

ATOMIC STRUCTURE, NUCLEAR REACTIONS, AND THE SUN

Dr. George L. Rogosa

There is no lithium at the interior of the sun, Dr. Rogosa said. Any which got to the center would promptly explode but not very much could ever get there, so there is no danger. But a nuclear reaction involving the formation of lithium is believed to occur in stellar explosions. Dr. Rogosa preceded these remarks about nuclear reactions and the sun by describing Rutherford's study of the behavior of cathode rays, which gave him a first inkling of the structure of the atom; Joliet's and Curie's investigations of radioactivity; and Fermi's bombardment of uranium to produce nuclear fission.

In the present day, in seeking to account for the enormous and enduring energy of the sun and other stars, two chains of nuclear reactions which would build new nuclei and release tremendous energy have been conceived. They are proton-proton fusion and the carbon-nitrogen cycle. In the proton-proton reaction, a proton plus a proton react to form a deuteron plus a positron. A deuteron plus a proton forms helium 3. Helium 3 does not interact with protons but two helium 3 nuclei can fuse and produce helium 4 which is an alpha particle plus 2 protons. This completes the reaction. The net result is conversion of four atoms of hydrogen into one atom of helium.

In the carbon-nitrogen cycle carbon 12 captures hydrogen nuclei in a series of steps which converts it successively to nitrogen 13, carbon 13, nitrogen 14, oxygen 15, and nitrogen 15. In the end the cycle is completed as nitrogen 15 takes on another proton and breaks down to carbon 12 again, emitting a nucleus of helium in the process.

The energy released in such reactions is measured in terms of millions of electron volts. Only when the nucleus is stripped of its electrons can we obtain nuclear reactions; they are always accompanied by a release of energy according to Einstein's formula  $E = mc^2$ .

---Morton Schiff

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APRIL CALENDAR

April 6 (Sat.) "THE PROGRESS OF ACCURACY OF STAR POSITIONS," Dr. Heinrich Eichhorn, Assistant Professor of Astronomy, Georgetown University, Department of Commerce Auditorium, 8:15 P. M.

April 13 (Sat.) D. C. AND MARYLAND JUNIORS OVER 12 meet with Mr. Leith Holloway in the Lounge of the Chevy Chase Community Center, 5600 block of Connecticut Ave., N. C., from 2 to 4 P. M., for a discussion of telescopes.

April 19 (Fri.) GROUP OBSERVING with Bill Isherwood at the NCA 5". Naval Observatory, 8:00 P. M.

April 20 (Sat.) DISCUSSION GROUP with Hoy Walls on telescopes (See story inside.) Department of Commerce Foyer, 8:15 P. M. Note: It seems difficult for people to get there at 8:00.

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' telephone number is OL 2-5395.

"THE PROGRESS OF ACCURACY OF STAR POSITION" - Star position is determined by several methods. Dr. Eichhorn will discuss the evolution of these methods, the men responsible for their development, and the consequences and significance of their work. Among the concepts discovered through this work are aberration, parallax and proper motion. The place and importance of, and contributions by, a) naked eye observation, b) telescope observation, c) modern meridian circle, and d) photography will also be considered. Dr. Eichhorn will conclude with a summary of modern techniques and an exploration of possible developments to be hoped for in the future.

Dr. Eichhorn received his Ph. D. in Astronomy from Vienna University and is now Assistant Professor of Astronomy at Georgetown University, Washington, D. C.

--Mrs. John C. Lund

NOMINATING COMMITTEE REPORT - The nominating committee presents the following candidates to be considered for election at the May meeting:

Robert H. McCracken, President  
Roger K. Smith, Vice-President  
Phyllis M. Seips, Secretary  
Lillian R. Gregor, Treasurer  
Elizabeth M. Lipscomb, Trustee

Nominating Committee: Larry White, Chairman; Dana Law, Mabel Sterns

---Everette Neville

MRS. ERNEST EDEN NORRIS, SR., has repeated her gracious gesture of last year, again making a gift to STAR DUST of \$25.00. Thank you, Mrs. Norris!

REGIONAL CONVENTION MEETING of one day will be held in Harrisburg, Saturday June 8. All NCA members should reserve this day. More details will follow in May STAR DUST.

---Dana K. Law

DISCUSSION GROUP - The telescope is the principal tool of the astronomer. With it Herschel laid the basis for positional astronomy. Teamed with the spectroscope it has shown us the composition of the stars and helped us to learn of their nuclear reactions. When used as a camera it shows distant galaxies and helps us in understanding the formation of the universe. So come to the meeting on Saturday April 20 and take part in the discussion of this important instrument.

---Hoy J. Walls

OBSERVATIONAL DATA FOR APRIL

Mercury reaches greatest eastern elongation April 15th and may be seen for several days at this time due west just after sunset. Venus is too close to the sun for observation in April, superior conjunction being on the 14th. Mars is in Taurus and well past the meridian at sunset. Jupiter has already risen at sunset and remains visible all night. Saturn rises in the southeast a couple of hours before midnight and is visible for the rest of the night.

