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AN ASTRONOMICAL ICE AGE THEORY

by Dave Greenwood

(Reprinted from Olympic Scope, v.5, no. 8, published by the Olympic Astronomical Society, Bremerton, WA)

The question of ice ages has always been a thorn in the geologist's side. However, there is an abundance of theories. Astronomer W.H. McCrea is largely responsible for the particular theory discussed in this article. Briefly, the theory is that ice ages are related to our solar system's movement through the spiral arms of our galaxy.

We are now in an ice age. Though the ice may not be a mile thick outside your door as it was 12,000 years ago, many scientists still consider us to be within a major ice age. Within each age are many advances and retreats of the glaciers. The previous major ice age was 250 million years ago in the Carboniferous Era. Before that, during Cambrian times 500 million years ago, the Earth was again visited by glacial ice. Earlier than this time, the evidence becomes confusing and obscure. It is important to note that since Cambrian times, we have been plunged into an ice age every 250 million years.
(cont. p. 4)

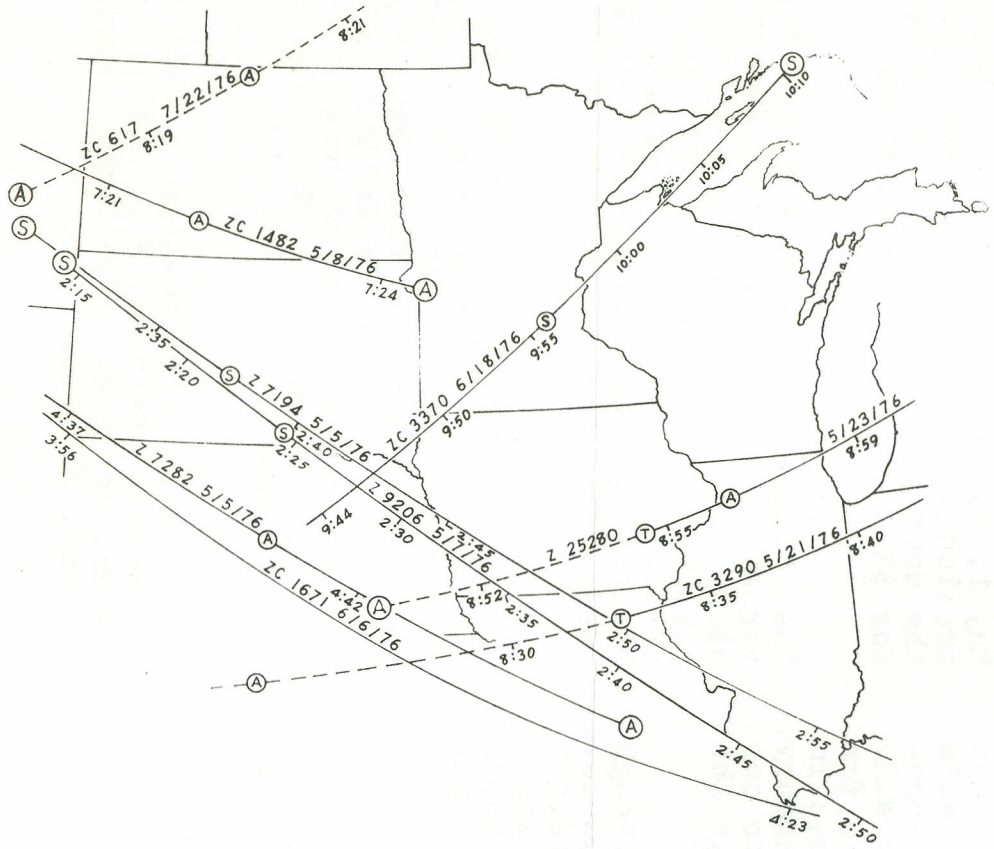
30TH REGIONAL MEETING

The Madison Astronomical Society, Inc., is host for the thirtieth North Central Regional Convention. The meeting will be held Saturday, May 1, at the Sheraton Inn. Registration is set at $2.00 ($2.50 at the door); a luncheon is available for $3.50; the banquet is $7.00.

The banquet speaker will be Dr. Verner Suomi, Professor of Meteorology and Director of the multidisciplinary Space Science and Engineering Center at the University of Wisconsin. Dr. Suomi will discuss the Venus probe.

Rooms are available at the Sheraton for attendees. The Madison society will have an open house at their own observatory on Fish Hatchery Road Friday night. On Saturday after the banquet, the University of Wisconsin's Washburn Observatory will be open.

For further information, contact convention chairman: Mrs. Arthur L. Koster, Route 2, 5794 Devoro Road, Madison, WI 53711.



