Ascher 1978. A detailed description of the khipu is in Ascher and Ascher 1978, and it is also discussed in Ascher and Ascher 1981: 118.

3. The khipu is AS70. A detailed description of the khipu is in Ascher and Ascher 1978, and it is also discussed in Ascher and Ascher 1981: 120.

4. The khipu is AS101. A detailed description of the khipu is in Ascher and Ascher 1978, and it is also discussed in Ascher and Ascher 1981: 123–125.

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Inka Writing

FIVE   *Robert Ascher*

Within the company of civilizations, the Inka have, for too long, been set apart as the one civilization without writing. Here I show that the Inka did indeed have a writing system. To begin, I retell the story of the first major confrontation between Spaniards and the Inka—an encounter in which a book played a key role.

WRITING SYSTEMS

If one had to choose a place and a time to mark the start of the downfall of the Inka state, it would surely be the plaza in the town of Cajamarca on November 16, 1532. Let us follow Prescott's (1900: 378–412) version of what happened there on that day. Early in the morning, Atahuallpa, the head of the Inka state, and his entourage were on the outskirts of town. The Spaniards, led by Francisco Pizarro, were in the town's triangular plaza. Through a messenger, Atahuallpa informed Pizarro that he would meet him in the plaza. Having already decided the previous day to take Atahuallpa prisoner, Pizarro stationed his army, with its guns and horses, in the large wide-doored hallways of the plaza's buildings. Late in the afternoon, Atahuallpa, elevated on a litter and surrounded by his supporters, entered the plaza.

With the stage thus set, Vicente de Valverde, a Dominican friar, stepped forward with a Bible in his hand and addressed Atahuallpa. He talked about the death and resurrection of Jesus, the authority of the pope over all earthly powers, the Spanish monarch whom the pope had commissioned to convert

native peoples, and Francisco Pizarro who was here now to execute that mission. Atahuallpa replied that he was the subject of no man, that the pope must be insane to think that he could give away the land of others, and pointing toward the west, Atahuallpa exclaimed that his God, the Sun, was still alive. Atahuallpa then demanded to know by what authority the Dominican spoke. Atahuallpa was handed the Bible, and after turning some pages, he threw it to the ground. Pizarro then waved a white scarf, the prearranged signal to attack. A massacre followed: within an hour, Atahuallpa was taken prisoner and hundreds of his followers were everywhere dying on the plaza's ground.

In watching Atahuallpa throw the Bible to the ground, the Spaniards witnessed what they took to be an insult to their religion. In fact, Vicente de Valverde said as much while Pizarro was preparing to wave his scarf. Beyond the presumed insult, the Spaniards saw the act of a person of the highest rank within his own community who, in their eyes, could not read or write. Then and now, literacy together with differences in technology and biology has been the wedge used to separate the "them" from the "us," with the clear connotation that the "them" are inferior (Pattanayak 1991). The literacy section of the wedge swelled in prominence during the waning years of the twentieth century.

It is likely that the Cajamarca Bible was a Gutenberg type-printed book. Just seventy-five years prior to the confrontation, the so-called Latin Bible, the first book printed in Europe with movable type, was issued in Mainz, Germany. By 1474, this way to make books in large numbers had reached Spain (Jennett 1967: 24–25), where it was put to good use (McLuhan 1962: 225–227). It seems that the plaza confrontation took place at a moment in history—and with a prime symbol of that moment in hand—that, according to some (Eisenstein 1979; Havelock 1986; McLuhan 1962; Ong 1982), would signal a division in the world's cultures. In this newly divided world, people who used alphabetic print would be placed to one side; everybody else would be on the far side. The alphabetic-print people are supposed to think differently, and presumably better, than other people.

The notion that human cognition changes with the introduction of writing, and then changes even more dramatically after the advent of alphabetic-print media, at first reinforced entrenched views of a nonliterate/literate divide. But recently, and for the first time, ideas based on the presumed divide were put to the test. Evidence gathered from anthropological, linguistic, and psychological perspectives, and accumulated from around the world, now suggests that the differences that separate oral and literate peoples are some-

times trivial, often mistaken, and usually exaggerated (Besmier 1995; Bloch 1989; Denny 1991; Narasimhan 1991; Parry 1989; Pattison 1982; Scribner and Cole 1981; Street 1988). For example, it has been shown that interpretation and reflection, presumed to become possible only after the introduction of written texts, are equally possible when only oral genres are present (Feldman 1991). Of particular importance here is the questioning and reexamination of the basics of writing systems that has resulted from the renewed attention to this issue.

