

**MARYLAND-D.C. JUNIORS CHANGE THEIR MEETING PLACE**

Starting this month, the Maryland-D.C. Juniors will meet in the meeting room at the new Chevy Chase Library at 8005 Connecticut Avenue in Chevy Chase. This library is located on the east side of Connecticut Avenue between East-West Highway and Chevy Chase Lake, 1.75 miles north of Chevy Chase Circle. D.C. Transit buses regularly run from Chevy Chase Circle to the library. This month's meeting will be held at 2:00 P.M. on March 12. - Leith Holloway

**PRINCE GEORGES' COUNTY JUNIORS PLAN TRIP**

The PGC Juniors have been taking reservations for their bus trip to Philadelphia on April 30 of this year. There are about ten places left to be filled, and we thought it would be good to offer these places to interested members of the NCA. So if you would like to go, contact one of the members of the PGC Juniors immediately. The particulars of the trip are:

Date: ..... April 30      Time: .... 8:00 A.M.      Place: Dept. of Commerce  
Destination: Philadelphia, Pa. with stop at Edmunds      Cost: \$7.50 per person  
 Persons under 18 years old require written permission from parents.

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★ **S T A R D U S T**



March 1966

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**DR. O'KEEFE WILL DISCUSS THE LUNAR SURFACE**



Dr. John O'Keefe

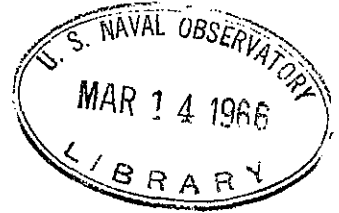
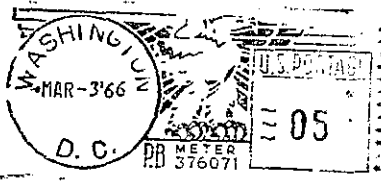
After several successful Ranger shots and the recent landing of Luna on the surface of the moon, one of the most discussed topics has become "What is the Lunar Surface Like?" On the evening of March 5, Dr. John O'Keefe, Assistant Chief of the Theoretical Division at the Goddard Space Flight Center, will present his views which have been derived from his studies of the surface of the moon from the point of view of the formation of lunar granites. This work is an outgrowth of studies of tektites. Dr. O'Keefe is the editor of a book on tektites and is responsible for the idea that tektites reach the earth from the moon via temporary natural satellites of the earth.

Dr. O'Keefe was born in Lynn, Massachusetts and received his A.B. from Harvard College in 1937 and his Ph.D. from the University of Chicago in 1941. From 1941 to 1942 he was Professor of Mathematics and Astronomy at Brenau College, after that he worked as a Mathematician for the Corps of Engineers, and in 1958 he joined the Goddard Space Flight Center. Dr. O'Keefe was Vice-President of the Washington Academy of Science in 1957-1958. He is a member of the Int'l. Astronomical Union, The American Geophysical Union, the American Astronomical Society, the Washington Philisiphical Society, the American Astronautical Society, and the Meteoritical Society.

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**CALENDAR**

- MARCH 5 THE LUNAR SURFACE, by Dr. John O'Keefe at 8:15 P.M. in the Interior Dept. Auditorium. Business meeting follows.  
 DINNER WITH THE SPEAKER before the meeting. Call Hank Hudson at 534-8378 for reservations before noon on Saturday.
- 12 MD-DC JUNIORS meeting at 2:00 P.M. in the Chevy Chase Library 8005 Connecticut Avenue. Program to be announced.
- 19 DISCUSSION GROUP will meet at 8:15 in the Commerce Department, Room 2062. Bring a friend and join in the lively discussion.
- 20 SPRING EQUINOX. Use your Time Table of the Heavens to determine the exact date.
- 20 PRINCE GEORGES' COUNTY JUNIORS will meet at the home of Ted Noble 2:00 P.M. Important meeting.
- 4,18 TELESCOPE MAKING CLASS at the McLean High School with Grady Whitney at 8:30 P.M.
- 1,8,15,22,29 TELESCOPE MAKING CLASS at the Chevy Chase Community Center from 7:30 to 10:00 P.M. with Hoy Walls.
- 4,11,18,25 ADVANCED TELESCOPE MAKING CLASS at the Chevy Chase Community Center from 7:30 to 10:00 P.M. with Hoy Walls.

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Library,  
 Naval Observatory  
 Washington 25, D.C.

★ S T A R D U S T

NCA HOBBY SHOW .....APRIL 16

Plans are underway for an NCA Hobby Show. This is to be an exhibit by the members of "Things Astronomical." Come and bring what you have--Others may find it interesting.

Middle East Region Astronomical League member societies are cordially invited to exhibit and attend the Hobby Show. The show will be held at the Department of Commerce from 12 noon until 10:00 P.M. that night. More details will appear in the April Stardust.

In addition to the individual exhibits, we will have one showing the organizations and private observatories, planetariums, etc., that are active in astronomy in the Washington area. All NCA members are invited to take part in it.

If you have pictures or descriptive pamphlets of any of these, or a publication by one of these institutions, bring it along. Even contributing one fact may be helpful. We don't expect exhaustive research. Perhaps you can add the name of a school or owner of an observatory near Washington.

