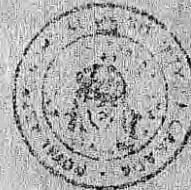


THE ROYAL ASTRONOMICAL SOCIETY OF CANADA



SASKATOON CENTRE

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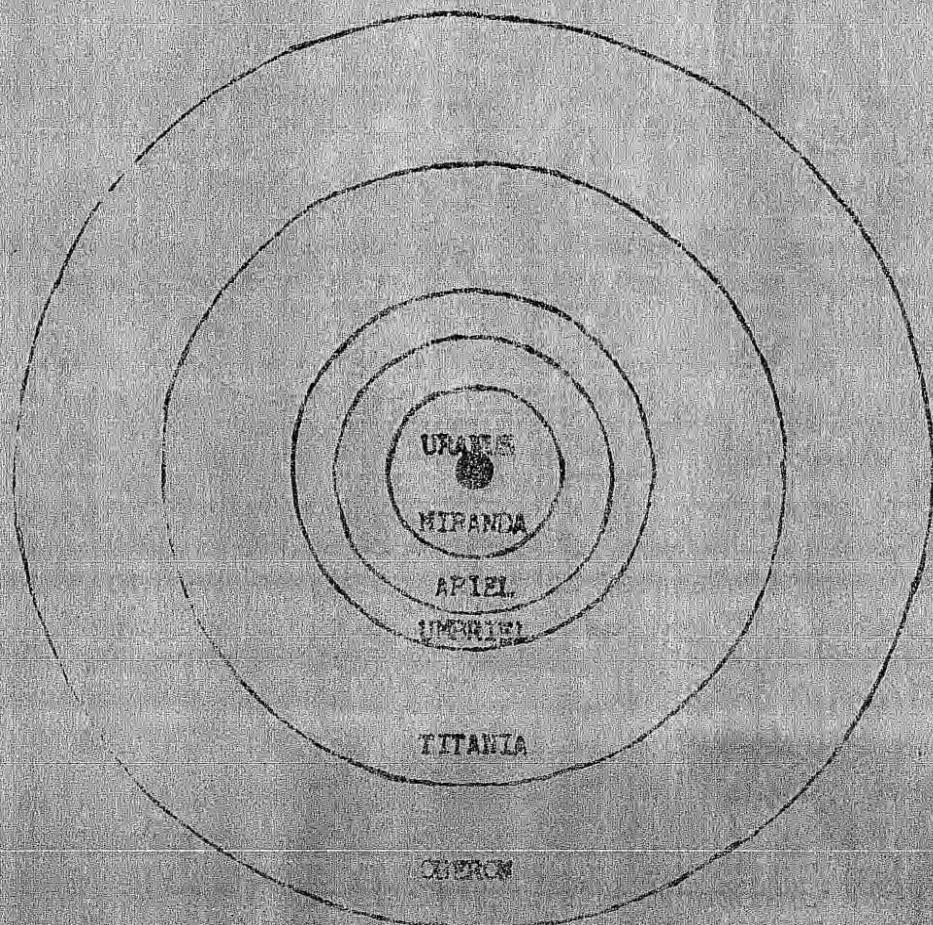
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NEWSLETTER



MEMO OF THE SATELLITES OF URANUS

ATTENDANCE AT THE UNIVERSITY OF SASKATCHEWAN OBSERVATORY

The small observatory on the campus of the University of Saskatchewan, Saskatoon, is operated by the Department of Physics. At least three times per week it is open to visitors, either for groups of school children with reservations made well in advance, or to the general public on a casual basis. At the moment the observatory assistants, Ron Waldron, Wendel Frenzel, and Halyne Kornuta, are all enthusiastic members of the Saskatoon Centre of The Royal Astronomical Society of Canada. Halyne is now the President of the Centre, Ron and Wendel are Past Presidents.

Most of the people who come to the observatory for the first time do so in order to view the planets and stars through the telescope in the dome. They may not be aware of the illustrated lectures and guided tours of the exhibits which are provided for visitors by the assistants. Numbers alone dictate that each individual be allotted not more than one minute of viewing time at the telescope for a particular sky object.

The attendance at the observatory in Saskatoon is influenced to a considerable extent by the weather and by the frequency of occurrence of special astronomical events. In 1970, the attendance was 1,965, and in the following year this figure more than doubled to 4,096 visitors who signed the guest book. Ron Waldron was optimistic that in 1972 a doubling of this figure could again be accomplished, with the added attraction of three eclipses instead of one, plus a planetary configuration. The attendance was barely one thousand short of Ron's goal, but it created a new problem for him: the size of the crowds made it very

difficult to handle visitors without lengthy waits for them. The final figure could in no way be attributed to lack of effort on his part or that of the other observatory assistants.

