NOMOS INTERSCIENCE PUBLIC REPORTS

(mayrheliophysics file 8 = mayrcosmictimetable file 6)

File # 8

F.C.MAYR

GALACTIC ORBITS OF THE SUN

? --- ? Well, I forgot to die in time, and now it's too late.

Time and Age in Geology

Geologists reckon in millions of years.

Fortunately enough, some of our terrestrial rocks have built-in radioactive time-keepers and can be dated (1). The method is not very precise, but applicable even to ages beyond three billion years. Ages of less than 600 million years are subject to paleontological arguments.

The best markers for an absolute time-scale are the deposits of true continental glaciations. The formation of a continental ice-sheet implies very cold conditions at its centre, with the underlying rocks being shattered by frost but not eroded. This inner zone is surrounded by a belt of glacial erosion, and by a second belt with glacial, fluvioglacial and glaciolacustrine deposits on land, and glaciomarine deposits at sea.

There are, however, many misnomers, mostly because of ice-rafted boulders which can be found far away from any real centre of glaciation. For the Upper Carboniferous, the remains of Glossopteris are compelling evidence of a glaciated former continent 'Gondwana' (2), but between 2.4 and 0.3 billion years we have to rely on physical evidence which only a very competent quaternary geologist could interpret correctly.

According to our present knowledge there were just 5 periods of widespread (continental) glaciation; the oldest one - represented by the Gowganda Formation in Canada - occurred 2.4 billion years ago (3).

Speed and Distance in Astronomy

When Sir Isaac Newton introduced the general principle of gravitation only the distance to the moon was fairly well known; the finite speed of light had just been discovered (4).

Since then, every major discovery in Physics became the source of remarkable advances in Astronomy. Galactic Astronomy is now an impressive array of ingenious methods (5) to figure out what has been going on for billions of years.

Speed and distance within our galaxy and beyond appear to be fairly well known. The key are pulsating stars of a particular type (Cepheids) which can even be identified in nearby galaxies. Within our own galaxy W.Baade (5,p.480) used stars of the type RR Lyrae to determine the distance to the galactic centre (8.2 pc = 26,732 lightyears). The Sun is known to drift towards the galactic centre at a speed of about 7.2 km/sec, but its orbital speed must be inferred from statistical studies on slower and faster stars in its neighbourhood: more than 200 and less than 250 km/sec is about all we can say. Recently, (Scientific American,April 2020) the distance to the galactic centre was reported to be 26,600 light-years (± 990 ly) and we were told that galactic matter is streaming past the Sun at a speed of 236 km/sec). The galactic orbit of the Sun was said to be a circle. No reference to Baade (1953)

A New Approach

The new approach makes geological knowledge available to galactic astronomy.

The prerequisites - paleobotany on a continental scale (6) and a new survey of the Würm type area in the Alps (7) - were published in 1968. The geological survey was followed by the study of 10,500 years of paleomagnetic and paleoclimatic variations before, during and after the last paleomagnetic event on Earth. The investigated profile was 56 m high, and the 112 paleomagnetic samples required more than 12,000 measurements (at the GSC in Ottawa) to determine the true secular variations of the magnetic field. The site is probably the most important deposit of micrometeorites on Earth (8).

Since the counting error was less than 20 years in 5000 years, the study became the starting point for the discovery of laws which could not have been detected otherwise. The first equation was published in 1979 (9). It described harmonic relationships between the Gleissberg cycle of solar magnetic activity (80 yrs), the observed periods of equal spin (280 yrs) and the observed periods of equal trend (112 yrs) of the magnetic field. The three periods are part of a Fibonacci series which can be written as follows

$$5040 \text{ yrs} = 280\times\mathbf{18} = 112\times\mathbf{45} = 80\times\mathbf{63} \qquad \mathbf{(1)}$$

The next step was the definition of 22 solitons of galactic origin which had a common link: the constant K which was derived from the fine structure constant of matter. The inferred phase differences were precise enough to publish a forcing function for climate on Earth for the last 10,000 years (10).

Continued cross-checking with magnetic records since 1840 determined the drift of the Sun towards the galactic centre (7,295 m/sec). The inferred orbit of the Sun on a logarithmic spiral was 27,028.0833 magnetic light-years away from the galactic centre. (The magnetic light-year is 767.9 seconds shorter than the sidereal year) (11).

