The Bronze Age and Early Iron Age Peoples of Eastern Central Asia

中亞東部青銅和早期鐵器時代的居民

Volume I

edited by
Victor H. Mair

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Volume One

Archeology, Migration and Nomadism, Linguistics

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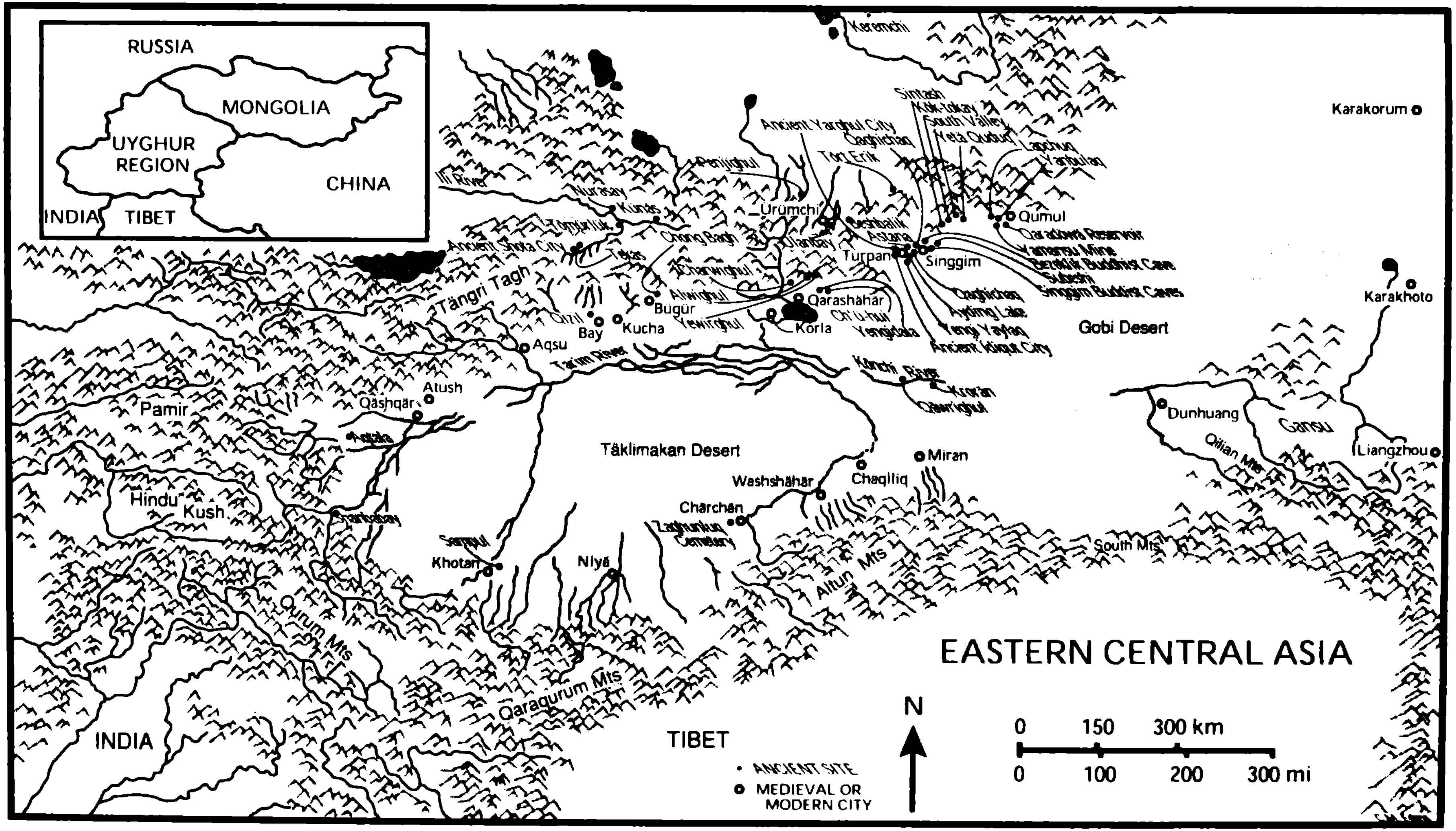

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Victor H. Mair, ed.

Volume 1

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Dolkun Kamberi

Acknowledgements

The genesis of this volume lies in the International Conference on the Bronze Age and Iron Age Peoples that was held at the University of Pennsylvania Museum of Anthropology and Archaeology, April 19-21, 1996 in Philadelphia. This was a large event that brought together 40 paper-presenters and 40 additional active participants from a total of 15 countries around the world. Also present were another 40 observers and members of the press. The Sunday afternoon public session was attended by an audience of over 500 members.

The planning and execution for an event of this magnitude required the assistance of numerous friends, students, and colleagues. First of all, I would like to thank Jennifer Alabiso, then of the Penn Language Center and now of the Linguistic Analysis Center, who was my "right-hand woman" starting from two weeks after the conception of the conference in the winter of 1995 until two weeks before the conference actually convened when she had a baby. Ms. Alabiso was responsible for most of the business aspects of the conference, from hotel reservations to catering and meeting room arrangements. After Ms. Alabiso gave birth to her baby, my son Thomas Krishna stepped in on very short notice and rescued me just as the tempo of activity increased ten-fold. In the midst of everything, he managed to teach me how to use e-mail in fifteen minutes even though I had been trying for the previous two years to master this complicated new technology. Also helping me to fill in for the much-missed Ms. Alabiso was Sharon Fennimore, an angel who worked wonders out of the sheer goodness of her heart.

Two members of the Museum staff went far beyond the call of duty to ensure that the conference was a resounding success. They are Elizabeth Proctor of the Special Events Office and Pam Kosty of the Public Information Office. I am deeply appreciative of the kind and enthusiastic aid they and their staff provided, especially during the last three or four frantic months leading up to the conference.

Most of the academic correspondence for the conference was carried out by me while I was a Visiting Research Professor at the Institute for Humanistic Studies (Jinbun Kagaku Kenkyūjo) of Kyoto University. I wish to express my thanks to the Institute and all of its researchers and staff members for providing the perfect atmosphere in which to pursue my own research that was germane to the conference and the communications facilities necessary to secure the agreement of 40 distinguished scholars from around the world to participate.

Dolkun Kamberi, who was a Visiting Research Associate at Penn during the 1995-1996 academic year, took care of a portion of the

correspondence in Chinese and in Uyghur. He also helped compile and assemble items in the conference folder for distribution. I am grateful for Dr. Kamberi's permission to use several of his extraordinary photographs to illustrate various materials pertaining to the conference.

Performing all sorts of tasks during the conference itself, from registering participants, to taking overseas guests to restaurants and on sightseeing tours, to operating audio-visual equipment were Tansen Sen, Anne Martin-Montgomery, Terry Graham, and Li-p'ing Lo. Colleagues who offered a hand at crucial moments include Kathleen Ryan, Joyce White, Naomi Miller, and Jianjun Mei. There were many other kind souls who generously devoted their time and expertise on the spur of the moment. Even though I do not name them here individually, my sincere thanks go out to each and every one of them.

Others who showed thoughtful consideration and understanding in the hectic days just before and after the conference were Gina Zinni of the Sheraton Sales Office and the sisters of the Divine Tracy Hotel. Needless to say, without the day in and day out services rendered by the administrative staff of the Department of Asian and Middle Eastern Studies (Margaret Guinan, Diane Moderski, and Linda Greene), I would have been utterly lost.

As for the publication of this volume, I wish especially to thank Karen Velluci of the University of Pennsylvania Museum Publications Office and Dr. Roger Pearson of the *Journal of Indo-European Studies* for helping me to produce it efficiently and expeditiously. Dr. Clark Riley, a veritable genius when it comes to electronic typesetting, worked wonders with his computers and scanners; in addition he was unfailingly courteous, prompt, and accurate. Dr. David Testen heroically converted Prof. Eric Hamp's handwritten faxes sent from half-a-dozen out-of-the-way places in Europe into a manageable computer file. My graduate students, Sara Davis and Jidong Yang (who also served as a translator and interpreter during the conference), assisted me by retyping several of the most heavily marked-up papers and by proofreading some of the papers. Others who proofread one or more papers include J. P. Mallory, Howard Reid, and Charlotte Roberts. Heartfelt thanks go out to Justine Snow for helping to prepare the index. I am especially grateful to Mr. Yang for his selfless contributions toward this volume.

Finally, I wish to declare my gratitude to the following for the donation of devices which ensured that the conference ran smoothly and kept exactly to the schedule: Alfredo Cadonna and the City of Venice for their tiny porcelain bell, my wife Li-ching Chang for her little brass German bell, and China Arts & Crafts of Chinatown in Philadelphia for their big Chinese opera gong, also E. Bruce Brooks for his electronic timer-beeper.

Victor H. Mair, editor

Above all, I wish to express my utmost gratitude to all of the renowned scholars who not only responded positively to my invitation to participate in the Philadelphia "mummies conference" but who also delivered their written papers to me in a timely fashion. From start to finish, this has been the most exciting and rewarding intellectual experience of my entire life. Thanks to one and all!

Victor H. Mair
Swarthmore, Pennsylvania
December 5, 1996

Priorities

Victor H. Mair
University of Pennsylvania

Introduction

Much progress has been made in research on the early inhabitants of the Tarim Basin and surrounding areas, but the project is still in its infancy and numerous difficult questions persist. In this introductory essay, I should like first to describe briefly what has been achieved thus far and then move on to an account of unsolved problems and current efforts to confront them. Finally, I shall close by outlining what needs to be done if we are ever to receive satisfactory answers to the many mysteries surrounding the ancient populations of Eastern Central Asia (ECA). The last portion of the essay is, as it were, an archeologist's wish list. The more wishes that are fulfilled, the clearer will be our understanding of the (pre)history of ECA. In this essay, I am more concerned with conceptual and methodological matters than I am with particular hypotheses. That is to say, rather than proposing explicit identifications for the various groups of prehistoric peoples in ECA, my task here is to delineate ways to overcome our present state of relative ignorance concerning them.

We must begin by expressing gratitude to the Chinese and Uyghur archeologists who, since the late 1970s, have exhumed scores of desiccated corpses dating to the Bronze Age and Early Iron Age as well as hundreds of skeletons from the same period. They have also recovered from the graves in which these human remains were found a wealth of artifactual evidence, a portion of which has been described in preliminary reports. Without their local efforts during the eighties, none of the international research of the nineties would have been possible. Especially deserving appreciation are MU Shunying and WANG Binghua, the first and second directors of the Institute of Archeology in Ürümchi, who were personally involved in important excavations at Krorän (Loulan), Qumul (Hami), and elsewhere in the Uyghur Region. Idris Abdursul, LÜ Enguo, and ZHANG Ping, senior researchers at the same Institute, have made outstanding contributions in the field. From the Museum of the Uyghur Region in Ürümchi, an expedition was sent to the Late Bronze Age cemetery outside the village of Zaghunluq in Chärchän County during the mid-eighties. Thanks to the persistence and dedication of Museum archeologists Abduqeyum Khoja, Dolkun Kamberi, and others, a magnificent group of three splendidly preserved and attired

mummies (a middle-aged man, an old woman, and an infant), together with an extraordinarily rich assemblage of burial goods revealing intimate details of their daily lives and spiritual beliefs, were brought back to Ürümchi. After encountering many obstacles, the leadership of the Museum (Director Sabit Ahmat and Vice Director Israfel Yusuf) finally succeeded in mounting an informative display of the Zaghunluq trio and other mummies. As a result, the Europoid mummies of the Tarim Basin became known to the world (Hadingham 1994; Mair 1995b, 1995d). We are likewise indebted to dozens of other colleagues, both in Ürümchi and in archeological and museological units throughout the Uyghur Region. Without their kind assistance and generous cooperation, it would have been impossible to carry out the research that has culminated in this volume.

Previous Achievements: Textiles, Physical Anthropology, and Cultural Typologies

To date, the most extensive and rewarding scientific examinations of materials related to the ancient populations of ECA by scholars outside of China are the textile studies of Elizabeth Barber (1995; this volume; 1998) and Irene Good (1995; this volume). The technology for the production of cloth is extraordinarily complex. In the case of wool (which is usually what we are talking about in ancient ECA), this involves (not an exhaustive list!): the selective breeding of sheep in order to obtain fibers of the desired length, diameter, color, flexibility, and other qualities; twisting and spinning of the fibers into threads and the threads into yarn (each step presents various options concerning directionality [S, Z], thickness, etc.); dyeing; the selection and construction of an appropriate loom; weaving, in which the warps and wefts may obviously be manipulated in many highly specific ways to obtain a variety of esthetic and functional surfaces and textures; and patterning. Such seemingly trivial matters as the types of beginning and ending edges and the width of the cloth must also be taken into consideration. This is not even to begin to discuss the plethora of sewing stitches and other techniques that are used to join the cloth into garments of fashionable design and comfortable fit.

Indeed, the variables concerning textile production are so numerous and complicated that, when they are all taken into account as a coherent body of technical data for comparative purposes, they become one of the most powerful diagnostic tools available to the archeologist. Unfortunately, textiles are far more perishable than pots (which have their own well-known set of variables with regard to shape, function, wall thickness, construction method, coloring, design, and ornamentation), for example, hence the textile archeologist is often reduced to unsatisfying bits of impressions on

more durable items such as pots (what else?) and bronzes. The Tarim Basin, however, is blessed with a combination of climatic and soil conditions that have conspired to preserve for us in pristine condition virtually countless textile specimens that may be submitted to a battery of tests. As an indication of the rigorous scientific nature of the investigations that may be carried out on textile samples, I name here only the types of instruments and kinds of procedures that may be employed for fiber and dye analysis alone: electron microscope, heat differential analysis, X-ray diffractometer; amino acid content analysis; infrared spectrometer; ultraviolet spectrometer; thin layer chromatograph; atomic absorption spectrometer; high pressure liquid phase analysis; gas chromatograph; nuclear magnetic resonance; nuclear spectrometer; X-ray fluorescence analysis; electron chromatograph. Until we are permitted to carry out such tests, we cannot even answer such seemingly simple questions as which plants or minerals were used for dying the woolen textiles from various sites.

Although Barber and Good have been hampered by lack of access to the full range of prehistoric textiles from the Uyghur Region, they have made enormous strides through painstaking utilization of the limited amount of primary materials that were made available to them in the United States and in Ürümchi. They have also exerted themselves to the utmost in combing through the scattered references to and illustrations of prehistoric textiles from ECA in previous publications. As a result of their labors, we may say with complete confidence that the textiles of ECA during the Bronze Age and Early Iron Age were not an independent, isolated phenomenon, but that they arose as part of a technological tradition that stretches west-northwestward to Europe and west-southwestward to the circum-Pontic region. We have already published preliminary findings about the tartan diagonal twills from Qizilchoqa (Good 1995; Mair 1995b) and will have much more to say about them in the future. For the moment, I shall mention only that on a recent expedition (August-September, 1996) to the Tarim, I recorded and photographed many other examples of tartans whose design is unmistakably {sett – reverse – repeat – reverse}, etc. in both the warp and the weft, often employing a pivot as well. Those who are familiar with Celtic tartans will instantly recognize this arrangement (the distances between pivots and reverses are also comparable) and wonder how it could be found in the center of Asia around 1000 BCE. I have no doubt whatsoever that Barber, Good, and their colleagues will eventually be able to connect the Tarim Basin textiles with specific archeological cultures in western Eurasia and that their findings will forge a key link in the chain of evidence leading to the more precise identification of the peoples of ECA and their cultures.

In order for that to happen, it will be necessary for specialists on the archeology of ECA to present more accurate and comprehensive

schemata for the cultural chronology of ECA. As late as five or six years ago, there were effectively no systematic classifications for the cultural development of this vast, important region. Now that the pace of archeological investigations concerning ECA has picked up immeasurably, at least half a dozen reasonably comprehensive proposals have been put forward, those by CHEN (1990, 1995), SHUI (1993), Debaine-Francfort (1988, 1989), Wang (1993), AN (this volume), and Chen and Hiebert (1995). Due to a dearth of site reports (to be discussed in more detail below), these classification schemes are still necessarily tentative, but at least we now have a choice of coherent frameworks in which to contemplate the overall evolution of human cultures in ECA from the Late Neolithic through the Early Iron Age.

The most sustained, scientific investigation of the Bronze Age and Early Iron Age populations of ECA undertaken in China are the physical anthropological studies of HAN Kangxin (Institute of Archeology, Peking). In a series of notable papers on the skeletal remains from various sites in the Uyghur Region, Professor Han has recorded the thousands of meticulous measurements and mathematical analyses that he has made over the course of the last decade and more. But Han has done much more than simply record vast amounts of accurate, hard data. He has also carefully compared the physical characteristics of the ancient populations of the Tarim Basin and surrounding areas with those of early peoples elsewhere in Eurasia. Furthermore, relying on archeology and history, he has put all of this invaluable information in the context of the physical and ethnic transformations that have occurred in ECA and East Asia during the past four millennia. The conclusions Han draws constitute a solid foundation for any serious investigations on the ancient inhabitants of ECA.

Again, back to Genetics

As I have explained on several occasions (e.g., Mair 1993, 1995a), the initial stages of our international, interdisciplinary research project on the prehistoric populations of ECA were focused heavily on genetic analysis (mitochondrial DNA). While the project subsequently came to embrace many other fields, genetics still plays a vital role in our investigations. After years of time-consuming, patient laboratory procedures, Paolo Francalacci (1995, 1996, this volume) has at last cautiously announced the results of his first round of investigations. Suffice it to state here only that Francalacci's observations are clearly in conformity with what would have been expected from the the general configuration of the physical anthropological, archeological, and linguistic evidence.

As for the validity of employing evidence from research on

genetics and physical anthropology in what is fundamentally an archeological and linguistic inquiry, we may cite the numerous persuasive papers of Robert R. Sokal and his associates (e.g., Sokal 1991a, 1991b; Sokal *et al.* 1988, 1989, 1990, 1991, 1992, 1993; Barbujani and Sokal 1990; Barbujani *et al.* 1995; Chen *et al.* 1995), the bibliographies of which refer to many other important theoretical and practical works by other researchers. Their basic raw data were gene frequencies for human blood group antigens, enzymes, and proteins of 26 genetic systems. Sokal and his team also complemented their genetic research by collecting and analyzing standard morphometric data. By investigating a large number of allele frequencies (as many as 93) and cranial variables (10) at approximately 3,500 locations (with over 7,500 data points in all) divided into 85 quadrats in Europe, Sokal and his colleagues have demonstrated that language-family boundaries show significant genetic frequency (and, to a lesser degree, morphometric) differences. In contemplating why this is so, Sokal *et al.* have pointed out that **language differences themselves act as barriers to free gene flow and hence enhance genetic differentiation.** As they have stated (and convincingly demonstrated) on various occasions, gene flow across language boundaries tends to be less than within areas speaking the same language.

Relying on the same huge data base, Sokal and his colleagues have computed the genetic distances among speakers of the various European language groups. By subjecting the matrix of distances to numerical taxonomic procedures, they were able to classify these groups in a manner that reflects geographic propinquity, ethnic origins, and linguistic affiliation (Harding and Sokal 1988). The languages they dealt with belong to the following families: Indo-European (various branches), Uralic (Ugric: Hungarian, Khanti, Mansi; Finnic: Estonian, Finnish, Karelian, Lappic), "Altaic" (Turkish, Tatar, Kazakh), Semitic (Maltese), and the isolate Basque. Using recent and sophisticated computational methods such as "Wombling", Sokal and his associates have shown that the genetic structure of populations in Europe is determined mainly by gene flow and admixture, rather than by adaptation to varying environmental conditions (Barbujani and Sokal 1990). A corollary of this finding is that the language affiliation of populations plays a major role in maintaining and probably causing genetic differences. These analyses demonstrate that **speakers of different language groups in Europe do differ genetically and** that **this difference remains even after geographic differentiation is allowed for** (Sokal 1988). Thus, **empirical evidence supports the conclusion that there is a correspondence between linguistic and genetic information, one aspect of which is rapid gene change across language boundaries.** Such correspondences occur because speakers representing various languages trace their ancestry back in time to relatively small groups

of persons who were geographically isolated for long periods from other nascent groups. As a result of their isolation and relatively small populations, they must have become linguistically and genetically distinct.

The results of the large-scale, ongoing research project carried out by Sokal *et al.* do **not** prove that the relationship between language differentiation and genetic constitution is one of identity. (For example, the genotypes of Germanic speakers and Celtic speakers are, on the whole, closer to each other than are their linguistic affinities [Sokal *et al.* 1990: 164-165; Harding and Sokal 1988: 9371] and, obviously, an adopted child from a distant, genetically quite distinct population may grow up as a native speaker in another population.) Rather, what they have shown is that there are measurable correspondences between the linguistic and genetic features of populations overall that may be analyzed in meaningful ways. In other words, they have conclusively demonstrated that "genetics and language are interrelated in world populations" and that "linguistic differences among people are at least partially reflected by the genetic differences among them" (Chen *et al.* 1995: 607, 610).[1] In sum, they have shown that **there is a significant correlation between genetic and linguistic distances**.[2]

Sokal and his colleagues (1993) have buttressed their laboratory and computational research on the genetic characteristics of modern language groups with extensive historical research. From a database of 6,161 records (reduced to 3,500 final records after the elimination of duplicate or unreliable information) of ethnic locations and movements of 891 ethnic units since 2000 BCE, they computed ethnohistorical affinities as arc distances between all pairs of the 85 quadrats mentioned in the second paragraph of this section. The results showed that "These affinities are significantly correlated with genetic distances based on 26 genetic systems, even when geographic distances, a common causative factor, are held constant. Thus, the ethnohistorical distances explain a significant amount of the genetic variation observed in modern populations." And, because the genetic variation in modern populations is linked to linguistic variation, their ethnohistorical studies afford a time-depth to their contemporary linguistic-genetic research even without resort to the analysis of ancient DNA. This aspect of their investigations is crucial and might well serve as a model for research on the ancient and modern populations of ancient ECA. Of course, when materials are available, it would be desirable to check the genetic composition of ancient

[1]In the paper by Chen *et al.* just cited, the presently available genetic data were found not to support a Eurasiatic superphylum.

[2]William Wang (this volume) cites several exceptional cases where, as he says, "genes and language have gone their separate ways." Below, however, I suggest that more thorough analysis may expose hidden linkages.

populations directly.

Additional findings of the ethnohistorical studies of Sokal *et al.* (1993: 66a) that will be of particular interest to readers of this volume are the following: 1. Most, but certainly not all, discernible population movements are of relatively short distance. A frequency distribution shows that 43.7% of the movements are within two quadrats (2 X 225 = 450 miles) in any direction. 2. The movement process from most quadrats is contagious. This means that the language family vector injected into a target quadrat faithfully reflects the vector of the source quadrat, regardless of the nominal language affiliation of the specific movement record. 3. Language family units occupy mid-sized to large areas and frequently move en masse. It should be mentioned that the relatively rapid population movements discussed here are of a very different nature from the gradual growth and outward expansions of language described in "*Die Sprachamöbe*" (Mair, this volume).

Other research based on gene frequencies and craniometric variables by Sokal (1991a; 1991b: 135) concludes that long-distance migration "was an important process in the formation of the modern gene-frequency surfaces of Europe, that the effect of early major migrations can still be detected, and that immigrant populations amalgamated with earlier groups as opposed to completely displacing them."

In this context, it is worth observing that basic cultural developments (e.g., the development of paleolithic tools, the neolithic revolution, the spread of agriculture) also possess partial correlations with demic diffusion (a combination of demographic growth, range expansion, and limited genetic admixture) (Sokal *et al.* 1991; Weng and Sokal 1995). At the same time, it must be observed that the spread of genetic traits associated with fundamental cultural changes is even slower than is the case with the expansion of languages, is not as highly focalized, and – most importantly – operates largely independently of language expansion. As for the transmission of technology (e.g., bronze metallurgy, wheeled vehicles), its spread can be extremely rapid and so far has not been linked directly and necessarily to genetic flow or demic diffusions, although small numbers of "experts" and "specialists" are usually absorbed into a population which borrows a complicated new technology (e.g., chariots, steam engines, airplanes, telegraphs, telephones, televisions, automated teller machines, etc.) from another population, bringing with them their minute pool of genes. Often such "experts" and "specialists" reside in the borrowing population for only a brief period of time, and in such cases their genetic impact is next to nil.

Thus, we are faced with the extremely complex combination of, for example, a gradual (measured) demic diffusion bringing agriculture **out of** Anatolia northwest toward Europe beginning

around the 7th millennium BCE, a quicker spread of Hittite speakers southeastward **into** Anatolia around the middle of the 4th millennium, and the rapid importation of horse-drawn wheeled vehicles **into** western Anatolia from the east-northeast a couple of millennia later. (Consult Fig. 3 [actually a schematic map] accompanying "*Die Sprachamöbe*" at the end of this volume. We can see the same sorts of processes at work in the present century, except that the pace of change in all three areas [culture, language, and technology] -- with their diverse implications for genetic transformations – has been speeded up because of vastly enhanced communications and transportation as well as better control over the environment.) The total genotypical complement of Anatolia in, say, 1500 BCE, would consist of all three of the above components in varying proportions, plus highly attenuated remnants bequeathed by earlier layers of Neolithic and Paleolithic peoples.

In spite of the phenomenal intricacy of the magnitudes, directionalities, and time-depths of all these genetic flows, provided that one uses a sufficiently nuanced and sensitive analytical tool, the resulting pattern of the overlaying inputs is analyzable. The task is actually much less overwhelming than, at first glance, it would appear. The reason for this is that most categories of genetic inputs (e.g., hired specialists and experts) are so weak as to be negligible. Even occupying armies of hundreds of thousands of men have minimal genetic impact on a population of millions (e.g., the Americans in Japan after World War II). The work of Sokal *et al.* has taught us unmistakably that one category we cannot disregard is the speech community. Those who successfully introduce a new language into a region where formerly another language was spoken exert a significant genetic impact. A language cannot spread without speakers and speakers necessarily carry with them a certain complement of genes.

