

Counts, Coups, and Tally Marks: Evidence of Notational Systems in the Pictographic/Petroglyphic Record

Abstract

Count marks or tallies are common in the rock art of the Northern Plains. Analysis of eighteen sites on the middle Yellowstone River, including some petroglyphic records of considerable complexity, is consistent with a notational system of units and pairs. No internal evidence of ordering, sequencing, or further arithmetical evolution is yet discernible.

Introduction

Rock art on the Northern High Plains has been described as symbolic or representational, biographic, or ceremonial. That it may also be notational and ideographic has received little attention, largely because of the lack of a sufficient amount of comparative material. A survey of known and newly-discovered sites in south-central Montana in 1981-1984 alleviates this scarcity and leads on to problems in interpretation.

Rock art productions frequently include a series of "counts," "coups," or "tallies" associated with a representational or symbolic theme. These tallies may be obscure and easily overlooked, or they may be clearly delineated although enigmatically related to the other glyphs. When associated with battle scenes they might, for example, signify coup markers, kills, or enemies involved. When associated with hunting, animals, or symbolic glyphs, other numerical evaluations are possible. With little justification tallies have been called day counts, year counts, moon calendars, or astronomical notations. The marks may have represented some non-arithmetic idea, but the cultural provenance of many pictographs and petroglyphs is unknown, and there are no coeval texts. Thus, their meaning may never be established by external data. We are limited to such internal information we can discern in the glyphs themselves. This discussion is based upon the presumption that count marks may be arithmetic. A minimal interpretation rule suggests that perhaps a notational system of some kind is being represented, and on examination of a number of examples may allow some hypotheses about aboriginal numerical ideas—for instance, are counts unitary, decimal, or based on

sets of 20 (vegesimal), or can other combinatory methods be described? As an initial effort, 87 pictograph/petroglyph sites were recorded in detail. Of these 18 had count marks of some kind.

The Tally Mark and the Origins of Arithmetic

The keeping of counts has been a human concern across millennia. Perhaps what began an aide-memoir and an answer to the question "how many," became an end and a pleasure in itself, a mental product with a magic and reality all its own. Cultures became reflected in what was counted and what was not. Marshak (1972) described engraved count marks on bone and antler from the European Paleolithic and found them congruent with lunar observation. The Maya, preoccupied with time and its divisions, elaborated with dot ("one") and bar ("five") into a numerical system with concepts of completion and zero, the ability to calculate in time units of 64,000,000 precise lunar-solar-venusian calendars, a numerical foundation for the component names of men and deities, and intricate books of divination based on dates (Thompson 1971). Modern European mathematics seems to have begun with the counting stick ("tally") and simple "sets" (scores, hundreds, etc.), as Shakespeare remembers in *Henry VI(2) Act 4 Scene 7*, "our ancestors had no other books but the score and tally." The Peruvian *quipu* and *chimpanu*, using knots or beads, achieved a similar accounting system based on units, tens, hundreds, and thousands which served the needs of an empire (Menninger 1969). The addition of a wire on which beads could slide and a mechanism for keeping track of sets as well as units produced the versatile abacus. Much encouragement that count or tally marks in pictographs might reflect

an arithmetic notational system comes from the meticulous analysis by Glossen and Marshak (1974) of a Chamula calendar board on which the day counters, vertical lines of equal length and spacing, are arranged in horizontal series, much like those at 24ST560 in our sample.

In order that the descriptive material from the Yellowstone sites may receive principal attention in this discussion, a review of the continental or world-wide pictographic record is deferred. The variety of presentation and interpretation presents a major task in synthesis and suggests that an intensive rather than comprehensive approach may be more illuminating. Also deferred is the complex issue of the cultural affiliation of the artists who produced the drawings we will examine. More than a score of tribes are known to have hunted across the Northwestern Plains (Ewers 1968). A summary of pictograph/petroglyph chronologies is provided by Sundstrom (1984 p. 137-140). In the geographic bounds of our study, namely the middle reaches of the Yellowstone River, several investigators have addressed counts and counting. Mulloy (1958 p. 139) illustrated without discussion several "coup series" of marks and glyphs. Secrist (1960 p. 8) described a series of figures which may ultimately be shown to have an arithmetical significance. Conner and Conner (1971 p. 27-34) were among the first to discuss the occurrence of counts and figures-in-series. Keyser and Knight (1976 p. 608) noted that tally marks were the most common pictographic motif in western Montana and described dot series and their possible meaning. Keyser and Sundstrom (1984) give many excellent reproductions of count series in the Black Hills and a brief discussion of tally marks (p. 19). Beyond the presumption that count marks were somehow numerical these authors avoided an analysis of meaning.