<u>Naval Observatory</u> -----	Bob Wright will bring Ephemeris.
<u>Georgetown Observatory</u> -----	We need material.
<u>Coast &amp; Geodetic Survey</u> -----	Anything about its work on tides.
<u>Howard University</u> -----	Does it still teach astronomy?
<u>Carnegie Institution</u> -----	Linked with Mt. Palomar and Mt. Wilson Observatories.
<u>National Aeronautics &amp; Space Administration</u> -----	Wide range of programs.
<u>National Science Foundation</u> -----	Another source.
<u>National Bureau of Standards</u> -----	Standards of time, optical glass, and radio astronomy. Lee Scott and Bob McCracken should be able to cover some of these.
<u>National Museum</u> -----	Has displays of telescopes, meteorites, etc. Here the juniors could help.
<u>Washington Missionary College, Takoma Park</u> -----	Is its observatory still in operation?
<u>Goddard Space Center</u> -----	Anything at all would be helpful.
<u>Nature Center, Rock Creek Park</u> -----	Has a planetarium. We need some notes about its astronomy program.
<u>Naval Research Laboratory</u> -----	Bob Bolster was badgered into getting some information and perhaps Dr. Krebs will help.
<u>Schools with planetariums</u> -----	Mrs. Noble will undertake to make a list, and Sheila Duck offered some. All juniors could take part.
<u>Astronomy clubs</u> -----	Juniors must know of several throughout the schools.
<u>Private observatories</u> -----	Whose and where?
<u>Anything else that you suggest</u> -----	

Bring what you can, or call: Mable Sterns-265-5219 to add any bits of information, names, or suggestions to this group project.

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APPLYING FOR NCA MEMBERSHIP

The following applied for membership at the February meeting. If you have any comments about the applicants, please contact a Trustee or an NCA officer before March meeting:

<u>Regular Membership</u>	<u>Junior Membership</u>
Irving S. Freidman	Sheila E. Barnes     Judith Ellen Fuchs
6620 Fernwood Court	3306 Manorwood Dr.     8302 Oliver Street
Bethesda, Maryland	Hyattsville, Md.     Hyattsville, Md.
	20782                     20782

Joanne M. Morgan  
1609 31st St. N.W.  
Washington 7, D. C.

Stephen Holland  
3218 Wintergreen Ave.  
Washington, D.C., 20028

BETTER COMMUNICATION

The Middle-East Region of the Astronomical League is asking that the member societies, which publish a monthly newsletter containing program information, send a copy to all other groups in the region. A list of names and addresses of the societies has been received from Mr. Ed Naylor, Chairman of MERAL. The current issue of Star Dust has been sent to the nineteen societies and we await the exchange of their publications. It will be helpful to our program planning committee to peruse their publications and make use of some new material.

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NCA MEMBERSHIP DIRECTORIES .....Thank You!

Plan to pick up your copy of the Directory at the March meeting. Mrs. Anna Lee Tucker did the beautiful typing and page arrangement, Mr. Sam Feilds made the photocopy and the printing and assembling was handled through the office of Mr. Sol Silverman of D.C. Public Schools. NCA wishes to thank these specialists as well as the people who helped to check lists of names and phone numbers. Prince Georges' County Juniors did the major work on the Junior section. Thanks for the cooperation and patience of everyone.

Use your NCA Directory to become acquainted with NCA members, take advantage of the services offered in the Directory and peruse the accomplishments of NCA in the Astronomical League.

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FEBRUARY LECTURE - CLOCK SYNCHRONIZATION AND RELATIVITY EXPERIMENTS UTILIZING ARTIFICIAL SATELLITES

According to Einstein's Theory of Relativity, clocks slow down with an increase in either their speed or the gravitational force acting on them. In fact, any physical phenomenon slows in the same way. Our February speaker, Dr. William Markowitz of the U. S. Naval Observatory, pointed out that Einstein's theory has more or less been verified by the following scientific observations:

1. The Michelson-Morley experiment which failed to detect an "ether wind."
2. The shift in the perihelion of Mercury's orbit of 43 seconds of arc per century more than can be accounted for by Newtonian theory.
3. Deflection of starlight by 1.75" near the sun as observed during total solar eclipses.
4. Slowing of radar waves while passing the sun on the way to Mercury at superior conjunction.
5. Change in rate of an atomic clock subject to a change of gravitational potential resulting from a 22-meter elevation.

Remaining to check is the slowing of a clock by high speed as could be accomplished in an artificial earth satellite. The 800-pound hydrogen-maser atomic clock (successor of the cesium clock) could be reduced in weight to 50 pounds for satellite use because heavy vacuum pumps would be unnecessary in space. However, present-day atomic clocks are only accurate to one part in 10<sup>11</sup> whereas 100 times this accuracy is needed to show us something we do not already know. Since improvement of this magnitude in light-weight atomic clocks will require many years, it will be a long time before a clock will circle the earth in a satellite.

Dr. Markowitz also told us about his pioneering work in synchronizing clocks between continents to less than one microsecond error by means of communication satellites. When an atomic clock is finally flown in a satellite, accurate synchronization of clocks around the world will be necessary to observe the Einsteinian slowing occurring in orbit.

-Leith Holloway

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TRIVIA .....Lb.

Roman mathematicians standardized the pound with a 16 ounce weight they called "Libra." This ancient Latin term gave us the abbreviation "lb." The zodiacal constellation Libra is the scale. What is so special about Libra in the Zodiac?