The orthodox view of writing had been based on an evolutionary scheme (Gelb 1952) culminating, not surprisingly, in the Roman alphabet. Evidence for this scheme has been drawn largely from the Near East and Europe; much less attention was given to the history of writing in Asia, and even less to that in the Americas. Some texts still restrict writing to marks that represent utterances (e.g., Daniels and Bright 1996), but others admit a wider range of phenomena into the framework of writing (Harris 1995). The evolutionary, multilayered classifications of writing systems have been reduced in some cases to two or even to one class (McCarthy 1995). There is still no single, generally accepted definition of writing, but most tend toward being inclusive and catholic (e.g., Gaur 1992).

I think of writing as a way to represent information, and I accept a dual classification of writing systems. One group can be called thought or concept writing and the second, sound writing (Gaur 1992, 1995). Although other terms may be used, these best reflect the idea that the systems in the first group are connected to units of meaning, while those in the second are related to units of speech sound. Examples of systems in the first group include choreographics and mathematics (Harris 1995). The second group includes our alphabetic system. There are systems, for example Japanese, that have elements of both groups.

Some classification schemes (e.g., Hill 1967) add a third group, but additional groups often turn out to be further breakdowns into subgroups of either or both speech-sound or concept writing (e.g., Sampson 1985). Although concept writing is not based on sound units, it can be sounded, as in the case, for example, of a dancer talking out the steps she learned from reading choreographics while she is dancing.

The Inka khipu fits into the concept writing group. Moreover, it is likely the most general-purpose example of it. This is so because instead of being about limited phenomena such as dance or chemistry, it can be used for a wide range of phenomena (Ascher and Ascher 1981). It is easy to understand how the Spaniards, knowing only their own alphabetic sound system, believed that

Atahuallpa and the Inka were illiterate even after becoming familiar with Inka khipu. It is harder to explain why recent general studies of writing mention khipu only in passing (e.g., Coulmas 1990) or not at all (e.g., Martin 1994). A continuing neglect of writing throughout the Americas may be partly responsible. Another explanation is that we are closer to the colonial Spaniards than we like to think. With the exception of the Inka, the Spaniards found correspondences between their own mode of representation and representations in the cultures they encountered. Inka abstractions and structures, as evidenced in some of their art and in khipu, were apparently too remote from their experience (Cummins 1994). In like manner, the sophistication and unusual characteristics of khipu writing place it at a distance from our usual conceptions of writing systems.

DECIPHERMENT

To decipher unknown writing based wholly or mostly on units of sound, one must, in every case, refer back to an already known sound-based writing system (Segert 1983). For example, the multiscript Rosetta Stone made it possible to decipher Egyptian writing by reference to Greek writing and language (Gelb 1952: 72). By contrast, to decipher a concept-based system, one must ultimately grasp a number of the meaning systems of the culture using the writing. A concept-based system as general as khipu writing does not have a single encompassing resolution. Decipherment of khipu writing can only mean a solution to a khipu or a set of related khipu. This is so because khipu writing is adaptable to many different systems of meaning, and for each such system a different khipu or set of khipu comes into being. Khipu makers and others who knew these systems of meanings and their representations could read and write.

In both concept- and sound-based systems, the essential groundwork for decipherment has to be prepared through close analysis of the internal structure of the writing itself. We call this internal structure the code of the writing. In the case of the khipu, the first breakthrough in the code happened when it was shown that the top cords at the heads of groups on some khipu contained numbers that, when read in the base ten, were the sum of numbers on the pendants in the groups (Locke 1923). Further close attention to the internal structure of khipu writing, using a large database, revealed the logic of the system and the importance in it of format, category, pattern, hierarchy, and numbers used as labels. Because numerical concerns in addition to base ten are built into khipu writing, the arithmetical ideas of the Inka were also

found without having to go outside the workings of the system itself (Ascher and Ascher 1981).

Access to Inka meaning systems, so necessary for deciphering khipu writing, is through artifacts and colonial documents. Archaeological artifacts are highly variable in their usefulness due to differential preservation, and they are notoriously difficult to interpret, as indeed are all material remains. The writings of the Spanish conquerors also present problems. Even under the best circumstances, the accounts are distorted as they pass from one culture (Inka) to another (Spanish colonial), where they are interpreted, and then to a third (contemporary Euro-American), where they are reinterpreted 465 years after the fact. Making do with what we have, it is still possible to find a method for khipu decipherment. The examination of a successful attempt, outlined below, suggests such a method.