What were the nomadic hunters of the Plains counting if that is what they were doing? How elaborate did their system become? Are their petroglyph marks recording anything more than "one count equals one thing"? Let us begin to look for answers in what seem to be the simpler examples. A battle scene at 24YL600 (Fig. 1) looks out over the Yellowstone River. Three men with shields are assailed by guns, spears, and arrows. On the left are 75 "tally marks" associated with two enigmatic marks. On the right is a

series of 12 "counts." Adjacent panels, now dim, have many barely-discernible series of parallel arrows and guns, and a series of 35 vertical "tallies" each about 60 cm. long.

Another combat between a mounted man and one afoot at 24GV557 (Fig. 2) has 13 "tallies" arranged in a slanting pattern. A hand-to-hand encounter at 24YL418 (Fig. 3) has a superscript of three deeply-carved "tally marks." At 24YL70 (Fig. 4) three armed men stand before a double set of count marks, joined at the ends by vertical lines. At 24ST403 (Fig. 5) large count marks dominate small figures engaged in bear hunting and horse-riding. At 24YL434 (Fig. 6) a group of four armed men ride toward a tally series. At 24ML563 the cliffs bear a profusion of painted and incised glyphs in several styles. Interspersed are several sets of "tally marks," also in several styles (Fig. 7).

The bear panel at 24YL419 (Fig. 8) contains almost-terminally-eroded bears and shield-bearing men mixed with others that appear to be later, almost-fresh additions. There is an adjoining "superscript" panel filled with faintly visible count marks (not figured), the top series with ten vertical bars, each 20 cm., in a horizontal series. Below is a similar row of 22 marks, each 30 cm. tall, with a crudely outlined bear's head.

At Pillar Creek (Fig. 9) a man (inverted) with a lance stands beside two smaller figures and a continuing row of 21 objects which look like guns. Just above, four figures, two of which are incomplete and another which looks like a death bundle are in horizontal series with four "hair-pin" (count marks connected at the top in pairs) and eleven count marks (pairs and units?). A red pictograph at 24CB630 (Fig. 10) shows more clearly an effort to use sets. Series of 16 dots, placed horizontally on an alcove wall is then repeated in 8 paired dots. Below 4 dots are placed in a vertical line, plus two half-moon shaped figures, perhaps? indicating a lunar count.

A "heraldry" panel of incised petroglyphs at 24YL419 (Fig. 11) is of count and symbol interest. At bottom left are two men in combat. Associated are two horizontal series and 37 lance-like objects and one gun. Some few of these are unadorned, but the rest have modifying details, none of which are identical. These include ornate "fans," projectile points, "feathers," varied-shape pendants, and perhaps individual

“medicine” or clan markers. The overall effect to the modern eye is of a hand-to-hand contest in the presence of a host of named individual observers, something like a heraldic tourney or the panoply of the Field of the Cloth of Gold. In any case, the glyphic panel does concern itself with an accounting, of some kind, of similar but recognizably individual objects.

A deep alcove 24ST560 in the upper reaches of Big Coulee Creek has a panel of black count marks (Fig. 12) which, are well-protected from the weather and exposed to sunlight only at the moment of sunset, and give an impression of antiquity. The panel is 276 cm. long, with 46 vertical bars, each 30 cm. Some have an enlarged head, others a bent foot. They were painted in black, evenly, without drip or run. The “brush” may have been a fingertip, or an implement of comparable size. The regularity of rendition suggests that they were done in one “sitting,” (i.e. they do not seem to be accumulated over time). Small interstitial figures include five tailed circles, seven “horse hoof-marks” twenty-four “dots,” four open squares or circles. Above are fourteen X marks, this series being interrupted by water damage and possibly being eighteen in number originally. The “coefficient glyphs” or “subsidiary notations” are enigmatic, as are permutations of 46 and 14 or 46 and 18. The cave overhang shades this glyph panel all day until just at sunset, and a rounded treeless hill due west cuts off the sunlight a few moments later (on 10 September 1983). No sighting mark was evident to suggest that solar equinoctial declinations were being observed, although the position was excellent for that purpose. The accompanying (also black) pictographs, some meters away, include a pair of humans in copulation, a man with spear and shield, a vertical series of eleven horizontal count marks, and a very nearly obliterated mounted spear-bearer.

