These are three universal standards of time:

1. UT0 - or Ephemeris time. This universal standard includes all the earth variation and uses the posit of the sun as a reference.

2. UT1 - This universal standard uses the average of all the earth variations.

3. UT2 - This is a standard of time based on the redesignated second of Tropical year 1900.

--J. A. Garcia

LUNAR OCCULTATIONS FOR DECEMBER

10	BD/1° 4744	5.6	8.7	D	7:56.2	P. M.
12-13	235 B. Psc.m	6.9	10.9	D	1:39.3	A. M.
13-14	19 Ari	6.0	11.9	D	1:26.3	A. M.

PUBLICITY: John Lund has taken over publicity for the NCA as Ruth Heisey has had a good deal of sickness this fall. I would like to thank Ruth for doing the job for the September and October lectures.

--Everette Neville

AS STAR DUST goes to press, Tove Neville is ill in Doctor's Hospital. We hope for you a speedy recovery, Tove.

MOON NOTE. It has been verified recently that the moon has a rare and tenuous air-- but sufficient to ignite meteors high above the lunar surface. The brighter fireballs glow brilliantly enough to be seen with a telescope, even at the moon's distance of 239,000 miles. British observers have detected a few of these lunar meteors during recent eclipses of the moon.

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STAR DUST
National Capital Astronomers

December 1956 Vol. 14, No. 4

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DECEMBER CALENDAR

Dec. 1 (Sat.) "OBSERVATIONS OF SOLAR FINE STRUCTURE", Miss Sarah L. Lippencott, Sproul Observatory, Swarthmore College. Department of Commerce Auditorium, 8:15 P.M.

Dec. 15 (Sat.) DISCUSSION GROUP with Roger Smith on STELLAR COMPOSITION. Department of Commerce Foyer, 8:00 P. M.

TELESCOPE MAKING CLASS with Hoy Walls each Monday evening at 7:30 P.M., Chevy Chase Community Center, 5600 block of Connecticut Avenue. Mr. Walls' phone number is OL 2-5395.

THE SUN IS THE ONLY STAR close enough to the earth to permit us to make direct observations of the surface features. Modern techniques make possible observations of different heights in the solar atmosphere, as well as on the surface or photosphere. Cinematographic methods are employed which give a graphic representation of the continuous changes in both the fine structure and the enormous prominence activity. Analyses of lifetimes and dimensions of fine structure are compared from motion picture observations projected on the disk and on the limb. The fine structure pattern will be discussed by Miss Lippincott, based on observations at the Pic du Midi in the French Pyrenees and at Sacramento Peak, New Mexico. Observations of chromosphere structure are of great interest to the theoretician who is concerned with building a chromosphere model.

Two 16 mm films taken at Sacramento Peak--one showing prominence activity and the other spicule or fine structure at the limb--will be shown.

Miss Lippincott has studied the nearest star while on leave from the Sproul Observatory, Swarthmore College,

where she works with other nearby stars. She spent some time at the Observatoire de Meudon and at the Pic du Midi, studying the films of Bernard Lyot; and later spent a summer at Sacramento Peak analyzing the spicule films of Richard Dunn.

---John C. Lund

STELLAR COMPOSITION - The December DISCUSSION GROUP will be concerned with these bonfires in the sky, their fuels and atmosphere. Spectroscopy indicates great differences among the stars. Is this due to differences in composition or due to thermoresonance of particular ions? How does atomic abundance in our solar system compare with that of the stars? How can we account for the difference in the abundance of the elements? Come prepared to contribute to the discussion. This author will monitor, not lecture.

---Roger Smith

OBSERVATIONAL DATA FOR DECEMBER

Mercury is an evening star in December, greatest eastern elongation occurring on the 24th. The planet may be seen at this time, low in the southwest, just after sunset. Venus is a morning star which may be seen low in the southeast just before sunrise. Mars is in Pices, nearly on the meridian at sunset, and sets about midnight. Jupiter rises about midnight and is in quadrature with the sun on the 22nd. Saturn is a morning star, but is too close to the sun for easy observation. A conjunction with Venus occurs at 5:25 A. M. (E.S.T.) on the night of December 25-26. The date of maximum intensity for the GEMINID meteor shower is December 12. This shower averages 30 meteors per hour.

---A. L. White

REDEFINITION OF THE SECOND

By Dr. William Markowitz

A VERY INTERESTING AND EDUCATIONAL TALK on "THE REDEFINITION OF THE SECOND," was given to NCA in November by Dr. William Markowitz, Director of the Time Division at U. S. Naval Observatory.

Using the "Apparent" or "Mean Solar" day as a reference, man introduced Mean Solar Time by the invention of the clock. The Mean Solar Second, which is a fraction of 1/86,400 of the Mean Solar Day was determined by dividing the Mean Solar Day into 24 hours and then dividing by 60. Up to this point, man had depended on the rotation of the earth to determine time, but in these modern times it was found necessary to use very precise measurements of time. Scientists as well as astronomers took on the task of checking the precision of the second using the rotation of the earth. They found that the rotation of the earth is not uniform, but has daily as well as yearly variations, which can cause it to vary as much as 30 seconds. Tidal friction also produces slow changes on the rotation of the earth.

Scientists decided to use the oscillations of atoms as a reference for producing a clock which is not affected by the forces which cause the earth variations. Whereas the pendulum has one oscillation per second, a watch five oscillations per second, the standard quartz clocks up to one hundred thousand oscillations per second, atomic clocks using ammonia have approximately twenty-three billion oscillations per second. Atomic clocks using a beam of cesium have a frequency of 9,192,631,800 cycles per second. Although the frequency is expressed to only a few hundred cycles per second, cesium is known to be precise to one part in 10 billion, therefore, it is a primary standard.