Admittedly, through adoption, kidnapping, capture, enslavement, education abroad, immigration at a young age, and other unusual circumstances, individuals (or, more likely, their offspring) can become native or near-native speakers of a language other than that of their biological ancestors. And elite dominance by leaders of a certain genetic type may also spread a language into an area occupied by individuals of another genetic type (see below). But unless sizable numbers of native speakers actually move into the area and settle there permanently, the original language cannot normally be replaced by a new language. Witness the situation in Korea and Taiwan which were both occupied and colonized by Japanese forces for nearly half a century or more and where Japanese was decreed to be the language of education and enforced as such. Or witness India, most of which was efficiently administered by Britain from 1757 to 1947, nearly two centuries. English is admittedly an extremely

important second language in India, but in terms of native speech it counts as only an ultra-thin veneer on the surface of a sea of Indic, Dravidian, and other languages. The contrasting repercussions of English (elite dominance) and Indo-Aryan (far-reaching language replacement) in the South Asian subcontinent bespeak a disparity in the numbers of transmitters who brought these languages with them.

It is worth our while to spend some time discussing the spread of Sinitic (perhaps more properly and precisely designated as Hanic) languages from a nuclear area at the confluence of the Yellow and Wei rivers (between roughly 109^0-111^0 east longitude X 34^0-35^0 north latitude) beginning more than two thousand years ago. This is so both because of the general principles of genetics and linguistics involved, but also because the gradual coalescence and expansion of Sinitic (Hanic) may well have been induced by the appearance of nomadic Indo-European speakers in this very area of China as early as the period of Late Yangshao Culture (c. 3500-2500 BCE).

The emergence and expansion of Sinitic (Hanic) has been ably treated by William S-Y. Wang in his "Three Windows" (this volume). As he points out clearly, there is a dramatic genetic split between Han Chinese north and south of the Yangtze River (at roughly the 30th parallel). This genetic distinction between northern and southern Han is corroborated by equally sharp differences in physical characteristics (see, for example, DU and Yip 1993) and surnames (Du, *et al.* 1992). Racially, the Han people north and south of the Yangtze are basically of two different types.

The rich linguistic and cultural diversity of these so-called Han peoples has been extensively documented by Leo J. Moser in his *The Chinese Mosaic* (1985). Yet much more work needs to be done to distinguish precisely among the many varieties of Sinitic (Hanic) spoken throughout China. The vast majority of these languages has never been written down (indeed, many of their morphemes are unwritable in Chinese characters – despite the fact that they are said to be Sinitic [Hanic] languages) and their great differences are customarily overlooked because of the existence of two national languages that have been extensively employed by bureaucrats and intellectuals within the shifting borders of the Chinese state: 1. a written, classical language that has probably not been sayable for at least the last two millennia and, in my estimation, has always been radically divorced from the spoken vernaculars since the time of its apparent invention around 1200 BCE (Mair 1994); 2. a vernacular *koine* now known as Mandarin that was based on the language of the capital and permitted officials from different regions of China to talk to each other, something they would not have been able to do in their native languages. I believe that a thorough investigation of the spoken Sinitic (Hanic) languages will show them to be at least as varied as the Indo-European languages of Europe. What is more, such an

investigation will also show the close interactions among Sinitic (Hanic) languages and the non-Sinitic (non-Hanic) languages that they are slowly displacing.

In a brief but very important new publication entitled *China's Vernacular Cultures*, Glen Dudbridge (1996: 13-14) has presented evidence which indicates that Han languages spread southward without entirely replacing the original genetic stocks they encountered. Indeed, there are still countless pockets of non-Sinitic (non-Hanic) speakers in the south whose genetic complement is similar to that of the Sinitic-speaking Hans who surround them. We know from historical sources that numerous individuals, expeditions, and even whole armies as well as refugee populations travelled from the north to the south during the incremental Han colonization of the latter. This is a process that began approximately two millennia ago and is still going on today. With them, the Hans brought their dominant language, but apparently not a sufficiently large pool of genes to alter substantially the makeup of the southern peoples whom they are even now absorbing into their culture. I suspect, however, that, with the application of more subtle, sophisticated, and sensitive types of analysis such as that applied by Sokal and his associates to Europe, the Chinese genetic-linguistic landscape will reveal itself to be exceedingly complex.

Like the communities who speak them, languages are born, languages live, and languages die. What became of the Khotanese, the Sogdians, and the Tocharians of ECA after the ninth century when their languages became extinct? A careful reading of Tongmao Zhao's paper (this volume) on the genetic composition of the Uyghurs is a good place to start in attempting to answer this perplexing question. Turkic languages (also Kirgiz, Kazakh, etc.) and their speakers have replaced these Indo-European languages and their speakers, but not entirely in either case. Just as the Uyghurs are genetically partially Europoid, so is their language replete with numerous elements borrowed from Indo-European languages.[3]

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[3]The Uyghurs also present an interesting case study in cultural and ethnographic history. A good example of their special outlook on the ancient peoples of Eastern Central Asia is Dolkun Kamberi's paper in this volume. An ethnic Uyghur himself, he has written his retrospective on a century of archeological exploration and discovery in the Tarim Basin and surrounding areas in such a fashion that no clear distinction is drawn between the historical Uyghurs and the (pre)historical populations that preceded them in the region. Uyghur ethnicity, in this view, transcends linguistic boundaries, collapsing Iranian, Tocharian, and Turkic languages from different time periods into an irrefrangible unity. In other words, he sees the Uyghur language, people, and culture holistically in terms of local continuities rather than analytically in terms of the constituent elements which entered the evolving, corporate Uyghur body over the course of millennia. It is for this

Taken as a whole, the coupled linguistic-genetic balance in ECA has swung in favor of Turkic-Mongoloid over IE-Europoid. Since it has not yet become fully Turkic-Mongoloid, however, it represents an interesting instance of a zone of linguistic and genetic contact that was still very much in flux a thousand years ago but which has been tipping more and more to the Turkic-Mongoloid side. In the last couple of decades, another tendency has emerged with millions of Sinitic-Mongoloid individuals settling in the region. The demographic implications of this immigration are immense; it is obviously having an enormous impact on the linguistic preferences and genetic composition of individuals in the region. Regarding language alone, Sinitic is gradually displacing Turkic in three main ways (in order of decreasing importance): 1. as the native language of the burgeoning Chinese population; 2. as the language of education and administration; 3. in the form of increasingly numerous loanwords and other linguistic elements within Uyghur and other Turkic languages. When Sinitic speakers (the vast majority of whom are Mongoloid Hans with their own extremely complicated linguistic, ethnological, cultural, and genetic background) who have entered the region from China actually outnumber the Turkic speakers , the local Turkic languages will have begun to die.

There may be instances in world history where a dominant or highly influential elite who were few in number were nonetheless able to impose their language on a subject population.[4] (I suspect that

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reason that he searches backward in time not just to a few disputed Paleolithic objects but all the way to half a billion years ago when the Tarim Basin was supposedly completely surrounded by the sea, and brings us forward in time right up to the present moment when there are, according to him, 16,000,000 living and breathing Uyghur compatriots who carry on those ancient traditions. Seen in this light, Uyghurdom acquires an emotional timelessness that is not to be gainsaid. Nonetheless, it needs to be pointed out that most of his paper is devoted to the languages, scripts, arts, crafts, kingdoms, and other manifestations of society and culture that are at least a thousand years later than the time period which is the focus of all the other papers in this volume except those by Tongmao Zhao and Dru Gladney. Perhaps not coincidentally, the latter two papers are about the genetic composition and ethnogenesis of contemporary Uyghurs. Whereas Zhao demonstrates that the Uyghurs combine Caucasoid and Europoid elements, Gladney shows that the ethnic identity of today's Uyghurs is essentially a modern phenomenon.

[4]Fredrik Hiebert (this volume) cites the case of Arabic in West Africa, intimating that it spread there without any appreciable biological influence on the local populations. Yet sizable numbers of Arabic merchants, slave-traders, religious leaders, and so forth circulated in the region, settling and mixing with the indigenous peoples. There is no doubt that Arabic has spread widely along with Islam as a learned, liturgical language and has exerted an enormous influence on the languages of the peoples who have accepted the religion (e.g., Persian and Turkish), but it has seldom displaced those native

could only have happened where the conquered population was also small in number and ravaged by war, disease, and the like. But then would they have survived at all?) North India, Pakistan, and Afghanistan 3,500 years ago have been suggested as examples of such a scenario, with a relatively small number of Aryan warriors supposedly being able to impose Indic languages upon the native population. In light of the above discussion, I find this to be an unconvincing explanation of how IE languages entered the subcontinent. The fact that a significant portion of the population in these countries possesses blue eyes, fair skin, and brown or even blond hair (where the environment makes these traits which are more suited to northern latitudes disadvantageous from the standpoint of survival) would seem to indicate that sizable numbers of IE speakers actually did intrude upon the subcontinent and have left not only their linguistic but their genetic imprint upon it as well.

In Europe and in other parts of the world, human populations differ considerably in genetic and morphometric traits, in spite of such complicating factors as linguistic assimilation by ethnic migrants. It has now been convincingly demonstrated, at least for Europe, that there is a significant correlation between the distribution of these biological features and the geographical location of various language groups. There is no reason to doubt that the same correlation obtains in varying degrees for other parts of the world. We are eagerly awaiting the time when conditions in ECA will enable us to collect sufficient genetic data to carry out the intensive types of analyses that Sokal *et al.* have undertaken for Europe and are confident that such

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languages – except for regions where significant numbers of native Arabic speakers impinged. This is obvious from the fact that there are probably about 150,000,000 speakers of Arabic in the world while there are approximately 800,000,000 followers of Islam. Hiebert treats language and ideology as being equally transmissible, but surely the latter spreads far more rapidly and easily than the former. Within a generation, whole nations may adopt a new religion through conversion or a new ideology through political indoctrination, but language habits are much more difficult to change. The reason for this, I believe, is that language is more deeply "wired" in the brain than ideologies (which are often cast off and picked up like fashions). Indeed, after having observed thousands of bilingual speakers over a period of three decades, I have formulated what I sometimes jokingly call "Mair's Law of Second Language Acquisition". According to this law, most individuals under the age of approximately 11.5 years can move to a different linguistic environment and readily become essentially native speakers of their new tongue, usually correspondingly losing full fluency in the language of their birth. After that age, while there are, of course, rare exceptions, it becomes increasingly difficult for an individual to acquire true native fluency in a secondarily acquired language. I suspect that this is so because the neurological configurations required for the processing of language become less malleable (they become "hardened", as it were) as one approaches puberty.

analyses will contribute substantially to the clarification of many obscurities surrounding the languages and peoples of ECA.

Linguistics, Chronology, and Geography

Regarding other aspects of the current state of research on the ancient peoples of ECA, the special collection of papers on "The Mummified Remains Found in the Tarim Basin" in *The Journal of Indo-European Studies*, 23.3-4 (Fall-Winter, 1995), 281-444 and the present volume give a good idea of what has already been accomplished. Especially heartening are the advances in linguistics. While we certainly are still in no position to state emphatically that the mummies spoke a certain language or languages, none of the linguistic evidence presented thus far rules out our primary hypothesis that some of the Bronze Age and Early Iron Age inhabitants of the Tarim Basin and surrounding areas were ancestors of the historical Tocharians and that others were ancestors of the historical Iranian peoples (Sogdians, Khotanese, Tumshuqese, and later Tajiks) of the region.

The linguistics papers in *JIES*, 23.3-4 and in this volume speak eloquently for themselves. I wish only to emphasize two things. The first is that, by inviting scholars such as Karl Jettmar, Kevin Tuite, and John Colarusso to participate in our proceedings and through other initiatives, I have made an effort to determine whether it is possible that non-Indo-European languages may have been spoken by some of the Bronze Age and Early Iron Age Caucasoid peoples of the Tarim Basin and surrounding areas. So far, no one has brought forward a convincing body of linguistic, archeological, anthropological, and historical evidence to indicate that there were numerically significant non-Indo-European Caucasoid groups present in this region during the Bronze Age and Early Iron Age. Certainly we have not seen any argument for non-Indo-European presence that can compare with the sizable amounts of data that have been adduced for Indo-European presence. Nonetheless, to ensure that we have not overlooked any reasonable explanation, I continue to welcome the submission of well-documented research papers on possible non-Indo-European Caucasoid presence in ECA during the Bronze Age and Early Iron Age.

The second item that I would like to highlight with regard to linguistics has to do with chronology. In order to make sense of the development of the Bronze Age and Early Iron Age populations of ECA, it is essential that we do our utmost to keep track of when various groups could have moved into the region. The paper by Donald Ringe and his colleagues in this volume has crucial implications for our research, but the cladistics are not directly tied to chronology, so it is difficult to utilize them in tandem with

archeological and historical data. Bearing this in mind, before the mummies conference I made a special plea to Professor Ringe that he and his colleagues attempt to assign approximate dates to the nodes of the "speciation" events on their I-E tree. Much to my delight, they did produce precisely the sort of chronological chart that I had requested; it was included as item 19 of the handout that they prepared for the conference. Not at all to my surprise, this chart was quietly removed from the paper by Ringe *et al.* that was submitted for publication. I have restored the "speciation-tree", after appropriate revision by Ringe *et al.*, as Figure 1 of the concluding article of this book ("*Die Sprachamöbe*"). I wish to state in no uncertain terms that: 1. the speciation-tree was originally drawn up specifically at my request and was not something that the authors would have created on their own initiative; 2. it is highly tentative; 3. Ringe *et al.* expressly wished to have it removed from the published version of their paper; 4. I personally take full responsibility for the inclusion of the chart. I have made this chart available because it helps to visualize when – and to a certain extent, where – things were happening in the evolution of IE. Indeed, Maps 1-9 of the same article (which follow the "speciation-tree") are my own attempt to superimpose the chronological and cladistic data of the chart upon the actual geography of Eurasia. In other words, with the maps, I have attempted to bring the theoretical and the statistical in line with the real world.

One could go further and strive to relate the nodes of the speciation tree (and likewise the areas on the maps that I have prepared) with archeological cultures / horizons, climatological events, and technological developments (i.e., the causes [and, in some cases, results] of the splits at the various nodes). A full accounting of the evolution of the Indo-European language family would require consideration of these matters, but I shall refrain from doing so here for such an undertaking would entail virtually book-length exposition. I do, however, need to make three other comments with regard to the series of maps attached to the final article, namely: 1. taken collectively, they are intended primarily for the heuristic and conceptual purpose of superposing the chronological-linguistic data on a rough geographical grid (we must admit that we still do not know enough to be highly specific about the exact location and extent of the various IE groups when they split off from the mother tongue); 2. the proto-language regions are meant only to indicate approximate entities; 3. suggestions for refinement are warmly welcome.

Mummies, Migrations, Metallurgy, and Miscellaneous Matters

Having mentioned the Philadelphia mummies conference, I should like to point out several papers whose abstracts were submitted to the conference but which – for various reasons – were not finished

in time for publication in this volume. These include:

1. **Kimal Akishev** (Senior Research Fellow, Institute of Archeology, Almaty, Kazakhstan), "Migrations of Nordic Tribes / Indo-Aryans and the Mummies from Qizilchoqa." Akishev (the excavator of the famous "Golden Man" of Issyk [see the paper by Littleton in this volume]) strongly emphasizes the role of the horse in the spread of the Indo-Europeans and, indeed, in the development of human civilization as a whole.

2. **Luigi-Luca Cavalli-Sforza** (Emeritus Professor [Active], Department of Genetics, Stanford University School of Medicine), "Genetic Geography and Ancient Migrations in Eurasia." Cavalli-Sforza, one of the key figures in the International Human Genome project, focuses on the major east-west cline (genetic gradient) across Eurasia and the expansions that occurred along it in both directions throughout history.

3. **CHEN Ge** (Professor, Institute of Archeology of the Academy of Social Sciences of China, Peking), "Cultures of the Bronze Age and Early Iron Age in Xinjiang." CHEN (see above), who has done extensive fieldwork in the Tarim Basin and surrounding areas, was the first scholar to propose a comprehensive and systematic classification for the archeological cultures of the region and it was also he who first popularized the notion that ECA had entered both the Bronze Age and the Iron Age before the Central Plains of China. His paper is an attempt to synthesize and assess all of these significant factors.

4. **Ulf Jaeger** (Ph.D. candidate, University of Freiburg / Breisgau), "The Ancient Mummies of the Tarim Basin in Light of the Tokharian Knights in the Buddhist Murals of Turpan and Kucha." The author examines the physical features, clothing, and implements (especially swords) of the historical Tokharians. Comparing them with corresponding items from Hallstatt (Lower-Austria) and elsewhere in Eurasia, he holds that their evident similarities suggest not only a continuity of occupation in the Tarim but offer intriguing hints about the origins of the Tokharians.

5. **Abduqeyum Khoja** (Senior Researcher, Uyghur Autonomous Regional Museum, Ürümchi), "The Ancient Culture of the Western Regions." The civilizations of the Uyghur Region are divided into "Altay Civilization", "Tängri Tagh Civilization", and "Tarim Civilization". The author provides an overview of the archeological discovery of these three civilizations during the twentieth century.

6. LÜ Enguo (Associate Researcher, Institute of Archeology, Ürümchi), "The Discovery of and Research upon Charwighul Culture." This paper provides an extensive description of the series of eight cemeteries of Harmodon Township in Khotunsumbul County consisting of nearly two thousand tombs. So far, Charwighul Culture is the sole Bronze Age archeological culture in the Uyghur Region that has been scientifically excavated and for which systematic research has been written up in a comprehensive report (summarized here) that is soon to be published in Chinese.

7. A. K. Narain (Emeritus Professor of History and South Asian Studies, University of Wisconsin), "On the Tokharians / Yuezhi and the Mummies from Qizilchoqa." The author begins with the assumption that the identity of the Tokharians and the Yuezhi has already been firmly established. He then proceeds to reiterate his long-held view (contra W. B. Henning) that the Tokharians / Yuezhi were the first "Indo-Europeans" and ends with a plea to scholars everywhere to cease looking for the homeland of the "Indo-Europeans" because, in his opinion, there never was such a people and they never occupied such a place.

8. WANG Binghua (Director, Xinjiang Institute of Archeology), "The Qäwrighul Historical Culture." In this paper, the leading archeologist of the Uyghur Region provides an important, fact-filled, and insightful look at the earliest known culture of the Tarim Basin and surrounding areas. The detailed data that he provides are extremely valuable for comparing the culture of this site with cultures from the same period (c. 1800 BCE) elsewhere in Eurasia.

9. WANG Kelin (Director Emeritus, Shanxi Institute of Archeology), "Cultural Origins of 'The Horseriding Peoples' in China." The author maintains that horseriding entered China from West Eurasia via the steppes, the edges of the Tarim Basin, and through the Gansu Corridor all the way to the area around what is now Peking. Coupled with short, compound bows and the adoption of new infantry tactics, mounted warriors displaced the chariot (a previous importation from West Eurasia) as a mobile platform in battle.

10. XU Wenkan (Senior Editor, *Hanyu Da Cidian*), "Is It Possible to Solve the Mystery of the Origins of the Tocharians?" The leading authority in China on the history of the Tocharians surveys the linguistic evidence for their origins and outlines a research strategy (including reliance on DNA analysis) for determining their homeland. He posits that the Tocharians reached the Tarim Basin after a prolonged trek from Eastern Central Europe.

11. ZHANG Ping (Associate Fellow, Institute of Archeology, Ürümchi), "Archeological Culture of the Bronze Age in Kucha." The chief excavator of a vast series of Bronze Age and early Iron Age cemeteries in the Kucha area stresses the importance of copper mining and smelting as well as links with other cultures in the region and in Western Central Asia.

All abstracts (some of them rather lengthy) submitted to the conference are available by writing to the editor. It is hoped that eventually they will all be turned into complete, published research papers.

One other major activity at the mummies conference was the metallurgy round table. The main participants were James Muhly, Vincent Pigott, Yangjin Pak, and Robert Bagley. Numerous other members of the conference spoke from the audience, generating a tremendous amount of enthusiasm and exchange. An incomplete tape recording of the round table proceedings was made by Miklos Erdy and has been imperfectly transcribed. I had originally planned to include the complete transcript of the metallurgy round table in this volume but decided against it after realizing that the magic of the moment was lost in the partial transcription. Even after soliciting helpful corrections and supplements to the transcript from more than a dozen individuals, I still could not recreate the essence of the give-and-take excitement. As a very poor substitute, I shall simply list here several of the highlights: 1. Evgeny Chernykh's important concept of an early Bronze Age Circum-Pontic Metallurgical Province; 2. low Soviet / Russian chronologies for Central Asian cultural traditions (e.g., Andronovo) tied to European (e.g., Mycenaean) parallels (Elena Kuzmina) versus higher, independent chronologies for Central Asia (Henri-Paul Francfort); 3. the sources of tin and arsenic, whether the latter was initially deliberately added to copper ore, analysis of mattes, etc. (Jianjun Mei, Emma Bunker); 4. the derivation of painted pottery associated with Bronze Age cultures in Eastern Central Asia from Western Central Asia or from the Ordos-Gansu-Kokonor region just to the east (at the time still not a part of the Chinese cultural sphere); 5. the relative importance of local variations versus common techniques – i.e., typology versus technology (Colin Renfrew and many others); 6. mining, smelting, forging, and metalworking (Jeannine Davis-Kimball); 7. handicraft traditions and the connections of bronzework with the use of other metals; 8. ornamental motifs in ECA and elsewhere (e.g., Etruscan bronzes) (Kezia Knauer); 9. bronze and the peoples to the north of China; 10. the significance of metallic ore sources in driving / leading people in search of them into new regions; 11. possible linkage of bronze with human physical types, horseriding, wheeled vehicles, textiles, and other significant elements of culture (David Anthony).

Victor H. Mair, editor

By far the most stunning outcome of the discussions on metallurgy was the realization that, aside from Europe and the Southwest Asian ecumene where bronze technology was already well known by at least the beginning of the fourth millennium BCE, it appears with remarkable rapidity starting in the centuries before and after 2000 BCE in the following rough sequence (Western Central Asia, South Asia, Eastern Central Asia, East Asia, Southeast Asia, Africa – but **not** the New World!) and with increasingly distinctive local traits the farther removed from Europe and the Southwest Asian ecumene (including northeast Egypt), although the exact dates of its appearance in various regions is difficult to pinpoint (Joyce White, Hal Fleming, Bruce Brooks, *et al.*). The importance of this subject has been highlighted by Muhly (1988: 16) in his virtuoso article on "The Beginnings of Metallurgy in the Old World" where he points out that, in China, India, Mesopotamia, Anatolia, the Aegean, and Central Europe, the introduction of bronze metallurgy appears to have been associated with a complex of social, political, and economic developments that mark the "rise of the state". A significant milestone in research on the origins of bronze metallurgy in China is An 1993.

Aside from the authors of the papers in this volume and the participants in the metallurgy round table, many other distinguished scholars were present at the mummies conference and contributed important insights and factual information during the discussion periods.

For readers who wish to gain a better sense of what transpired at the Philadelphia mummies conference, a number of reports have already been published (e.g., Mallory 1996; XU 1996; KANG 1996; Wilford 1996; O'Brien 1996; Mair 1995a [appeared in 1996]). Those by Mallory, XU, and Wilford are particularly informative and perceptive.

Hard Questions (and How to Find the Answers)

It is clear from this survey of research on the Bronze Age and Early Iron Age peoples of ECA that a great deal has already been accomplished within a relatively short period of time. Nonetheless, we cannot yet answer with precision any of the following most frequently-asked questions about the ancient Europoid peoples of ECA: When did they arrive in the Tarim Basin and surrounding areas? Where did they come from? Was it from far or near? What propelled them to leave their homeland (wherever it may have been) and settle in the inhospitable environment of the fringes surrounding the Tāklimakan and adjoining deserts? Who are their closest relatives? What language(s) did they speak? What impact, if any, did they have on the formation of Chinese and other Asian civilizations? How were their own cultures influenced by the cultures of other groups? What was

their average life span? What did they eat? What kind of houses did they live in? What diseases did they succumb to? What eventually happened to them? I.e., were they succeeded by the Wusun, Yuezhi, Sogdians, Khotanese, and Tocharians of historical times? And were the latter succeeded by the Uyghurs, Kazakhs, Kirghiz, and Tajiks of modern times? If so, what are the mechanisms of biological, social, ethnic, and linguistic transformation that can account for the manifest differences and obvious continuities among the earliest known inhabitants of the region (the people we are studying in this volume) and their various successors?

These are the sort of reasonable queries which are directed at me during the discussion periods after virtually all of my public lectures on the mummies. It is natural for people to ask such questions and they deserve responsible replies. For most of the above questions, we can already give partial answers. If, however, we are to answer them responsibly, fully, and convincingly, we need to acquire much more data from many different disciplines. Our international research project has long since evolved into a full-blown multidisciplinary enterprise (cf. Mair 1995a: 1a). Nonetheless, for various reasons (including some that will be touched upon below), we have not been able to apply all of the investigative techniques at our disposal. In order to respond accurately and adequately to the types of inquiries that are commonly put to us by laypersons and specialists alike, in addition to the investigations that have previously been carried out, we need to expand the scope of our activities in the following ways:

1. First and foremost, we need to carry out extensive settlement surveys throughout the Uyghur Region. To learn more about who the ancient peoples of ECA were and how they lived, it is essential to study the shapes of their houses, the construction methods used, and the layout of their villages. So far, nearly all excavations in the Uyghur Region have been of graveyards,[5] thus we know very little about how the Bronze Age and Early Iron Age peoples of the Tarim Basin and surrounding areas lived other than what can be extrapolated from how they died. This is a great drawback in carrying out comparative studies with cultures elsewhere in Eurasia.