Some ancient artists, instead of single-marks or tally strokes, used a series of depictions of the objects themselves. At 24ML562 (Fig. 13) men are “counted” by presenting rows of conventionalized man-figures. At 24YL82 (Fig. 14) a superscript above a spirited battle is a row of eleven tipis. At 24YL417 (Fig. 15) a group of seven guns hangs over another battle scene. Rows of horse hoofprints, perhaps counts, perhaps trails or direction indicators, occur at 24YL1189 (Fig. 16),

24YL402, 24YL600, 24YL1190 and 24YL419, where they wind through the “action” of the scene, and at 24YL704 where they are depicted in squared groups.

The pictograph at 24ST560, as noted, suggests a solar notation, while that at 24CB630 on similarly limited grounds, provokes question of a lunar record. Another, 24CB416 (Fig. 17 photograph) was pointed out by a landowner within the former reservation boundary. “The Crow used to call it a moon calendar,” he said. The glyph seemed to be a number record laboriously pecked into extremely hard sandstone. It was composed of “units” of regular, carefully-formed, carefully-spaced, short, double, horizontal lines. These were in two vertical series, beginning 1.35 cm. above the cliff base. One series, extending 90 cm., had 23 of the double-horizontal units. The other series, inclined slightly from the vertical, has 17 “units.” Below was a serpentine pecked figure which seemed to represent a horned dancer.

Discussion

“Tally” or “count” marks are common in the Plains petroglyphic record. Do they indeed represent an arithmetical notation and the mental processes which adumbrate it, or is the artist illustrating some other idea, quite unknown to us? If they are counts, what is being counted and why? In some glyphs the intended communication seems to be “how many” tipis or guns or men, but there is no evidence yet discerned of *ordering* or *sequencing* of units, the next expectable step in a number system. A third expectable step, a *grouping* of numbers, seems to be shown in two of our samples by way of pairs or “counting by two’s.” It is unfortunate for the hypothesis of a notational system that proof most likely will come, if at all, from internal evidence of the glyphs themselves. We can, so far, only presume for working purposes a rudimentary counting device of one mark for one object, with no further conceptual evolution, as in Mesoamerica, of notational sophistication; i.e., sets more complex than pairs, glyphic number conventions, calendric ideas, naming sequences, phonetic equivalents or time units. The very large number of sites yet to be analyzed, dated, and understood, and indeed yet to be discovered, may alter this appraisal.

Sites Described

24CB417	Kraus	24YL434	Horse-House
24CB630	Bear Two Shield	24YL82	Manual Lisa
24YL417	Doctordic	24YL419	Nordstrom-Bowen
24YL704	Chief Joseph	24YL1190	Pillar
24YL402	Alkali Creek South	24GV557	Northside
24YL1189	Canyon Creek	24ST403	Molt
24YL600	Custer	24ST560	Weppler #2
24YL418	Castle	24ML563	Signal Mountain
24YL70	Rossell	24ML562	30 Mile Station

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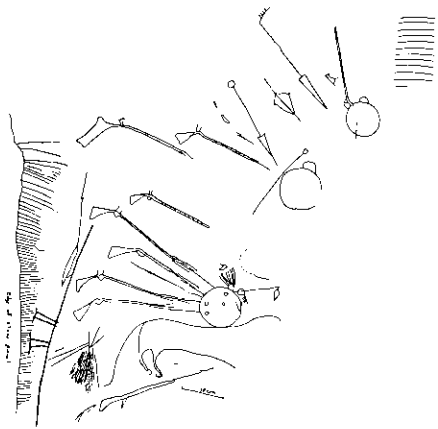


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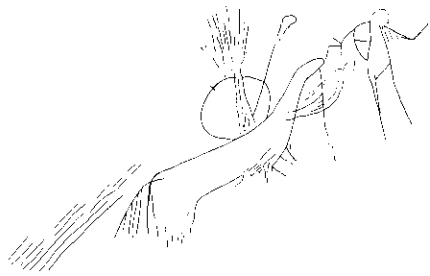


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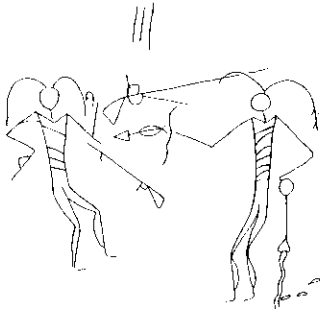


