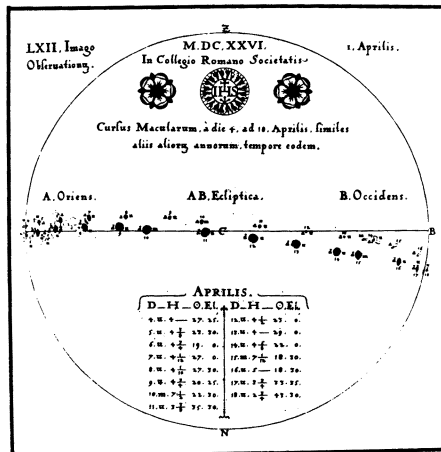


As the sun turns: A continuing story

The rotation of the earth is so regular that people set their clocks by it. Although it is gradually slowing down, it fluctuates very little. People would be ill-advised to set their watches, or rather their calendars, by the sun's 25-day rotation. In the first place, the sun exhibits differential rotation; regions at different latitudes go around at different periods with the equatorial regions coming around appreciably faster than the polar regions. Furthermore, the basic rates seem to change from time to time.

The changes appear to be related to the amount of sunspot activity. The equatorial rotation rate seems to be appreciably faster at times in the 11-year sunspot cycle when the amount of spot activity is small. Such a result is physically explicable by supposing that the solar rotation forms a magnetic dynamo that generates a complicated magnetic field of which the sunspots are the surface manifestation. The correlation between sunspot numbers and rotation rates seems to go centuries back in solar history according to a recent study by John A. Eddy, Peter A. Gilman and Dorothy E. Trotter of the High Altitude Observatory of the National Center for Atmospheric Research in Boulder, Colo., which was published in the Nov. 25

SCIENCE. The question of how well the correlation stands up historically is an important one because the record of sunspot activity is far from regular. The 11-year cycle that appears to be the current norm was not always apparent. There was a long period in the 17th century (1645-1715), the so-called Maunder Minimum, when sunspots were generally lacking. An earlier study of solar rotation by Eddy, Gilman and Trotter indicates that the rotation was appreciably faster during the Maunder Minimum.



Scheiner's sunspot data: April 4 to 18, 1626.

The equatorial regions went around in a day less time than at present.

In their latest study Eddy, Gilman and Trotter go back beyond the Maunder Minimum to a period 20 years before it began (1625 through 1626), when there was sunspot activity similar to that at present, and to the time just at the beginning of the Minimum (1642 through 1644). To determine the rotation rate, they used records of sunspot motions compiled by Christopher Scheiner and published in his *Rosa Ursina*. The researchers present a long discussion of the possibilities of error in Scheiner's instruments and of error contributed by "proper" motion of the sunspots on the surface of the sun to justify their use of Scheiner's data. From the data, they deduce that the rotation in 1625 and 1626 was like that of today. At the beginning of the Maunder Minimum, it had speeded up by 3 to 5 percent, and the difference between the rates of equator and pole was three times what it had been earlier. □

instructor in psychiatry and human behavior at the Thomas Jefferson Medical College in Philadelphia.

In further comparing the mothers of autistic and non-autistic children during pregnancy, the researcher found that:

- More than twice as many "autistic" mothers as controls were diagnosed as having a psychiatric problem.

- Several of the control mothers who separated from their husbands during pregnancy suffered no apparent emotional conflict. But all six of the autistic group who separated were emotionally affected.

- Rather than discord, the problems of control mothers centered more on "reality" situations, such as illness in another child, a husband's loss of job, death of a close relative or a drug habit. And whereas most of the autistic mothers felt "powerless" to overcome their difficulties during pregnancy, the control women often took positive steps to deal with their problems.

- While 5 of the 10 unmarried control mothers were planning to get married, none of the unwed nine in the autistic group were planning marriage.

- Eight of the control mothers requested birth control information in response to their pregnancy, but none of the autism mothers reported such an interest.

Ward says his study is of particular significance because it is among the first to employ a control group. The findings, he adds, "appear to be supportive" of his hypothesized link between "prenatal maternal anxiety and ... offspring with higher levels of anxiety, slower rate of development and a higher rate of emotional disturbance."

That connection, he further suggests, is "mediated by neuroendocrinal changes" that may affect the composition of the maternal blood that is transmitted to the fetus. Blood composition may be crucial to the formation of the neural, endocrinal and other structures of the fetus, Ward says.

If the causes of autism are indeed neurochemical, as Ward and others believe, then the mother's prenatal disposition would have a much greater impact on the development of the disorder than would her postnatal behavior. "In many cases, the mothers [of autistic youngsters] continued to have problems after the birth of the child," Ward said in an interview. "But many children are born into families where the parents are not too well put together, and they [the children] are able to handle it well. But it is the mother's problems before birth that can result in a more vulnerable child ... one with neurological or developmental handicaps — a child who never really starts to grow."

Ward suggests that future research concentrate on identifying "chronic, prenatal anxiety" in a sample of the general population before the child's birth and on following the conditions of infants of such mothers. Such studies, he hopes, may lead to "true ... prevention programs." □

Mother-to-be's anxiety linked to autism

In the constellation of mental illnesses, childhood autism is among the most mysterious. Although its first signs—rejection of close contact with the mother—appear in early infancy, the disorder is usually not detected until the child is two and one-half or 3 years old. By then, the youngsters are enveloped in a trance-like state in which they isolate themselves from people and concentrate almost completely on inanimate objects, such as a stick, a flower or a wall.

The causes of autism, which affects about 1 in every 10,000 children born in the United States, essentially remain an enigma. But researchers are finding some possible clues. Some of the latest findings indicate that mothers-to-be of autistic youngsters may possibly be prone to certain types of emotional problems during pregnancy.

An unusually high percentage of mothers of autistic children are subject to "family discord" while they are pregnant, Alan J. Ward, director of the Henry Horner Children's Center in Chicago, reported recently in Washington at the annual meeting of the American Association of Psychiatric Services for Children. Such discord includes "interference in family functioning by a previous husband"; "feeling 'insane';" or having "frequent arguments."

In a study of 59 mothers of autistic youngsters (whose average age was about 7 years when brought to the hospital for treatment), Ward found that 32 percent of the women experienced that definition of marital discord. However, only 3 percent of a demographically-matched control group of 59 mothers of "normal" youngsters had a history of such discord while pregnant, reports Ward, who is also an