The Horse, the Wheel, and Language

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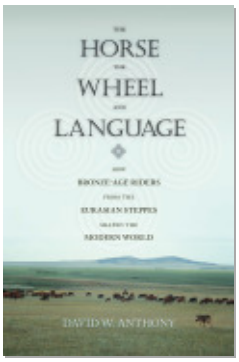

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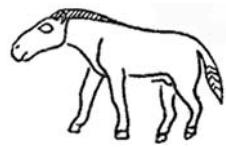
Chapter Seven



How to Reconstruct a Dead Culture

The archaeology of Indo-European origins usually is described in terms that seem arcane to most people, and that even archaeologists define differently. So I offer a short explanation of how I approach the archaeological evidence. To begin at the beginning, surprisingly enough, we must start out in Denmark.

In 1807 the kingdom of Denmark was unsure of its prospects for survival. Defeated by Britain, threatened by Sweden, and soon to be abandoned by Norway, it looked to its glorious past to reassure its citizens of their greatness. Plans for a National Museum of Antiquities, the first of its type in Europe, were developed and promoted. The Royal Cabinet of Antiquities quickly acquired vast collections of artifacts that had been plowed or dug from the ground under a newly expanded agricultural policy. Amateur collectors among the country gentry, and quarrymen or ditch diggers among the common folk, brought in glimmering hoards of bronze and boxes of flint tools and bones.

In 1816, with dusty specimens piling up in the back room of the Royal Library, the Royal Commission for the Preservation of Danish Antiquities selected Christian J. Thomsen, a twenty-seven-year-old without a university degree but known for his practicality and industry, to decide how to arrange this overwhelming trove of strange and unknown objects in some kind of order for its first display. After a year of cataloguing and thinking, Thomsen elected to put the artifacts in three great halls. One would be for the stone artifacts, which seemed to come from graves or sediments belonging to a Stone Age, lacking any metals at all; one for the bronze axes, trumpets, and spears of the Bronze Age, which seemed to come from sites that lacked iron; and the last for the iron tools and weapons, made during an Iron Age that continued into the era of the earliest written references to Scandinavian history. The exhibit opened in 1819 and was a triumphant success. It inspired an animated discussion among

European intellectuals about whether these three ages truly existed in this chronological order, how old they were, and whether a science of archaeology, like the new science of historical linguistics, was possible. Jens Worsaae, originally an assistant to Thomsen, proved, through careful excavation, that the Three Ages indeed existed as distinct prehistoric eras, with some qualifications. But to do this he had to dig much more carefully than the ditch diggers, borrowing stratigraphic methods from geology. Thus professional field archaeology was born to solve a problem, not to acquire things.[1]

It was no longer possible, after Thomsen's exhibit, for an educated person to regard the prehistoric past as a single undifferentiated era into which mammoth bones and iron swords could be thrown together. Forever after time was to be divided, a peculiarly satisfying task for mortals, who now had a way to triumph over their most implacable foe. Once chronology was discovered, tinkering with it quickly became addictive. Even today chronological arguments dominate archaeological discussions in Russia and Ukraine. Indeed, a chief problem preventing Western archaeologists from really understanding steppe archaeology is that Thomsen's Three Ages are defined differently in the steppes than in western Europe. The Bronze Age seems like a simple concept, but if it began at different times in places very close to each other, it can be complicated to apply.

The Bronze Age can be said to begin when bronze tools and ornaments began to appear regularly in excavated graves and settlements. But what is bronze? It is an alloy, and the oldest bronze was an alloy of copper and arsenic. Arsenic, recognized by most of us simply as a poison, is in fact a naturally occurring whitish mineral typically in the form of arsenopyrite, which is frequently associated with copper ores in quartzitic copper deposits, and is probably how the alloy was discovered. In nature, arsenic rarely comprises more than about 1% of a copper ore, and usually much less than that. Ancient metalsmiths discovered that, if the arsenic content was boosted to about 2–8% of the mixture, the finished metal was lighter in color than pure copper, harder when cool, and, when molton, less viscous and easier to cast. A bronze alloy even lighter in color, harder, and more workable was copper and about 2–8% tin, but tin was rare in the ancient Old World, so tin-bronzes only appeared later, after tin deposits were discovered. The Bronze Age, therefore, marks that moment when metalsmiths regularly began to mix molten minerals to make alloys that were superior to naturally occurring copper. From that perspective, it immediately becomes clear that the Bronze Age would have started in different places at different times.