The date of maximum intensity for the LYRID meteor shower is April 21. This shower averages 12 meteors per hour. On the 15th at 11:00 P. M. (E.S.T.) the Milky Way lies along the northern horizon passing through Auriga, Perseus, Cassiopeia, and Cygnus.

---A. L. White

LUNAR OCCULTATIONS FOR APRIL

Date	Star	Mag.	Age	Phase	E. S. T.
4	282 B Tau	6.6	4.7	D	9:07.0 P. M.
16-17	Omega <sup>1</sup> Sco	4.1	16.9	D	1:10.9 A. M.
16-17	Omega <sup>1</sup> Sco	4.1	16.9	R	2:07.9 A. M.

---A. L. White

NEW MEMBERS

Pearl C. Jones, 1307 - 12th St., N.W., Apt. 305, Wash., D.C.  
\*John Posniak, 5404 - 39th St., N.W., Wash. 15, D.C. WA 6-836  
\*Robert F. T. Krassa, 708 Buckingham Drive, Silver Spring, Md. JU 7-7980

CHANGES OF ADDRESS

Stanley F. Davis, Amite, Louisiana

Salome Betts, 3685 - 38th St., N.W., Wash., D.C. EM 3-7149

### THE COMET AREND-ROLAND

This comet was discovered last November 8 and it will reach the perihelion point of its orbit on April 8. It is expected to be a first magnitude object on April 22, located in Triangulum, but its proximity to the sun may prevent observation. At the end of the month it will have moved through Perseus into Camelopardalis and decreased its brightness to 3rd magnitude. It should be easy to see at this time in the northwest at the end of evening twilight.

---A. L. White

### THE E.R.D.L. MOONWATCH STATION

The Engineer Research and Development Laboratory's observing station is ready for operation. It is located on level terrain at the Engineer Proving Ground. The timing equipment will be operated inside a weather station building at the site. The moonwatch station has three extra pieces at the north end which allows an extension of the meridian fence to within 20 degrees of the southern horizon. If it becomes necessary, the coverage will be extended to an altitude of 5 degrees. The rapid completion of the station was possible because of the efforts of Myron Klein and Alan Bradford.

---A. L. White

### SPECIAL EVENT FOR MAY -- AN OUTSTANDING OCCASION -- It

seems the National Capital Astronomers are just living right these days. Last September Mars was obliging enough to arrange to be at its closest approach to Earth and provide a splendid show for our picnic, and now another unique event of astronomical importance has presented itself on our horizon at a distance of merely 110 approximate miles.

It has fallen to our happy lot to receive a special invitation from Dr. Armand Spitz to come up to the Spitz Laboratories in Yorklyn, Delaware and see the newly completed Air Force Planetarium which in size is comparable to the Hayden Planetarium in New York and the Adler in Chicago. This is the first Spitz instrument of its size to be seen in this country, and it will not be open to the public until it has been moved out to its permanent site at the Air Force Academy in Colorado Springs, Colorado. The only other Spitz like it in existence is located in Montevideo, Uruguay.

Armand Spitz has promised to put on a fine show and demonstration for us and furthermore has offered us a treat which will undoubtedly be of great interest to all NCA members and a new experience for most of us - to let us go through the workshops and see how a planetarium is made.

The laboratories are located in a very quaint, red building which used to be an old snuff mill, and the rumor is that there is still some snuff around if there are any takers. Yorklyn is about two miles from the Mason-Dixon line, historic ground, but is there really a line? Let's go and find out if somebody handed us one! The trip will be scheduled for either the 11th or the 25th of May. Dr. Spitz was not sure just what date it will be installed in the building which is being specially constructed for it, but we will know by the time of the April lecture. To give everyone an occasion to take advantage of this outstanding opportunity, we have tried to make the plans as flexible as possible. This can be either a one-day or an over-night trip; we are planning for both. We should leave Washington about 9 A. M. and reach Yorklyn right after noon where Armand Spitz has offered to order box-lunches and have them ready for us there as it is out in the country where no Hot Shoppes grow. If you prefer to bring your own lunch or eat on the way, it is your privilege as we are going in private cars. Passage will be provided for those who want it with the recommendation that they chip in for gas if possible.

After spending a most profitable day at "Spitz" we plan to have dinner somewhere near Wilmington and intend to join a local astronomy group for the evening. The next day holds many possibilities. In the close vicinity are two of the most beautiful, honest-to-goodness magnificent estates - belonging to the DuPont family - with gardens and interiors of more than oriental splendor, is the report; or we might stop at Ft. McHenry and recreate in our imagination the feelings of Francis Scott Key as he wrote The Star Spangled Banner; or maybe you would rather go down to Annapolis and see the Naval Academy which has a fine museum of ship models, flags, arms, etc. Different groups might want to visit either or all of these places, according to weather and personal preference, but we certainly have plenty of choice. If you know of any other interesting places nearby let us know at the April meeting, and let us see who think they can come and can take passengers or want a ride. More particulars in the May issue.

---Tove Neville