2. Full reports for all sites hitherto investigated should be published

[5]French archeologists and Japanese teams have been engaged in long-term, systematic surveys and excavations at Qaradong and Niyä respectively during the past half-dozen and more years. While their findings are valuable and have uncovered a plethora of precious objects (including Caucasoid human remains), these sites are both relatively late (mainly Han period and after), thus not directly relevant to our research on the Bronze Age and Early Iron Age.

as soon as possible. To this day, not a single complete report has been issued for any of the sites associated with the early peoples of the Tarim Basin and surrounding areas, although some reports already exist in various stages of draft preparation (e.g., that by LÜ Enguo for the Khotunsumbul [Charwighul Pass] cemeteries), and in spite of the fact that I have personally offered to assist with the expenses of printing and distribution. We are, of course, grateful for the preliminary reports of many sites that have appeared in *Wenwu [Cultural Relics], Wenwu Cankao Ziliao [Reference Materials on Cultural Relics], Kaogu [Archeology], Kaogu yu Wenwu [Archeology and Cultural Relics], Kaogu Xuebao [Journal of Archeology], Xinjiang Kaogu [Xinjiang Archeology], Xinjiang Wenwu [Xinjiang Cultural Relics], Xinjiang Ribao [Xinjiang Daily], Xiyu Yanjiu [Studies on the Western Regions], Xibei Shidi [History and Geography of the Northwest], Wenwu Tiandi [The World of Cultural Relics],* etc.[6] Such reports often contain extremely valuable information but are difficult to track down and lack the comprehensiveness that is necessary for an accurate assessment of a given site.

3. Qualified researchers should be granted supervised access to the full range of textiles, pottery, and other types of material goods associated with the human remains that have been exhumed. To date, most of the excavated artifacts remain in storerooms scattered across the region. These constitute a vast wealth of precious resources which, if scientifically examined, would surely result in a quantum leap in our understanding of the origins and evolution of the ancient peoples of ECA.

4. More C^{14} dates with multiple corroboration by independent laboratories are needed. Funds and facilities for such testing are available but permission has not yet been granted. The new radiocarbon dates should be calibrated and complemented by dendrochronological studies which, to the best of my knowledge, have not been applied in the Uyghur Region at all. AMS (accelerated mass spectrometry) dates, to the best of my knowledge, have only been applied to a tiny handful of objects from the Uyghur Region. As for thermoluminescence, I am not aware of any published dates obtained by that method for an artifact from the region.

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[6]Some of the publications just listed have their own English or Latin titles. In order to remain idiomatic and consistent, I have not here followed those titles in all cases. In China, the usual translation of *wenwu* is "cultural relic" and I have accepted that usage, although "cultural artifact" is also frequently used for this term in Western publications.

5. Additional tissue and bone samples should be made available to qualified geneticists. To date, only a very few samples have been released; this represents a serious obstacle to scientific research on the ancient populations of the Tarim Basin and surrounding areas. To allay the qualms of the Chinese government, I have suggested that genetic investigations can be carried out cooperatively with Chinese scientists in China and in other countries. As we develop a larger data base for the DNA of the Bronze Age and Iron Age peoples of ECA, we should begin to make detailed comparisons with ancient DNA from other parts of Eurasia (e.g., Ötzi the Bronze Age Iceman [Spindler 1994], the Kushan skeletons from the first-century CE levels of the Bactrian site at Tillya Tepe in far northwest Afghanistan [Ch'en this volume], the Iron Age Pazyryk people from just north of the Altai, etc.). Earlier in this paper, I have stressed how important research in genetics is for understanding the relationships among various groups of peoples. If the Chinese authorities would permit us to find out as much about the genetics of the Tarim Basin as is known about the genetics of Europe, many of the mysteries surrounding the origins and affiliations of the Bronze Age and Iron Age peoples of the region would soon be unravelled.

6. Han Kangxin should be enabled to continue his invaluable physical anthropological studies and extend them to the human remains from all of the Bronze Age and Early Iron Age sites in the Uyghur Region. Professor Han's work is first-rate; he deserves the highest accolades for pursuing his investigations under less than ideal conditions. It is urgently necessary to train younger colleagues who can carry on his exacting studies according to the same stringent, objective standards he has set for himself.

7. Several of the world's most prominent authorities on the teeth structure of ancient peoples have agreed to examine the numerous skeletal remains from the Tarim Basin and surrounding areas. If they are allowed to do so, we will have a much clearer picture of the racial composition of the region during the Bronze Age and Early Iron Age.

8. Estimates of total populations at various periods and places need to be made. Some of the ancient cemeteries in the Uyghur Region stretch on for miles (e.g., Sampul-Qaraqir, Khotunsumbul, Zaghunluq, Kucha, Subeshi, etc.). At Sampul[7]

[7]Sampul lies just to the east of Khotan along the southwest rim of the Tarim Basin. In spite of its 30,000 households, it is by no means among the larger

alone, I stood at a spot where thousands of tombs dating from the ninth to the second centuries BCE (mostly around the third-second century BCE) were peppered across the surface of the land. The adjoining cemeteries extended for approximately 15 kilometers to the east and 8 kilometers to the west. To the north is the modern oasis of Sampul with its 30,000 households. To the south was a wispy string of poorer dwelling areas. This is a typical Tarim site for locating graveyards – a large, raised terrace of pebbly, barren land lying between an oasis and the mountains whence the people derive their life-sustaining water. Such land is good for nothing else than cemeteries, but it is perfectly suited for the latter purpose: high, dry, easy to dig in, conveniently close to the community but not part of it, and so forth. The band of cemeteries at Sampul was roughly half a kilometer to a kilometer wide and there was a grave about every four to five meters. I walked for approximately a kilometer in each direction and counted hundreds of tomb-depressions in the sand. Many of these graves contain multiple or even mass burials. From one grave alone that had recently (March, 1996) been desecrated and robbed, 179 crania were counted. This is not unusual for Sampul where other graves holding around 150 individuals have been reported. The Sampul people were blond or brown-haired Caucasoids with white skin. I saw plentiful evidence of this littered over the ground where the graverobbers had strewn parts of their bodies in haste to gather valuables. Whoever these ancient people were, the scope of their populations was of large proportions, especially considering the harsh surroundings in which they lived. It is clear that, at least during the Early Iron Age, the ancient Tarim peoples engaged in intensive agriculture and animal husbandry, insofar as such activites could be sustained by the poor conditions of the land.

9. An array of modern archeological and anthropological investigative techniques have yet to be employed in the Uyghur Region. These include:
   a. Forensic studies of, for example, the fingerprints of potters.
   b. GIS (Geographic Information System) cartographic studies.
   c. GPS (Global Positioning System) cartographic studies.

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oases of the region. Both in antiquity and in modern times, the population densities for the region are remarkably large when one considers the very poor envionmental (moisture, soil, terrain, etc.) conditions. In my forthcoming books on the region, I shall describe in more detail the irrigation systems which have permitted this surprisingly large population growth. In particular, I shall explain why the oases no longer reach so far into the desert as they used to a thousand or two thousand years ago (in many places by as much as nearly a hundred miles).

d. Paleoenvironmental studies.
e. Paleoclimatological studies.
f. Palynological (study of spores and pollen) investigations.
g. Paleoethnobotanical and archeozoological studies (seed, charcoal, phytolith, and coprolith analysis). We need to learn much more about the kinds of plants and animals utilized by the ancient inhabitants of the Uyghur Region and the degree to which they were domesticated. It is especially important to know which plants and animals were most heavily relied upon and precisely how they were employed. For example, the seasonality, age, and sex of ovis / caprine kill-off patterns can tell us much about the purposes of maintaining flocks of sheep and goats (for meat, milk products, wool, etc.).
h. Sieving of deposits.
i. Soil flotation.
j. Utilization of isotopic bone analyses to determine diet (carbon 12/13 and nitrogen), but also perhaps matri/patrilocality (from strontium isotope patterns).

10. A few attempts have been made to utilize satellite images to locate ancient sites, but this needs to be done on a much more systematic basis and employed regularly **on the ground** in conjunction with data from other types of remote sensing and imaging.

11. A comprehensive classification scheme for pottery and other vessel types should be worked out and compared with artifacts from neighboring regions **in all directions**.

12. Far more attention needs to be paid to geomorphology, stratigraphy, and soil types.

13. More advanced, sophisticated laboratory analysis should be applied to the fatty-protein substance (butter, ghee, or other dairy product?) that is found on the skin of some of the mummies in order to identify its composition and to determine to what degree it may have been a significant factor in their preservation.

14. When news of the Uyghur Region mummies was first made widely known to the world in 1994, many distinguished paleopathologists from numerous countries volunteered their services to study the diseases and causes of death of these ancient people. Unfortunately, we still have not been able either to take these experts to China or to bring relevant specimens to them

for study. I have recently learned that the most advanced non-invasive diagnostic equipment (including MRI [Magnetic Resonance Imaging], PET [Positron Emission Tomography], and CAT [Computerized Axial Tomography]) has been made available to our research project free of charge. We earnestly hope that the Chinese authorities will take advantage of this rare opportunity to understand better the lives of the ancient Täklimakanians.

15. More detailed comparisons with the material and spiritual elements of contemporary cultures elsewhere in Eurasia (e.g., Andronovo, Hallstatt, Bactria-Margiana, etc.) would certainly help to illuminate the affiliations of the ancient peoples of ECA.

16. Investigations of ancient irrigation systems and methods; detailed comparisons with irrigation techniques elsewhere.

17. Investigations of ancient nomadism and transhumance; comparisons with similar phenomena elsewhere in Eurasia.

18. Investigations of the role of hunting among the ancient inhabitants of the Tarim Basin and surrounding areas.

19. Paleoethnographical studies and comparisons with the results of modern ethnographic fieldwork. We have already detected many survivals of ancient customs and practices among various groups living in the region still today, but this sort of investigation needs to be carried out in a much more comprehensive and systematic fashion.

20. Extensive, in-depth investigations of symbolism, mythology, and art history; comparisons with comparable phenomena elsewhere in Eurasia.

21. A routine, yet very serious, deficiency in studies concerning ECA is the confusion that reigns with regard to toponymy and ethnonymy. Recently there has been a dismaying tendency to refer to names of peoples and places of the Uyghur Region by the romanized transcriptions of Modern Standard Mandarin transcriptions instead of by direct transliterations from the Uyghur, Tajik, and other relevant languages (e.g., Kashi instead of Kashgar [or, more precisely, Qāshqār], Wulumuqi instead of Urumchi [or, more precisely, Ürümchi], etc.). This results in gross distortion, partly because the Chinese syllabic script copes very poorly with consonant clusters and partly because Chinese researchers transcribe the local names in wildly different ways

according to their own dialectal pronunciations. In an effort to stem the chaos, Dolkun Kamberi and I have compiled a "List of Place, People, and Site Names of the Uyghur Region Pertinent to the Archeology of the Bronze Age and Iron Age" which is included as an appendix in this book and which will also be published separately as an issue of *Sino-Platonic Papers*. Furthermore, we are happy to serve as a clearing house for the historical and archeological onomastics of ECA.

22. Last, but surely not least, far more attention and resources should be devoted to the conservation of the precious heritage of ancient humankind that exists in unparalleled abundance and pristineness in the Uyghur Region. It would be a capital crime to destroy through negligence and abuse what nature has preserved so incredibly well for millennia.

We are prepared to assist the Chinese government in its efforts to protect the ancient cemeteries, settlements, and other sites of the Uyghur Region. I would like to take advantage of this opportunity to reiterate our long-standing offer to build a museum at an appropriate site to house the ancient human remains of the Uyghur Region and their associated artifacts. The museum would be equipped with the latest and most advanced research facilities and equipment.

Our ability to undertake all of the above tasks is determined chiefly by two factors: 1. receiving the permission of the Chinese government; 2. receiving adequate funding. So far, we have experienced little difficulty in securing sufficient support from private foundations to carry out our work. Furthermore, skilled and willing investigators for undertaking each of these tasks are available in China, America, Europe, Japan, and elsewhere. Consequently, further progress in this research project which holds such great promise for unravelling many knotty problems concerning Eurasian (pre)history depends in large measure on the good will and foresight of the Chinese government.

The Bigger Picture

Aside from the above pressing desiderata which must be addressed as soon as possible, there are countless other detailed archeological, ethnological, historical, and linguistic matters concerning the ancient inhabitants of ECA that need to be thoroughly examined in a Eurasian context. Several sample investigations that might be carried out are:

1. An exhaustive comparison of bronze horse bits, the distribution of which reaches from southwest Asia and northwest Europe

through Central Asia to south China. Bronze bits seem like utterly mundane objects, but their thorough examination certainly merits at least one good doctoral dissertation and would yield enlightening information about their invention, transmission, typology, and usage.

Recent research in archeology (Ciarla 1994) and art history (Chiou-Peng, this volume; cf. also note 11 below) has made it increasingly clear that steppe influences penetrated all the way to south China. Further investigations in diverse fields are necessary to determine the timing, routes, nature, and extent of such intrusions from the northwest.

2. Tracing the distribution of piping on clothing (see Good, this volume). Where is it first found? What is the sequence of its spread elsewhere? What are the various materials and methods for making piping? How do they vary or stay the same across Eurasia? What are the exact stitches for tacking and fastening the piping to seams? How do they vary or stay the same across Eurasia?

3. An exhaustive study of the development and spread of trousers. Ötzi, the Alpine Iceman (5,300 BP), wore crotch-length leather leggings suspended from his belt. So did a man from Subeshi (2,400 BP – he wore woolen underwear beneath them) in ECA, as did American Indians right up to this century. At some point, leggings became trousers, which are more complicated to cut and sew. How, when, and where did that happen? We know from observation that trousers, worn by many of the male Tarim Basin mummies and Scythians represented in art, were the fashion of choice for equestrian men who lived in cold climates. We also know, from historical texts, that the Chinese consciously adopted the wearing of trousers from the nomads during the Warring States period (475-221 BCE) when they realized that they too would have to engage in mounted warfare if they were to withstand their enemies from the north and northwest. Supposedly, it was King Wuling of Zhao who in 307 BCE first ordered his troops to put on pants specifically for the purpose of mounting on horseback so that they could shoot their bows from this swift animal. The question of who wore pants and when is, indeed, one of no little significance in the history of humankind.

4. A thorough comparison of the physical and genetic features, clothing, weaponry, and ornaments of the historical Tocharians as represented, for example, in wall-paintings and graves of the area around Kucha with similar attributes of other Eurasian peoples, but especially to the Yuezhi / Kushans of sites such as

Khalchayan (first century BCE, Surkhan Darya region [Bactria]) who are thought to be their close ancestral relatives. It has been pointed out to me by Justine Snow (personal communication [September 9, 1996]) that the aristocratic Tocharian donors depicted in wall-paintings at Qumtura (near Kucha) dressed and ornamented themselves almost exactly like a Kushan prince whose remains were exhumed at Tillya Tepe (see #5 above in the list of desiderata).

5. A favorite design of the ancient inhabitants of the eastern and southeastern rim of the Tarim Basin (especially at Chärchän) was the spiral, often in the form of the spiral of Archimedes. Sometimes the spirals are interlocked at the edges in pairs or triplets; sometimes they are arranged to look like recurring waves. These spiral decorations are found carved on wooden spindle whorls (see the drawing accompanying the paper by Irene Good in this volume), woven into textiles, and painted or tattooed on peoples' faces. What is most curious is that almost identical spirals in virtually identical positions may be found on the faces of Maori tribesmen in New Zealand.[8] In a series of important but now generally ignored articles, the great Austrian ethnographer, Robert Heine-Geldern, long ago pointed to striking design similarities between Maori artwork and circum-Pontic ornamentation. He even posited that the transfer of these designs occurred within the context of a Tocharian migration beginning in the latter region and passing through the area of the Tarim Basin. Given that Heine-Geldern wrote of these things roughly half a century before the Europoid human remains of ECA became known to the world, his insights and intuitions seem almost preternatural.

6. Elsewhere (Mair 1990, 1996a) I have discussed how the Indo-European words for "wheat", "mage", "wheel", and so forth were borrowed into Sinitic along with the specific objects, technologies, and practices they designated during the prehistoric and early historic period. However, the linguistic linkages centering on the Uyghur Region (the center of Asia) and embracing the rest of the supercontinent (Eurasia) in all four directions are vastly more complicated and intriguing than such instances of identifiable borrowing. Here I shall give only the rudiments of one example illustrating such complexities.

   The Chinese refer to the great chain of mountains to the

[8]Similar spirals occur as decorations on Japanese pottery vessels from the Jomon period and an interlocked whirlpool scheme like that found on Chärchän spindle whorls may be seen on a large megalith at New Grange in Ireland.

north of the Tarim Basin as Tian Shan ("Heavenly Mountains") and Turkic peoples refer to them likewise as Tängri Tagh ("Heavenly Mountains"). Which came first? Since we initially hear of the Tian Shan in the *Shi ji (Records of the Grand Historian)* by Sima Qian, completed c. 90 BCE, while the word *tängri* is very old (probably pre-Turkish), can be traced back to the language of the Xiongnu (Huns) c. 111 BCE, if not earlier (Clauson 1972: 523b), and was frequently applied to various high, sacred mountains by indigenous Central Asian peoples (whereas the Chinese appear to have confused Tian Shan with Qilian Shan [see article by Lin in this volume] and were evidently aware that the Xiongnu / Huns styled the mountains in question "heavenly"), it is probable that the name "Heavenly Mountains" was first applied by local peoples and adopted by the Chinese when they became active in Central Asia during the Han Dynasty. I am not prepared to discuss the question of priority[9] in greater depth here, but wish to point out the fact that Sinitic *tian* (sounded roughly the same in the Han period as it does in Modern Standard Mandarin now), "Altaic" *tängri*, Indo-European **dyeu-s* (accusative **dyem*), and Sumerian *dingir*[10] not only sounded much alike, but all four also meant **both** "sky" **and** "god (of the sky)". This is profoundly puzzling. Can we attribute these conjoint resemblances purely to chance? Were these languages (all from different families) borrowing this religiously-charged word from each other? Or is there some deeper commonality among them? The solution of such mysteries demands the dedicated efforts of numerous researchers in linguistics, mythology, ethnography, and history.

These are merely a few out of thousands of similarly illuminating investigations which should be carried out if we wish to clarify the

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[9]Pulleyblank (1962: 240), citing Pelliot (1944), states that the variation and instability of the word in Turkish and Mongol make it quite likely that it was ultimately a loanword in those languages. Considering the evidence adduced above, it would seem that the immediate source of the "Altaic" word was Xiongnu / Hsiung-nu (Hunnic). As for where and how the Xiongnu (Huns) got the word, that is another – more difficult – question altogether.

[10]In the "woman's" dialect of Sumerian, this word is read as *dimmer*. The word for "god" in Sumerian is written with the sign for "sky", an asterisk-like star symbol (Philip Jones, personal communication [January 10, 1997]). This is thought-provoking, inasmuch as the PIE root for "deity", "Deus", "divine", "Zeus / Jove" ("god of the bright sky"), etc. is **deiw-* ("to shine"), with derivatives meaning "sky", "heaven", "god". For reflexes in Hittite (with parallels in Sumerian) and other Indo-European languages, see Watkins (1974). For reflexes in Slavic, Baltic, Italic, Old Indian (Sanskrit), Old Irish, and Old Norse, see Rudnyćkyj (1974).

past.[11] Such minutiae are to the archeologist and the prehistorian what different molecules are to the chemist or what cells are to the biologist. They are the fundamental building blocks out of which once living cultures are reconstructed. I wish to stress, however, that all such constituents of culture should be studied not merely for their own sake and in isolation, but always as part of an organic whole. Due to an anthropological overemphasis on the emic and the processual during the past two decades, researchers have neglected the etic and the aggregate to such a degree that they can no longer see the forest for the trees. They have lost, so to speak, "the big picture". They observe the parts but cannot see the whole, which means that they do not really understand the whole.

It is impossible for any individual or even any research group – no matter how large – simultaneously to examine all phenomena related to human civilization at a given point in time. What I am suggesting is not that we should attempt the inconceivable mission of concurrently considering all historical and archeological evidence. Rather, I advocate that we should not concentrate so exclusively on studies of single sites and cultures; we should begin to devote more of our attention to broad investigations of a wide variety of cultural phenomena on an areal, regional, continental, or even global scale. It is surprising how little curiosity has been shown about the astonishing commonalities of human cultures and how much emphasis has been placed on their differences.[12]

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[11]Models for the type of research that I am advocating already exist and may be found, among other places, in the very impressive papers of Elfriede Knauer which trace various objects, techniques, and practices across the whole of Eurasia during antiquity. For example, Knauer 1993 ("*Knemides* in the East?") follows the path of specific pieces of body armor, especially greaves, from Greece to the Scythians and other Central Asia "barbarian" tribes, thence to the Dian culture (400 BCE to 200 CE) in what is now Yunnan Province and elsewhere in China. Without undertaking such investigations on a massive scale, we will never be able to make sense of the many mystifying artifacts that have been found in Eastern Central Asia such as the now famous but very poorly understood reddish bronze statue of a big-nosed Europoid warrior kept in the Ürümchi Museum. He is kneeling on one knee and is barechested, but wears a kilt and a pointed Aegean-looking helmet with a blade horizontally extending forward from the peak. The presumably 5th-4th century BCE statue was found on the south bank of the Künäs River (for a line drawing, see An, this volume, Fig. 5, no. 6).

[12]I am overwhelmed by cognitive dissonance when I read anthropological and archeological treatises that mention, for example, red ocher associated with hundreds of ancient burials or hugely buxom paleolithic Venus figurines at sites scattered across a large region without so much as raising the possibility that these traits may be the result of cultural exchange and communication. The assumption – and often this is explicitly stated – would seem to be that such phenomena have been spontaneously and independently invented over

Conclusions

As I have repeatedly mentioned in public and in writing, although we believe that the sum total of the archeological, linguistic, biological, cultural, and historical evidence indicates that some of the Bronze Age and Early Iron Age Europoid inhabitants of ECA were likely to have been Tocharians while others who came into the region were probably Iranians, we still do not know for certain what the exact identity of individuals from any given site was. Consequently, I shall close this discussion of priorities with a sincere and cordial invitation for tightly reasoned and well-documented discussions from researchers who may embrace hitherto overlooked interpretations. The more different approaches we consider and the more disciplines that we integrate, the more quickly we shall be able to unravel the complexities of the Europoid peoples of the Tarim Basin and surrounding areas.

Above all, in doing research on the Bronze Age and Early Iron Age peoples of ECA (or on any other subject, for that matter), let us eschew all dogmas, preconceptions, and cant.[13] We ought to view our investigations as a process of discovery. The scientific method requires that we advance hypotheses, but we should constantly bear in mind that all hypotheses are tentative and must be confirmed (or denied) by abundant factual data. Since we know the full answers to so few of the intricate, multitudinous questions surrounding the ancient inhabitants of the Tarim Basin and surrounding areas, let us work together patiently, diligently, honestly, and humbly to discover what they may be. Why are we engaged in this extraordinarily elaborate and demanding research project? To seek the truth about the past to the best of our ability so that we may learn from it and to bring clarity where there is now obfuscation. In other words, although we still do not know the answers to all of the difficult questions posed above, we are determined to do our utmost to try to discover them.

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and over again by countless groups. The same holds for dragons, flood myths, axial mountains, eyes of heaven, and scores of other widespread myths. Ditto for all manner of tools (e.g., the plow), weapons (the bow), symbols (e.g., the swastika [though much favored by the Indo-Europeans, it originated before their emergence]), and practices (e.g., circumcision). I find the supposed independent invention of these shared aspects of culture to be an extremely uneconomical, unlikely, and unbelievable explanatory device for the totality of such cases.

[13]In our research, let us also ignore modern political borders and entities, since most of them are largely or totally irrelevant for the study of prehistoric civilizations and cultures.

Notes

This essay is intended to serve as an introduction to the entire volume, just as "*Die Sprachamöbe*" is meant to be a coda. I would like to take advantage of this opportunity once again to thank all of the contributors. Everyone cooperated magnificently in getting their papers to me in good time, in spite of the great distances and sometimes unreliable mail services. Nonetheless, dealing with 40 some authors spread across the face of the globe, it has not been easy to maintain contact with each of them. For that reason, and because of the wide variety of language backgrounds involved, it has been virtually impossible to achieve absolute uniformity in usages and format.

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Archeology

Cultural Complexes of the Bronze Age in the Tarim Basin and Surrounding Areas

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The territory of Xinjiang, China, situated on the "Silk Roads", became a vital region for east-west cultural exchanges as early as prehistoric times. During the Bronze Age, as shown in archeology, numerous cultures varying in time and character, occurred in the Tarim Basin and its surrounding areas, forming ten regional complexes. The unearthed objects, mostly small in size, include tools, weapons, ornaments and vessels and show a close relation to their counterparts on adjacent regions of Xinjiang. The Bronze Age in Xinjiang, dating from *c.* 2000-400 BCE, can be divided into three periods, with the middle one seeing the introduction of iron. The earlier occurrence of both bronzes and irons in comparison with North China suggests that Xinjiang functioned as an intermediate link in the eastward spread of metal culture, which is an important subject calling for thorough research.

I. Introduction

The "Silk Roads" across Xinjiang, owing to their geographic situation, constituted a vital link for cultural exchange between the East and the West from remote antiquity. The initial opening of this communications line was by no means marked with the Han envoy Zhang Qian's journeys to the Western Regions or with the emergence of silk trade; it may be traced to prehistoric times, which is exemplified by the discovery of bronze culture along the "Silk Roads".

Archeological work in Xinjiang was begun in the early twentieth century; especially after the founding of the People's Republic of China, it obtained rich fruits and provided many source materials for studies into the early history and culture of this region. But only since the 1980s, a series of cultural complexes, previously attributed to the late Neolithic, have been included into the Chalcolithic, Bronze and even Iron Age. The establishment of the Bronze Age marks an important turn in the history of Xinjiang archeology.

The present paper attempts mainly to talk about some problems of bronze culture in Xinjiang, including its geographic

distribution, the classification of its bronzes, its chronology and periodization, and its important position in the history of cultural exchanges. This is a preliminary discussion with some views put forward only for reference because a large amount of archeological material has largely been published in brief reports or accounts, which can hardly avoid causing certain limits to its understanding.

II. Geographic distribution

Xinjiang is a territory of 1,600,000 sq km with numerous ethnic groups. During early historic times, it was characterized by ethno-cultural multiformity and complexity, as is shown in the record of 36 states in the *History of the Han*, "Accounts of the Western Regions" (*Han shu*, "Xiyu zhuan") 漢書 · 西域傳. Going back to the Bronze Age, one can also see a great variety in cultural respects, which seems to concern not only different cultural pedigrees but also the problem of periodization and chronology.

