PRINCE GEORGE'S COUNTY JUNIORS

The PGC Junior Division held their monthly meeting on March 14, 1965. We discussed the Constitutional changes, our Astro-camera, photometers and Middle-East Convention plans.

We would like to publish an open letter to the Trustees as follows:

Dear Sirs:

The Prince George's County Junior Division of the National Capital Astronomers, after due consideration, gives its full support to the proposed changes in the NCA Constitution and By-Laws and will in no way support any action taken by the remainder of the Junior Division in opposition to the proposed changes.

Signed,
Mike Pique
Secretary-Treasurer
PGC Juniors

MD-DC JUNIORS

Mr. Ellis Marshall told of his activities in satellite predicting and observing at the March Md-DC meeting. Discussing the all-decimal Gear Ratio system, he demonstrated a problem in placing a satellite within the half-degree field of his telescope. Also mentioned were the SATOR, NORAD 5-line, and ITC methods of satellite prediction.

The April 10 speaker will be Mr. Carroll Lidback of the Naval Observatory. His topic will be "Variable Stars." Mr. Lidback is an astronomer with the Time Service and has done some work in positional astronomy.

Norman Sperling
MD-DC Junior Editor

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WASHINGTON, D.C.
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April 1965 Vol. XXII No. 8

THE BUILDING MATERIAL OF THE PLANETS

Dr. Ernst Öpik

The NCA is especially proud to present one of its own members, the world famous Space Physicist and Astronomer, Dr. Ernst Öpik, as the lecturer for April.

Dr. Öpik needs little introduction as he is well known by most NCA members and has spoken to the group several times in the past. Dr. Öpik is the author of many many scientific papers and books, among these the popular book, The Oscillating Universe. He is editor of the Irish Astronomical Journal and at present divides his time between the University of Maryland and Armagh Observatory in Northern Ireland.

There are almost no traces left of the initial processes which led to the formation of the sun and the solar system; much freedom is here given to speculation. On the other hand, the solid bodies of the planets, much better than the solar gasball, have preserved imprints which help in deciphering the happenings of a later stage, when the sun was already there, surrounded by a flattened rotating disk of gas and dust which gave birth to the planets.

Jupiter, with the other outer planets, is an important clue. From its flattened shape, speed of rotation, mass and radius, its internal structure is pretty well known. It consists chiefly of hydrogen, compressed into solid state by the gravitation of the planet, at a "low" temperature of a few thousand degrees. The total mass is 318 times the terrestrial; a central core, about 5-6 times the earth's mass, of heavier elements, probably silicates and nickel-iron, must have formed first from the dust of the nebula, becoming thus a sufficient center of attraction to keep the lighter gases. The earth, with its smaller mass, could not achieve it and lost to space most of its original gaseous constituents.

Continued on page 2.

CALENDAR

April 3	THE BUILDING MATERIAL OF THE PLANETS by Dr. Öpik at the Department of Commerce Auditorium at 8:15 P.M. Business meeting follows.
9	VIRGINIA JUNIORS meeting at 7:30 P.M. at the Westover Baptist Church. Call John Geweke (KE 8-5148) for details.
10	MD-DC JUNIORS meeting at 2:00 P.M. in Silver Spring Library.
11	PRINCE GEORGE'S JRS. meet at Ted Noble's home at 2 P.M.
17	DISCUSSION GROUP. Topic to be announced. Dept.of Commerce, Room 2062 at 8:15 P.M.
23	VIRGINIA JUNIORS meeting at 7:30 P.M. at the Westover Baptist Church.
30	OBSERVING AT THE FIVE INCH on the grounds of the U.S. Naval Observatory with Larry White from 8:00 to 10:00 P.M.
6,13,20,27	TELESCOPE MAKING CLASS at the Chevy Chase Community Center with Hoy Walls from 7:30 to 10:00 P.M.
2,9,16,23,30	ADVANCED TELESCOPE MAKING CLASS at the Chevy Chase Community Center with Hoy Walls from 7:30 to 10:00 P.M.

Continued from page 1 - From spectral, photometric, thermal radiation and stellar occultation data it appears that the composition of Jupiter's atmosphere is different from its interior: its chief constituent is helium, hydrogen taking a modest second place. Uranus and Neptune show a similar peculiarity. In the universe, helium is ten times less abundant than hydrogen; being heavier than hydrogen, it is strange that helium is placed on top of the solid-hydrogen main body of Jupiter. The explanation is to be sought in the fact that helium is much more difficult to condense than hydrogen.

