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ANTHROPOLOGY

TIME, SPACE, AND CLIMATE IN THE MIDDLE MISSOURI

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ABSTRACT

It has been postulated that some cultural movements or conditions may be correlated with climatic episodes. One area where such correlations can be attempted lies in the Dakotas along the Missouri River mainstem where there is an apparent correspondence between dates of certain widespread climatic events and sequential episodes of native cultural history. During the period ranging from A.D. 700-1200 and from A.D. 1300 on into the nineteenth century significant changes of a climatic nature may have affected Indian societies.

The correlation of some climatic episodes or conditions with cultural movements is being attempted in an area of the Dakotas along the Missouri River mainstream.

The close correspondence between the dates of certain widespread climatic events defined by Reid A. Bryson and a sequence of episodes in the history of the native cultures of the Missouri Valley in the Dakotas (Fig. 1) suggest a close correlation between climatic and cultural changes (Lehmer, 1969).

The correspondence between a sequence of native cultures in the Missouri Valley and certain climatic episodes may have begun as early as A.D. 900 with the climatic episode known as the Neo-Atlantic. This period is characterized as one of warm moist conditions due to influxes of moist tropical air. It was a period which produced favorable conditions for maize horticulture and correlates with the first appearance of horticultural villages in South Dakota (Caldwell, 1968, p. 108-109; Lehmer, 1968, p. 12). Griffin (1967) mentions that agricultural societies in the Missouri and Upper Mississippi Valleys and in the Great Lakes northeastern United States had their primary growth and development during the A.D. 700-1200 period. During this time open water appeared in the Canadian Arctic, summer rains extended further into the southwest, the raising of maize would have been possible in the plains area (Bryson and Julian, 1963). Approximately A.D. 1200 the increasing flow of the westerlies (Bryson and Baerreis, 1968, p. 29) terminated the Neo-Atlantic and initiated the period designated the Pacific I. From A.D. 1200 to about A.D. 1450 the westerlies continued to increase; temperatures were lowered; and there was a decrease in precipitation. Between A.D. 1300 and continuing up into the 1800's, there were significant climatic changes which influenced Indian societies (Griffin, 1967, p. 171). The Pacific I (Baerreis and Bryson, 1965) correlates with the noticeable reduction of the extent of area occupied by the Missouri Valley cultures. Pacific II times, A.D. 1450-1550, (Baerreis and Bryson, 1965) became somewhat warmer with an increase in rainfall and here one sees an increase in