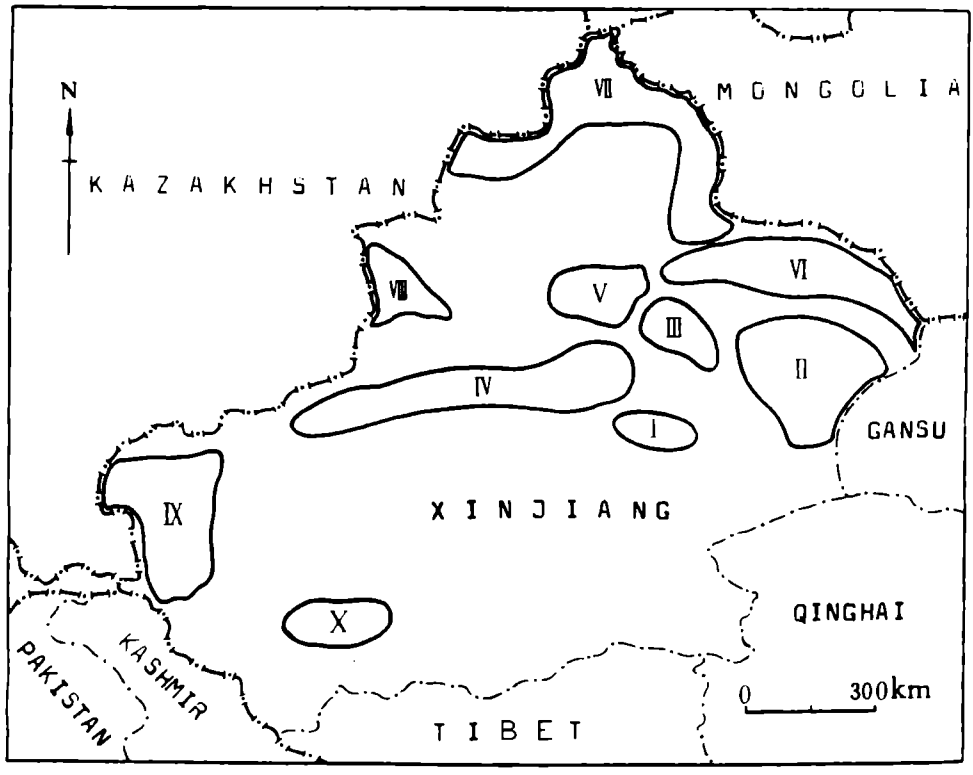


Figure 1: Distribution of Bronze Cultures in Xinjiang, China

There have appeared various approaches to the subject of Xinjiang bronze culture: 1) Denomination of the Yanbulaq Culture and Charwighul Culture after the type site and cemetery. Although these two archeological cultures have generally been recognized, either of them is only a complex limited spatially and temporally. 2) Division of the cultural remains known in the Bronze and so-called early Iron Ages into eight cultures and eleven types. As the concept of archeological culture in these cases is quite vague, and

there is a lack of concrete standards for establishing archeological cultures and types, this version seems helpless in distinguishing cultural pedigrees and their interrelation. 3) Demarcation of eight regions among the known Bronze Age cultural remains in the light of geographical circumstances. Actually, the distribution of archeological cultures was not strictly controlled by geographic factors, for even in the same region one can see the intertwining of different cultures. But, for the time being, at least until all archeological cultures are distinguished and denominated, this division can be taken as a framework for comparative studies.

In order to facilitate the survey of general cultural conditions in Bronze Age Xinjiang, it is necessary to carry out research into the character of cultural remains with their geographic distribution taken into account. Here we distinguish ten regions of bronze culture and list their representative cemeteries or sites (see Fig. 1) as follows: 1)The eastern margin of the Tarim Basin—represented by the Qäwrighul cemetery in the Kōnchi River valley; the Tōwān River cemetery and the previously excavated No. 5 cemetery also belonging to this type. 2) The Qumul (Hami) Basin—including the Yanbulaq cemetery and Qaradōwā Reservoir cemetery; the whole complex has been named the Yanbulaq Culture. 3) The Turpan Basin—including the Ayding Lake cemetery in Turpan City, Subeshi and Yanghe cemeteries in Pichan County and Qaghichaq cemetery in Toqsun County. 4) The Qarashāhār (Yanqi) Basin—represented by the Charwighul cemetery in Khotunsumbul (Hejing) County; also including the Chong Bagh cemetery in Būgūl (Luntai) County and Bozdōng cemetery in Aksu-Konashār (Wensu) County. The whole complex is called Charwighul Culture. 5) Mountain valleys in the middle Tāngri Tagh (Tianshan Mountains)—with the Alwighul and Yewirghul cemeteries in Ürümchi City as the center. The burial grounds in the vicinity largely present the same character. 6) The Barkōl grassland—including the Tōrt Erik (Sidao-gou) site in Muri County, the Penjighul site in Guchung (Qitai) County and the South Bend (Nanwan) cemetery in Barkōl County. 7) The Altay grassland—including the Keremchi cemetery in Altay City and similar remains in the Tarbaghatay (Tacheng) region and near the Barkōl grassland. 8) The Ili River valley—including the Shota cemetery in Mongghul Kūrā County, Sodunbulaq cemetery in Chapchal County, Qaratōpā cemetery in Nilqa County, and Tōmūrlūk cemetery in Kūnās County. There have often been discovered large-sized bronze weapons and vessels in this area. 9) The Pamir highland—including the Shambabay cemetery in Tashqurghan County and Aqtala site in Qāshgār-Konashāhār County. 10) The northern foot of the Qurum (Kunlun) Mountains—represented by the Sampul cemetery in Lop County.

The above regional complexes are distinctly different from each other. Their variation in funeral ritual, burial customs and object types shows them to belong to archeological cultures of different character. What they share in common are small bronze (and copper) objects that first appeared in small numbers and then increased in variety as time went on as well as iron objects that began to appear a little later. The use of metal objects stimulated cultural exchange; this is particularly evident in the development of bronze.

III. Typology of Bronzes

In the early and middle periods of Xinjiang bronze culture, the bronzes were mainly small-sized implements, weapons, and ornaments, while a few objects were still made of copper; only in the late period did large-sized bronzes make their appearance, including implements, weapons, and vessels. Here is a brief description of the principal finds.

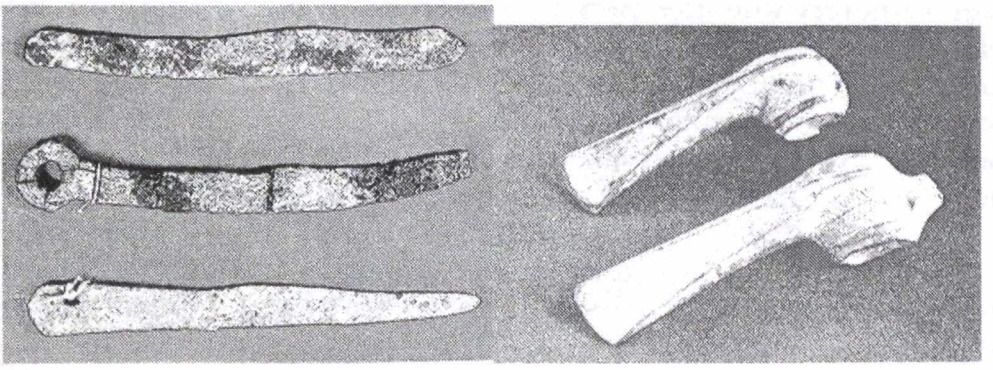


Photo 1 (left): Bronze knives, Charwighul, Khotunsumbul County.
Photo 2 (right): Bronze axes, Toquztara County.

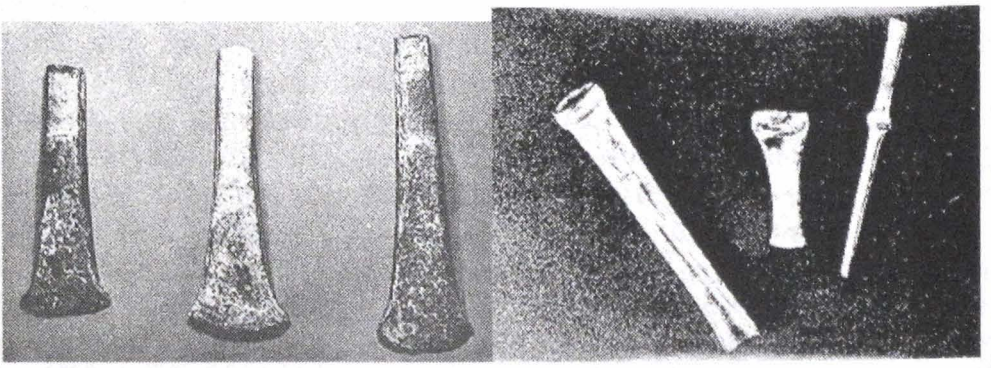


Photo 3 (left): Bronze axes, Toquztara County.
Photo 4 (right): Bronze chisels, Toquztara County.

Most of the implements are small knives, all flat, long, and narrow. In the form of the blade and handle, there are three types which have, respectively, no, fairly, and very clear demarcation between the two parts, with the handle end in the second type perforated or shaped like a ring and that in a portion of the third

type having an animal-head-shaped ornament. Among the relatively large tools are axes, chisels, and hammers. The axes fall into the socketless, upright-socketed, and transverse-socketed types, the last being rather peculiar and uniform with the West Asian battle axe and with its counterpart in the Andronovo culture of southern Siberia. Besides, there are articles for daily use, such as awls, needles, and spoons (Fig. 2).

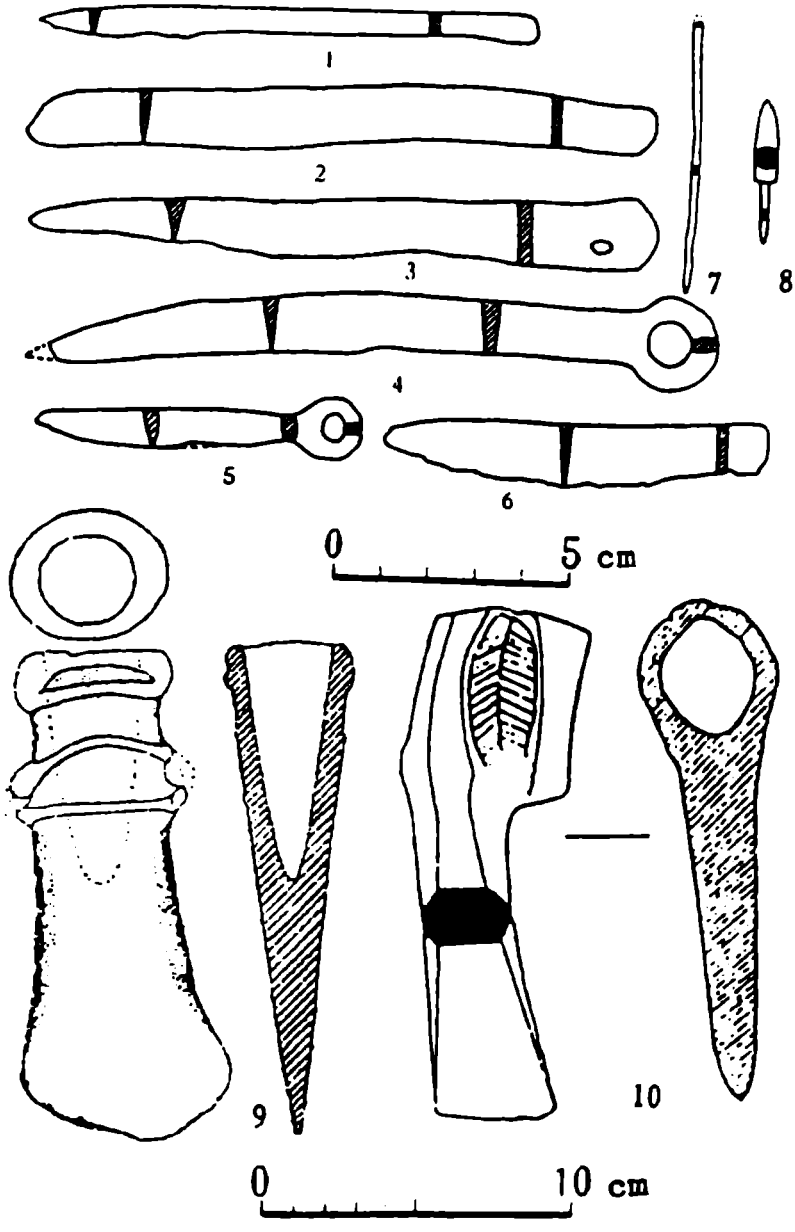


Figure 2: Bronze tools from Xinjiang. 1-6, knives; 7, needle; 8, awl (Charwighul); 9, upright-socketed axe (Shintala); 10, transverse-socketed axe (Toquztara county).

Among weapons, the arrowhead is the largest in both number and variety. The tubular-socketed *ge* dagger-axe is a particular weapon with a tubular socket between the blade and the butt end, the blade being pointed at the end, which is a little different from the variant tubular-socketed axe with an end edge and indicates that the whole object belongs to the hooking class of weapon (Fig. 3). Examples of it are widely distributed in the Eurasian steppes and have quite often been discovered in Pichan, Yanghe, Bügür and Chong Bagh of Xinjiang, as well as at Baicaopo of Lingtai in Gansu, Dasikong village of Anyang in Henan, Baifu of Changping in Beijing, etc. The tubular-socketed axe, belonging to the same sort as the tubular-socketed *ge*, was even more widespread in north and northeast China and became a weapon characteristic of the Shang and Zhou periods. Judged by their formal features, the two types can at least be said to have considerably close genetic relation, although their precise sources call for further research. The spear and dagger are rare. The latter is partly wrought of sheet bronze; being crude and thin, it seems to have been made exclusively for funeral use.

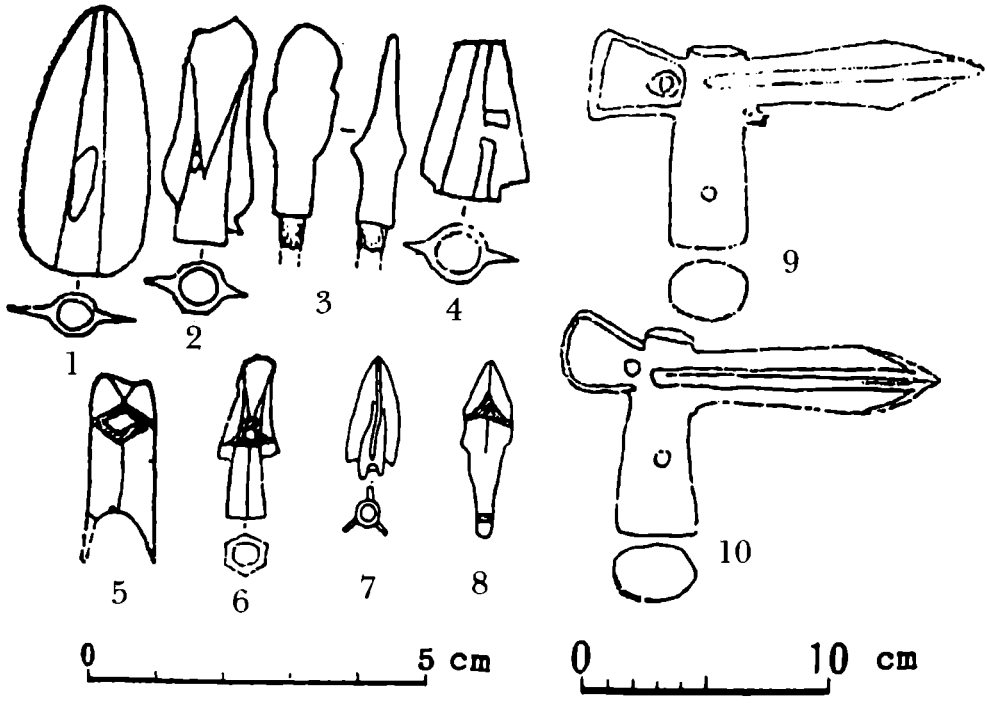


Figure 3: Bronze weapons from Xinjiang. 1-8, arrowheads (1-6, Yanbulaq; 7-8, Charwighul); 9-10, tubular-socketed *ge* dagger-axe (Yanghe).

The ornaments display great variability (Fig. 4). Among them, the earring and the tubular ornament are made by twisting and rolling techniques. The former is a single- or multiple-layer ring shaped by twisting copper wire; the latter is a roll made of sheet copper. Their material was always flexible copper because bronze was too hard and brittle to work in this way. The tubular ornaments

unearthed from Qāwrighul at the Kōnchi River have been identified as copper products, and the same sort of object in the middle and late periods of bronze culture was also made of this material, which was determined by its quality and working techniques. Thus, copper finds should not be taken as definite evidence for greater antiquity.

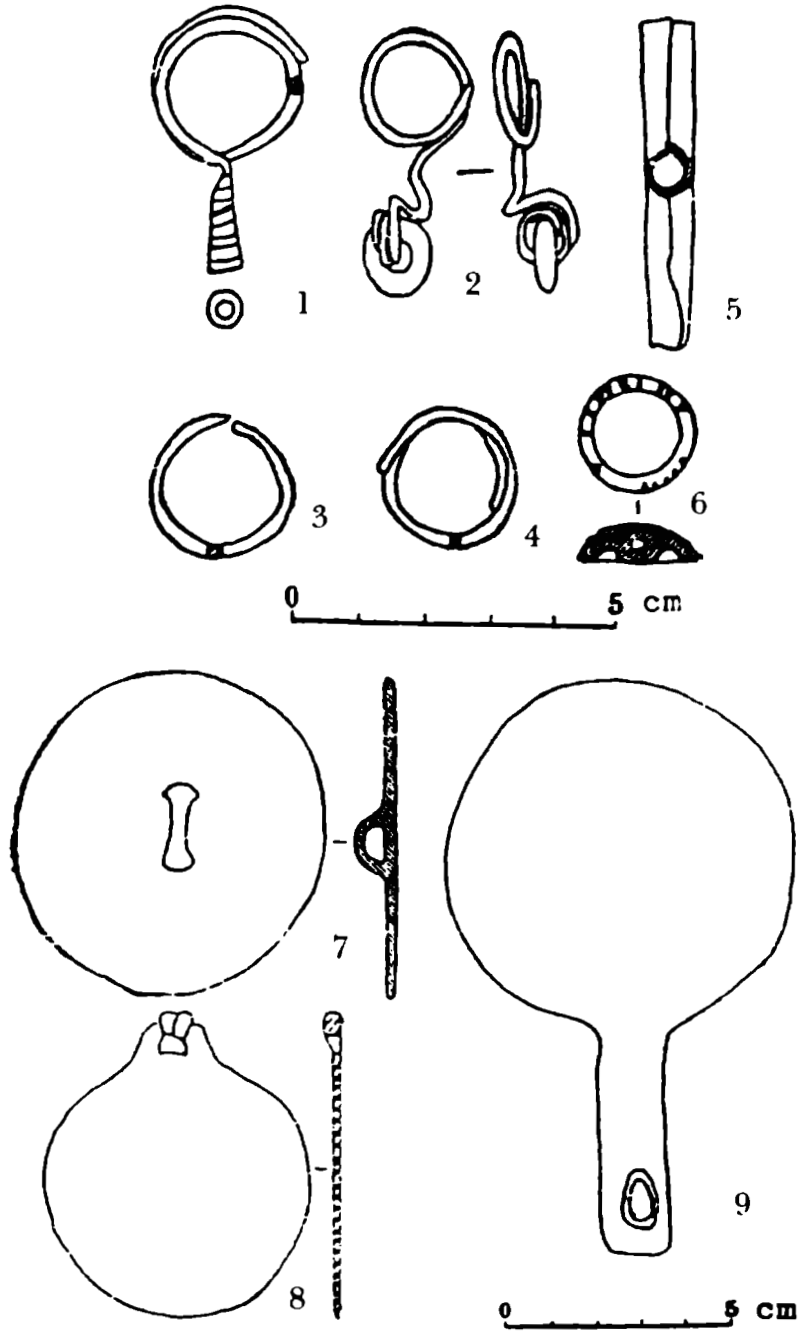
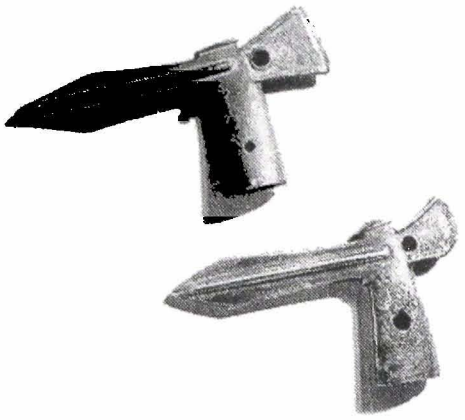


Figure 4: Copper and bronze ornamental articles from Xinjiang. 1-4, earrings; 5, tubular ornament; 6, button-shaped ornament (Yanbulaq); 7-9, mirrors (Yanbulaq, Charwighul and Chong Bagh).



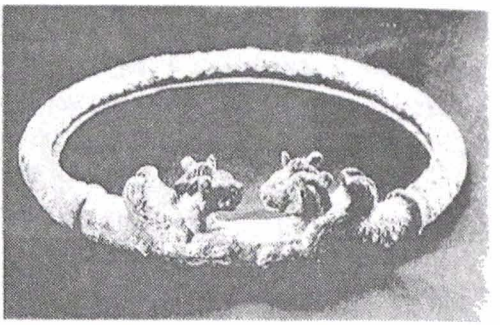


Photo 5 (left): Bronze *ge* dagger-axes, Yanghe, Pichan County.
Photo 6 (right): Bronze ceremonial torque-like collar, from south bank of Künäs River, Künäs County.

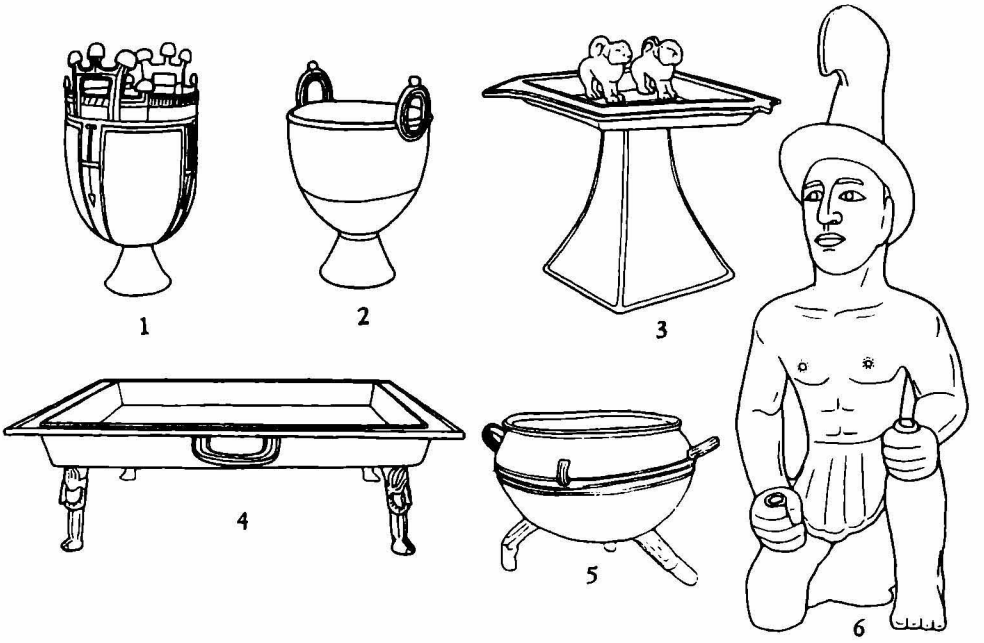


Figure 5: Bronze vessels and warrior figure from Xinjiang (varying in scale). 1-2, caldron (Forest Farm in South Mountain District, Kök-tokay); 3, plate with animal figures (Alwighul); 4, plate (Sodunbulaq); 5, trileg *fu* caldron; 6, warrior figure (Künäs country).

Cast products for ornamental use are largely made of bronze. Among them, the mirror is the most characteristic and bears both eastern and western cultural elements. The unearthed examples represent three types: 1) Round and thin, with 1-3 small holes at the edge. This type could have been a sort of pendant exclusively for funeral use. However, being similar in shape to the Qijia Culture mirror unearthed in Guinan County of Qinghai, it should be classified as a mirror. 2) Round, with an arched handle on the back. It is roughly uniform with the Shang and Zhou type of bronze mirror; a Charwighul Culture example with animal patterns is

especially similar to its counterpart from a Guo State tomb in Sanmenxia City, Henan. 3) The handled mirror with a round hole at the handle end, in shape bearing analogy with West Asian bronze mirrors. The hairpin, bracelet, finger ring, and other ornaments have no striking traits. The animal pattern plaque, button-shaped and crisscross headstall ornament, bit, and belt buckle are all similar to their counterparts in North China, especially a bronze cowry from the Charwighul Culture suggests that it had an inseparable relation to the Shang and Zhou cultures.

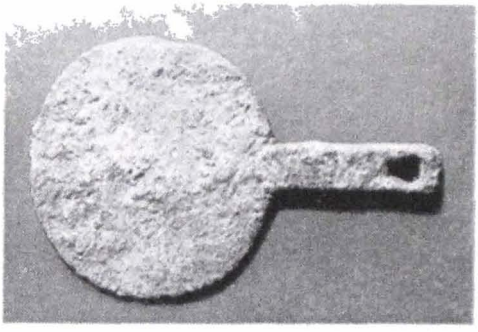


Photo 7 (left): Bronze mirror, Charwighul, Khotunsumbul County.
Photo 8 (right): Bronze mirror, Charwighul, Khotunsumbul County.