The University of Saskatchewan and the Saskatoon Centre have been most fortunate in receiving excellent publicity on the observatory open house programs through local press, radio and television stations. Even when nothing of special interest can be shown to visitors, the coverage of the Wednesday evening program by the news media increases the attendance to the point where the space and facilities become over-taxed. Hence, on the one hand, Ron has been concerned in the past when too few individuals visited the observatory, and he has faced a problem of a slightly different nature when too many suddenly appear. Is there a ready solution to both of his problems?

While recently enjoying a sabbatical year, I had an excellent opportunity to consider these matters in greater depth than would have been possible had I been in Saskatoon. My travels took me to Dumfries, Scotland, and to the Burgh Museum there which started as an observatory and museum in 1835. The present curator is A. E. Truckell, who was most helpful in placing at my disposal the archival material which I was seeking. A Camera Obscura, installed about the time this observatory was opened, is still in operation. An splendid early Gregorian telescope, with altitude and azimuth mounting, is stored in the basement and should be refurbished so that it could take its rightful place among the permanent museum displays.

A solution to Ron Waldron's problem with attendance at the University of Saskatchewan Observatory suddenly appeared during my searches at Dumfries, in the form of a 19th century handbook. Presumably, this

would have been posted in a prominent location in the square and possibly at other sites in the town as well. Several copies of this handbill were stored in the archives. While I was somewhat hesitant to ask for one of these, the curator was delighted that I should have an interest in bringing this item back to Saskatoon. It is reproduced here with sincere thanks to the generosity of Mr. Truckell.

On many occasions, it has been stated that a picture is worth a thousand words. My explanation has, of necessity, been kept well within this number. So you see Ron, whenever the attendance is not on the increase at the rate you think it should be, lengthening the hours during which the observatory is open to the public might possibly correct this situation. On the other hand, if the number of visitors at any time is larger than can be coped with by you and an assistant, lengthening the hours of opening of the observatory should spread this total over a longer period of time. Thus, extension of the observatory hours should, as a single remedy, alleviate both of your problems.

Needless to say, the hours of opening of the Dufferin and Maxwell-town Observatory, which must have served the visitors of the 1830's quite well, are offered for your guidance only. To me, those hours appear eminently satisfactory. Do you agree?

J. E. Kennedy
J. E. Kennedy.

November, 1974

THE
**Dumfries and Maxwelltown
OBSERVATORY**

IS OPEN,

FOR

VISITORS

AND

SHARE-HOLDERS.

FROM

SIX O'CLOCK IN THE MORNING

TILL

TEN O'CLOCK AT NIGHT,

EVERY LAWFUL DAY.

OVERDUE BOOKS

Astronomy Made Simple - Dennis Marquis
Amateur Telescope Making - Book 2 - Alvin Nagy
Splendor in the Sky - Alvin Nagy
Foundations of Astronomy - Adrian Arbus
The Universe Nature Library - Lorne Gaska
A Key to Worlds Beyond - Blair Petterson
2001: A Space Odyssey - Richard Shaver

* * "PHYSICS FOR FUN" FILM SHOW * *
* * *****

Three interesting films will be shown in Room 107, Physics Addition, U of S, on Wednesday, March 19 at 8:15 p.m. They are the following:

To Initiate the Sun (Thermal Nuclear Fusion)

Jump Jets

Spirits of the Polar Night

GENERAL MEETING

DATE: Tuesday, 18 March, 1975

TIME: 8:00 p.m.

PLACE: Room B111, Health Sciences Building
(across from observatory)

PROGRAM: Ron Waldron will be showing his slides of
"Recent Planetary Close - ups" covering
the Pioneer and Mariner orbits of Mercury,
Venus, and Jupiter.

all are welcome

THE NEW PLANETS

Blair Pettersen

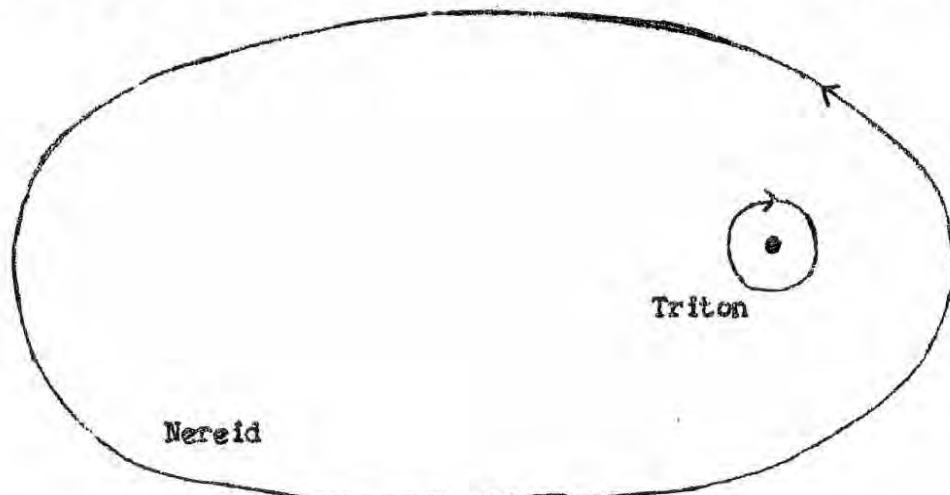
Before the advent of telescopic astronomy, six planets were known to exist; Mercury, Venus, Earth, Mars, Jupiter, and Saturn. In 1781, a British astronomer, William Herschel, discovered the seventh planet Uranus. Using a 7 inch reflector, he was checking dimmer stars in Gemini when; "I perceived one that appeared visibly larger than the rest...I suspected it to be a comet." Thinking this, he published his discovery as "An Account of a Comet." When the orbit was worked out mathematically, it surprised the world by being a planet at a distance of 1,782 million miles from the sun.