REGIONAL GRAZE MAP

MAY THROUGH JULY 1976

Map scale precludes its use to set up expeditions. If interested in a particular graze, contact H. F. DaBoll, 6 N 106 White Oak Lane, St. Charles, Ill. 60174 (phone 312/584-1162) for possible information on an expedition already in your area, or order predictions ($1.50 per set; give star number, date, and approximate longitude of proposed observation) from Berton Stevens, 4032 N. Ashland Ave., Chicago, Ill. 60613. To receive predictions on a regular basis, as well as other advantages, including *Occultation Newsletter*, send your annual International Occultation Timing Association dues ($7.00) to Mr. Stevens. Please make all checks and money orders payable to *IOTA*. For those who have limit predictions, John D. Phelps, Jr., 8621 W. 167th Pl., Orland Park, Ill. 60462 now offers a service of predicting limit shifts (for stars with Z.C. or G.C. position sources) of grazes in or near the NCR, regardless of the planned size of the expedition. Include a stamped envelope with the request.

If an encircled A or S (moon or sun altitude, respectively) is shown within a limit, increasingly larger telescopes are needed from there to the same symbol ending the limit, while "IMBSW" (it might be seen with) refers to the better part, on the other side of the intra-limit symbol. Time ticks on the south side of a limit indicate a northern limit graze, and vice versa. A dashed limit indicates central graze at the bright limb; an encircled T means just at the cusp.

1976 DATE	STAR NUMBER	MAG	MOON	MOON ALT	SUN ALT	CUSP ANGLE	IMBSW	NOTES
5/5	Z 7194	8.4	28%+	41,26	-5,-22	7N,7N	6"	2,3
5/5	Z 7282	8.3	29%+	20,17	-23,-25	6N,6N	6"	4,5,6
5/7	Z 9206	7.6	49%+	52,44	-2,-21	8N,9N	5"	1,2,3,4,5,6
5/8	ZC 1482	6.3	62%+	10,4	-25,-26	2N,1N	3"	A
5/21	ZC 3290	7.3	45%-	19,22	-20,-17	0.2N,1.0N	4"	1,3,4,5,6,7
5/23	Z 25280	7.9	27%-	9,16	-19,-13	-0.6N,+0.6N	4"	3,8
6/6	ZC 1671	7.6	57%+	34,24	-12,-27	3N,1N	6"	1,4,5,6,9,10
6/18	ZC 3370	6.2	61%-	38,38	-10,+1	4N,4N	3"	B,11,12
7/22	ZC 617	6.6	22%-	6,9	-20,-18	-1.6N,-1.5N	3"	C,13

Universal times and dates are used. Moon altitude, sun altitude, and cusp angle, in degrees, are given for the western and eastern intersection of each limit with the boundary of the North Central Region, and for the end of any limit which falls within the Region. Cusp angle is the separation of central graze from the northern or southern cusp, with negative values indicating central graze on the bright limb. Under MOON, + means waxing, - means waning.

NOTES:

A. 14 Sextantis
B. 6 G. Piscium
C. 188 B. Tauri

1. This star's position source is either Z.C. (the Zodiacal Catalog) or G.C. (the General Catalog). Note, in columns 1 and 2, at left, the new service offered in connection with such stars.
2. Possible Clark (St. Louis, Missouri) expedition.
3. Possible Northeastern Illinois expedition.
4. Possible Wilds (Topeka, Kansas) expedition.
5. Possible Binzel (Atchison, Kansas) expedition.
6. Possible Sandy (Kansas City, Missouri) expedition.
7. Possible Benjamin (Central Illinois Occultation Timers)(Peoria, Illinois) expedition.
8. Possible Olsen (Cedar Rapids, Iowa) expedition.
9. Possible Senne (Rolla, Missouri) expedition.
10. Point of exit from the North Central Region is taken as the closest point of approach to Illinois.
11. Possible Fox (Twin Cities of Minnesota) expedition.
12. Exit point from the North Central Region is taken as Isle Royale, Michigan.
13. Possible Bochonko (Winnipeg, Manitoba) expedition.

VIGNETTES

Johann Gottfried Galle 1812-1910

by H.U. Brueckner

Galle was born on the 9th of June in Pabsthaus, near Gräfenhainichen, Germany, where his father was manager of a tar distillery. Galle attended school at Radis and then, in 1825, he went to Wittenberg. Five years later he left Wittenberg and went to study in Berlin. Here he studied under several celebrated instructors including Enke, who is probably best remembered today by the comet that bears his name. In 1833, Galle was certified to teach physics and mathematics at the high school level. Galle never lost contact with Enke during that time.