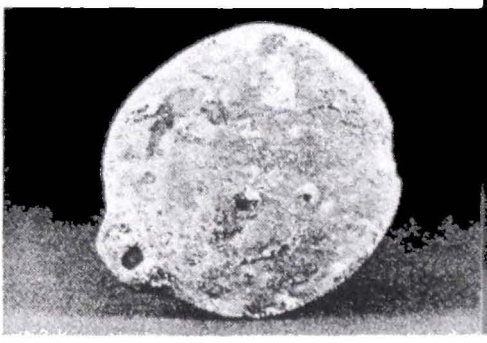


Photo 9 (left): Bronze mirror, Sheep/Goat Breeding Farm, Kūnās County.
Photo 10 (right): Bronze trileg *fu* caldron, from south bank of Kūnās River, Kūnās County.

Vessels have only been found rarely. Typologically there are only the plate, caldron, trileg *fu* caldron, etc. (Fig. 5:1-5). Appearing relatively late and spreading merely in the steppes around and north of the Tāngri Tagh, they must have had a close relationship to northern nomadic cultures. All of them belong to the late period except for the caldron from Kök-tokay (Lanzhouwanzi) of Barköl County which may be a middle period object. The plate is square or rectangular and falls into the four-legged type and the square-foot type with animal figures on the

body, the latter being ritual vessels with quite strong regionalism. The caldron is large-mouthed, double-handled, deep-bellied, and round-bottomed with a ring-foot below and belongs to the type of cooking vessel prevailing in the Eurasian steppes, so its source is also clear. The trileg *fu* has a contracted mouth, four loop-handles on the belly, and a round bottom with bent legs. It is analogous to the same sort of utensil in Central Asia, bears distant regional features, and shows apparent influence from the Shang and Zhou *ding* tripod.

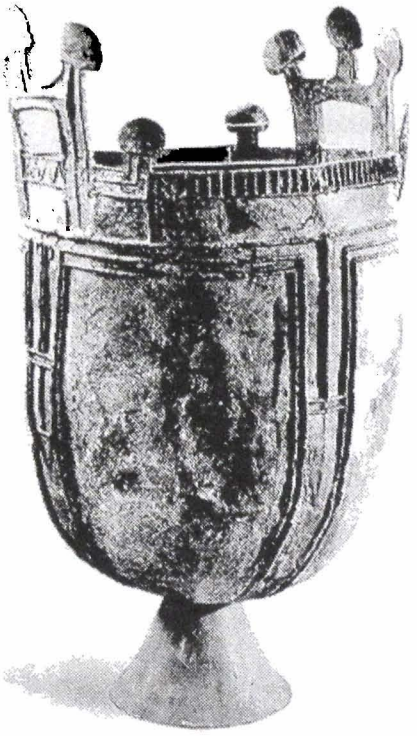
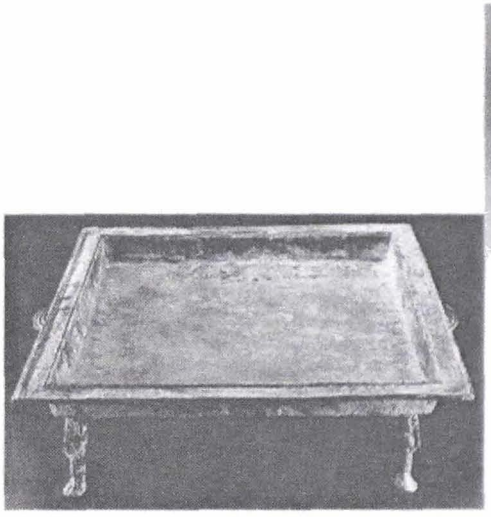


Photo 11: Bronze caldron, South Mountain, Ürümchi City.
Photo 12: Bronze caldron, Kök-tokay, Barköl County.

In addition, there are a warrior figure, ceremonial staff-heads, and large bronze circles with facing animals. The warrior has a long head and a high nose, wears a top hat on his head and a short skirt on an otherwise nude body, and kneels on his right knee, with his left hand on his left knee and his right hand on his right thigh. Being represented expressively, this is a rare work of art (Fig. 5:6). This find and the wooden and stone figures frequently discovered in cemeteries combine to indicate that burying funeral figures with the deceased must have been a common custom in the Bronze Age. The ceremonial staff-heads are shaped like an ox-head or crescent and attached by means of a tubular socket. The purpose of the large-sized rings with head-to-head animals is unknown, but they may have functioned as decorations at ceremonies. (Editor's note: The similarity of these large bronze ring-shaped objects to Celtic

torques is striking, except that the large rings from the south bank of the Kūnäs River seem to have been imperfectly copied because they actually lack a small gap between the finials which are essential for a genuine torque. Similar objects have often been recovered at early Roman suburban sites. Perhaps the central key to understanding the distribution of these torque-like objects lies with the Scythians who are depicted bearing them as gifts presented to Darius I the Great at Persepolis [early 5th c. BCE].)



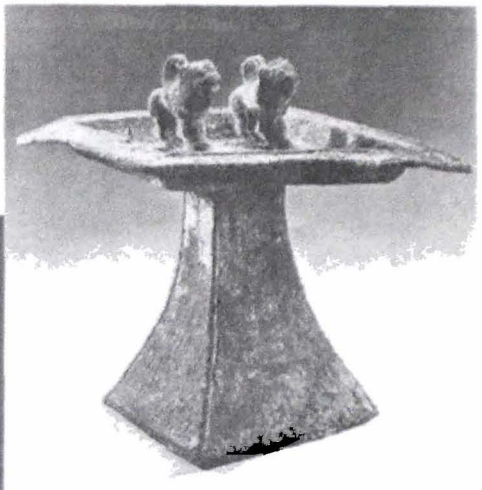


Photo 13: Bronze tray, Chapchal County.
Photo 14: Bronze tray, Alwighul, Ürümchi City.

The above-described bronzes are generally characterized by considerable commonness within the same type, which was due to the fact that the cultural complexes they belonged to were close in distribution and active in mutual exchange. As time went on, these complexes gradually formed traits characteristic of their times and widened their contacts with surrounding areas. Thus, the transverse-socketed axe, tubular-socketed *ge*, animal pattern mirror, handled mirror, plate, caldron, trileg *fu*, and so forth present clear features resulting from east-west cultural exchanges.

IV. Chronology and Periodization

The plentiful Bronze Age cultural remains discovered in Xinjiang have drawn a tremendous amount of attention. In archeology, apart from typological examination, radiocarbon testing became an important scientific means of dating. There have been accumulated more than 139 radiocarbon dates facilitating chronological analyses. Nevertheless, certain errors are present among them. Thus, in some tests the same cemetery yielded widely varying radiocarbon dates and occasionally some specimens from the same tomb were dated with a difference of several hundred or even a thousand years, which would seem to constitute errors in chronological determination. Therefore, a minute analysis is always

necessary and no single datum can be believed absolutely. As different methods of dendrochronological calibration also cause divergences, the present paper takes 5,730 years as the half-life period so as to achieve uniformity among available data. For convenience of reference, it would be appropriate to make a brief table of C^{14} dates for Xinjiang bronze cultures (Fig. 6).

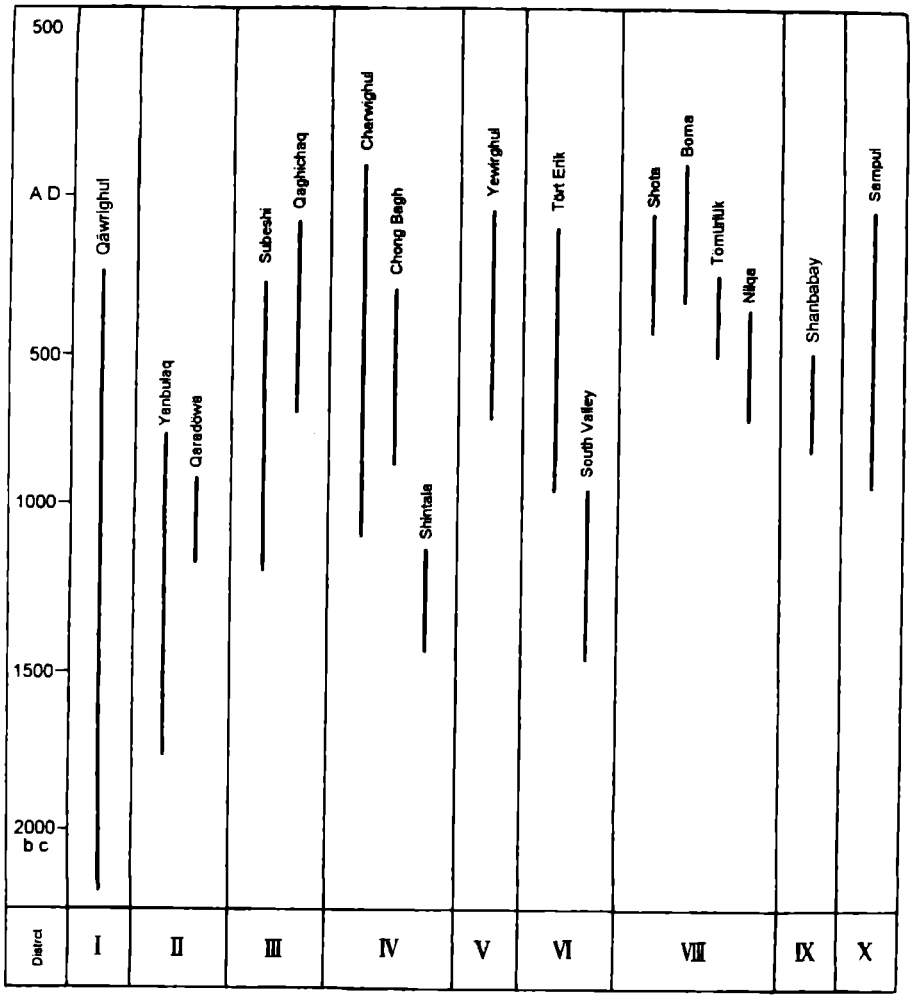


Figure 6: Brief table of C^{14} dates for Xingiang bronze cultures.

The above 10 regions of bronze culture can be divided into three periods:

1) The Early Period (*c.* 2000-1500 BCE)

The first period is represented by the Qäwrighul cemetery. The grave goods include wooden articles, microliths, copper, bone and jade ornaments, straw objects, and wheat grains. The absence of pottery might be due to the burial institutions of the time or to some other custom, thus it can not be taken as evidence of an earlier date. Although there were unearthed a small number of copper ornaments, the traces of chopping discovered on wooden objects were apparently made by edged bronze implements. In the roughly contemporary Qijia Culture distributed in neighboring

Gansu and Qinghai provinces, one can also see the coexistence of copper and bronze objects, so it seems possible that the Qāwrighul cemetery was already in the Bronze Age. The eight available radiocarbon dates show a great deal of difference among each other. Most of them are concentrated at about 1700 BCE or *c.* 2000 BCE after calibration, referring the complex to an earlier stage of the Bronze Age. The same sort of tomb by the Töwān River, however, has a later date (*c.* 700 BCE), which may be evidence that the cemetery functioned longer.

Photo 15: Bronze figure of kneeling warrior, from south bank of Kūnās River, Künās Country.

2) The Middle Period (*c.* 1500-1000 BCE)

This period is represented by the cemetery at Yanbulaq and that at the Qaradöwä Reservoir. The tomb furnishings consist of painted pottery, woolen knit-wear, wooden-ware, small-sized bronzes such as knives, arrowheads, awls, needles, mirrors and plaques, and a few small iron knives occurring later and implying the initial introduction of iron implements. The main radiocarbon dates are as follows: 1700-1100 BCE for Yanbulaq, 1100-900 BCE for the Qaradöwä Reservoir. In addition, the Shintala site and the cemetery at Barköl South Bend, etc. also lie within these chronological limits.

3) The Late Period (*c.* 1000-400 BCE)

The representative remains of this period are the main tombs at Charwighul, which are mostly collective burials and contain pottery, stone, wooden, bone, bronze, iron, gold, and silver funeral objects. The bronzes are mostly small in size, such as knives, awls, arrowheads, spearheads, mirrors, plaques, belt buckles, and bits. The irons are small in both size and number. They include knives, awls, daggers, mirrors, and loops. The C^{14} data for this cemetery (totaling 26 in number), apart from for later tombs, show a date of *c.* 1000-400 BCE. The Chong Bagh, Yewirghul, Tömürluk, Shanbabay, and Sampul cemeteries and the Tört Erik site and Nilqa copper mine site all fall roughly around these times. In addition, the large-sized tools, weapons, vessels, warrior figure, and ceremonial staff-heads and torque-like rings unearthed from different localities should also be dated to this period, although some of them might have been still later.

The above chronological and periodizational description covers more or less the whole range of the Bronze Age in Xinjiang. For the early period, the Qäwrighul cemetery offers wooden articles bearing traces of working with sharp tools as clear evidence of its belonging to the Bronze Age, though more precise information is expected to be discovered in the future. In the middle period, bronzes were principally small in size but rather great in number, and a few large-sized bronzes came into use, indicating the flourishing of bronze culture in Xinjiang; ironware made its first appearance, but was still undistinguished. The late period was characterized by the increase of bronzes in both number and variety, which marked the further advance of metallurgical technology. Irons also increased in variety, but their number was far smaller than that of bronzes, and the unearthed objects are mostly small-sized. This suggests that society during that period had not yet entered the epoch when iron was widely used, so for the time being it hardly seems proper to speak precipitously of the so-called early Iron Age.

V. Other Problems

The establishment of the Bronze Age for Xinjiang marks the erection of a new archeological milestone because it extricates the related remains assembled in a group of cultural complexes from the Neolithic or Chalcolithic hypothesis and represents an individual developmental stage. These numerous bronze cultural complexes show different features due to their vast distribution in the territory of what is now Xinjiang. The ten regions discussed in this paper include only relatively concentrated localities; their denomination in terms of archeological culture calls for further research.

In cultural aspects, there were apparent divergences between different periods and regions, which is shown by variations in burial customs and tomb furnishings. Taking pottery, for example, painted pottery flourished in the middle and late periods and was mainly distributed in eastern Xinjiang, presumably having an exceedingly close relationship to that of prehistoric Gansu and Qinghai. Bronze elements evolved as the essential characteristic of these cultures; their early period was roughly contemporary with or a little later than the Qijia culture in Gansu and Qinghai, and there is no evidence to deny the possibility that still earlier remains of bronze culture have not yet been discovered. Moreover, in the Central Plains, embryonic bronzes came into being in the Longshan culture going back to 4000 years ago, which, however, was far less advanced than the Qijia culture of Northwest China judged by the number of bronzes. Obviously, the sudden appearance of early bronzes in the Central Plains was a result of influence from Northwest China. The cultural complexes of the middle and late Bronze Age in Xinjiang more distinctly present close cultural relations with the east and the west. The nomadic economy flourishing on the northern steppes played an especially important role in cultural diffusion. The germination and development of iron metallurgy in Xinjiang were also earlier than those in the Central Plains, which is evidenced by the fact that among the archeological records so far, the earliest iron artifact is the iron sword with a jade hilt and a bronze core unearthed from a Guo State tomb of the late Western Zhou in Sanmenxia City. A few individual discoveries of early iron objects have been made mainly in tombs of the Spring and Autumn period (8th-5th centuries BCE) in Gansu, Shaanxi, Henan and Shandong. It was only in the Warring States period (5th-3rd centuries BCE) that iron objects came into prevalence. Being a region with bronzes and irons appearing earlier than in the Central Plains, Xinjiang was bound to become an intermediary zone for the eastward spread of metal culture. Nevertheless, as time went on and things developed further, the Xinjiang region in turn came under the strong

influence of Central Plains cultures, which is quite distinctly shown in the later development and change of bronzes and irons, particularly in the specific example that the iron casting techniques of the Central Plains newly-invented in the Warring States period rapidly spread into the territory of Xinjiang.

In racial respects, physico-anthropological studies reveal the complex conditions of Bronze Age Xinjiang. There were Mongoloid, Proto-European, Mediterranean, Pamir-Fergana and other populations. Skeletons of various races coexist even in the same cemetery, which must have been due to the migration and amalgamation of different racial groups. Nevertheless, cultural exchanges did not always result only from people's migrations, especially since metal implements of production were easy to be accepted as burgeoning productive forces by archeological cultures in contiguous areas. It can be imagined that initially bronze and iron technology took its rise in West Asia, first influenced the Xinjiang region, and then reached the Yellow River valley, providing external impetus for the rise of Shang and Zhou civilizations. This means that Xinjiang was situated as the middle link in the eastward diffusion of metal culture, which constitutes one of the important problems worthy of thorough-going research.

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Cultural Connections of the Tarim Basin People and Pastoralists of the Asian Steppes in the Bronze Age*

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The 10,000 km belt of Eurasian steppeland stretches from the Danube to the Great Wall of China. It was a zone which for thousands of years was the way for distributing goods, innovative technologies, new religious beliefs, art images, and finally, separate ethnic groups, that determined the ethnogenesis of various peoples including Indo-Europeans. Therefore, the problems of studying the steppe culture were emphasized by A. Toynbee and F. Braudel, the head of a new French historical school, who considered the steppe belt to be a sort of safety fuse stretching from Germany to China. The steppes may also be considered as a "drivebelt" of Old World civilization that promoted the diffusion of many important cultural achievements in Eurasia.

When F. Richthofen (1878: 454) named the Silk Road, he was thinking of its special importance in the process of cultural exchange. It connected China with Europe, as well as with the Near East and India.

Analyzing the Chinese chronicles and evidence from the ancient classics such as Pliny the Younger (*Naturalis Historiae,* VI, 53-54), Dionysios (746-761 cit. G. Müller, *Geographi Graeci minores,* v.2, 1864), Ptolemy (*Geographia,* VI, 15, 1-3; 16, 1-8; VIII, 24), several generations of scholars (Ritter 1837; Grigoriev 1873; Tomaschek 1888; Berthelot 1930; Stein 1904; 1907; 1928; Herrmann 1931; Markwart 1938; Mandelstam 1957; Shiratori 1957; Mursaev 1957; Petrov 1966, 1967; Humbach 1972; Hulsewé and Loewe 1979; P'yankov 1988; Lubo-Lesnichenko 1988) have established that the Silk Road stretched from Lake Lopnur in the north running via Kucha and Qarashāhār along the Tāngri Tagh (Tian Shan) and the Tarim River to Kashgar, over the Terekdavan Pass to Ferghana and farther, either along the Syr Darya through the steppe towards the South Urals and Lower Volga, and on to the territory north of the Black Sea or from Ferghana to Samarkand and then over the Amu-Darya (Oxus) near Merv, continuing on to Iran and the Near East. The southern route stretched from Lake Lopnur along the northern slopes of the Kunlun mountains, then along the Yarkand Darya river to Tashkurgan towards

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the Pamirs to Vahan and through the passes towards Merv or southward to India, through Gilgit and Kashmir to Gandhara finishing at the mouth of the Indus (Mandel'shtam 1957: 43; Lubo-Lesnichenko 1988: map 10). There also existed a section of the southern route stretching from Vahan through the Karakoram Pass to Swat and farther along the Indus (Jettmar 1980). The way across the Pamirs through Karatag and Karategin (P'yankov 1988: 218-219) is less usable owing to extremely difficult terrain.

The opening of the Silk Road is usually said to date back to the Hellenist epoch when silk was exported from China to the West,[1] while China imported jade from Khotan, glass from the Mediterranean area, and horses and furs from the steppe nomads.

However, the actual functioning of this route has been traced back to earlier times. In the 8th century BCE Herodotus (VII, 23) mentioned transit trade at great distances across the Scythian steppes. This route stretched from Tanais on the River Don to the Urals and farther to the Altai (Hudson 1930: 37; Chlenova 1983). As early as 1897, P. Reineke, on the basis of the unity of animal style, showed that trade contacts existed between the areas situated to the north of the Black Sea and China during the 7th-6th centuries BCE.

The goods made of Chinese cotton and silk textiles found in Pazyryk, bronze mirrors from Pazyryk, Minusinsk, and eastern Kazakhstan (Lubo-Lesnichenko 1970; Rubinson 1985), also testified to those contacts.

At present, no one doubts the fact that separate sections of the route began to function as far back as the Bronze Age. Since the third millennium BCE, one of the sections of the route was used to export lapis-lazuli (Sarianidi 1968) to the Near East and India from Badakhshan. Turquoise was also exported from Sogdiana and Bactria, the exchange being realized through the steppe people. Beads, dated back to the second millennium BCE and imported from Bactria, were found in the graves of the Andronovo pastoral tribes that were discoverd to the south of the Urals; in Sintashta and Uskatta—lapis-lazuli beads, in Alabuga—turquoise, in Gurdush near Bokhara—lapis-lazuli, agate, turquoise beads in the form of the Maltese cross, and even in Siberia—in Rostovka—turquoise, in Sopka II—beads in the form of the Maltese cross (Kuzmina 1988: 51-52).

In the third millennium BCE, the "Jade Road" appeared: jade, extracted in Khotan and Yarkand, was delivered to China where it was widely used in the Lungshan culture (Willets 1965: 44) and especially during the reign of the Zhou dynasty.

In the Bronze Age, China established relations with

[1]The earliest silk textiles beyond China were found at Sapalli-Tepe in Uzbekistan which was occupied by farmers; it dates from the beginning of the second millennium BCE (Askarov 1973: 133-134).

Transbaikalia where clay *li*-type tripods, dating back to the end of the second and the beginning of the first millennium BCE, were found in the zone of jade deposits (Okladnikov 1959).

In the second millennium BCE, jade was known to pastoral tribes in the steppes. Beads made of jade (or its imitations?) were found in Andronovo graves in the Urals—Alakul and Ushkatta, in Kazakhstan—Aishrak and Kanai, and in Siberia—Rostovka (Kuzmina 1988: 52).

The study of the relations of China with the Eurasian steppe is of principal importance for settling the problems of the origins of civilizations in China. Chinese archeologists advocate the hypothesis of autochthonous development of culture. Most European and American researchers, however, believe that a tremendous flowering of Chinese culture during the rule of the Yin dynasty was conditioned by three major innovations: wheeled transport, horseriding, and metallurgy propagated under the impact of the West. This hypothesis was suggested by M. Loehr (1949; 1956; 1965) and S. Kiselev (1960) and is supported now by L. Fitzgerald-Huber (1995) and K. Linduff (1994, 1995) and others.

Consideration of the details of the argumentation is outside my competence. It is only important to stress the fact that the three major innovations which appeared in Anyang in a very developed form indicates many centuries of preceding development which has still not been discovered in China.

Reasearch on contacts with the steppe is also important in order to solve the problem of the origins of the Tocharians. Linguists studying the Tocharian language and the Indo-European problem proved that the Tocharian languages A and B belong to the Indo-European family of languages and that the Proto-Tocharian language separated from it very early (Sieg and Siegling 1931; Pedersen 1941; Krause 1952; Telegin 1959; van Windekens 1976; Ivanov 1985; 1988). But the time when Tocharians came to Eastern Turkestan from their ancestral country is unknown. To judge from written sources, Tocharian B remained the spoken language during the 5th to 10th centuries CE while Tocharian A had already become the dead language of religious texts. Tocharian lexemes in Indian texts written in Prakrit are dated to the beginning of the Common Era, and this serves as a terminus ante quem for the coming of the Tocharians to Xinjiang.

The fact that Tocharians passed from west to east across the steppes is confirmed by lexical borrowing between Tocharian and Finno-Ugrian languages. The speakers of the latter languages dwelt in the southern part of the Eurasian forest zone during the second millennium BCE. Widespread contacts of Tocharian with East Iranian languages may also be traced to the steppes and in Central Asia. The analysis of the Xinjiang archeological data is of key importance for

solving these problems.

Archeological investigation of early relics and monuments in Eastern Turkestan started in the first half of the twentieth century by A. Stein (1921: 356-357; 1928, v.1: 183-184, 205-206), F. Bergman (1939: 14, 26-28), and Huang Wenbi (1948: 7). They confined themselves to collecting occasional materials that remained unsystematized and with no dates. Since the 1950s, the Group for Protection and Study of Xinjiang Material Culture Monuments started systematic investigations throughout the vast region. But stratified monuments in Xinjiang are small in number and C^{14} dates are rare. This has impeded the compilation of the chronology of Xinjiang cultures and the interpretation of historical processes in the region. Some researchers even spoke of the retarded cultural development of the area (Chang 1967: 519).

Attempts were made by E. Antonova (1988: 136-155), C. Debaine-Francfort (1988: 5-26; 1989: 189-213), K. Jettmar (1985: 145-162; 1992: 141-144), E. Kuzmina (1992: 43-45; 1994: 241-242), and S. Havrin (1992: 45, 46) to classify materials published by Chinese researchers, proceeding from analogies with Soviet Central Asia. A comparison of Xinjiang artifacts with painted pottery of the Chust culture in Ferghana was made by Zadneprovsky (1962: 67, 106, 107; 1994: 18, 19; 1995: 15-18).

The conference held in 1992 in Mongolia, devoted to the culture of ancient northern peoples of China, was of great importance.

The study of Xinjiang culture entered into a new stage after the discovery of graves containing remarkable mummies with the skulls of Europoid anthropological types. Such burials were first discovered in the Lopnur region (Stein 1928, v. 1: 264-266; Bergman 1939). Huang Wenbi recognized them as Sakas (Wang 1987: 42). Later, mummy burials were discovered in other areas of Xinjiang (Hadingham 1995: 68-77; Kamberi 1994: 1-15; Mair 1995a: 281-307; 1995b: 28-35; Bower 1995: 120-125).