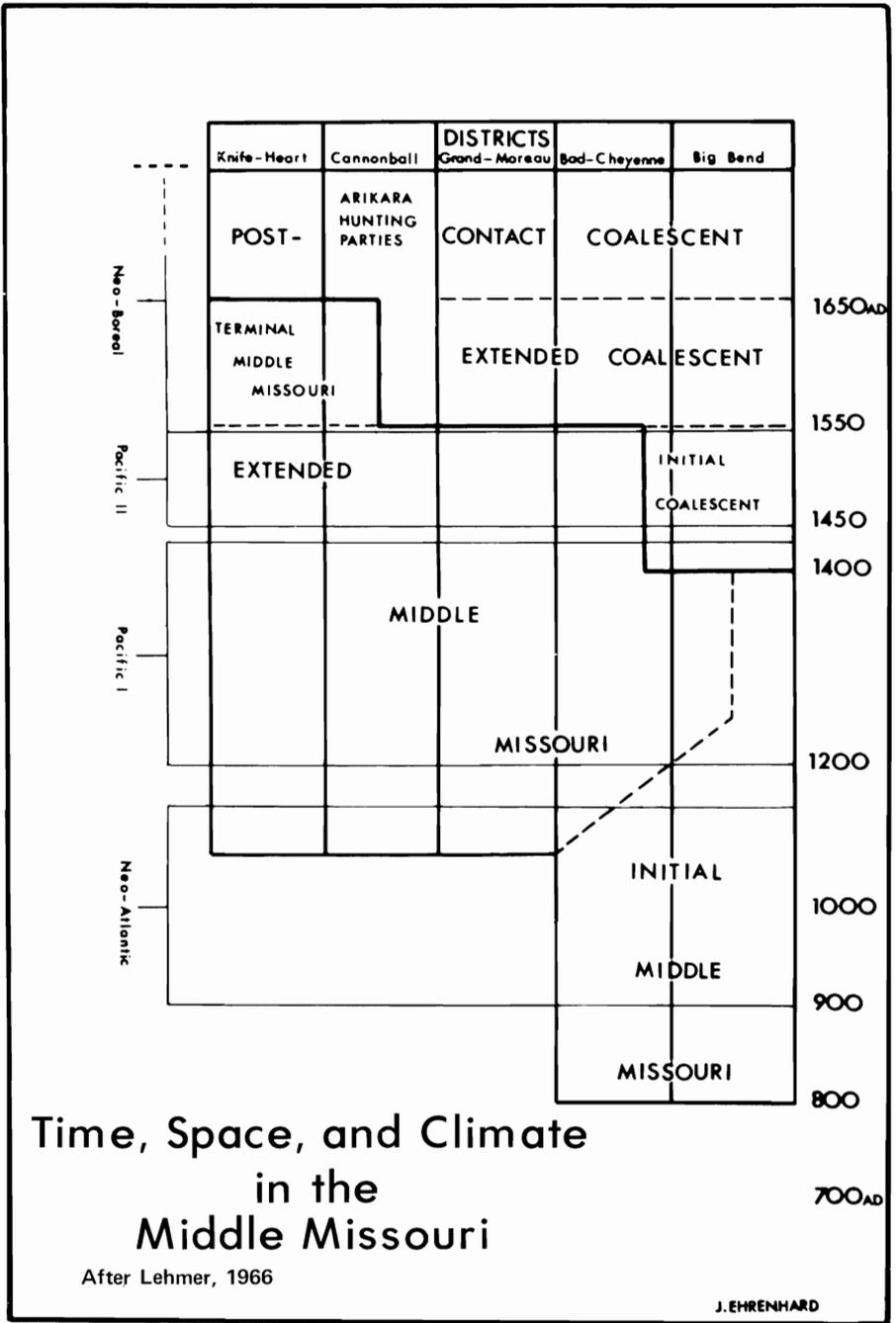


FIGURE 1

ANTHROPOLOGY

the number and geographic distribution of village sites along the river. A cool moist climate, the Neo-Boreal, commenced around A.D. 1550 and village communities of the middle 1500's suggest a marginal economy. The climate becomes somewhat more moderate in the 1700's. Another indication of this moderation is that the native cultures appear to expand and become more substantial during this time.

When working with climatic and cultural relationships, one can deal only with those factors which may be assessed in so far as it is possible through a study of the existing environmental and archaeological data. In the case of the Middle Missouri, an area situated near the paths of large numbers of cyclones and anticyclones with extremes of summer heat and winter cold (Laskowski, 1941, p. 1117), the influences of weather and climate appear to be reflected in terms of maize horticulture, hunting resources, and timber supply. It should be emphasized that although the Middle Missouri is known as being primarily horticultural in nature the evidence suggests a mixed economy depending upon hunting as well as the cultivation of maize. To date, the problem of *how much* horticulture supported the economy (25, 50, or 25 percent) has not been studied. The problem does merit consideration and research.

The principal climatic factors affecting these items are the same as those which influence all flora and fauna — temperature, precipitation, length of growing season, and wind (Critchfield, 1965, p. 336). There are, however, two overlapping problems expressed here. One deals with the effect that climate has on plant and animal distribution, and the other concerns itself with the particular influences that climatic factors have upon the productivity of specific plants and animals. Adequate game reserves and shelter would in part be a function of the habitats but dependent to some degree on favorable weather and moisture conditions (Swift, 1949, p. 564). Enormous amounts of timber, a highly exploited resource, were expended in the erection of villages and at certain times village stockades. A further drain on the timber resources would have been its use as fuel during the harsh winters. This cultural patterned removal of large quantities of timber would affect the "natural environment". This would decrease the deer and elk population.

