased radiation temperature below 1526 and 1101 Å suggest enhancement from the ionization continua of SiII and ClI, respectively. The absence of Fraunhofer lines shortward of 1526 Å indicates that the continuum is entirely chromospheric below this wavelength. Here the continuum, like the emission lines, is enhanced in plane regions.

Behavior of Absorption Features in the Spectra of Mira Variables. A. J. DEUTSCH, P. W. MERRILL, and P. C. KEENAN, *Mount Wilson and Palomar Observatories and Perkins Observatory*.—Comparison of coudé spectrograms of Mira (Me) variables and of normal red giants has established several regularities in the complex behavior of their absorption spectra:

(1) *Temperature* types of M stars later than about M5 can be improved by comparing relative strengths of their molecular bands (TiO and VO) rather than absolute intensities. The reason is that even the vibrational levels of TiO are far enough apart to have appreciably different populations at temperatures of 3000 K and lower.

(2) Consistent differences in the ratios of the bands of YO, ScO, and AlO appear to reflect real differences in the *abundances* of these metals in certain Mira variables. Strengthening of YO and ScO indicates a tendency towards spectral type S; in such stars AlO is often weak.

(3) A striking characteristic of the spectra of many Mira variables is the *weakness* of many absorption lines in comparison to their strength in nonvariable stars of type M. The weakening is most noticeable in the range of types M0e to M5e, while many of the coolest Mira variables (R Leo) can scarcely be distinguished from ordinary giants. The line weakening is most pronounced in the blue and visual regions, and tends to disappear in the ultraviolet below 3900 Å. In any one variable the weakening can *vary* greatly from one cycle to another.

The lines *least* weakening arise from: (a) Ions of elements with ionization potentials less than about 6 eV (BaII, SrII). (b) Low levels of neutral atoms (Fe, Ti, Co) that have higher ionization potentials.

The differential behavior of these lines suggests that the Mira variables have atmospheres in which both pressure and temperature are lower than in normal giants of the same spectral type. They differ from supergiants, however, in having weaker lines (higher opacity) and in the absence of pronounced turbulent broadening of lines.

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Coma Formation and an Artificial Comet Experiment. BERTRAM DONN, *Astrophysics Branch, Goddard Space Flight Center, National Aeronautics and Space Administration*.—Inherent difficulties of observing comets have left such fundamental properties as nuclear structure, composition, and activation uncertain. Facilities for space research suggest additional ways for studying comets. Whipple's model can be simulated by putting several hundred pounds of an appropriate ice mixture into a terrestrial orbit.

Calculations of coma development and luminosity indicate the feasibility of an artificial-comet experiment. The analysis also applies to comet flares. For a 1-m sphere, density 1 g/cm³, weight 1300 lb, comparison with Halley's comet, which may underestimate luminosities, leads to the following: 4.8 mag. at 10 000 km; 7.4 mag. at 36 000 km.

If the thermodynamic properties of the nucleus are similar to ammonia and only solar thermal radiation acts, the coma forms in a few hours and in about a 1° diameter. The duration is 11 days for a 2.5-mag. decrease, 13.5 days for 4 mag.

A suggested nonreactive composition consists of ammonia (NH₃), cyanogen (CN)₂ and methyl acetylene, C₃H₄. The inclusion of micron-sized non-volatile grains would be desirable.

In this experiment, dimensions, structure, composition, and external environment would be known. The correlation of predicted and observed behaviors plus comparison with actual comet phenomena would test the validity of the model and provide information for extending or revising it. Atomic and spectroscopic data with solar excitation would also be obtained. If a suitable orbit can be attained, tail phenomena may also be studied.

Observations would mainly be by conventional methods and cooperation of astronomers, for complete observational coverage will be necessary. Space-borne radiation and particle detectors appear possible.

A modified experiment employing chemical