Wherever writing first appeared, it was used to record information deemed important to the state. States are very much concerned with forecast and control, so the discovery that calendrics is a subject for khipu is no surprise. In general, a calendar is an agreed-upon schedule for a culture (Hockett 1962). In itself, it is a system of meaning. It is also an organizer for other systems of meaning; for example, it sets the timing of rituals. In the Inka case, colonial documents imply that a giant representation of a calendar was superimposed on Cusco, the Inka capital (Zuidema 1964). It consisted of forty-one imaginary lines in four quadrants that emanated outward from the Temple of the Sun near the capital's center and reached out to the ends of the known world. Points along the imaginary lines were marked by 328 sacred sites, including natural landmarks such as hills, piles of stones, houses, and fountains. The colonial documents are backed up by archaeological evidence, including the remains of sacred sites (Rowe 1979), and there is an excavated representation of the calendar woven into cloth (Zuidema 1977). A search of the khipu corpus led to the decipherment of four khipu that are calendric. My collaborator and I were able to associate two of these with one calendric interpretation and the third with an alternate interpretation (Ascher and Ascher 1989). The fourth and most complex khipu was tied to the alternate interpretation (Zuidema 1989).

I suggest that khipu decipherment should follow a procedure something like that used in the calendric example. First, a colonial document that is specific and reflects, as far as is possible, an Inka system of meaning is located. Supporting evidence, drawn from artifacts in particular, is then sought. In the next step, a search is undertaken in the corpus for a matching khipu or one that comes close to a match. Alternatively, it is possible to start with a

promising khipu from the corpus and then search documents and artifacts for a solution. There is nothing necessary in the order of procedure. In practice, the route to decipherment is nonlinear. One might proceed, say, from khipu to document and then from document back to the same khipu or to a different one. With a khipu corpus as small as the four hundred that have survived and can be studied, the chance of success is rather low. Failing on all the above routes to decipherment, one might reroute the course and move toward *encipherment*.

ENCIPHERMENT: AN EXAMPLE

Knowing the internal structure of the khipu—that is, knowing how khipu writing works, knowing its code—opens the way to encipherment. In encipherment, information is written into khipu. For example, some colonial document makers write that the information they record was obtained from a khipu maker who read from a khipu containing the information given in the document. Information from such documents can be written back into one or more hypothetical khipu (Ascher and Ascher 1972). In other words, in encipherment, the order of things is reversed. Encipherments are kin to *thought experiments:* they allow us to explore and think about Inka representations of information.

To choose an example for encipherment, I have in mind a group of khipu that are characteristically highly patterned, almost rhythmic in nature. They make up at least 15 percent of the khipu corpus and, strikingly, are set apart from those that seem to be primarily concerned with magnitudes. They call to mind musical scores, spatial layouts, textile patterns, and formulas rather than, say, tribute and census data. Such khipu may be plans to do something rather than recordings of something collected or accomplished. An idealized, highly patterned khipu might show, for example, three groups of four cords with cord colors ABAB in the first and third groups, the colors ABBA in the second group, and with the numbers, group by group, 2, 5, 2, 5, followed by 2, 5, 5, 2, and then followed by a repeat of the first 2, 5, 2, 5. None of these highly patterned khipu have been deciphered. Below, I take a colonial documented textile and, via encipherment, explore the notion that some of the highly patterned khipu are recordings of, or plans for, textile designs.

A single page in an early Spanish document attributed to Martín de Murúa (1946) details either the plan for making a cloth belt or the description of a belt already made. At the top of the page is a preface, followed by a set of specifications. In part, the translation (Desrosiers 1986: 219) of the pref-
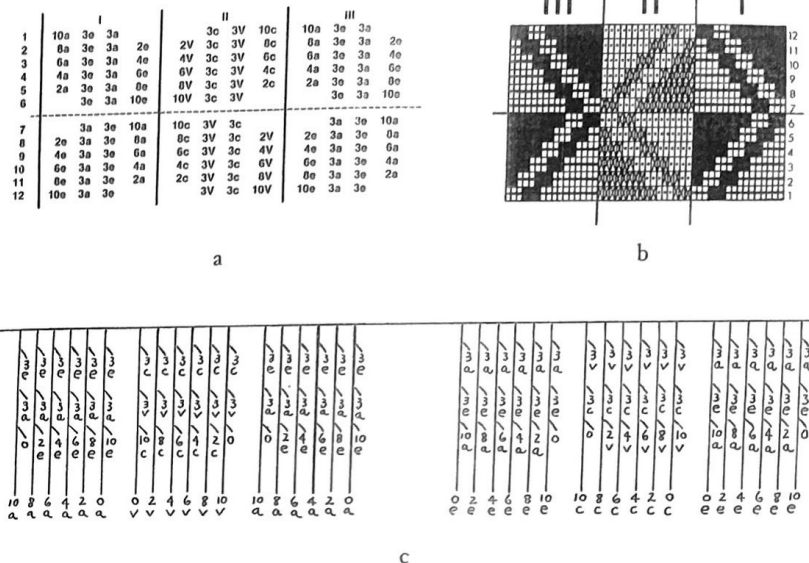
FIGURE 5.1 Cumbi belt: *a* chart, from Desrosiers 1986; *b* graphic design, from Desrosiers 1986; *c* khipu encipherment.