The Initial Middle Missouri beginning about A.D. 900 is the oldest village culture in this area to be exposed to known climatic variations. Archaeological evidence suggests that the culture was an integrated hunting and horticultural society which might have supported large numbers of people. Most Initial Middle Missouri village sites are found along the mainstream of the Missouri between the mouths of the White and Cheyenne Rivers (Fig. 2). However, there are extensions into northwestern Iowa and southwestern Minnesota. These sites, believed to be related to Over Focus materials found on the James River, South Dakota, suggest that the Initial Middle Missouri

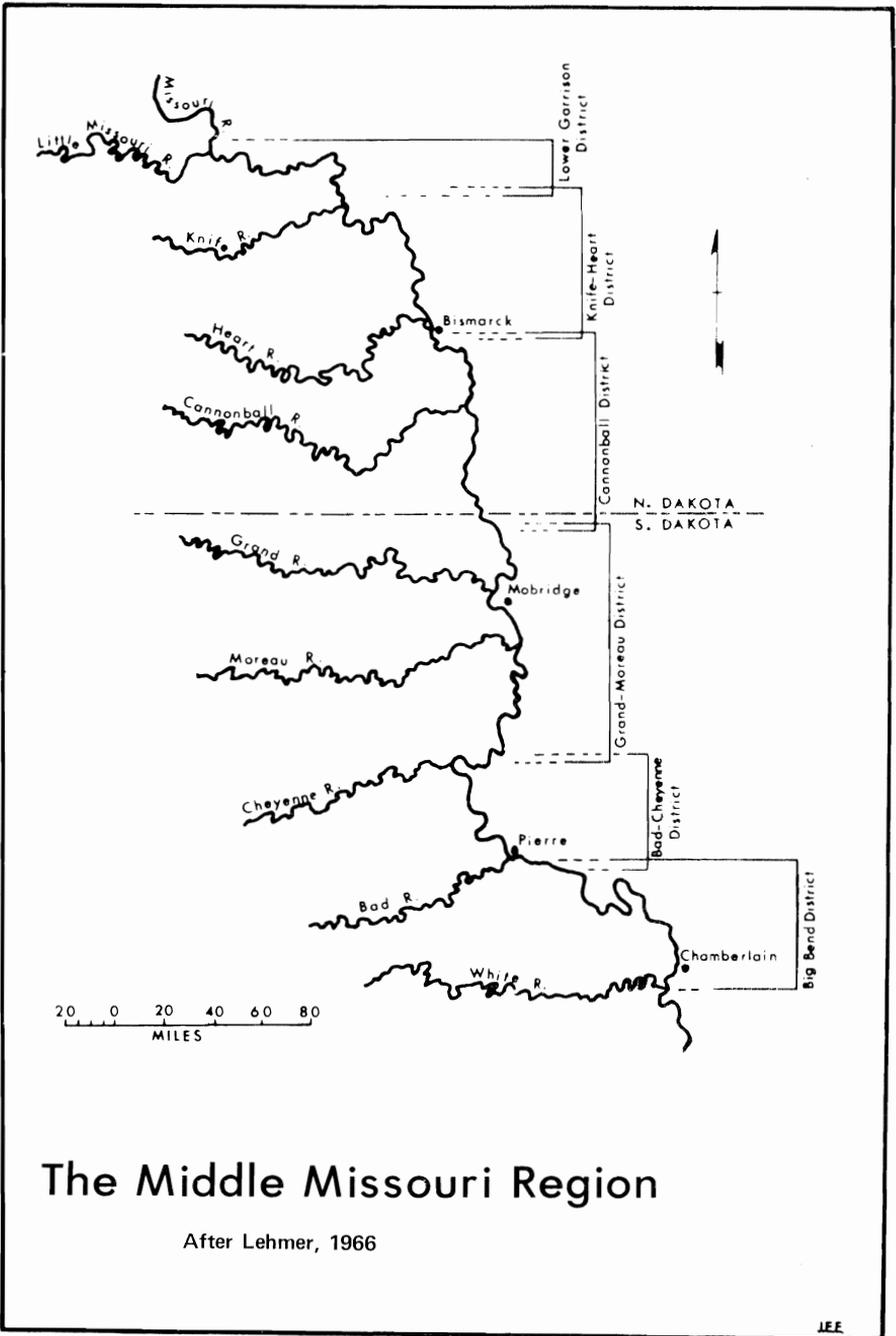


FIGURE 2

ANTHROPOLOGY

“variant” (Lehmer, 1968, p. 9) was an intrusive complex which was carried into the Missouri Valley from southwestern Minnesota and northwestern Iowa at the beginning of the 10th century (Caldwell, 1968, p. 108; Lehmer, 1969). In the White and Cheyenne River districts one finds good cultivable soils with a dependable supply of water. These two characteristics, reflected in the construction of the village, suggest that it was built to be used as a permanent base. The villages are located on stream-side terraces and are protected by ditches (Wedel, 1964, p. 212).