The most ancient cemetery seems to be that of Qāwrighul situated west of Lake Lopnur, on the bank of the Kŏnchi River, discovered in 1979, that was investigated under the guidance of Wang Binghua (*Kaogu* 1982: 662; 1983: 658; 1986: 361-384; Debaine-Francfort 1988: 15-16; Kuchera 1988: 3-14; Jettmar 1992: 141; Han 1994: 1-9). Forty-two graves were excavated, each containing one burial. The inner chamber of each grave was made of wood. One grave was surrounded by seven circles, formed by wooden stakes dug into the surface. The dead lay on their backs, their heads to the east. Felt pointed caps, leather boots, and woolen textiles were preserved owing to the arid climate. Little bags containing ephedra branches were found in the graves. In the graves, there were also wooden dishes

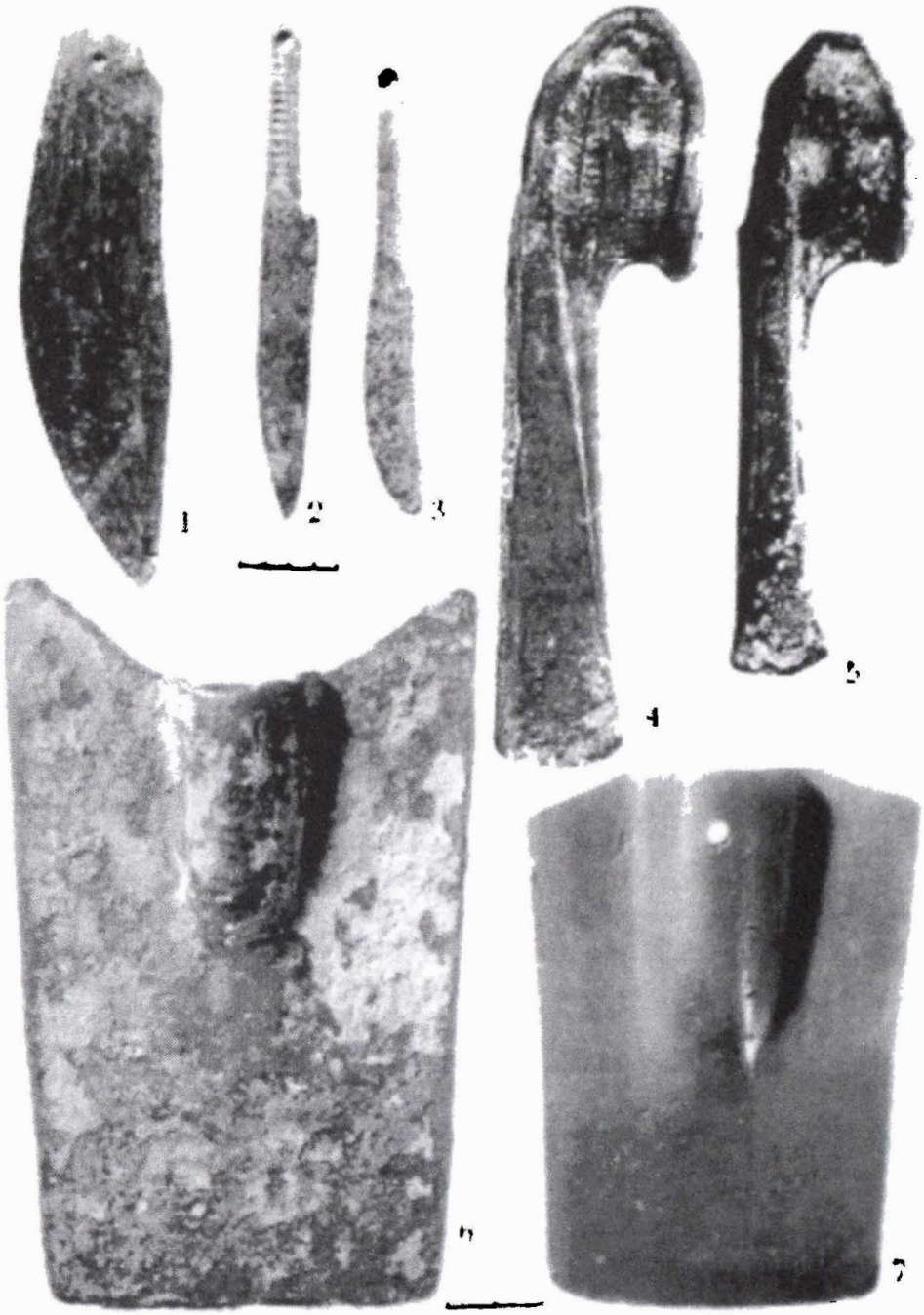

Figure 1: Bronze Implements from the Semirechye (Seven Rivers Area) and Kazakhstan. 1. Sickle: Alma Aty; 2-3. Knives: 2. Alma Aty, 3. Karkaralinsk Settlement; 4-5. Axes: 4. Alexeeva Hoard, 5. Issyk-Kul Hoard; 6-7. Celt-spades: 6. Tup, 7. Upper Syr-Darya Valley.

and vessels, a staff, remains of metal objects made of pure copper, including a little ring, tubular beads made of bone and jade, bone pins, a stone arrow worked at both ends with a rod shaft, as well as stone and wooden anthropomorphic figures. There were also two types of cereals, horns and bones of sacrificed domestic animals (goat,

sheep, ox) as well as the bones of camel, wild deer, moufflon, and birds.

The data obtained allow us to reconstruct the economy as a mixed one that included agriculture and stock-breeding, with hunting still playing a certain role. The homogeneity of burial rites testifies to the absence of social differentiation.

The opinions of Chinese specialists on the chronology of the graves differs. It varies from 4000 BCE to the Han epoch. There is a great latitude in C^{14} dates, but if we neglect the two extreme ones, the dates are located within the interval of 1710-1535 BCE (or, if calibrated, within 2030-1815). Han Kangxin studied 18 skulls found in the graves. All of them belong to the Europoid race. Originally the Chinese researchers singled out two groups of burials, viz., the more ancient ones in the graves without wooden structures inside having dolichocephalic skulls and stratigraphically subsequent burials surrounded by circles with mesocephalic skulls. On the basis of V. Alexeev's classification (1961: 164), Han Kangxin compared the first group with the skulls of Afanasievo culture of Siberia and the second group with the skulls of Andronovo culture.

V. Alexeev (1992: 389-394) showed that the Europoid complex of features in the Chalcolithic Age and in the Bronze Age was characteristic of the population of Western Siberia, Tuva, Mongolia, and Eastern Turkestan. The eastern border of Europoid settlement were the Nan Shan (South Mountains) and Altyn Tagh mountains, Tibet being the native territory of the Mongoloid race. As for the craniological series of the Qäwrighul graves, V. Alexeev stressed that there was no doubt about their belonging to the Proto-Europoid complex, but it is still impossible to differentiate between Afanasievo and Andronovo skulls. In his recent publication, Han Kangxin (1994: p. 2, fig. 1) acknowledged "homogeneity between individuals" and considered all of them to be of Proto-European type, characteristic of "the population of the Bronze Age of southern Siberia, Kazakhstan and Central Asia and even the grassland areas of the Volga River."

To what culture and what ethnic groups did the populations whose remains were found in the Qäwrighul graves belong? The lack of ceramics—the main determining feature of culture—makes it impossible to give a definite answer to this question. The analysis of the clothing, analogous features of which were found in the complex of Saka costumes, namely, in Pazyryk, made Wang Binghua (1987: 42) come to the conclusion that they belonged to Saka culture, C. Debaine-Francfort (1988: 15) justly dated the monument back to the Bronze Age. E. Kuzmina (1988: 15) showed that the costume represented in Qäwrighul was characteristic of the Andronovo culture. The Andronovo costume consisted of caftans, trousers, boots, caps, and pointed caps. Clothes were made of felt, leather, and fur (Maximenkov 1978: 14, 72; Kuzmina 1994: 156-162). Woolen textiles,

woven with diagonal and linen-type techniques, are analogous to those of Eastern Europe and Denmark in the Bronze Age. The same technique of weaving was discovered by E. Barber (1995) and I. Good (1995) in Xinjiang (Mair 1995). This is important since the vocabulary associated with weaving belongs to ancient Indo-European heritage (Gamkrelidze and Ivanov 1984: 383). The clothes complex was formed in the Chalcolithic Age: leather boots and a felt cap were discovered in the burials of the Yamnaya (pit-grave) culture. Pictures of pointed caps in works of Siberian art are known to date back to the Afanesievo culture (Lipskiy 1961: 276-277).

The Qäwrighul burial rites have analogous features with those in the steppe cultures of Eurasia. The construction of circular and concentric fences is known in Yamnaya (pit-grave), Afanasievo, and Andronovo cultures. The graves had wood (more rarely stone) roofing and bedding for the dead made of branches and birchbark, while sacrifices of heads and legs of domestic animals are characteristic of those cultures.

However, the specific features of Qäwrighul burial rites may be traced not to the Andronovo culture but to that of Afanasievo. In the former, the dead are flexed on the left side with their heads to the west. The extended position of the skeleton with knees raised is usually characteristic of the Afanasievo culture. In some graves the heads of the dead were oriented westward, in others eastward, especially in those discovered in the Altai (the Kuyum). S. Tsyb considers eastern orientation to be a feature of early settlers. Fences were circular; in the Altai these were concentric, consisting of two circles made of flat stones or vertically dug slabs, sometimes of logs (Kurota)[2] (Kiselev 1949: 14-40, pl. III-VI; Griaznov and Vadezkaya 1968: 159-165; Vadezkaya 1986: 16; Tsyb 1980; 1984; Savinov 1994: 130-135).

Very important for the chronological and cultural attribution of Qäwrighul culture are metal articles forged of pure copper that are characteristic of the Afanasievo culture known from a few finds such as leaf-shaped knives, awls, a spear, bracelets, and earrings, while in the Andronovo culture metal articles contain high tin content. Among Afanasievo monuments there were the following Qäwrighul-compatible articles: a copper ringlet, wooden vessels, a stone arrowhead, bone beads, needles, awls, little trowels, stone and wooden staffs, a shroud (made not of felt but of birchbark).

The Afanasievo economy is reconstructed as mixed, combining agriculture, cattle-breeding, and hunting. The bones of ox, sheep and

[2]Graves with wooden frames surrounded by rectangular and circular concentric fences made of 1.5 m. posts were found in the Pikshik burials of the Abashevo culture on the Volga, dated back to the beginning of the second millennium BCE (Merpert 1961) and in the Andronovo cemetery at Yurnan (Savinov and Bobrov 1994).

horse as well as wild animals, such as aurochs, deer, roe, musk-deer, fox, and birds (eagles) were found in the graves. The Afanasievo fauna corresponds to that found in Qäwrighul.

Finds of camel bones are specific to Qäwrighul. Two-humped *Camelus bactrianus* was domesticated in southern Turkmenia in the third millennium BCE and used for draught vehicles with solid wheels (Kuzmina 1983: 96-142; Bulliet 1975; Ermolova 1976). Later petroglyphs testify to the spread of *bactrianus* to Uzbekistan and Kazakhstan. The earliest finds of the bones of *bactrianus* in the settlements, ritual burials, and figurines are known in the Andronovo culture, but references to the finds of *bactrianus* bones in Afanasievo contexts are debatable (Kuzmina 1963: 38-46; 1994: 203).

Another contrast is the absence of horse bones. However, horses were found in other Xinjiang cemeteries. A solid wheel made of three parts was found there too (Mair 1995: 294). Similar cart wheels abound in the Yamnaya culture monuments (Piggott 1983; Kuzmina 1983, 1994b, 1996; Izbitser 1993).

These facts allow us to hypothesize that the Qäwrighul burials can be connected with the Afanasievo culture. However, the absence of stone constructions, ochre, and pottery in the graves prevents us from proving this. The possible similarity between Afansievo handmade pottery with comb-made geometric ornamentation and the sherds recovered by A. Stein on the Yarkand-Darya has been mentioned more than once (Kiselev 1949: 36; Antonova 1988: 150). The collection from Xinjiang is kept in the St. Petersburg Museum of Anthropology and Ethnography but the fragments of pottery are inadequate to draw a clear conclusion. Among the finds in the Afanasievo Tes' grave, one's attention is drawn to incense burners with red painting and a vessel with a white ladder painted inside triangles (Kiselev 1949: 20, pl. III, 28). But no analogies of this motif among the painted pottery of either Eastern Turkestan or China are known to me.

If the hypothesis about the participation of the Afanasievo population in forming the Qäwrighul culture eventually proves to be true, this will allow us to solve the most important problem of ethnogenesis of the Old World.

K. Jettmar (1992: 141) compared Qäwrighul materials with those of Ördek's burial ground (Bergman 1939: 61-99) where the graves were found with wooden walls and roofing, and wooden fences, as well as anthropomorphic statues. The Europoid-type skulls, ephedra, and costume found in both cemeteries are similar. Cereal grains (millet, barley corn) were also found. Jettmar identified the population as Tocharians.

The absolute difference of the Afanasievo anthropological type from the ancient populations of Siberia and their full similarity with the creators of Yamanya culture stimulated G. Debetz as early as in

1948 to express the hypothesis that the Afanasievo culture migrated from the west. This point of view was supported by S. Kiselev and others, since the Afanasievo culture does not find its sources in neolithic Siberia while the anthropological type and many features of burial rites, utensils, and peculiarities of pottery have correspondences in the Yamnaya culture (Alexeev 1961: 380; Griaznov and Vadezkaya 1968: 165; Tsyb 1980; Posrednikov 1992; Savinov 1994: 134). The latter culture was formed on a local basis in the steppes of southern Russia and in the third millennium BCE occupied the territory from the Danube to the Urals (Merpert 1968; 1974).

Monuments of the Afanasievo culture are localized in the Altai and the Yenisei Basin as well as in Tuva and western Mongolia (Zimina 1966; Mamonova 1979; Kyzlasov 1979; Novgorodova 1989: 81-86). They are dated back to the second half of the third and the beginning of the second millennium BCE (C^{14} dates differ greatly).

Some burial grounds are situated in remote areas of the steppe and on highlands; this testifies to their origin in a pastoral nomadic migration. In recent years, Chalcolithic complexes, comparable with those of the Yamnaya group, were also discovered in the intermediate territory of the Asian steppe to the west of the Urals, which confirms the possibility of migration.

Linguists investigating the origin of Indo-Europeans, even though they locate the initial motherland differently, consider the territory of the European steppe as an important center of Indo-European ethnogenesis (Schrader 1907, 1935; Georgiev 1958; Diakonov 1982, 1996; Gamkrelidze and Ivanov 1984; Renfrew 1987; Mallory, 1989). This gives reason to connect the migration of the Yamnaya group of tribes eastward in the third millennium BCE with the settling of Indo-Europeans in new places and allows us to hypothesize that the migrants were Proto-Tocharians that had separated from the community at an early stage.

It should be noted that, along with the prevailing Yamnaya component in the Afanasievo culture of the Altai, this culture is characterized by the impact of the North Caucasian variant of Catacomb culture,[3] which is supported by the spread of incense-burners (Tsyb 1980; Kovalev and Resepkin 1995). Catacomb culture spread to the Volga-Ural area (Smirnov and Kuzmina 1977; Malov and Filipchenko 1995).

The combination of Yamnaya and Catacomb peculiarities is also apparent in the Zaman-Baba culture of the Bokharan Oasis in Uzbekistan (Kuzmina 1958). B. Litvinskiy and the author (1963: 127-8) have already advanced a hypothesis on the Indo-European and, possibly, Proto-Tocharian attribution of the Zaman-Baba people.[4]

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[3]V. Fisenko (1967) proposed that the Catacomb tribes were the Hittites.

[4]The clay statues and copper pins from Zaman-Baba provide a remote analogy

The interaction of genetically different Yamnaya and Catacomb cultures in the process of formation of Afanasievo and Zaman-Baba cultures can be elucidated by reference to the evidence of contacts of Tocharians with various groups of Indo-European languages, including Hittite.

Migrations in the steppe were necessitated by demographic causes—population pressure—and intensified by a climatic crisis, viz., aridization of the climate (Kuzmina 1994b: 36). Some Yamnaya tribes came into contact with Catacomb people and advanced eastward; one group separated and went southward. The Zaman-Baba culture was formed as a result of their interaction with the local farming populations of Bactria and Margiana.

Another group advanced to the Altai and farther to Tuva and western Mongolia. It is probable that the appearance of the Qäwrighul Europoid population in Xinjiang was associated with that migration wave.[5] If this hypothesis receives further support, it will be possible to state that the Tocharians appeared in Eastern Turkestan at the end of the third and the beginning of the second millennium BCE, thus the assumption of some linguists that the Tocharians appeared in Eastern Turkestan earlier than Iranians and that they had contact with Finno-Ugrians will be justified (Burrow 1935; Benveniste 1959; Pulleyblank 1966; Ivanov 1985). The hypothesis is confirmed by the fact that the anthropological type and costume in Xinjiang remained unchanged up through the time of the historical Tocharians.

The next stage of development of pastoral cultures in the steppes is the Andronovo period. The culture was formed in the seventeenth-sixteenth centuries BCE[6] in the forest-steppe area between the Don, Volga, and the Urals. Four extremely important inventions were made by Andronovo tribes:

1. They learned to smelt ore and produce copper-tin bronze which was stronger than copper, and to cast bronze shafthole weapons. Rich deposits in areas where they settled were available for mining ore.

2. Fortified settlements, being the centers of metallurgy—prototowns—were built for protecting the mines in the region of the South Urals (Batanina 1995; *Arkaim* 1995).

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with the wooden figures and bone pins from Qäwrighul (Ghulamov, *et al.* 1966: pl. V, 4, 5, XVI; Debaine-Francfort 1988: pl. I, 5, 6).

[5]The hypothesis of T. Gamkrelidze and V. Ivanov (1989) on Tocharian migration from the Near East has not been corroborated either by archeological or anthropological data.

[6]The C^{14} dates—from the twenty-first to the nineteenth centuries BCE (Anthony and Vinogradova 1995)—do not correlate with those in the European chronological scale.

3. The Andronovo people invented light war chariots harnessed to a pair of horses. The burials of the earliest war-chariotieers in the world were discovered on the Volga River and in the Urals. The dead were buried together with a set of armaments, chariots, and horses (Smirnov and Kuzmina 1977; Zdanovich 1988; V. and V. Gening 1992; Zdanovich 1992; Kuzmina 1994ac; Vasiliev, Kuznezov and Semenova 1994; Diakonoff 1995).

4. For the first time in the world, well-bred, swift, light horses were selected for driving chariots. The contemporary breed species, such as Ahalteke, Arab, and English, are the offspring of these ancient horses (Zalkin 1972; Kovalevskaya 1976; Kuzmina 1977).

Such innovations made Andronovo tribes invincible and in the 15th-13th centuries BCE allowed them to spread east to Kazakhstan, Kirghizia, and south Siberia as well as southward to the Amu-Darya. Rich deposits in the Urals, Kazakhstan, and the Altai made the Andronovo tribes the greatest metallurgists of Eurasia. Their products spread westward to the Dnieper and southward to southern Turkmenia, as well as eastward to East Turkestan. Possibly the most ancient of the sporadic findings is a pin with a double head from Kroran (Bergman 1935: pl. XVI, 3). The center of the origin of those decorations was the region situated in the southeastern Caspian area where they appeared in the Anau-Namazga IV culture in the middle of the third millennium BCE and continued to exist during the second millennium BCE (Kuzmina 1966: 78-80, pl. XVII. 7, 27-29).

Territorially, the nearest find to Xinjiang comes from Ferghana in the form of the Hak hoard dating back to the end of the third and the beginning of the second millennium BCE. Now and then this type of decoration occurred among Andronovo culture monuments (Borovoe), the Tazabagyab culture in Khorezm (Kokcha 15, Tagisken), Bishkent culture (Talgar). Since this type of decoration is widespread chronologically and geographically, the date and place of origin of comparable objects from Xinjiang cannot be determined without using spectrum analysis.

From the fifteenth to the ninth century BCE, Xinjiang was populated by Europoids but the people belonged to various anthropological types (Han 1994: map. I). Archeological monuments are represented by tepe-settlements of tillers and sites of cattle-breeders; burial rites and pottery are very diverse. This testifies to the complex character of ethnogenesis in Eastern Turkestan, where different groups of Europoid population superseded one another and sometimes coexisted.

Metal was found in many monuments, Yengidala (Xintala) being one of the earliest. The C^{14} dates go back to 1500 BCE. This settlement mound has two strata. At the lower level were found painted pottery and earthenware with comb-made geometric ornamentation (Debaine-Francfort 1988: 16). Since the author has

not been able personally to acquaint herself with this pottery, its cultural attribution cannot be judged by her. The following objects were found on the surface of the settlement: celt, socketed arrow, awl, and the fragment of a knife.

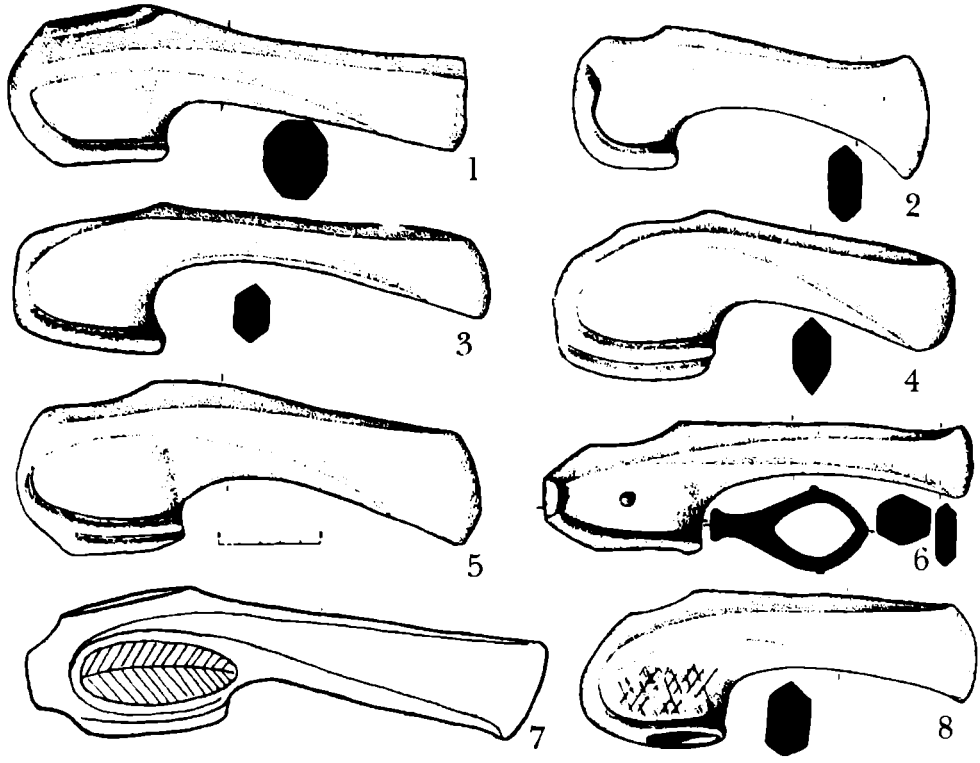

Figure 2: Axes from Kirghizia, Ferghana, and Xinjiang 1. Novo-Pavlovka; 2. Ivanovka; 3. Kairak-Kumy Settlement (moulding); 4, 5, 8. Sukuluk Hoard; 6. Issyk-Kul Hoard; 7. Agharsin Hoard.

In the Qizilchoqa grave of Qaradöwä (Wupu) near Qumul (Hami) (C^{14} dates around 1350-1000 BCE), the following objects were discovered: socketed chisel, arrow, mirror with a handle, and boots with sewn-on beads. Some of the dead, whose remains were found in Yanbulaq graves of a related Qumul group (C^{14} dates are 1110-525 BCE) belong to the Qäwrighul anthropological type which is attested by mirrors with loop-like handles.

A celt, a ringheaded knife, and a large cast cauldron were found in Kök-tokay (Lanzhouwan) settlement of the Nanwan (South Bend) group (C^{14} date is 1335+ or - 75 BCE).

A celt, knives, an arrow, an awl, a mirror with a central projection, earrings, and beads were found in another Nanwan grave (C^{14} date 1050 BCE).

A sickle, awls, and an arrow with a triangular head were found at the ancient site of Qaraqocho in Turfan (C^{14} date 945-100 BCE) (E. Antonova 1982: 57). In the settlement of Aqtala in the western part of Xinjiang there was a knife with a straight back, cast in bronze alloyed with 1.2% tin (Kuchera 1984: 12). The bronze knife and two molds

for casting axes found in a grave at Keremchi in the Altai are of interest too (Antonova 1988: 149).

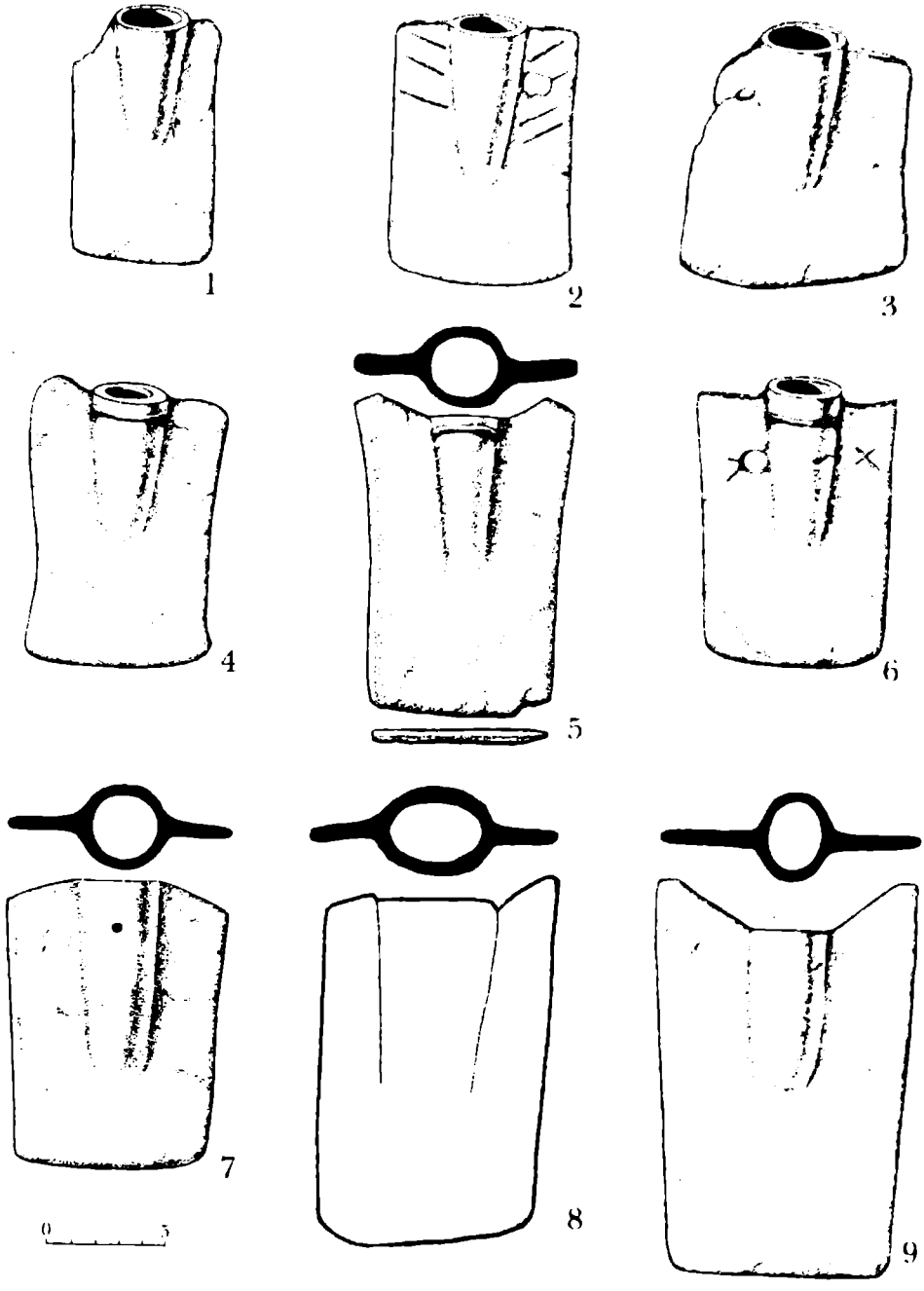

Figure 3. Celt-spades from Kirghizia, Ferghana, and Xinjiang. 1, 4. Novo-Pavlovka; 2. Ivanovka; 3. Kant; 5. Ringitam; 6. Beshkek; 7. Upper Syr-Darya Valley; 8. Agharsin Hoard; 9. Tup.