The Three Ages in the Pontic-Caspian Steppes

The oldest Bronze Age in Europe began about 3700–3500 BCE, when smiths started to make arsenical bronze in the North Caucasus Mountains, the natural frontier between the Near East and the Pontic-Caspian steppes. Arsenical bronzes, and the Bronze Age they signaled, appeared centuries later in the steppes and eastern Europe including the lower Danube valley, beginning about 3300–3200 BCE; and the beginning of the Bronze Age in central and western Europe was delayed a thousand years after that, starting only about 2400–2200 BCE. Yet, an archaeologist trained in western Europe may commonly ask why a Caucasian culture dated 3700 BCE is called a Bronze Age culture, when this would be the Stone Age (or Neolithic) in Britain or France. The answer is that bronze metallurgy appeared first in eastern Europe and then spread to the west, where it was adopted only after a surprisingly long delay. The Bronze Age began in the Pontic-Caspian steppes, the probable Indo-European homeland, much earlier than in Denmark.

The age preceding the Bronze Age in the steppes is called the Eneolithic; Christian Thomsen did not recognize that period in Denmark. The Eneolithic was a Copper Age, when metal tools and ornaments were used widely but were made of unalloyed copper. This was the first age of metal, and it lasted a long time in southeastern Europe, where European copper metallurgy was invented. The Eneolithic did not appear in northern or western Europe, which skipped directly from the Neolithic to the Bronze Age. Experts in southeastern Europe disagree on how to divide the Eneolithic internally; the chronological boundaries of the Early, Middle, and Late Eneolithic are set at different times by different archaeologists in different regions. I have tried to follow what I see as an emerging interregional consensus among Russian and Ukrainian archaeologists, and between them and the archaeologists of eastern Poland, Bulgaria, Romania, Hungary, and the former Yugoslavia.[2]

Before the Eneolithic was the Neolithic, the later end of Thomsen's Stone Age. Eventually the Stone Age was divided into the Old, Middle, and New Stone Ages, or the Paleolithic, Mesolithic, and Neolithic. In Soviet archaeology and in current Slavic or post-Soviet terminology the word *Neolithic* is applied to prehistoric societies that made pottery but had not yet discovered how to make metal. The invention of ceramics defined the beginning of the Neolithic. Pottery, of course, was an important discovery. Fire-resistant clay pots made it possible to cook stews and soups all day

over a low fire, breaking down complex starches and proteins so that they were easier to digest for people with delicate stomachs—babies and elders. Soups that simmered in clay pots helped infants survive and kept old people alive longer. Pottery also is a convenient "type fossil" for archaeologists, easily recognized in archaeological sites. But Western archaeologists defined the Neolithic differently. In Western archaeology, societies can only be called *Neolithic* if they had economies based on food production—herding or farming or both. Hunters and gatherers who had pottery are called *Mesolithic*. It is oddly ironic that capitalist archaeologists made the mode of production central to their definition of the Neolithic, and Marxist archaeologists ignored it. I'm not sure what this might say about archaeologists and their politics, but here I must use the Eastern European definition of the Neolithic—which includes both foragers and early farmers who made pottery but used no metal tools or ornaments—because this is what *Neolithic* means in Russian and Ukrainian archaeology.