Dust in the flattened solar nebula prevented solar radiation from reaching the region of the planets where a temperature of 4 deg K(-452°F) must have prevailed. Hydrogen must have formed clouds of solid crystals, hydrogen snowflakes which were absorbed by Jupiter's nucleus, either directly, or, mixed with snow of other substances and silicate or iron dust, first gathered into little "snowballs", planetesimals or comet nuclei. These were partly absorbed by Jupiter, partly accelerated by near-miss encounters with Jupiter and ejected to the "sphere of comets", whence they sometimes return to our region, directed by stellar perturbations. The mechanism of acceleration, which helped to put the comet nuclei on "cold storage" at the outskirts of the solar system, could work efficiently only because of the eccentricity and precession of Jupiter's orbit, as caused by perturbations from other planets.

Comet nuclei, as well as meteors originating from them and meteorites which can only be of cometary origin (contrary to a widespread different opinion), are thus genuine samples of the primordial material of which the planets, including earth and moon, were built, some 4,500 million years ago.

CONSTITUTION AND BY LAWS CHANGES

A special meeting was held on March 20 to discuss the proposed changes in the NCA Constitution and By Laws. The changes will be voted on at the April meeting. Please come and express your opinion on these important matters.

APPLYING FOR NCA MEMBERSHIP

Persons applying for membership will be listed in Star Dust for the consideration of all members. If you have any comments about the applicant, please contact a Trustee or an Officer of NCA before the night of the regular meeting.

Junior Member Applicant

Edward Joseph Mescher
10101 Gardiner Avenue
Silver Spring, Maryland

* * *

NOTE NCA TREASURER'S NEW ADDRESS:

Please correct your directory to read:

3101 Chichester Lane
Fairfax, Virginia

Frederick Cornelius
Treasurer of NCA

MEMBERS WITH NEW ADDRESSES

Please send new addresses to Fred Cornelius immediately.

* * *

JUNE 25-26 MIDDLE-EAST REGION CONVENTION

Have you registered for the Convention to be held in Baltimore? Bring your dollar to the April meeting and see Bob Wright about registration. Let's have NCA high on the early registration list.

* * *

MAY MEETING TO BE HELD IN THE DEPARTMENTAL AUDITORIUM

MARCH LECTURE — HOW STARS ARE FORMED

Although our sun is possibly 8 billion years old, there are in the Milky Way thousands of stars formed not more than a million years ago. Our March speaker, Dr. Uco van Wijk of the University of Maryland, pointed out that super-luminous blue stars 10,000 times brighter than the sun and ten times more massive cannot shine longer than 30 million years without running out of fuel. Even brighter stars burn out sooner. When their hydrogen is exhausted, these stars blow up, expel mass, and then collapse into white dwarfs.

New stars form in the huge clouds of interstellar material mainly concentrated in our galaxy's spiral arms which are in fact half gas and dust and half stars. Star formation has practically stopped in the galactic nucleus which is 99% stars. Interstellar dust consists of microscopic particles separated from their nearest neighbors by about one meter. In spite of this extreme low density these clouds are opaque to starlight because of their great depth measured in light years.

The Orion nebula is a particularly active birthplace of stars. Here dark spots or globules are observed silhouetted against bright nebulae flourescing in the intense ultraviolet radiation emitted by newly-born superhot white giants. These globules probably are protostars not yet contracted enough to shine. Stars like our sun require about 10 million years to form whereas the brightest ones spend only 500,000 years contracting into stars. Gravity and outside light pressure favor this contraction, but angular momentum and magnetic fields impede the condensation of globules into stars. Rapid star generation carries the seeds of its own destruction, for the resulting hot bright stars tend to blow away the parent nebula by light pressure leaving the area clear of material for additional stars. Thus star production is usually a sporadic process. This accounts for the fact that there is still plenty of matter left in our galaxy for more star formation. Slow creation of relatively cool sun-like stars could go on almost indefinitely in a nebula.

Comets represent the remnants of the sun's creation. Indeed, perhaps the comets condensed first, and the sun resulted from collisions of millions of these bodies. Before the sun began to shine, the comets would have had a much higher percentage of hydrogen than they do today.

Stars not seen on 20-year old plates have appeared on recent photographs. By taking frequent photos of regions of active stellar creation, astronomers hope to confirm whether it is actually possible to see new stars form within a decade or two.

- Leith Holloway

* * *

JUNIOR BIOGRAPHY

John Geweke

John Geweke, Vice President of the NCA Junior Division, is also President of the Virginia Region of the NCA Juniors and editor of their new publication, Skylines, the sequel to Nova which he also edited. John is 16 and a junior at Yorkstown High School where he has been a member of the science club for two years. He is a member of the Virginia Junior Academy of Sciences. He has won numerous awards at local science fairs in the last three years, including an NCA award last year. His hobbies are playing the piano and swimming.