House plans, long rectangular lodges, were a universal and distinctive feature of the Middle Missouri tradition. Houses were usually from one and a half to two times longer than wide and were constructed in and over a straight walled pit 2.5 to 5.0 feet deep and 30 or more feet long. They were entered through a 5 to 15 foot long vestibule-like entrance passage built over a sloping trench which descended from ground level to the forward edge of the house pit (Krause, 1967, p. 48).

Judging by the distribution of post holes, the roof of the house was held aloft by (1) upright posts set close together into the house floor and leaned against the long walls of the house pit (in some cases against all walls), and (2) a row (sometimes a double row) of larger, widely spaced upright posts set in a line down the center of the lodge floor (Hurt, 1951, p. 51-52). Hurt (1951) mentions that the roof was evidently constructed of poles laid close together.

The superstructure may have been covered with a heavy thatch (Hurt, 1951, 51-52), perhaps with heaps of earth banked against the side walls for additional protection. Considering the paucity of evidence any reconstruction will be speculative but a bark slab covering is suggested by fragments of bark found in houses at the Langeau site (Krause, 1967, p. 40-41).

Accompanying these houses one finds a varied assemblage of tools. These include: (1) gardening and digging tools, (2) projectile points, and (3) tools for skin working and food preparation. The stable climate of the times plus the persistence of these artifact forms suggest that there was a stable hunting-farming economy (Krause, 1967, p. 48).

Around A.D. 1100 a complex closely related culturally to the Initial Variant moved into the southern sections of the Missouri Valley (Lehmer, 1969, p. 4). This manifestation is known as the Extended Middle Missouri. Lehmer and Caldwell (1966) mention that groups of this period, of which only one phase (Thomas Riggs) is presently distinguished, are known to have occupied all five districts and had a duration from A.D. 1100 to 1550.

The termination of the Neo-Atlantic and the beginning of the Pacific I around A.D. 1200-1275 correlates with the next major population shift of village communities. The Pacific I episode is characterized as being cool and

ANTHROPOLOGY

dry; in part this is due to the flow of the westerlies. In my estimation, this condition which brought considerable amounts of cool dry air into the region would have caused a lowering of temperatures and reduced amount of rainfall.

In turn, these changes would have precipitated unfavorable growing conditions for maize. There is also the possibility that at this time there would have been setbacks in the game supply due to a decrease in pasture and shelter.

These climatic conditions appear to be directly reflected in the distribution of villages in the Middle Missouri Valley during Pacific I times (Lehmer, 1969). Initial Middle Missouri settlements appear to compose pockets or enclaves along the river in the districts of the Big Bend and Bad-Cheyenne (Fig. 2). Extended Middle Missouri sites, those of both the northern and southern sections of the valley, seem to have been somehow affected throughout the Pacific I. Villages of these peoples become limited in terms of their numbers, size, and geographical location.

Lehmer (1969) states that the harsh conditions of the period strongly suggest that many settlements of the Extended Middle Missouri were completely abandoned in the central sections of the valley and became concentrated in the northern and southern areas. Evidence of these hard times is found in the Extended Middle Missouri cultural complexes designated the "Thomas Riggs" phase (Lehmer and Caldwell 1966, p. 515) A.D. 1250-1500. Villages of this affiliation developed along the entire course of the river in the Middle Missouri area. However, the villages seem to have been concentrated in northern and southern centers (Krause, 1967, p. 58). Distinctive cultural features developed in each of the centers. Lehmer (1954) and Wood (1964) mention that the northern villages were small unfortified clusters of randomly constructed lodges. Such construction may in part be due to inferior timber resources. Southern settlements were somewhat larger and were commonly surrounded by dry moats and bastioned palisades which enclosed lodges sometimes arranged in rows (W. Caldwell, 1961, p. 57). To me, this suggests that timber resources were more adequate here. These fortifications could denote conflict among groups due to scanty food supplies.