Accidental finds of metal articles are also known in Eastern Turkestan. A celt and an arrowhead or javelin were discovered in Kroran by Sven Hedin (Bergman 1935: pl. XVI, 1, 7), two axes were found in Ginlu (?) (Antonova 1988: 151), an asymmetrical celt—in

Xinjiang, a celt in the form of a spade—in Ürümchi (Debaine-Francfort 1988: figs. 9, 3, 5). (Fig. 3, no. 8)

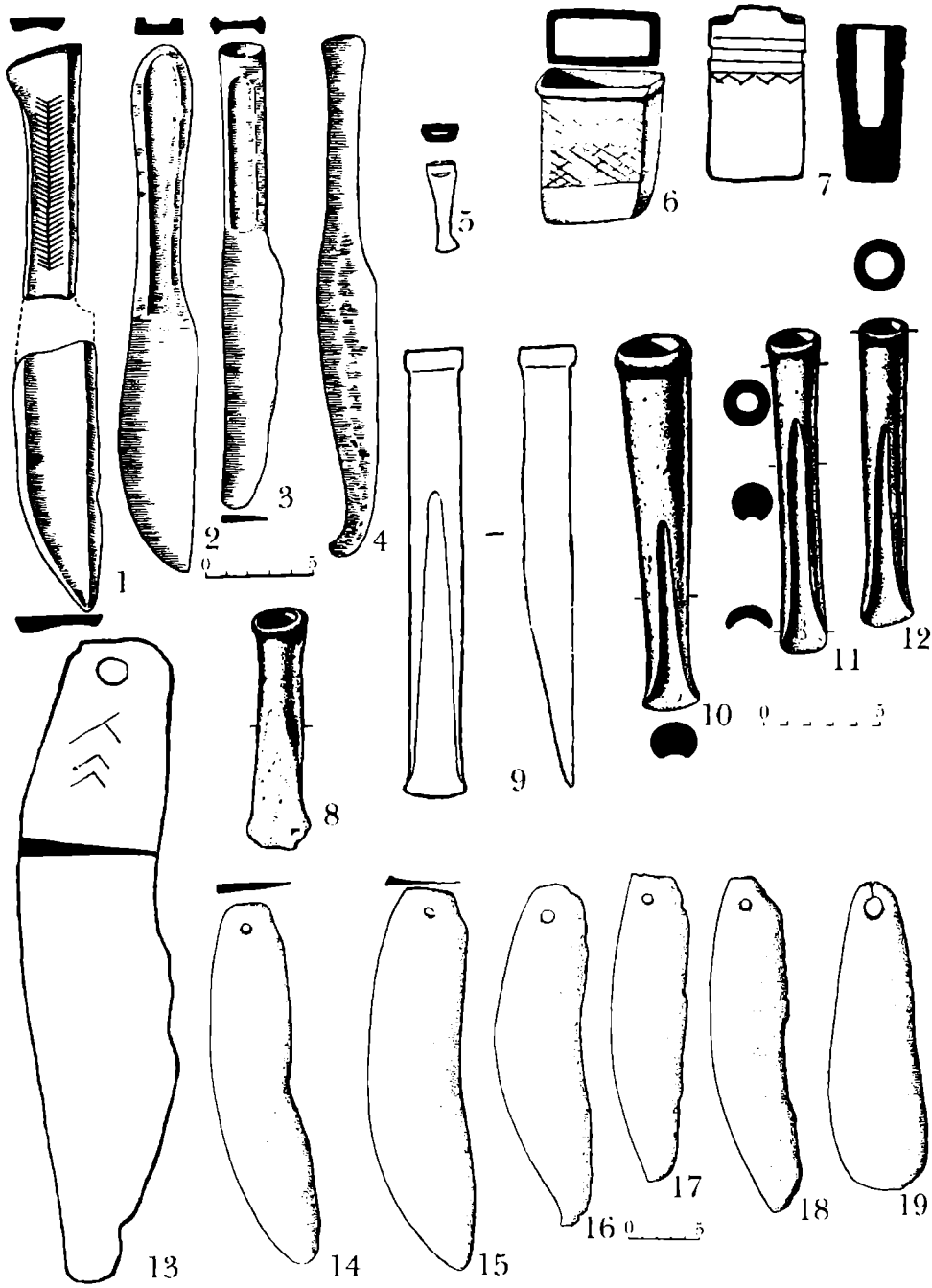

Figure 4. Bronze Implements from Kirghizia and Xinjiang. 1, 6, 11. Sadovoe Hoard; 2. Issyk-Kul; 3, 4. Preobrazhenka; 5, 7, 9, 13. Agharsin Hoard; 10, 12. Sukuluk Hoard; 8. Beshkek; 14, 15, 17, 18. Chu River Canal; 16, 19. Ivanovka.

Of great interest is the hoard found in Agharsin village of Toquztara district. (Fig. 2, no. 7; Fig. 4, nos. 5, 7, 9, 13) It was discovered in 1975 at a depth of one meter (Debaine-Francfort 1989: 200, fig. 20, pl. II, 5, 6) and includes three axes with beveled butt-

ends, three sickles, five chisels and one celt-hammer. Originally, the hoard was attributed to the Warring Kingdoms period, that is, to the developed Iron Age. Wang Binghua dated it back to the Early Bronze Age and synchronized it with the Qäwrighul cemetery. C. Debaine-Francfort (1989: 200) pointed out the possibility of synchronizing it with Andronovo culture but attributed it to the Saka period. Comparing bronze artifacts of Xinjiang with those of Andronovo allows us to specify their chronology and origin. Socketed spearheads and arrows appear in the Andronovo culture during the seventeenth century BCE. They continued developing up to the Late Bronze Age and on that basis the arrows of the Saka epoch were formed. The socketed arrows are not typical for farming populations of China, Bactria, Margiana, and Chust in Ferghana. Specimens from Yengidala and Qaraŭzhma find their nearest analogies in late Andronovo sites of Kazakhstan and Ferghana (Kuzmina 1966: 33-37, pl. VI, 11; 1994, fig. 42, 7) dated back to the end of the second or the beginning of the first millennium BCE. Celts appear in the Turbino-Seima complexes (the sixteenth-fifteenth centuries BCE) and continue up to the Saka period. Specimens from Kroran, Agharsin and Yengidala with oval sockets and cast ridges can be dated to the Late Bronze Age of the thirteenth-ninth centuries BCE by analogy with the celt from the Sadovoye hoard in Kirghizia (Kuzmina 1966: 22, pl. IV, 13; 1994: fig. 31).

The tetrahedral asymmetrical celt from Xinjiang (Debaine-Francfort 1988: figs. 9, 5) is similar to the instrument from Regar in Tajikistan dated from the Late Bronze Age (Kuzmina 1966: 23, pl. IV, 7).

Celt-spades from Ürümchi and Nanwan are instruments whose production was concentrated in Ferghana and Kirghizia (Fig. 1, nos. 6, 7; Fig. 3). They are dated from the Late Bronze Age (Kuzmina 1966: 24-25, pl. V).

A miniature celt-hammer from the Agharsin hoard finds its analogies in the Sadovoye and Shamshi hoards of Kirghizia (Kuzmina 1966: pl. IV, 8; 1994: fig. 43a, 78) (Fig. 4, nos. 6, 7; Fig. 6, no. 18).

In many monuments of Xinjiang chisels were found. A grooved chisel with cast ridge on the shaft from Agharsin is comparable to the type characteristic of Late Andronovo complexes represented in the Semirechye hoards: Alexeevka, Sadovoye, Sukuluk, Shamshi, and Tuyuk (Kuzmina 1966: 26, pl. III, 3-5; 1984: fig. 43 a, b) (Fig. 4, nos. 9-12; Fig. 6, nos. 12, 13).

Three axes with beveled butt-ends from Agharsin belong to the Andronovo type, known throughout the culture area. The main finds are concentrated in eastern Kazakhstan, Ferghana, and the Semirechye (Fig. 1, nos. 4, 5; Fig. 2; Fig. 6, nos. 16, 17) including the hoards in Sukuluk, Shamshi, Issyuk-Kul, Alexeevka, and Turksib (Kuzmina 1966: 11-14, pl. II; 1994: fig. 43a). Axes from Agharsin and

Sukuluk are decorated with similar cast ornament.

Chart 1

Correlation of types of Bronze Implements in the Hoards of Xinjiang and the Semirechye

Hoards	Axe	Chisel	Sickle	Hammer
Agharsin	+	+	+	+
Shamshi	+	+	+	+
Turksib	+	+	+	
Alexeeva	+	+	+	
Sukuluk	+	+		
Sadovoye		+		+

Three massive sickles from Agharsin are similar to a sickle-chopper type widespread from the Volga River to western Siberia. The greater part of such sickle finds comes from eastern Kazakhstan, Kirghizia, and the Semirichye (Fig. 1, no. 1; Fig. 4, nos. 13-19; Fig. 6, nos. 19-21) including those from the Alexeevka, Turksib and Shamshi hoards (Kuzmina 1966: 54-56, pl. 18-22, 24, 25; 1994: fig. 43a; Kozhomberdiev and Kuzmina 1980).

Thus, most of the Xinjiang bronzes find analogies in eastern Kazakhstan, the Semirichye, and Kirghizia where hoards were found with similar correlation of types of bronze objects that allows us to synchronize them (Chart 1). The Shamshi hoard is a perfect analogy with that of Agharsin.

The chronology of hoards is determined on the basis of: 1. articles with a short range of existence, such as, for instance, razors analogous to European ones; 2. objects and molds for their making found in settlements having pottery with decorative ridges. This allows us to date the hoards to the thirteenth to ninth centuries BCE. That is confirmed by the C^{14} dates of Xinjiang sites.

The ornaments found in Eastern Turkestan do not contradict these conclusions. In the Qizilchoqa burial (1350-800 BCE) bronze beads were used to decorate boots. Such a custom was widespread in the Andronovo culture. A mirror with a handle was found in the same monument. This type was known in Kirghizia, in the hoards of Sukuluk, Saovoye and Shamshi, and in Ferghana in the settlements of the Chust culture (Zadneprovskiy 1962: 68, pl. XX, 4, 5; Kuzmina 1966: 68, pl. XIII, 1, 4, 6, 8, 9; 1994: fig. 43a) (Fig. 5, nos. 1, 2, 4, 19). The mirror with a loop-like handle was found in the Yanbulaq settlement (1110-525 BCE). It has analogies with Andronovo

monuments all over the area, including those in Kirghizia (Kuzmina 1994: pl. XIII, 2, 7) and helps to solve the problem of genesis of mirrors in China (Juliano 1985) (Fig. 5, nos. 3, 6).

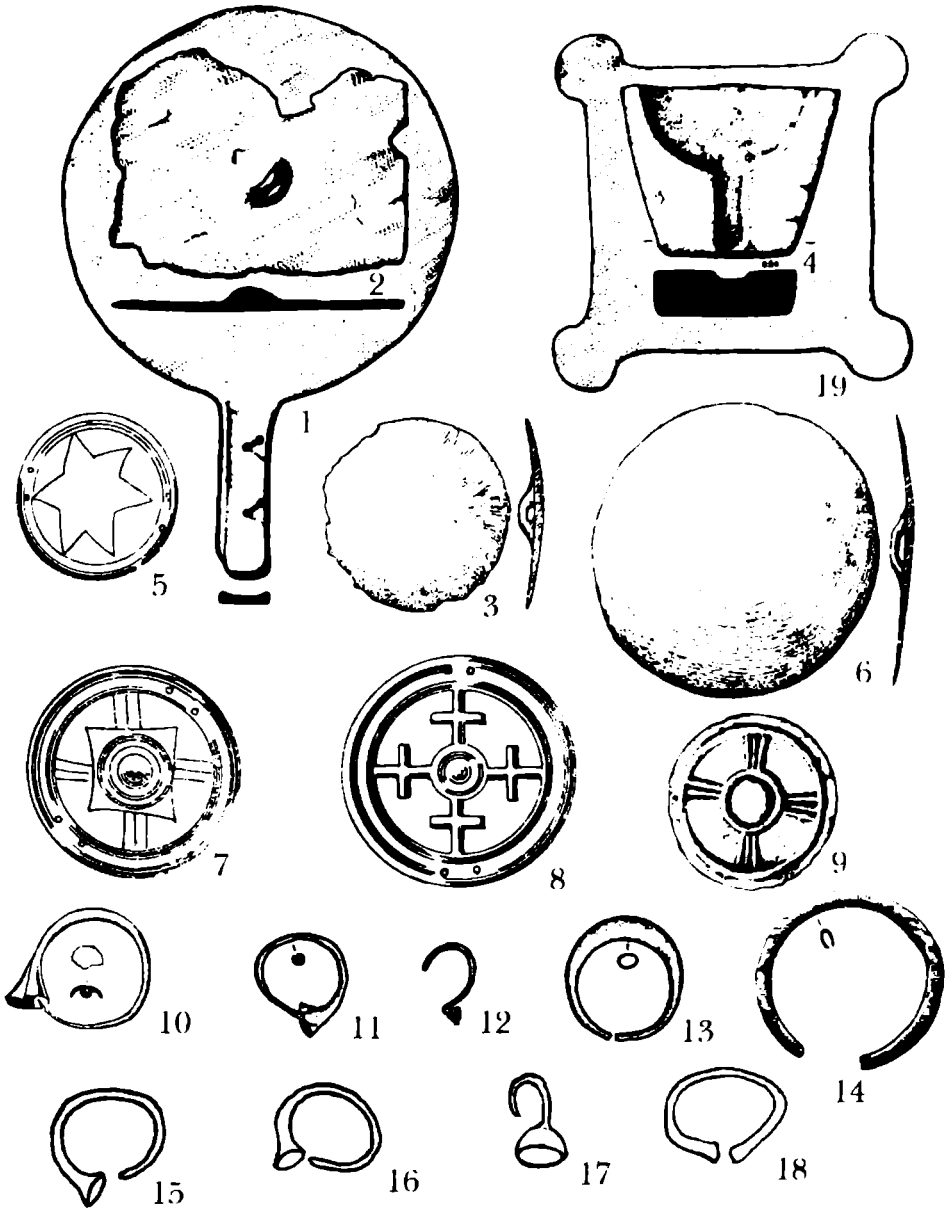

Figure 5: Ornaments from Kirghizia, Ferghana, Kazakhstan, Xinjiang, and China. 1-4, 6, 19. Mirrors; 1, 2. Sadovoe Hoard; 3, 6. Shanshi Hoard; 19. Sukuluk Hoard; 5, 7-9. Plates: 5, 7, 8. Bylkyldak Cemetery; 12. Alexeevka Cemetery; 10-18. Ear-rings: 10, 11. Tash-Tube; 12. Dzhasy-Kechu; 13, 14. Begazy Cemeteries; 15, 16. Dun Bei; 11, 18. Liujia He Grave.

Thus, in the thirteenth-ninth centuries BCE, metal goods were widespread, the center of their production being in Kirghizia and

Ferghana.[7]

There is no doubt that independent metallurgy existed in Eastern Turkestan. This is confirmed by the molds found in Keremchi. But the determining influence was exerted from the west. The movement of western influence toward the east was probably the result of important ecological and historical changes in Asia in the Late Bronze Age.

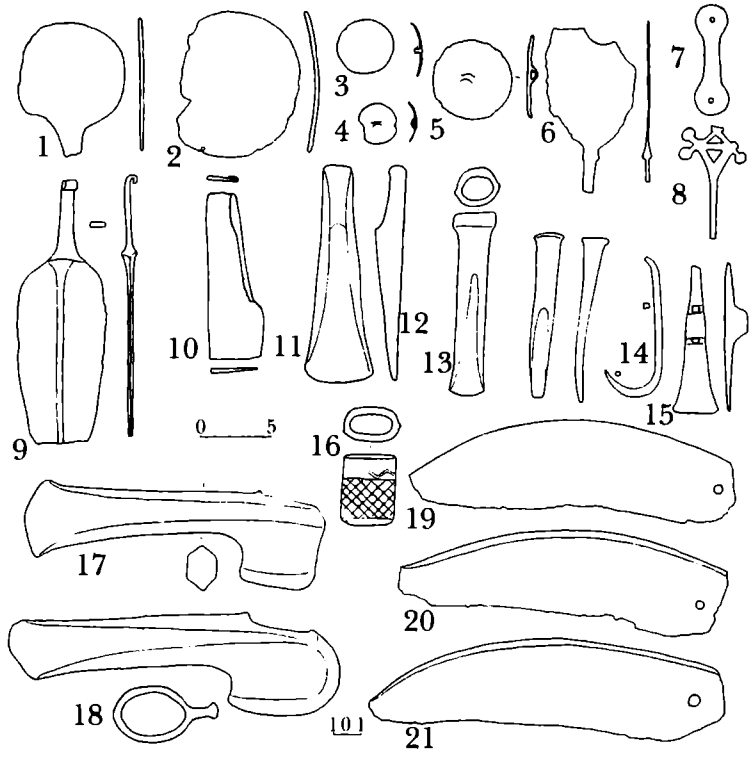

Figure 6: Shamshi Hoard.

The climate suddenly grew cold and damp which made part of the Andronovo population abandon mixed agriculture and stock-breeding near their houses and master a new form of cattle-breeding—driving livestock to distant pastures and changing the latter every season. This permitted them to utilize new ecological niches: high mountains of the Tängri Tagh (Tian Shan) and the Pamirs and oases along the fringes of the deserts of Central Asia. The shift to nomadism was conditioned by the emergence of riding and the growth of importance attached to horses. Horsemen with arrows and spears defended their herds. Owing to social stratification, there appeared rich families who possessed cattle and metal. Successes in metallurgy resulted in the specialization of craftsmen-metallurgists who made metal articles for sale. In case of military danger, precious

[7]Andronovo housebuilding traditions can possibly be traced back to the architecture of a large house in Kök-tokay settlement with a floor space of 200 m^2 and walls made of stone blocks, bearing pillars, and a round hearth.

metal objects were buried. Such hoards were found in the Semirechye and Kirghizia. The Agharsin complex in Xinjiang is also an example of such hidden treasures.

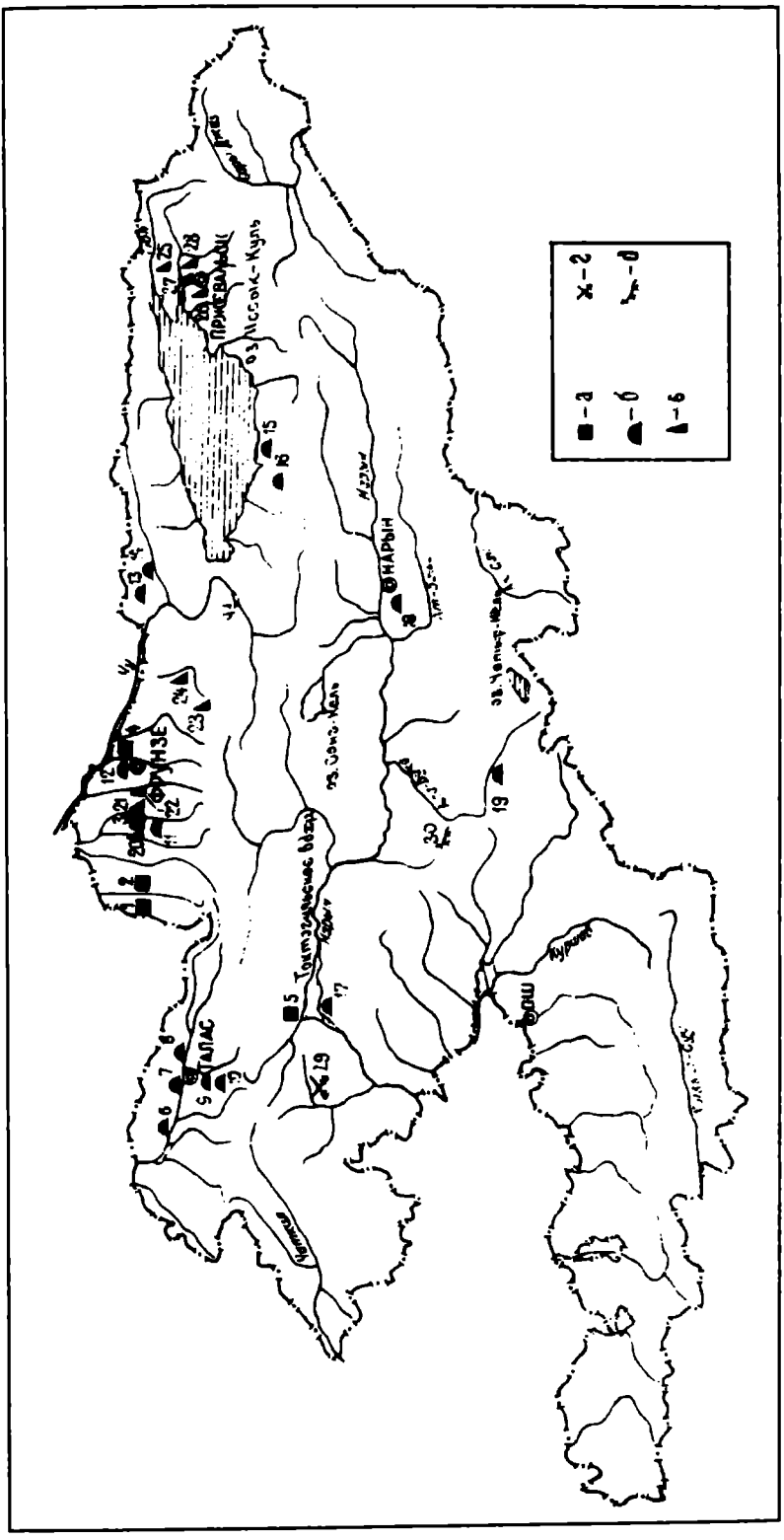

Figure 7: Map of Andronovo sites in Kirghizia. (a. settlement, b. cemetery; c. hoard; d. mine; e. petroglyph) 1. Kainda, 2. Dzhailma, 3. Alexandrovka, 4. Alamedy, 5. Dzhal-Aryk, 6. Tash-Tube, 7. Kulan-Saj, 8. Tash Bashat, 9. Kyzyl, 10. Besh-Tash, 11. Tegermen-Say, 12. Prigorodnoe, 13. Novorosiysk, 14. Chon-Kemin, 15. Kekelik-Sai, 16. Ton, 17. Dzhasy-Kechu, 18. Chyrgail, 19. Arpa, 20. Sadovoe, 21, 22. Sukuluk I, II, 23. Tuyuk, 24. Shamshi, 25. Tup, 26. Preobrazhenka, 27, 28. Karakol I, II, 29. Usun Ahmat, 30. Saimaly-Tash.

Important innovations in culture, ecological crisis, and the search for new lands resulted in ethnic migrations in the steppe. It is probably that, during this time, some groups of pastoralists from Kirghizia advanced to Xinjiang where, around the borders of oases, there were lands suitable for cattle-breeding (Petrov 1966, 1967).

It is likely that the above-mentioned advance is associated with the growing importance attached to the horse in Xinjiang culture. The bones of horses were found in many sites (Sintash [Shirenzi], Qaraqocho, Qaradöwä [Wupu], Kök-tokay [Lanzhou-wanzi]); finds of wooden cheekpieces with two holes and other parts of harness are also known, analogous to those of Late Andronovo (Jettmar 1992: 142, 143; Kuzmina 1994: 186-188, figs. 39, 42).

Since most researchers consider the creators of the Andronovo culture to be Indo-Iranians, there are grounds to connect the ethnic wave from Kirghizia to Xinjiang in the twelfth-ninth centuries BCE with the advance of Iranian population revealed by linguists.

The bilateral character of connections is indicated by finds of jade in Chust. It is likely that the genesis of the Chust culture in Ferghana (Burguluk) in Tashkent Oasis, Yas I, Kuchuk, Tillya in Parthia, Bactria, and Margiana was subjected to the influence of Xinjiang cultures. All those cultures are characterized by similar types of querns, stone sickles, and knives as well as their bronze imitations and ceramics with a geometrical ornament of black paint on a red background (Chust) or of brown paint on a light white background (Yas I). The character of cultural interactions and the direction of the impulses remain disputable and require further investigation (Masson 1959: 106-107; Kuzmina 1970: 135-138; Antonova 1988: 152-155; Zadneprovskiy 1962, 1994, 1995).