Dating and the Radiocarbon Revolution

Radiocarbon dating created a revolution in prehistoric archaeology. From Christian Thomsen's museum exhibit until the mid-twentieth century archaeologists had no clear idea how old their artifacts were, even if they knew how to place them in a sequence of types. The only way even to guess their age was to attempt to relate dagger or ornament styles in Europe to similar styles of known age in the Near East, where inscriptions provided dates going back to 3000 BCE. These long-distance stylistic comparisons, risky at best, were useless for dating artifacts older than the earliest Near Eastern inscriptions. Then, in 1949, Willard Libby demonstrated that the absolute age (literally the number of years since death) of any organic material (wood, bone, straw, shell, skin, hair, etc.) could be determined by counting its ^{14}C content, and thus radiocarbon dating was born. A radiocarbon date reveals when the dated sample died. Of course, the sample had to have been alive at some point, which disqualified Libby's discovery for dating rocks or minerals, but archaeologists often found charred wood from ancient fireplaces or discarded animal bones in places where humans had lived. Libby was awarded a Nobel Prize, and Europe acquired its own prehistory independent of the civilizations of the Near East. Some important events such as the invention of copper metallurgy were shown to have happened so early in Europe that influence from the Near East was almost ruled out.[3]

Chronological schemes based on radiocarbon dates have struggled through several significant changes in methods since 1949 (see the appendix

in this volume). The most significant changes were the introduction of a new method (Accelerator Mass Spectrometry, or AMS) for counting how much ^{14}C remained in a sample, which made all dates much more accurate; and the realization that all radiocarbon dates, regardless of counting method, had to be corrected using calibration tables, which revealed large errors in old, uncalibrated dates. These periodic changes in methods and results slowed the scientific reception of radiocarbon dates in the former Soviet Union. Many Soviet archaeologists resisted radiocarbon dating, partly because it sometimes contradicted their theories and chronologies; partly because the first radiocarbon dates were later proved wrong by changes in methods, making it possible that all radiocarbon dates might soon be proved wrong by a newer refinement; and partly because the dates themselves, even when corrected and calibrated, sometimes made no sense—the rate of error in radiocarbon dating in Soviet times seemed high.

A new problem affecting radiocarbon dates in the steppes is that old carbon in solution in river water is absorbed by fish and then enters the bones of people who eat a lot of fish. Many steppe archaeological sites are cemeteries, and many radiocarbon dates in steppe archaeology are from human bones. Analysis of ^{15}N isotopes in human bone can tell us how much fish a person ate. Measurements of ^{15}N in skeletons from early steppe cemeteries show that fish was very important in the diet of most steppe societies, including cattle herders, often accounting for about 50% of the food consumed. Radiocarbon dates measured on the bones of these humans might come out too old, contaminated by old carbon in the fish they ate. This is a newly realized problem, one still without a solution widely agreed on. The errors should be in the range of 100–500 radiocarbon years too old, meaning that the person actually died 100–500 years *after* the date given by the count of ^{14}C. I note in the text places where old carbon contamination might be a problem making the dates measured on human bones too old, and, in the appendix, I explain my own interim approach to fixing the problem.[4]

Attitudes toward radiocarbon dating in the CIS have changed since 1991. The major universities and institutes have thrown themselves into new radiocarbon dating programs. The field collection of samples for dating has become more careful and more widespread, laboratories continuously improve their methods, and the error rate has fallen. It is difficult now to keep up with the flow of new radiocarbon dates. They have overthrown many old ideas and chronologies, including my own. Some of the chronological relationships outlined in my 1985 Ph.D. dissertation have now been proved wrong, and entire cultures I barely knew

about in 1985 have become central to any understanding of steppe archaeology.[5]

But to understand people we need to know more than just *when* they lived; we also need to know something about their economy and culture. And in the specific case of the people of the Pontic-Caspian region, some of the most important questions are about *how* they lived—whether they were wandering nomads or lived in one place all year, whether they had chiefs or lived in egalitarian groups without formal full-time leaders, and how they went about getting their daily bread, if indeed they ate bread at all. But to talk about these matters I first need to introduce some additional methods archaeologists use.

What Did They Eat?