The termination of Pacific I times begins after the turn of the 15th century when the climate becomes moderately warm and moist. During Pacific II times circular houses were introduced into the valley. It is important to note that by the end of the Pacific II this pattern of lodge construction was the dominant form found in the valley.

The Initial Variant of the Coalescent emerges in the Big Bend and Bad River districts about the beginning of the Pacific II times. This cultural complex differs considerably from other assemblages found in the Middle Missouri Valley and suggests relationships with the Central Plains Tradition. It

ANTHROPOLOGY

may represent northward infiltrations into the Missouri Valley from the Plains. Although Upper Republican house floors were usually square, nearly circular houses have been reported by Champe (1936, p. 258, Fig. 3) and Wedel (1935, p. 150).

At approximately the same time that one finds villages occupied by Initial Coalescent peoples, there are similar movements into the southern Extended Middle Missouri area out of North Dakota suggesting that as the climate improved, there was a re-occupation of previously abandoned areas. It is not known how long such re-occupation took. I believe that climatic factors might have brought about a very rapid re-occupation if that movement depended solely on available game supplies.

Like the earlier sub-rectangular lodges, the circular structures were substantial dwellings of poles, grass, and dirt which required a considerable expenditure of energy (Krause, 1967, p. 76). However, the superstructure was less massive than that of its rectangular counterpart.

The middle of the 16th century witnessed the beginning of a fourth climatic shift known as the Neo-Boreal. During this time the climate reverted back to one that was cool and moist. The increased flow of the westerlies once again lowered temperatures and precipitation and cut back the area of available food sources.

It was during Neo-Boreal times that the southern reaches of the Extended Middle Missouri were abandoned and moved northward into the Grand-Moreau River districts (Fig. 2). This movement continued northward into the Cannonball and Knife-Heart districts (Fig. 2) where it is expressed as the Terminal Variant of the Middle Missouri Tradition (Fig. 1).

This movement differs from the earlier cultural responses to unfavorable climatic conditions of the Pacific I where, while there was a reduction in the number and size of occupied villages, they appear to have been occupied for a long period of time. The cultural response during Neo-Boreal inflections was to reduce the length of village occupation as well as its size. These varying cultural responses could be due to trade facilities and to cultural adaptations to climatic fluctuations.

At approximately the same time as the onset of the Terminal Middle Missouri there was an expansion out of the Initial Coalescent known as the Extended Coalescent (Fig. 1). Sites of this period are found over the entire length of the Middle Missouri Valley. These sites contain only a few houses, have no fortifications, are scattered over large areas, and appear to have been used for only a short period of time. Extended Coalescent sites are usually located on flat-topped ridges away from thick vegetation and fertile ground of the river bottoms. The climate, somewhat unfavorable, may again be a cause. These villages may have been so constructed as to be in full view of any possible game movements. Animals would be scarce as poor pasturage probably forced them out of the area (Lehmer, 1969).

ANTHROPOLOGY

The Extended Coalescent period ends around A.D. 1650 and it is at this point in the cultural history of the Middle Missouri where the discussion of climatic-cultural relationships become subsidiary to a new set of factors which began to exert profound influence in the area. These factors are cultural rather than climatic and revolve around European penetration into the Missouri Valley. The reactions of the native cultures to European innovations outweigh any changes which at this point could be attributed to climate. After the middle 1700's aboriginal village populations became only remnants of formerly larger groups. Caldwell (1968) suggests that this reduction can be attributed partly to small pox epidemics. Lehmer (1969) mentions that in the years 1780-82, 1801-02, 1818-19, 1837-38, and 1856 there were severe outbreaks of the disease.

In conclusion, it can be said that there does seem to be some correlation between climatic and cultural events taking place in the Middle Missouri area. The favorable warm and moist climates of the Neo-Atlantic and Pacific II times suggest village expansion among the horticultural peoples within the valley while the disharmonious climates, the Pacific I and Neo-Boreal, show reason for their significant reduction. After A.D. 1675 it is not yet possible to disentangle any cultural changes taking place which are resultants of climatic factors, as these factors are engulfed by the influx of European innovations. Further investigations into cultural and climatic interrelationships will hopefully bring to light new evidence which will clarify their relationship in the 1700's.