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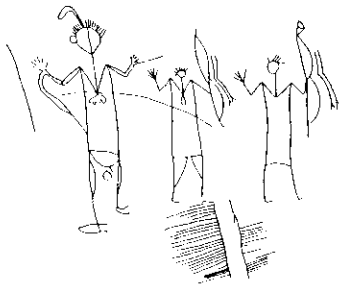


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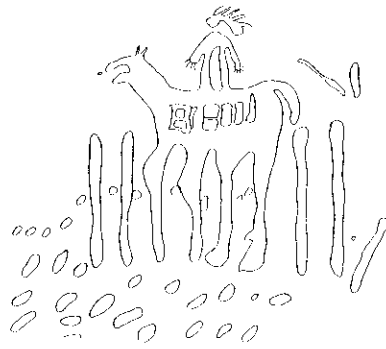


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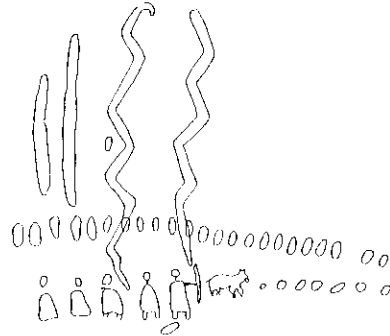


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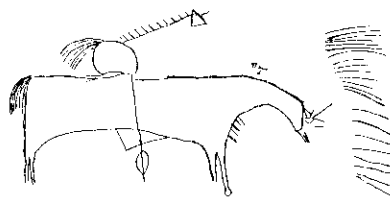
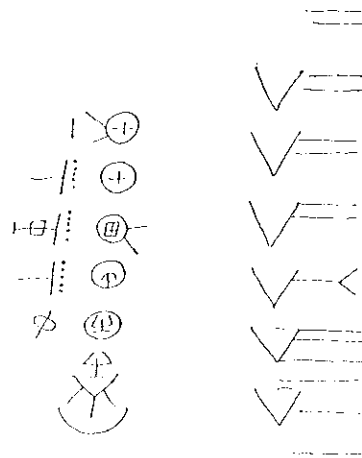


Figure 7.



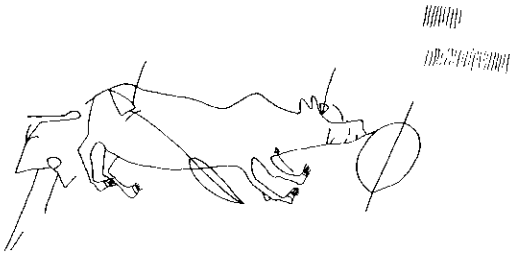


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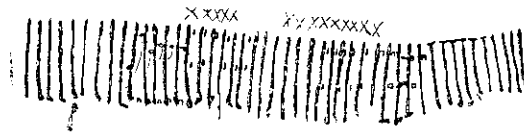


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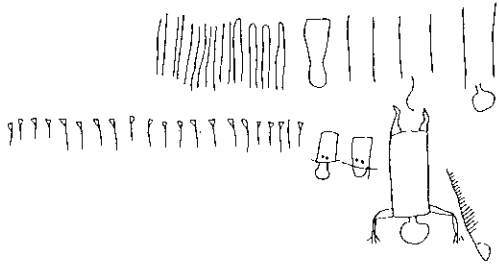


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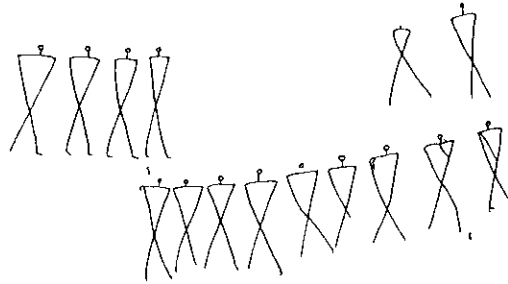


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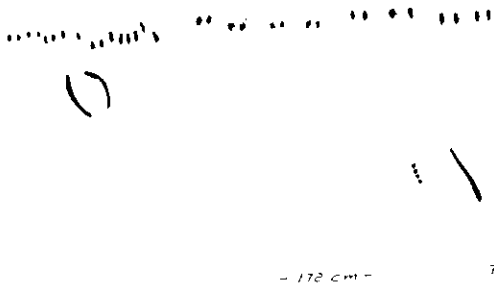


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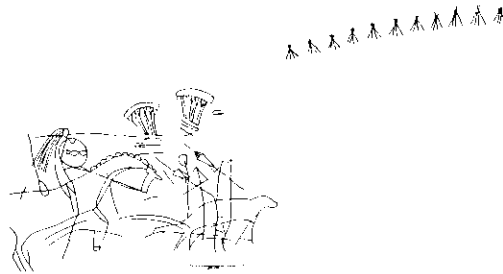