One of the most salient signals of cultural identity is food. Long after immigrants give up their native clothing styles and languages, they retain and even celebrate their traditional food. How the members of a society get food is, of course, a central organizing fact of life for all humans. The supermarkets we use so casually today are microcosms of modern Western life: they would not exist without a highly specialized, capital-financed, market-based economic structure; a consumer-oriented culture of profligate consumption (Do we really need fifteen kinds of mushrooms?); interstate highways; suburbs; private automobiles; and dispersed nuclear families lacking a grandma at home who could wash, chop, process, and prepare meat and produce. Long ago, before all these modern conveniences appeared, getting food determined how people spent much of their day, every day: what time they woke in the morning, where they went to work, what skills and knowledge they needed there, whether they could live in independent family homes or needed the much larger communal labor resources of a village, how long they were away from home, what kind of ecological resources they needed, what cooking and food-preparation skills they had to know, and even what foods they offered to the gods. In a world dominated by the rhythms and values of raising crops and caring for animals, clans with productive fields or large herds of cattle were the envy of everyone. Wealth and the political power it conveyed were equated with cultivated land and pasture.

To understand ancient agricultural and herding economies, archaeologists have to collect the animal bones from ancient garbage dumps with the same care they devote to broken pottery, and they must also make special efforts to recover carbonized plant remains. Luckily ancient people

often buried their food trash in dumps or pits, restricting it to one place where archaeologists can find it more easily. Although cow bones and charred seeds cannot easily be displayed in the national museum, archaeology is not about collecting pretty things but about solving problems, so in the following pages much attention is devoted to animal bones and charred seeds.

Archaeologists count animal bones in two principal ways. Many bones in garbage dumps had been broken into such small pieces for cooking that they cannot be assigned to a specific animal species. Those that are big enough or distinctive enough to assign to a definite species constitute the NISP, or the "number of identified specimens," where *identified* means assignable to a species. Thus, the NISP count, which describes the number of bones found for each species, is the first way to count bones: three hundred cattle, one hundred sheep, five horse. The second counting method is to calculate the MNI, or the "minimum number of individuals" those bones represent. If the five horse bones were each from a different animal, they would represent five horses, whereas the hundred sheep bones might all be from a single skeleton. The MNI is used to convert bones into minimum meat weights—how much beef, for example, would be represented, minimally, by a certain number of cattle bones. Meat weight, comprised of fat and muscle, in most adult mammals averages about half the live body weight, so by identifying the minimum number, age, and species of animals butchered at the site, the minimum meat weight, with some qualifications, can be estimated.

Seeds, like wheat and barley, were often parched by charring them lightly over a fire to help preserve them for storage. Although many charred seeds are accidentally lost in this process, without charring they would soon rot into dust. The seeds preserved in archaeological sites have been charred just enough to carbonize the seed hull. Seeds tell us which plant foods were eaten, and can reveal the nature of the area's gardens, fields, forests, groves, and vineyards. The recovery of charred seeds from excavated sediments requires a flotation tank and a pump to force water through the tank. Excavated dirt is dumped into the tank and the moving water helps the seeds to float to the surface. They are then collected in screens as the water flows out the top of the tank through an exit spout. In the laboratory the species of plants are identified and counted, and domesticated varieties of wheat, barley, millet, and oats are distinguished from wild plant seeds. Flotation was rarely used in Western archaeology before the late 1970s and was almost never used in Soviet archaeology. Soviet paleobotanical experts relied on chance finds of seeds charred in burned

pots or on seed impressions preserved in the damp clay of a pot before it had been fired. These lucky finds occur rarely. A true understanding of the importance of plant foods in the steppes will come only after flotation methods are widely used in excavations.

Archaeological Cultures and Living Cultures

The story that follows is populated rarely by individuals and more often by cultures, which, although created and reproduced by people, act quite differently than people do. Because "living cultures" contain so many subgroups and variants, anthropologists have difficulty describing them in the abstract, leading many anthropologists to discard the concept of a "unitary culture" entirely. However, when cultural identities are contrasted with other bordering cultures, they are much easier to describe.