REFERENCES CITED

- Baerreis, David A. and Reid A. Bryson, 1965. Climatic Episodes and the Dating of Mississippian Cultures. *The Wisconsin Archeologist*, 46, (4): 213.
- Bryson, Reid A. and Paul R. Julian, (Eds.) 1963. Proceedings of the Conference on the Climate of the 11th and the 16th Centuries, Aspen, Colorado, June 1962, *NCAR Technical Notes* 63-1.
- Bryson, Reid A., David A. Baerreis, and Dale R. Henning, (Eds.) 1968. Climatic Change and the Mill Creek Culture of Iowa: Part I. *Journal of the Iowa Archaeological Society*, 15.
- Caldwell, Warren W. 1961. Excavations at Certain La Roche and Thomas Riggs Sites in the Big Bend and Oahe Reservoirs, *Plains Anthropologist*, VI (12, Pt. 1): 57. 1968. The Later Occupations: A Summary, Reprinted from *Loess and Related Eolian Deposits of the World, Proceedings of the VII Congress of the International Association for Quaternary Research*, U.S.A. 1965, 12.
- Champe, John L., 1936. The Sweetwater Culture Complex, E.H. Bell, (Ed.), Chapters in Nebraska Archeology, No. 3: 349-97.
- Critchfield, Howard J., 1966. *General Climatology*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Griffin, James B., 1967. Climatic Change in American Pre-History. *The Encyclopedia of Atmospheric Sciences and Astrogeology*, 2: 171. Reinhold Publishing Corporation, New York.
- Hurt, W. R., 1951. Report of the Investigation of the Swanson Site, 39BR16, Brule County, South Dakota. *South Dakota Archeological Commission, Archeological Studies Circular* No. 3.

ANTHROPOLOGY

- Krause, Richard A., 1967. A Study of the Factors Affecting Stylistic Change in Late 18th and Early 19th Century Arikara Pottery. Dissertation, Yale University, New Haven.
- Laskowski, Bernard R., 1941. Climate of South Dakota, *Climate and Man Yearbook of Agriculture*, p. 1117. United States Department of Agriculture, United States Government Printing Office, Washington, D. C.
- Lehmer, Donald J., 1954. Archeological Investigations in the Oaha Dam Area, South Dakota, 1950-51. *Bureau of American Ethnology Bulletin 158*, River Basin Surveys Papers, No. 7.
- Lehmer, Donald J. and Warren W. Caldwell, 1966. Horizon and Tradition in the Northern Plains, *American Antiquity*, 31 (4): 511-516.
- Lehmer, Donald J., 1966. The Fire Heart Creek Site. *Smithsonian Institution River Basin Surveys, Publications In Salvage Archeology*, No. 1, Lincoln, Nebraska. 1968. Climate and Culture History in the Middle Missouri Valley. Paper read at Symposium on Pleistocene and Recent Environments of the Central Plains, Oct. 25-26, University of Kansas. 1969. Epidemics Among the Indians of the Upper Missouri. Paper read at the Western History Association, Fall 1969, Omaha, Nebraska.
- Swift, Lloyd W., 1949. Forests as a Wildlife Habitat. *Tree, Yearbook of Agriculture*, p. 564. United States Department of Agriculture, United States Government Printing Office, Washington, D. C.
- Wedel, Waldo R., 1935. Contributions to the Archeology of the Upper Republican Valley, Nebraska. *Nebraska History Magazine*, 15: (3). 1961. *Prehistoric Man on the Great Plains*. University of Oklahoma Press, Norman. 1964. *Prehistoric Man on the Great Plains*. University of Oklahoma Press, Norman.
- Wood, W. R. and A. R. Woolworth, 1964. The Paul Brave Site (32SL4) Oahe Reservoir Area, North Dakota, Smithsonian Institution, *Bureau of American Ethnology, Bulletin 189*, River Basin Surveys Papers, No. 33, Washington, D. C.