Herschel looked for satellites orbiting his planet, and at first he claimed six. Four turned out to be stars, and the other two, Titania and Oberon, are now officially recognized as moons. As of this writing, Uranus has five satellites, Oberon, Umbriel, Titania, Ariel, and Miranda. The last was discovered in 1948! (See diagram on cover page)

Next from the sun is the planet Neptune, first discovered through mathematical analysis of orbital perturbations of Uranus. Uranus' orbit had been worked out many times, but no matter how many calculations were made, the planet strayed from its predicted path. In 1834, an astronomer by the name of Rev. T.J. Hussey suggested that a yet undiscovered planet could be the cause of the "wandering" of Uranus. This attracted little attention until 1843 when John Adams, a brilliant Cambridge graduate decided to apply his mind to finding where the planet ought to be. He sent his findings to the then Astronomer-Royal, Sir George Airy.

Because of some misunderstanding, Airy took no action, and the discovery was delayed. Three years later, a French astronomer, Urbain Le Verrier, worked out the same problem with similar results. This announcement prodded Airy to rather hurried action. He asked two astronomers to check the spot indicated by Adams. One of them had a broken ankle, the other no suitable star maps of the area.

So it was Johann Galle and Heinrich d'Arrest, who, working with Le Verrier's calculations, discovered the eighth planet at the Berlin Observatory in August of 1846. This new planet was named Neptune. Neptune is larger than Uranus, is 2,793 million miles from the sun, and orbits it about every 165 years. The planet has two known satellites, Triton and Nereid. Triton is large enough to have an atmosphere and is the largest satellite of the two planets. Nereid was discovered by Kuiper only a year after he detected Miranda, a satellite of Uranus.



Orbits of the Satellites of Neptune

Pluto was discovered by the same method that Neptune was, by the perturbations of Uranus' orbit. Following in Adams' and Le Verrier's footsteps, Percival Lowell worked out where the new planet should be. After searching for several years, he died, Pluto still undiscovered.

Another astronomer, Milton Humason, took up the search. He photographed it twice without noticing it. The first time Pluto's image fell on a fault in the photographic plate, and the second was masked by a bright star nearby. This search was also given up. Finally, in 1929 the search was undertaken at Flagstaff, Arizona, headed by a young astronomer named Clyde Tombaugh. In 1930, "planet X" was at last found.

Pluto's orbit is the strangest one in the solar system. Inclined at an angle of 17° from the ecliptic, it sometimes ducks closer into the sun than does Neptune. Because of this inclination, there is no danger of colliding with Neptune. As far as is known, Pluto has no satellites. It is very difficult to estimate size, and for this reason, no Earth-Pluto comparison diagram is included. The best estimate for diameter is 3700 miles, now the official size.

Below are data on the planets, with the Earth and Moon left in for comparison.

VENUS EARTH MARS JUPITER SATURN URANUS NEPTUNE PLUTO

PLANETS	Distance*	Equatorial Diameter	Oblateness	Mass	Gravity	Density
Earth	149.5 million	12,756 kilometers	1/298%	1	1	5.52
Uranus	2869 million	47,000 kilometers	1/16 %	14.6	1.07	1.56
Neptune	4497 million	50,900 kilometers	1/50 %	17.3	1.08	1.54
Pluto	5900 million	5,500 kilometers ?	? ?	0.11	0.6 ?	5.0 ?

* mean distance from sun in kilometers.

@ water = 1.

SATELLITES

Name	Discovery	Distance*	Diameter [®]	Magnitude ⁺
Moon	---	384,500	3476	- 12.7
Miranda	Kuiper, 1948	128,000	550	+ 16.5
Ariel	Lassell, 1851	192,000	1150	+ 14.4
Umbriel	Lassell, 1851	267,000	970	+ 15.3
Titania	Herschel, 1787	438,000	1800	+ 14.0
Oberon	Herschel, 1787	587,000	1600	+ 14.2
Triton	Lassell, 1846	354,000	3800	+ 13.6
Nereid	Kuiper, 1949	5600,000	530	+ 18.7

* from planet in kilometers. + at mean opposition

® in kilometers