The third parameter, the tangential speed of the Sun in its galactic orbit, was computed when it became clear that the general equation for K was

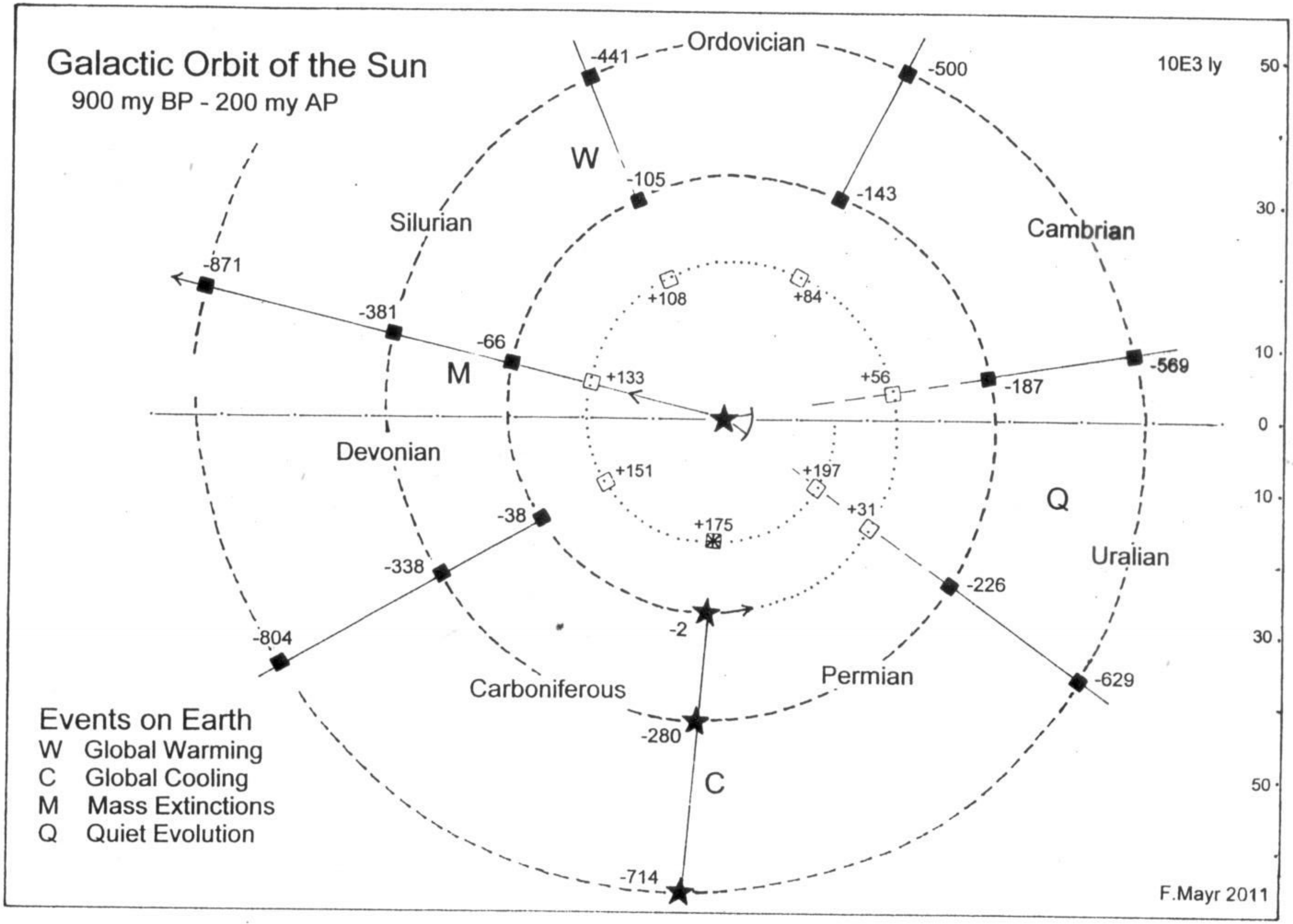
$$K^{3} = \frac{h\,c^{-1}}{2\pi e^{2}} \cdot 10^{7} \cdot \frac{\tan\delta}{\pi} \qquad \mathbf{(2)}$$

The deviation δ from a circular orbit is $1.8°$, $\tan\delta = \pi/100$, and the numerical value of K = 1.110737787. If δ diminishes to 1.3133 degrees, $\tan\delta = \pi/137.036$ and K = 1.00. At this point, the model (12, fig.19) is reduced to five solitons.

Applying equation **(2)** yields a tangential speed of the Sun of 232,207 m/sec.

Computed Galactic Orbits of the Sun

The figure on the next page is a right equiangular approximation in 80 steps per orbit. The ages were rounded off to millions of years. The point of reference is the present direction to the galactic centre. The generally accepted boundaries between geological periods lie on straight lines pointing to the galactic centre.