ace reads: "specification of a famous *lipi* or *cumbi* belt which the Coyas used to wear during the great Corn Festivals. . . ." The specifications following the preface consist of twelve lines, Yillaba 1 to Yillaba 12, interspersed with twelve lines of alternating pairs, with each pair consisting of a number and an alphabetic letter.

In a model of analysis and interpretation, Desrosiers (1986) points out several errors in the specifications and traces most of them to copying mistakes. Her resolution is detailed in Figure 5.1a, where the belt is shown composed in three bands (I, II, III) and four colors (a, e, c, V). The number-color pairs recall for Desrosiers the way she observed beginning weavers being taught in the Andes. Band I, Line 1, for example, can be read: 10 of Color a, followed by 3 of Color e, followed by 3 of Color a. The pattern that results is shown in Figure 5.1b, drawn in the graphic mode customarily used for textile pattern representation. In Figure 5.1b, a dash is used for Color a, a black rectangle for e, a cross is used for c, and a spot for V. Continuing with the example, 10a, 3e, 3a is laid out from right to left along Band I, Line 1, at the bottom, extreme

right. All of Figure 5.1b is derived from Figure 5.1a in the same way, line by line, band by band. A diamond divided into four quarters is the belt's basic design motif, as can be seen in Figure 5.1b.

Desrosiers's analysis went far beyond graph-paper construction. She wove experimental textiles, studied Inka belts in museums in Europe and the United States, and examined different looms, including ones known to have been used in Inka times. She suggests the most likely colors for each of a, e, c, and V, and discusses alternative weavings that could have been used to make the belt. Her combined ethnological, linguistic, historical, artifactual, and experimental approaches are convincing.

Now, by encipherment, I add the third representation—the hypothetical khipu shown in Figure 5.1c—to the chart and the graphic representations. There are thirty-six pendants on the khipu. All the pendants show three subsidiaries. There are six groups. Three of the groups are in one part, the remaining three are in a second part. Part 1—the first three groups—corresponds to Lines 1 through 6 on both the graphic and the chart, and Part 2 corresponds to Lines 7 through 12. To read the khipu in a way that corresponds to the chart and the graphic, do as follows: read the first pendant and its subsidiaries in the first group (10a, 3e, 3a, 0); then read the first pendant and its subsidiaries in the second group (0, 3c, 3V, 10c); next, read the first pendant and its subsidiaries in the third group (10a, 3e, 3a, 0). This khipu reading corresponds to Line 1 on both the chart and the graphic. Stay in Part 1 of the khipu, and Lines 2 through 6 can be read in the same manner. To read Lines 7 through 12, move to Part 2 and proceed in the same manner.
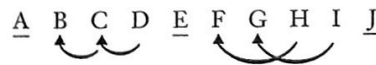
Clearly, there is more than one way to construct a hypothetical khipu. Taking this one as an example, consider how it might help in thinking about khipu representation. The constructed khipu shows some symmetry. Numerically, Parts 1 and 2 are vertical reflections of each other. There is also redundancy. The first and third groups of Part 1 are identical, as are the first and third groups of Part 2. Redundancy is common in the khipu corpus, and the combination of redundancy with symmetry is also common, in particular, in the highly patterned, rhythmic khipu. The constructed khipu is probably adequate in leading toward the design motif, but it is less valuable in giving weaving instructions. To have accomplished that, it probably should have been laid out in groups of three, so that each group in itself corresponded to one line of weaving. But doing it that way would double the number of groups. A question of parsimony appears more seriously in the number of subsidiaries. Although subsidiaries are common enough, the number of them seems excessive. A second-generation hypothetical khipu representation of the belt

might aim at reducing the number of subsidiaries and combining design with weaving instructions. A belt is a relatively small item, yet its encipherment, as envisioned here, results in an average-size khipu. Does this mean that if much larger, more complex textiles were represented in khipu, they would have likely been abbreviated versions of plans rather than full descriptions?