Frederik Barth's investigations of border identities in Afghanistan suggested that the reproduction and perhaps even the invention of cultural identities often was generated by the continuous confrontation with Others inherent in border situations. Today many anthropologists find this a productive way to understand cultural identities, that is, as responses to particular historical situations rather than as long-term phenomena, as noted in the previous chapter. But cultural identities also carry emotional and historical weight in the hearts of those who believe in them, and the source of this shared emotional attachment is more complicated. It must be derived from a shared set of customs and historical experiences, a font of tradition that, even if largely imagined or invented, provides the fuel that feeds border confrontations. If that font of tradition is given a geographic location or a homeland it is often away from the border, dispersed, for example, across shrines, burial grounds, coronation sites, battlefields, and landscape features like mountains and forests, all thought to be imbued with culture-specific spiritual forces.[6]

Archaeological cultures are defined on the basis of potsherds, grave types, architecture, and other material remains, so the relationship between archaeological cultures and living cultures might seem tenuous. When Christian Thomsen and Jens Worsaae first began to divide artifacts into types, they were trying to arrange them in a chronological sequence; they soon realized, however, that a lot of regional variation also cut across the chronological types. Archaeological cultures are meant to capture and define that regional variation. An archaeological culture is a recurring set of artifact types that co-occur in a particular region during a set time period.

In practice, pottery types are often used as the key identifiers of archaeological cultures, as they are easy to find and recognize even in small excavations, whereas the recognition of distinct house types, for example, requires much larger exposures. But archaeological cultures should never be defined on the basis of pottery alone. What makes an archaeological culture interesting, and meaningful, is the co-occurrence of many similar customs, crafts, and dwelling styles across a region, including, in addition to ceramics, grave types, house types, settlement types (the arrangement of houses in the typical settlement), tool types, and ritual symbols (figurines, shrines, and deities.) Archaeologists worry about individual types changing through time and shifting their areas of distribution, and we *should* worry about these things, but we should not let problems with defining individual tree species and ranges convince us that the forest is not there. Archaeological cultures (like forests) are particularly recognizable and definable at their borders, whereas regional variation in the back country, away from the borders, might often present a more confusing picture. It is at robust borders, defined by bundles of material-culture contrasts, where archaeological cultures and living cultures or societies might actually correspond. As I argued in the previous chapter, robust borders that persist for centuries probably were not just archaeological or cultural but also linguistic.

Within archaeological cultures a few traits, archaeologists have learned, are particularly important as keys to cultural identity. Most Western archaeologists accept that technological style, or the way an object is made, is a more fundamental indicator of craft tradition than the way it is decorated, its decorative style. The technology of production is more culture-bound and resistant to change, rather like the core vocabulary in linguistics. So clay tempering materials and firing methods usually are better indicators of a potter's cultural origin than the decorative styles the potter produced, and the same probably was true for metallurgy, weaving, and other crafts.[7]

One important alternative to archaeological cultures is the archaeological *horizon*. A *horizon*, more like a popular fashion than a culture, can be defined by a single artifact type or cluster of artifact types that spreads suddenly over a very wide geographic area. In the modern world the blue jeans and T-shirt complex is a horizon style, superimposed on diverse populations and cultures around the planet but still representing an important diffusion of cultural influence, particularly youth culture, from an area of origin in the United States. It is important, as it tells us something about the place the United States occupied in world youth culture at the

moment of initial diffusion (the 1960s and 1970s), but it is not a migration or cultural replacement. Similarly the Beaker horizon in Late Neolithic Europe is defined primarily by a widespread style of decorated drinking cups (beakers) and in many places by a few weapon types (copper daggers, polished stone wrist-guards) that diffused with a new fashion in social drinking. In most places these styles were superimposed on preexisting archaeological cultures. A horizon is different from an archaeological culture because it is less robust—it is defined on the basis of just a few traits—and is often superimposed on local archaeological cultures. Horizons were highly significant in the prehistoric Eurasian steppes.