Galactic Orbit of the Sun
900 my BP - 200 my AP
10E3 ly
50
30
10
0
10
30
50
Ordovician
Silurian
Cambrian
Devonian
Carboniferous
Permian
Uralian
W
M
Q
C
-441
-500
-105
-143
-871
-381
-66
+133
+108
+84
+56
-187
-569
+151
+197
+31
+175
-38
-338
-804
-226
-629
-2
-280
-714
Events on Earth
W Global Warming
C Global Cooling
M Mass Extinctions
Q Quiet Evolution
F.Mayr 2011

This is astonishing, because the parameters of the spiral remained the same irrespective of the distance to the galactic centre.

The graph speaks for itself. It mentions the four salient features of the geological record: global warming, global cooling, mass extinctions and periods of quiet evolution. It introduces the name 'Uralian' for the geological period between the beginning of the 'Cambrian' in Russia and the onset of the 'Cambrian' in North America; and it suggests a subdivision of the 'Tertiary' at the beginning of the 'Oligocene' (38 my BP).

The tabulated geological calendar of the last 2.4 billion years was added for the convenience of the reader. The unnamed geological period in which we are living (file # 3, p.4) began 2.2 my ago with the abrupt end of the Pliocene and its glaciations (13).

Galactic Time-Table for Important Events on Earth

Event	Predicted Ages within post-archean Orbit number 1	2	3	4	5
I (C)	-2445	-1390	-714	-280	-2 my BP
II	-2240	-1259	-629	-226	+31
III	-2092	-1164	-569	-187	+56
IV	-1925	-1057	-500	-143	+84
V (W)	-1782	-965	-441	-105	+108
VI (M)	-1635	-871	-381	-66	+133
VII	-1531	-804	-338	-38	+151 my AP

Implications in Cosmology

A geometrical proof is a proof and cannot be disputed.

Gravitation and normal magnetic fields fall off with the square of the distance. If these were the leading forces in our galaxy, the boundaries between geological periods could not lie on straight lines pointing to its centre.

We have to admit the existence of another force. Let us call it **magnetation**. Its carrier are magnetic solitons emitted by a celestial body at the centre of a galaxy. The energy of these solitons appears to remain constant irrespective of the distance to their source.

Magnetation and magnetic solitons could, for instance, explain why our galaxy is moving at a speed of 300 km/sec towards the Virgo cluster of galaxies. Since the cluster is 50 million light-years away it will take 50 billion years to reach the point of destination (14).

How could that be if the Universe is only 15 billion years old ?

REFERENCES

(1) HOLMES, A. (1965) Principles of Physical Geology, 2nd edition, 354-385.

(2) NEUMAYR, M. (1895) Erdgeschichte. 2.Auflage, 2.Band, 157-162

(3) GEOLOGY OF CANADA (1970), GSC Economic Geology Report 1, 49-51, 112-114

(4) ENCYCLOPEDIA BRITANNICA (1966), vol.16, 417-420; vol.19, 439-440

(5) MIHALAS,D. and BINNEY,J. (1981) Galactic Astronomy, 2nd edition, 597 p.

(6) FRENZEL, B. (1968) Grundzüge der pleistozänen Vegetationsgeschichte Nord-Eurasiens, Erdwissenschaftliche Forschung (ed. C. Troll) Bd.1, 326 p.

(7) MAYR, F. (1968) Über den Beginn der Würmeiszeit im Inntal bei Innsbruck. Zeitschr. f. Geomorphologie, N.F. 12, 256-295

(8) MAYR, F.C.(1977) A Paleomagnetic Survey in the Austrian Alps. Reprint Edition, Nomos Interscience Public Report P89-02

(9) MAYR, F.C. (1979) True and False Variations of the Magnetic Field. Acta Geol. Acad. Scient. Hungaricae 22, 171-183

(10) MAYR, F.C. (1982) Magnetic Control of Climate. Proceedings IGCP Project 73/01/24 8th session (Kyoto), reprint edition Prague, Geol. Survey (1984), 152-171

(11) NOMOS INTERSCIENCE , Annual Report for the Year 1986, p.7

(12) NOMOS INTERSCIENCE (1985) Calendrier des Savants 1986-88, 42 graphs + text

(13) MERCER, J.H. (1976) Glacial History of Southernmost South America. Quaternary Research 6, 125-166

(14) DRESSLER, A. (1987) The Large Scale Streaming of Galaxies. Scientific American 257/3, 46-54

End of File # 8