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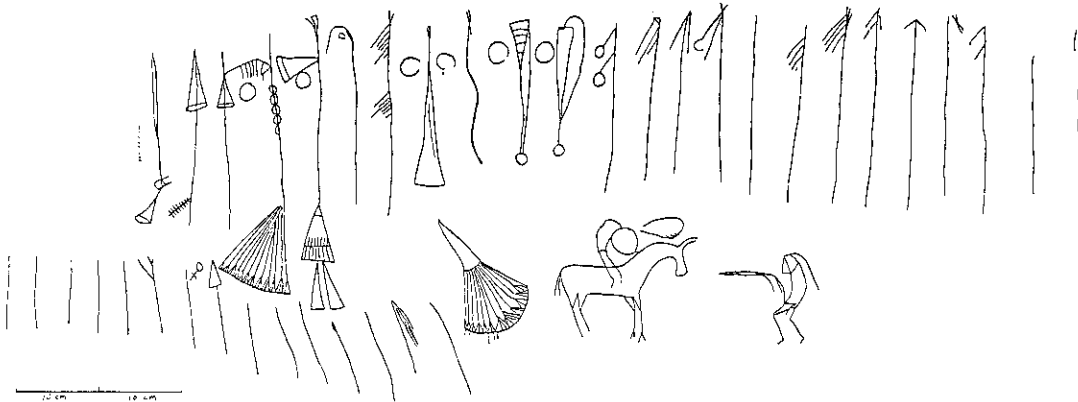


Figure 11.



Figure 15.

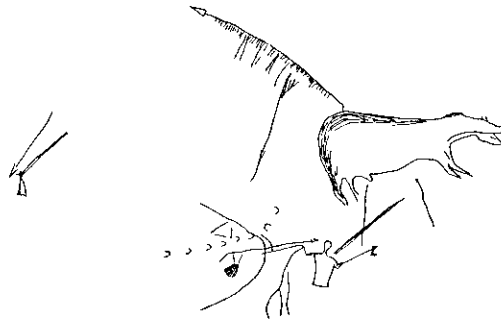


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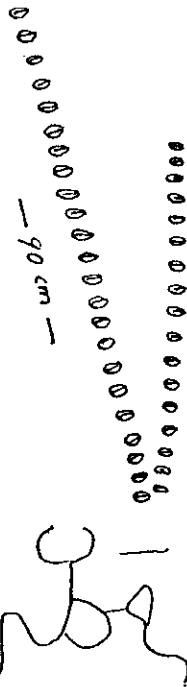


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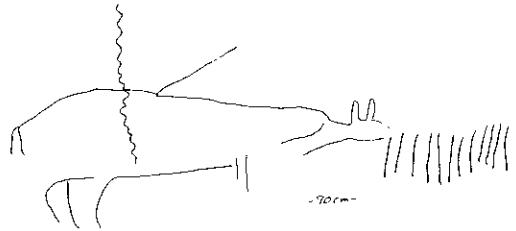


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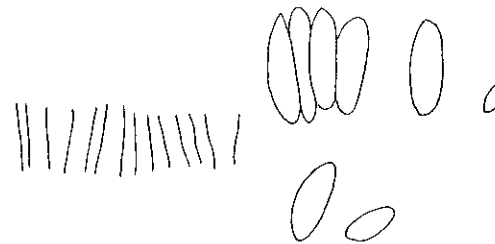
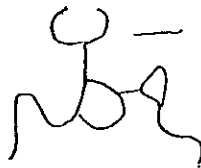


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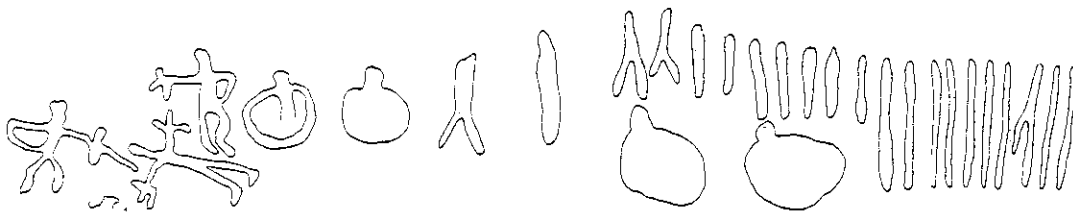


Figure 20.