A North American Stonehenge

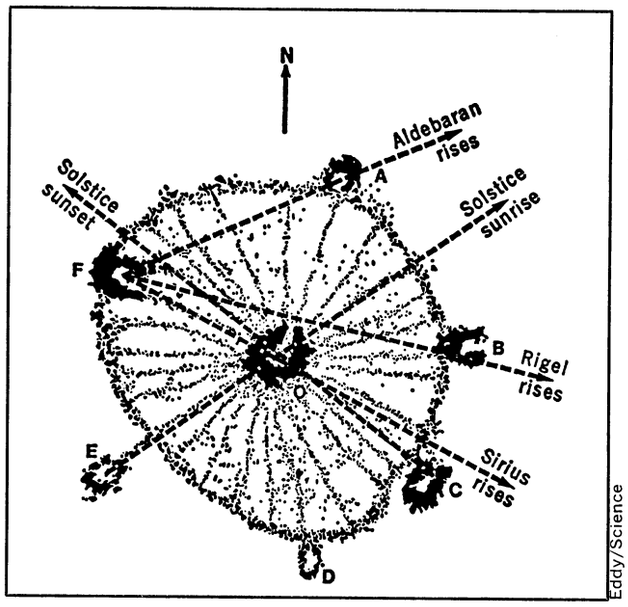
Stonehenge, the Egyptian pyramids and the Mayan temples were more than monuments. Like giant calendars, they marked for their builders and users the first day of summer. When the precise astronomical alignments of these monuments were first noted, some researchers were skeptical. They doubted that ancient peoples, especially those who built Stonehenge, had the atronomical sophistication necessary to design and use such devices. Increasingly, however, the evidence suggests that they did. It now appears that even the nomadic Plains Indians of North America had their own Stonehenge—the Big Horn Medicine Wheel.

The Medicine Wheel is a pattern of stones laid out on the ground just above the timberline in the Big Horn Mountains of northern Wyoming. The pattern is that of an imperfect circle with a diameter of about 25 meters. In the center of the circle is a cairn or pile of stones about four meters in diameter. From this hub 28 spokes or lines of stones radiate and connect with the outer wheel. Six smaller circular cairns are unevenly situated around the rim. Considering that the Plains Indians built almost no stone monuments, this is a very elaborate structure.

Tree-ring analysis of a piece of wood found in one of the cairns dates the wheel at about 1760. Construction of the wheel is attributed to the Plains Indians, possibly the Crow, Sioux, Arapahoe, Shoshone or Cheyenne, all of whom lived in the area and for whom the Big Horn Mountains had a special significance. The wheel was first investigated by whites in the late 19th century but its purpose has remained a mystery. Now, astronomer John A. Eddy of the High Altitude Observatory in Boulder, Colo., suggests that the Big Horn wheel may have been a primitive astronomical observatory.

Eddy has studied the alignments of the wheel and its cairns and has made observations at the Big Horn site during the past two summers. He explains in the June 7 SCIENCE that the high altitude (9,640 feet) and the clear horizons of the site make possible the viewing of sunrise and sunset at the summer solstice. The view from one cairn, for instance, across the center cairn marks the point on the horizon where the sun will rise on the first day of summer (an important piece of information to a nomadic people whose livelihood depended on a knowledge of the seasons).

The 28 spokes, suggests Eddy, could have been used as day counters for lunar intervals. The remaining cairns, he says, may have been used to mark the rising points of various bright stars at the time of solstice. Such observations would have served to double check and increase the precision of the sunrise method.



Eddy/Science

The Big Horn Medicine Wheel appears to be laid out along astronomical lines for observation of the summer solstice.

Eddy's explanation works, but it raises some questions. How useful, for instance, is such an inhospitable wind- and snowswept site for observing sunrises? At solstice in 1972, one morning out of three was clear at sunrise. In 1973, three mornings out of four were clear. So this site, says Eddy, is probably as good as Stonehenge.

The other problem has to do with the authenticity of the site. One writer has suggested that the entire structure was redesigned and relaid by U.S. Forest Rangers, using different stones, between 1931 and 1955. But Eddy considers this suggestion unsubstantiated. He admits that the structure could have been altered by visitors because it was not protected until 50 years ago. But comparisons of the present-day site with old photographs show that the general appearance of the Big Horn wheel has not changed since 1905. □

The thymus and sexual development

Since 1961, the thymus has been found to play a major role in the body's immune system. This mass of lymphoid tissue in the upper chest processes bone marrow cells into T cells, which attack chemical compounds that threaten the body. It is becoming apparent that hormones in the thymus help the thymus make T cells (SN: 1/26/74, p. 52). Now evidence is reported in the May 24 NATURE suggesting that the thymus is also involved in sexual maturation.

H. O. Besedovsky and E. Sorkin of the Swiss Research Institute in Davos, Switzerland, surgically removed the thymus from female mice when they were two or ten days old. Both groups of mice and control mice were subsequently examined for vaginal opening and the development of ovaries and uterus. The animals thymectomized on day two showed a marked delay in vaginal opening, and their ovaries and uterus were very small until the opening occurred. But the animals that had their thymus removed on day 10 did not show a delay in vaginal opening or in ovary and uterus development.

Besedovsky and Sorkin then studied female mice born without thymuses and found that they too showed a delay in vaginal opening and in ovary and uterus development. But if they were given a thymus transplant when two days old, they experienced normal sexual maturation.

So the data suggest that the absence of the thymus in the early stages of life, as in the mice thymectomized on day two and in congenitally athymic mice, causes a significant delay in vaginal opening time and in the maturation of the ovaries and uterus. How might the thymus control sexual maturation? Besedovsky and Sorkin offer this hypothesis: "The onset of puberty is a neuroendocrine phenomenon; for this reason one can conceive of the thymus exerting its influence by the elaboration of hormones that could either act directly on the central nervous system or indirectly through endocrine glands. These hormonal influences of the thymus may be greatest during the perinatal period, when this organ is known to be more crucial than in later life." □