The Big Questions Ahead

We will proceed on the assumption that Proto-Indo-European probably was spoken in the steppes north of the Black and Caspian Seas, the Pontic-Caspian steppes, broadly between 4500 and 2500 BCE. But we have to start somewhat earlier to understand the evolution of Indo-European–speaking societies. The speakers of Proto-Indo-European were a cattle-keeping people. Where did the cattle come from? Both cattle and sheep were introduced from outside, probably from the Danube valley (although we also have to consider the possibility of a diffusion route through the Caucasus Mountains). The Neolithic pioneers who imported domesticated cattle and sheep into the Danube valley probably spoke non–Indo-European languages ultimately derived from western Anatolia. Their arrival in the eastern Carpathians, northwest of the Black Sea, around 5800 BCE, created a cultural frontier between the native foragers and the immigrant farmers that persisted for more than two thousand years.

The arrival of the first pioneer farmers and the creation of this cultural frontier is described in chapter 8. A recurring theme will be the development of the relationship between the farming cultures of the Danube valley and the steppe cultures north of the Black Sea. Marija Gimbutas called the Danubian farming cultures "Old Europe." The agricultural towns of Old Europe were the most technologically advanced and aesthetically sophisticated in all of Europe between about 6000 and 4000 BCE.

Chapter 9 describes the diffusion of the earliest cattle-and-sheep-herding economy across the Pontic-Caspian steppes after about 5200–5000 BCE. This event laid the foundation for the kinds of power politics and rituals that defined early Proto-Indo-European culture. Cattle herding was not just a new way to get food; it also supported a new division of

society between high-status and ordinary people, a social hierarchy that had not existed when daily sustenance was based on fishing and hunting. Cattle and the cleavage of society into distinct statuses appeared together. Right away, cattle, sheep—and horses—were offered together in sacrifices at the funerals of a select group of people, who also carried unusual weapons and ornamented their bodies in unique and ostentatious ways. They were the new leaders of a new kind of steppe society.

Chapter 10 describes the discovery of horseback riding—a subject of intense controversy—by these archaic steppe herding societies, probably before 4200 BCE. The intrusion into Old Europe of steppe herders, probably mounted on horses, who either caused or took advantage of the collapse of Old Europe, is the topic of chapter 11. Their spread into the lower Danube valley about 4200–4000 BCE likely represented the initial expansion of archaic Proto-Indo-European speakers into southeastern Europe, speaking dialects that were ancestral to the later Anatolian languages.

Chapter 12 considers the influence of the earliest Mesopotamian urban civilizations on steppe societies—and vice versa—at a very early age, about 3700–3100 BCE. The chiefs who lived in the North Caucasus Mountains overlooking the steppes grew incredibly rich from long-distance trade with the southern civilizations. The earliest wheeled vehicles, the first wagons, probably rolled into the steppes through these mountains.

The societies that probably spoke classic Proto-Indo-European—the herders of the Yamnaya horizon—are introduced in chapter 13. They were the first people in the Eurasian steppes to create a herding economy that required regular seasonal movements to new pastures throughout the year. Wagons pulled by cattle allowed them to carry tents, water, and food into the deep steppes, far from the river valleys, and horseback riding enabled them to scout rapidly and over long distances and to herd on a large scale, necessities in such an economy. Herds were spread out across the enormous grasslands between the river valleys, making those grasslands useful, which led to larger herds and the accumulation of greater wealth.

Chapters 14 through 16 describe the initial expansions of societies speaking Proto-Indo-European dialects, to the east, the west, and finally to the south, to Iran and the Indian subcontinent. I do not attempt to follow what happened after the initial migrations of these groups; my effort is just to understand the development and the first dispersal of speakers of Proto-Indo-European and, along the way, to investigate the influence of technological innovations in transportation—horseback riding, wheeled vehicles, and chariots—in the opening of the Eurasian steppes.