NARRATION AND THE NEXT FIRST STEP

One solution at a time is perhaps the best approach to khipu writing. For some, this may be unsatisfactory. Accustomed to systems based on speech sounds, where the resolution can be more general, some wonder if khipu can be made, so to speak, to talk. This notion is driven by assertions in sixteenth-century Spanish documents that khipu were used for narratives, including histories and myths. Assuming that there is truth in these assertions, it is argued that the khipu code likely included ways to directly represent speech sounds (e.g., Pärssinen 1992). It would be foolhardy to deny this possibility. But before unduly multiplying hypotheses, we need to ask if a system based on units of meaning can be used for recording and telling stories.

Everywhere, narratives have formulaic, traditional frameworks. Take, for example, a story about a diviner and a king who want to overthrow another king. The story is from Burundi, a native African state (Vansina 1965). The story can be seen unfolding in ten episodes, A–J. The initial episode (A) is followed by three episodes (B, C, D). The starting phrases of D repeat, with only slight variation, the start of C; the start of C repeats, again with slight variation, the starting phrases of B. The narrative continues with a middle episode E. Then there is another set of episodes (F, G, H, I), with repeats. The story ends with episode J. It is easy to schematically represent the framework of the narrative:

$$\underline{A} \quad \underline{B} \; \underline{C} \; \underline{D} \quad \underline{E} \quad \underline{F} \; \underline{G} \; \underline{H} \; \underline{I} \quad \underline{J}$$

It would be easy to encipher the framework of the story on a khipu using only a small part of only one of the elements of the khipu code. Different colors, for example, might be used for each of the episodes A–J without exhausting the color repertoire. Other colors and color combinations, along with still other elements of the code, might be used for incidents within the episodes, and so on to units in the story smaller than incidents. A narrative recorded this way would look like a number of the highly patterned, rhyth-

mic khipu in the corpus. I believe that this satisfies the uniformly nonspecific colonial Spanish assertions concerning the telling of narrative with khipu. A system based only on units of meaning is enough to tell a story.

To say that the Inka could record a narrative without recourse to direct representation of speech sounds does not diminish them in regard to writing. Writing systems are no more hierarchical than are, say, kinship systems or religious beliefs. Khipu texts could be profitably compared with late medieval European Latin alphabetic manuscripts, which lacked meaningful punctuation and were filled with abbreviations. One had to know the special vocabulary of a text and its subject matter, in addition to Latin paleography, in order to make any sense of it. Medieval readers of texts said them out loud; Greek and Roman texts had to be read out loud to be understood, largely because the words were not separated (Sirat 1994: 416).

Going further, let us speculate on the relationship between the khipu as an artifact and the actual telling of a narrative. Imagine a khipu held in the hands of a performer. We see the performer looking at the khipu from time to time as the story unfolds. All during the telling, we also watch the performer move his or her hands over, in, below, and through the soft, pliable, ever mobile, nonlinear khipu. This touching recalls Serbo-Croatian singers of tales who found it difficult, if not impossible, to tell their stories without fingering their one-stringed bowed instruments (Lord 1974: 127; 1987: 475; Parry 1987: 442).

The performer we hear and watch has developed special skills. In all non-khipu writing and reading, with the exception of Braille, touch is important only in writing; in the case of the khipu, touch comes into play and is elaborate in both writing and reading. Tactile sensitivity begins in the rhythmic, pulsating environment of the unborn child, far in advance of the development of the other senses. Still, it was difficult for us to learn the tactile control necessary in writing; as adults, we forget just how difficult. The term "scribal tract" (Watt 1994) has been used to gloss the biophysical means we use in producing writing. Watching the performer, we think that "tactile tract" is a better term to cover both the writing—assuming that he or she made the khipu in use—and the reading necessary for the performance. In fact, the performer simultaneously engages at least four tracts: tactile, visual, vocal, and auditory; and all four were wired to the brain via a complex circuitry about which we know almost nothing.

In his intriguingly entitled article "If Wittgenstein Had Been an Eskimo," Edmund Carpenter (1980) dwells on how differently Euro-Americans and native peoples interpret experience. He contends that we transfer most sense

experience into the visual, often excluding other senses, as in, for example, the expression "Let us see what we can hear." For others, there is a continuing interplay of several senses at once. Applying these notions here, we say: if Wittgenstein and we were Eskimos, he and we might understand khipu writing as simultaneously tactile and visual, and probably more. Being that we are who we are, it is difficult to internalize this notion so that it becomes a part of us, but I think that it is the next step that must be taken in the study of Inka writing.

Those interested in trying their skills at decipherment, encipherment, or narrative interpretation should visit the web site http://instruct1.cit.cornell.edu/research/quipu-ascher/ to find detailed descriptions of 206 khipu studied and recorded by me and my collaborator, Marcia Ascher.

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