When Enke was appointed Director of the Berlin Observatory he made many changes. He had it modernized and in 1835 called Galle to work there as an assistant. Galle's duties called for his skill as a mathematician as well as becoming acquainted with observing. He had patience and good vision. The same year that he came to work under Enke at the Berlin Observatory, he discovered the crepe ring of Saturn but he did not publish his discovery. He turned his attention to comets and discovered three of them. He received high acclaim and royal recognition for this feat.

With the government's financial support he now continued his education and finally received his doctorate in March of 1845. His doctorial thesis concerned a mathematical analysis of some of Roemer's recorded observations. It occurred to Galle that his thesis might be of interest to LeVerrier, a fellow mathematician, so he sent him a copy. When LeVerrier finally replied with his comments on the thesis he also mentioned his work on the perturbations of Uranus. He gave Galle the position of a hypothetical planet which his computations indicated would account for these irregularities. LeVerrier believed the superior instruments at the Berlin Observatory were better suited for the search than his telescopes at the Paris Observatory and he asked Galle to look for the suspected trans-Uranian planet. The evening of the same day that he received LeVerrier's letter, September 23, 1846, Galle took to the telescope and found an 8th magnitude "star" that was conspicuous by its absence from the observatory's star charts. He located the object only 52 minutes from the position predicted by LeVerrier. Galle finally published his discovery in the Astronomische Nachrichten, vol.89, 1877, pages 349 - 352.

Independently of LeVerrier's computations, John Adams, of England, also investigated the perturbations of Uranus. He was only 26 years old when, in October of 1845, he arrived at a solution to this problem. He could not get to see the Astronomer Royal, Sir George Airy, who was too busy. He finally left a copy of his work at the Royal Observatory. However, Airy did not begin to search for the predicted planet until its discovery had been announced.

Galle stayed at the Berlin Observatory for sixteen years. He studied double stars and computed orbits of comets and asteroids. In June of 1851 when Boguslavsky, the director of the Breslau Observatory, died, the position was offered to Galle, who accepted. He was honored with a full professorship and became the Director of the obsolete Observatory of the University of Breslau which was located in the middle of the city.

(cont. p. 4)

GALLE (cont.)

In 1857 Galle married the daughter of Professor Regenbrecht. They had two sons, one of whom, Andreas, became an astronomer who worked at the Potsdam Observatory.

Galle continued to observe comets and meteors. In 1872 he established the relationship between meteor showers and comet debris. Galle was a modest man. He was showered with honors throughout his long life. He remained in good physical and mental condition to the very end. He died in retirement at Potsdam at the age of 98.

(Ed. note: this is the last of four Vignettes dealing with the principals of the discovery of Neptune.)

NATIONAL CONVENTION

Nearly 200 registrations have already been received for the 1976 Astronomical League Convention. The meeting will be held August 19 thru 22 at Kutztown State College, Kutztown, Pennsylvania. Advance registration is $4. per person; $5. for families. Room and board for the three days of the convention is $45 while an additional $5. provides room for the entire week for those who wish to partake of pre-convention sight-seeing. Registration, paper entry, photography contest and telescope competition forms may be obtained from George Maurer, Convention Treasurer, RD 3 - Box 140, Coopersburg, PA 18036.

MAY 21 IS DEADLINE FOR

JUNE ISSUE

PUBLICITY PACKAGE

A packet of materials designed to help local astronomy clubs and planetaria publicize astronomical events is available from the Astronomical League's Middle East Region. The 1976 News Service Packet, expanded from last year, contains 11 pattern news releases, a suggested year-long publicity calendar, astronomy fact fillers for newspapers and publications and helpful ideas to increase the flow of accurate, timely astronomy information to the public. Send a self-addressed mailing label and $1.00 to: R. Young, c/o MERAL News Service, 329 S. Front St., Harrisburg, PA 17104.

ICE AGE THEORY (cont.)

The Sun revolves around the galaxy every 500 million years. It crosses oppositely placed spiral arms of the galaxy every 250 million years. Recent astronomical research shows that the spiral arms may be stable and are the result of a pattern of shock waves that eminate throughout the galaxy. Dust lanes would be very prominent within the spiral arms. When our Sun enters into the spiral arms every 250 million years, it also encounters the dust clouds. The result of dust falling into the Sun is an increase in solar energy. This rise in solar radiation increases evaporation at the equator, leading to a greater abundance of snow farther north. This is the mechanism thought to trigger a glacial advance. Advances and retreats of the glaciers within one major ice age would be caused by variations in the density of the dust clouds within the spiral. Thus, you could say we are now in a rather dust-free area of the spiral. However, the situation can quickly change and meteorological studies indicate it is possible to have a permanent snow cover in Seattle within 100 years.