Since the beginning of contacts may be determined as the late third to early second millennium BCE, it is possible to come back to the problem of the origin of Chinese civilization. The culture of the Yin kingdom with its capital at Anyang is characterized by three important innovations, viz., popularization of 1. horse, 2. horse-drawn chariot, and 3. metallurgy.

China lay outside the natural range of wild horses, so the horse could not have been domesticated there. In terms of genetics, the wild Przewalsky's horse living in Xinjiang was not the ancestor of the domestic horse either. It was the tarpan, widespread in the steppes from the Danube to Kazakhstan (Bibikova 1967, 1970; Zalkin 1970; Kuzmina 1977, 1996; Bökönі 1994; Telegin 1986; Anthony 1995).

In this zone, once the horse was domesticated in the late fourth-early third millennium BCE,[8] the cult of this animal was soon established, this being documented by ritual burials of horse heads

[8]Attempts to refute the conclusions on early domestication of the horse in the steppes are unconvincing (*Das Pferd und Die Indogermanen* [Berlin: 1992]).

and legs as well as horse images in art (cult complexes in Dereivka, Syevzhaya, Chvalynsk, representations in Suvorovskaya, Lipoviy Ovrag). The bones of horses make up 80% of faunal remains in the Khutor Repin Chalcolithic settlement. In the third millennium BCE the domestic horse was known in the Yamnaya culture from the Danube to the Urals and in the Afanasievo culture in Siberia.[9] Having been invented in Southwest Asia, wheeled carts appeared in the steppes in the middle of the third millennium BCE. Heavy carts with solid wheels were harnessed to a pair of oxen (Piggott 1983; Kuzmina 1986; 1994; Izbitser 1993).

In the seventeenth to sixteenth centuries BCE, light chariots with spoked wheels were invented in the steppes. To them were harnessed a pair of horses of selected breed. As has already been mentioned, the world's most ancient burials of chariots and bridled horses were discovered in the Volga and Ural regions. Chariots spreading in the Ancient East date from the middle of the second millennium BCE and are connected with the advent of the Indo-Iranians among the Mitanni (Mayrhofer 1966; Kuzmina 1994a).

According to linguistic data, familiarity with horses and chariots in China also took place as a result of borrowing from the Tocharians, or, more likely, Indo-Iranians,[10] horse names and mythological motifs connected with this animal testifying to that fact (Polivanov 1968; Pulleyblank 1966; von Dewall 1964; Izuchi, 1930).

All of this proves the hypothesis of the western genesis of horse and chariot in China[11] (Kuzmina 1977; 1983; Piggott 1978; Shaughnessy 1988) and allows for the possibility of reexamining the problem of the origins of Chinese civilization, together with the role of northwestern pastoral nomads of the Eurasian steppes in this process.

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[9]Despite the opinion of M. Gimbutas (1977), D. Telegin (1986), and D. Anthony (1995), shepherds pasturing herds of horses used to ride on horseback, but they were not warrior riders because the bridle for strict horse control appeared only in the late second-early first millennium BCE (Kuzmina 1994a, 1996).

[10]Sinologists consider the finding of metal belts and frontlets in Erlitou culture and bone tubes perforated transversely by a hole at Qijia as proof that horse-breeding existed at that time. They identified the tubes as cheekpieces after D. Telegin (Fitzgerald-Huber 1995: 6, 12, 15, 31-34, 47).

[11]Horse bones were found in Afanasievo cemeteries at Afansievo, Chernovaya VI, Letnik VI, Krasnyiyar, Malye Konani, Tepsey X, Kuyum, and Bike.

List of Abbreviations

BMFEA	*Bulletin of the Museum of Far Eastern Antiquities*
EW	*East and West*
JRAS	*Journal of the Royal Asiatic Society*
SA	*Soviet Archeology*
SE	*Severnaya Eurasiya ot drevnosti do srednevekoviya (North Eurasia from the Early Times to the Middle Ages)* (Saint Petersburg: I, II)
VDI	*Vestnik Drevney Istorii (Ancient History News)*
VT	*Voctochvyi Turkestan v drevnosti i rannem srednevekovie (Eastern Turkestan in Ancient Times and Early Middle Ages).* Ed. by B. A. Litvinskiy (Moscow: 1988, vol. I; 1992, vol. II; 1995, vol. III).

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The Opening of the Eurasian Steppe at 2000 BCE

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Beginning at least as early as the Bronze Age, the people of Xinjiang were closely connected with the steppes to the west. Their physical type, fabrics, wheeled-vehicle technology, and burial rituals suggest an origin in the western steppes. The steppes were not a one-way corridor leading from west to east. Instead, the steppe zone was potentially a bridge across the center of the Eurasian continent. Once that bridge was open the dynamics of historical development changed permanently, not just for the societies east of the Tian Shan, but for all the peoples of Eurasia.

Before about 2000 BCE the Eurasian steppes were occupied by a number of distinct cultures that differed in their origins, economies, technologies, mortuary rituals, and ceramic types. Low-energy ecologies—steppe and desert—posed real challenges to the development of an economy that could support significant concentrations of people. During the millennia before about 2000 BCE, only a few cultural traits diffused across the steppe zone in either an east-west or north-south direction. This long-established pattern changed dramatically between 2000 and 1700 BCE, when the people of the steppes became relatively unified with the widespread adoption of similar subsistence strategies, ceramic and weapon types, house and settlement types, and ritual practices. This complex of broadly shared traits defines the early Andronovo horizon between the Ural Mountains and the Tian Shan, Map 3), and its cousin in the steppes west of the Urals, the Timber-Grave (or Srubnaya) culture (Kuzmina 1994). The metallurgical aspect of this transcontinental horizon has been described by Chernykh as the Eurasian Metallurgical Province (Chernykh 1992:191).

With the development of Srubnaya and Andronovo the steppe bridge was open, and significant transcontinental exchanges began to occur. Some of the earliest involved wagon technology, chariot technology, bronze metallurgy and weapon types, and fabrics. Exchange was multi-directional. The Seima-Turbino horizon is the archeological designation for a widely shared series of decorative weapon and ornament types, superbly made of tin bronze and occasionally of Altaic nephrite, that originated in the Altai Mountains (tin deposits occur on the upper Irtysh and nephrite occurs in the Altai) and diffused westward through the northern steppe/forest borderlands as far as the foothills of the Carpathians (Chernykh 1992:

215-234). Western-style fabrics, importantly diagonal twills, were carried *from* the west into Xinjiang (Mair 1995:31). Wagon and chariot technology, the ring-based bronze knife, and a ring-based socketed axe type seem to have been carried from the steppes east of the Ural Mountains eastward and southward into Xinjiang and China (Linduff 1994; Huber 1995; Chen and Hiebert 1995). The Andronovo horizon also extended southward into Bactria, where it is interpreted as the archeological footprint of the Indo-Iranian Aryans (Parpola 1995; Hiebert and Lamberg-Karlovsky 1992).

No single factor produced the change that opened the steppe corridor at around 2000 BCE The evolution of the Andronovo horizon was the culmination of changes that had been developing in the western steppes over the previous 3,000 years. Three fundamental factors revolutionized steppe lifeways during this long period.

The first was the introduction, largely from outside the steppe zone, of the two principal domesticated grazing animals, cattle and sheep, which laid the foundation for steppe subsistence practices. The second was innovation in the means of transport—the introduction of horseback riding and of the wheeled vehicle—which together made it possible to exploit the low-energy grassland environment in a manner that was both productive and predictable. The culminating factor was a complex interplay of technological and ideological changes after 2000 BCE—the spread of cattle and sheep herding east of the Urals, the development of metallurgy and mining in the steppe zone of the southern Urals and in northern Kazakhstan, the introduction of the horse-drawn chariot as an instrument of elite competition, and the diffusion of an associated Indo-Iranian ritual complex that was widely adopted by the previously diverse societies between the Urals and the Tian Shan. In the remainder of this paper I will examine each of these three developments.

1. The Introduction of Domesticated Grazing Stock

The dominant vegetation of the steppe, grass, is useless to humans, but sheep and cattle convert grass into useful products—milk, cheese, yogurt, meat, wool, and leather. Sheep and cattle were the foundation of a productive steppe economy. Domesticated cattle and sheep were introduced into the Eurasian steppes through the Caucasus Mountains, southeastern Europe, and Iran.

The Neolithic cultures of Iran, dated before 5500 BCE, once were thought to have been the source from which domesticated sheep entered the dry grasslands and semi-deserts east of the Caspian Sea. The bones of ovicaprids were recovered in the 1950's at the cave sites of Dam-Dam Chesme and Dzhebel, southeast of the Caspian, in levels that also contained crude shell-tempered ceramics. The putative domesticates were provisionally dated to 5500-5000 BC (6140 ± 80 BP [P-3081], or 5214-4942 BC, for level 4, above and later than the levels

with the claimed domesticates). However, *wild* mouflon sheep and goat occurred in the Mesolithic strata in these caves, and the supervising archeozoologist (Tsalkin 1956) could not certainly identify any ovicaprids as domesticates in any levels (Vinogradov 1981: 139-41; Dolukhanov 1986b:126).

Although some scholars continue to argue for a very early phase of ovicaprid pastoralism at these cave sites and across the east Caspian region (Dergachev 1989:242; Matiushin 1986:147), the faunal evidence suggests that ovicaprid pastoralism did not become widespread in the steppes and deserts east of the Caspian Sea until the mid-third millennium BC. Hunter-fishers of the Kelteminar culture continued to rely on wild resources—fish, fowl, boar, deer, and onager—in the steppes, rivers, and marshes of the Aral basin until well into the 3rd millennium BCE (Map 2). North of the Aral Sea, the cultures of the northern Kazakh steppes (the Eneolithic Tersek, Surtanda, and Botai cultures) also depended on wild resources—bison, aurochs, or horses—for most of their meat also until well into the 3rd millennium BCE [1] East of the Caspian Sea before the mid-third millennium BCE, economies based on domesticated animals and cereal cultivation were confined largely to the Iran-Turkmenistan borderlands, where rich river deltas at the southern edge of the deserts supported villages (Djeitun, Namazga I-II) and later, cities (Namazga III-IV, Anau, Altyn-Tepe). The steppes and deserts north of the oasis cities were not an early center for the development of stock-breeding economies.

The earliest stock-breeding economies in the steppes appeared west of the Caspian Sea in what is today Ukraine and southern Russia (Map 1). Domesticated cattle, sheep, and cereals were introduced

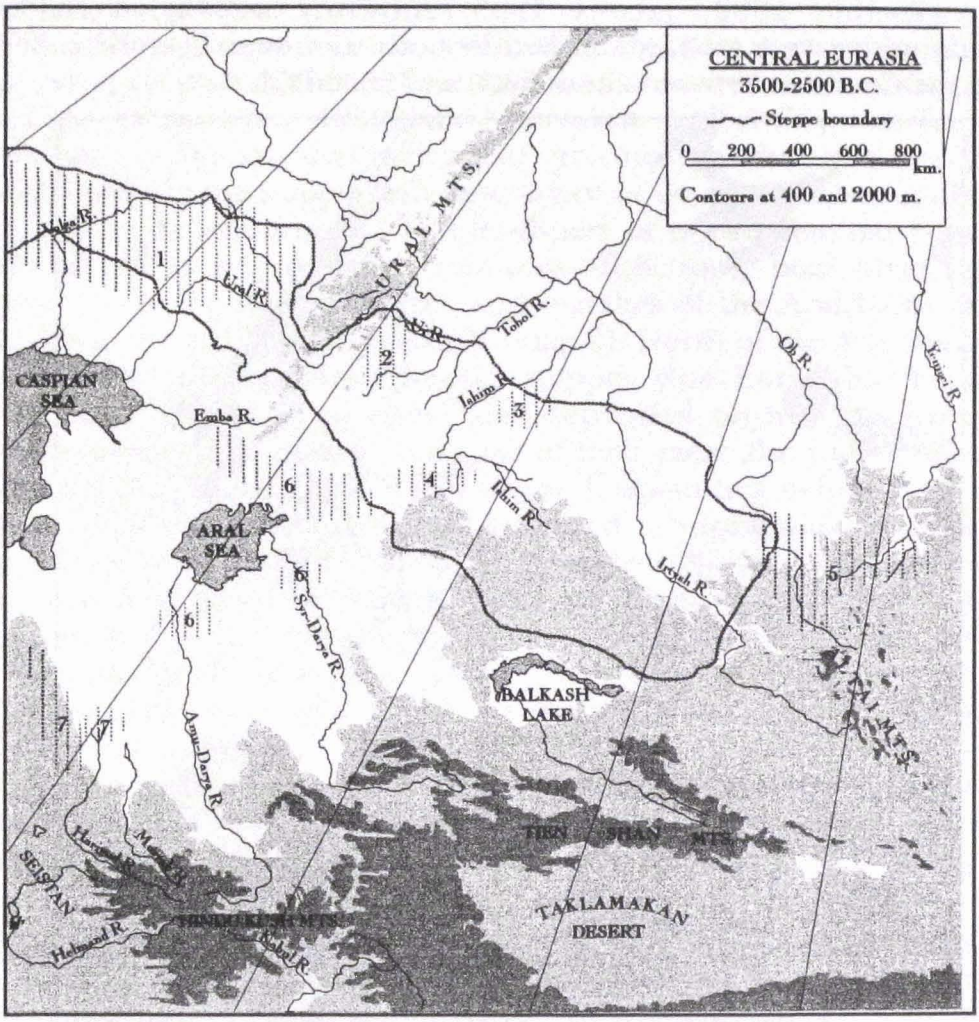
[1]The people of northern Kazakhstan were hunters and fowlers–horse, bison, and wild pig were the most important game animals, and swans, cranes, marsh loons, and geese were among the birds. Horses became the focus of intensive horse-specialized economies and probably were herded and ridden as well as hunted in the context of the Botai culture (Ishim River region), and to a lesser degree in the Tersek culture (Turgai steppes), between about 3500 and 2700 BC. Some of the Botai horses were bitted–they have bit wear on their teeth (Brown and Anthony 1998). These horse-centered economies of the northern Kazakh steppes were unique in Eurasia. Cattle herding is claimed for Surtanda and Tersek (Logvin 1992), but the Tersek bovids were much larger than domesticated cattle–they probably were bison, perhaps large aurochs (Sandra Olsen, personal communication). The Surtanda culture is problematic even in the definitional sense–it was defined by Matiushin (1986) by combining sites that were originally assigned to other local archeological taxa, and some Ural archeologists continue to use these more local groupings, explicitly questioning the validity of the 'Surtanda' label (Kovaleva and Chairkina 1991). Questions of archeological taxonomy aside, the east Ural groups generally did not adopt stock-breeding economies until the emergence of Sintashta and Andronovo.

through two sources: a western source, the Neolithic cultures of the lower Danube valley and the east Carpathian piedmont (the Criș, Linear Pottery, and Cucuteni-Tripolye cultures); and a southern source, the Neolithic cultures of the Caucasus (Shnirelman 1989:83-96, 175-180, 1992; Jacobs 1993; Anthony 1994b). Farming communities were well established in both the lower Danube valley and the Caucasus between about 6000 and 5500 BCE

Map 1. The Pontic-Caspian steppes, 5000-4000 BC
1. Early Tripolye culture
2. Dnieper-Donets (Mariupol) and Sredni Stog cultures
3. Rakushechni Yar group
4. Dzhangar group
5. Khvalynsk culture

The earliest domesticates in the steppes west of the Caspian were sheep, cattle, and an unidentified species of barley. All occurred in

the context of the Mariupol (or Dnieper-Donets phase II) culture in the Dnieper and Donets river valleys in steppe and forest-steppe Ukraine by about 5000 BCE (Telegin and Potekhina 1987; Anthony 1994b:50).



Map 2. Central Eurasia, 3500-2500 BC
1. Yamnaya horizon
2. Surtanda group
3. Botai culture
4. Tersek culture
5. Afanasievo culture
6. Kelteminar culture
7. Namazga III-IV culture

Farther to the east, on the middle Volga near Saratov and Samara, the cemeteries and settlements of the Khvalynsk culture were established during the same period, 5000-4500 BCE (Agapov, Vasiliev, and Pestrikova 1990). Khvalynsk has traditionally been dated to a later period, about 4000 BCE, but new radiocarbon dates have confirmed

older dates from Russian laboratories[2]. The Khvalynsk cemetery contained ornamental rings made of Carpathian or Balkan copper (Ryndina and Ravich 1987), presumably traded eastward through the same social networks (Tripolye A, Dnieper-Donets of the Mariupol type) through which domesticated animals had diffused. Sacrificial deposits in the Khvalynsk cemetery contained the heads and lower leg bones of sheep and cattle, and the leg bones of a few horses. A single grave contained bones from 22 individual sheep, perhaps used as gaming pieces(Petrenko 1984:49). Personal ornaments included bone plaques carved in the shape of cattle and horses. A Khvalynsk-culture settlement, Vilovatoe, located east of Samara, also yielded the bones of domesticated sheep, horses, and cattle (Petrenko 1984:149).

At about the same date or somewhat later, around 5000-4500 BCE, sheep and cattle were exploited in sites of the Dzhangar group[3] on the lower Volga in the northwest Caspian steppes (Kol'tsov 1984, 1988; Yudin 1988), and at Rakushechni Yar on the lower Don, near the Sea of Azov (Kremenetskii 1987). Sheep were not native to the Pontic-Caspian steppes, so must have been introduced as domesticates.

These data indicate that the principal domesticated grazing animals, sheep and cattle, had been incorporated into steppe subsistence patterns from the Dnieper valley eastward to the Volga by

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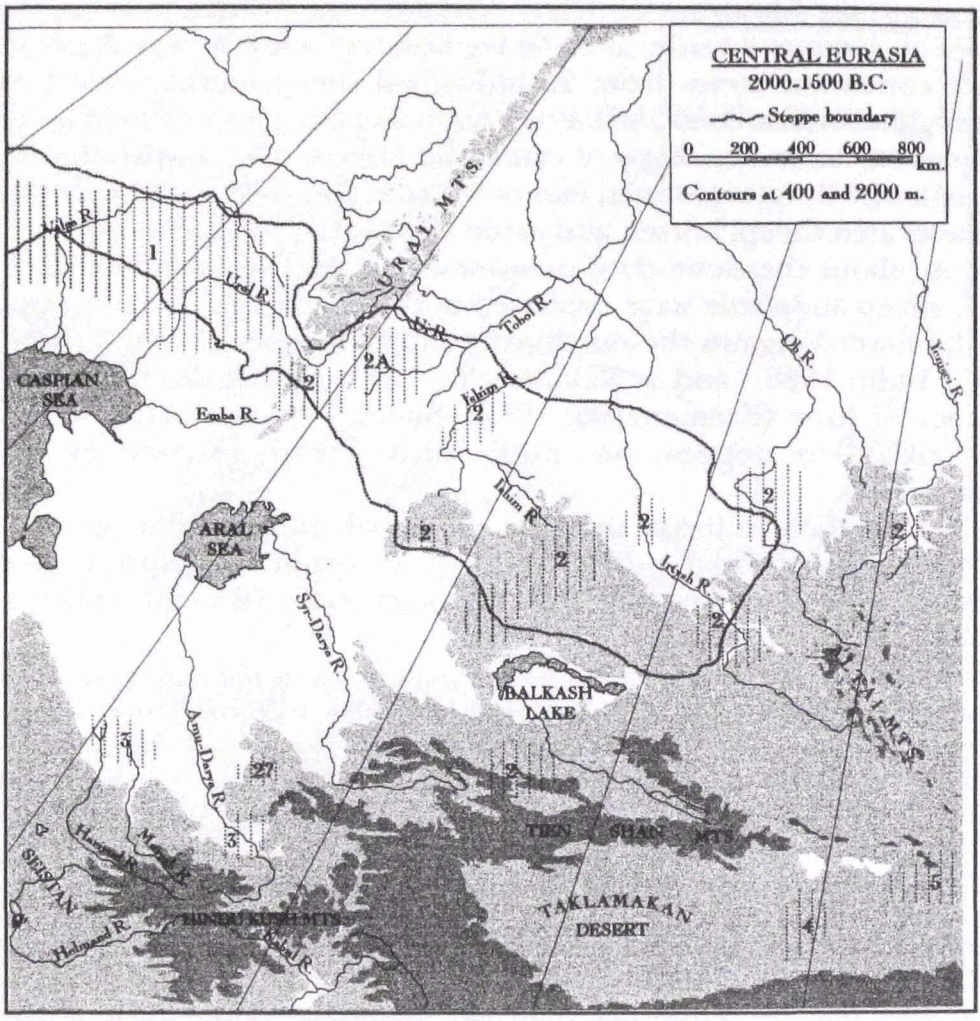
[2]The Khvalynsk culture of the middle and lower Volga region traditionally has been dated through ceramic typological analogies with the pottery of the Copper Age Sredni Stog culture of the Dnieper-Don region in Ukraine. Sredni Stog is well dated to about 4500-3500 BCE, calibrated, and it was assumed that Khvalynsk was about the same age. The author obtained radiocarbon readings from the University of Arizona (AA) laboratory on femur bone from two humans buried at the Khvalynsk cemetery. These dates are supported by a single reading from the Oxford University (OxA) laboratory and by results from the Russian laboratory at Ural State University in Ekaterinburg (UPI), also on human bone from the Khvalynsk cemetery. It is possible that the Khvalynsk cemetery should be placed early in the Khvalynsk culture, and that later Khvalynsk sites might yield more recent dates, perhaps overlapping early Sredni Stog. At any rate, Khvalynsk seems to be a candidate for a precursor to Sredni Stog, rather than a sister culture. Calibrated dates, one sigma range:

AA 12571, Khvalynsk II, grave 30: 6200 BP ± 85, 5251-5010 BCE
AA 12572, Khvalynsk II, grave 18: 5985 BP ± 85, 4946-4783 BCE
OxA 4314, Khvalynsk II, grave 18: 6015 BP ± 85, 4994-4799 BCE
UPI 119, Khvalynsk I, grave 4 : 5903 BP ± 72, 4897-4715 BCE UPI 120, Khvalynsk I, grave 26: 5808 BP ± 79, 4778-4544 BCE

[3]Radiocarbon dates from Dzhangar, in levels with comb-pricked and incised ceramics, lithic blade and flake tools, and the bones of cattle, sheep, and horses:

level 1, 5980 ± 70 BP, 4938-4787 BC, most probable 4898-4847 BC
level 2, 6100 ± 70 BP, 5194-4928 BC, most probable 4993 BC.

about 5000 BCE. An economic (and perhaps cultural) boundary then became established around the Volga and middle Ural rivers—east and north of the Ural river, domesticated sheep and cattle were not widely adopted into steppe or forest-zone economies until more than two thousand years later, during the mid-third millennium BCE



Map 3. Central Eurasia, 2000-1500 BC
1. Srubnaya horizon
2. Andronovo regional variants
2A. Sintashta culture, followed by Andronovo
3. Bactria-Margiana complex, 2000-1750 BC
4. Qāwrighul I
5. Yanbulaq

2. Innovations in Transport: Horses and Wheeled Vehicles

Sheep and cattle could be herded on foot, but large-scale herding was greatly facilitated by horseback riding[4]. Riding also

[4]In Inner Mongolia, a single herder on foot could manage 150-200 sheep. If he had a horse, he could manage more than twice that number, about 500

improved the annual search for good pastures, and for any other resources that required long-distance travel. Once people began to ride, perceived and experienced distances were reduced, and the social and geographic landscape of the steppes was permanently altered. Riding led to the expansion of territorial boundaries, which increased territorial conflicts and warfare, and intensified long-distance trade (Anthony 1986; Anthony, Telegin, and Brown 1990; Anthony 1994a).

Horseback riding is documented earliest near the western margin of the Eurasian steppe, at the Copper Age site of Dereivka on the Dnieper river in Ukraine. Dereivka is a small settlement and cemetery of the Sredni Stog culture (4500-3500 BCE). Five radiocarbon dates from the settlement, and a sixth from the associated cemetery fall between 4200 and 3700 BCE, a chronological range that is supported by an imported Tripolye B1 (4200-3800 BCE) bowl recovered from one of the graves in the cemetery[5]. The evidence for riding at Dereivka consists of bit wear discovered by Anthony and Brown on the teeth of a 7-8 year-old stallion (Anthony and Brown 1991; Anthony, Telegin and Brown 1991). Bit wear is the damage that occurs on the premolar teeth of a horse when it chews a bit. Our experiments with 52 domestic horses of 10 different breeds and 20 feral horses from two distinct populations have established that bit wear causes a distinctive signature which we have quantified and defined (Anthony and Brown 1991; Brown and Anthony 1995, 1998). The Dereivka stallion exhibits bit wear made by a hard bit—perhaps bone. The amount of wear would have required at least 300 hours of riding with a hard bit, according to our experiments. If the deposit containing the stallion skull and mandible dates to about 4000 BCE, as Brown, Telegin and I would argue, it pre-dates the invention of the wheel. If the bit wear at Dereivka precedes the introduction of wheeled vehicles, it probably resulted from riding. The bit wear at Dereivka is the earliest evidence for the use of horses as transport animals anywhere in the world[6].

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sheep. Two herders on horseback were more efficient than one: two mounted herders could manage up to 2,000 sheep, although a single herd of more than 1,000 was unusual (Khazanov 1994:32).

[5]The radiocarbon dates from Dereivka, calibrated, one sigma range:

UCLA 1466A, settlement animal bone: 5515 BP ± 90, 4457-4260 BCE
UCLA 1671A, settlement animal bone: 4900 BP ± 100, 3783-3548 BCE
OxA 5030, cemetery human bone: 5380 BP ± 90, 4337-4048 BCE
Ki 465, settlement shell: 5230 BP ± 95, 4221-3959 BCE
Ki 466, settlement shell: 5400 BP ± 100, 4346-4086 BCE
Ki 2197, settlement shell or bone: 5180 BP ± 95, 4211-3820 BCE
Ki 5481, settlement horse bone: 4330 BP ± 120, 3092-2784 BCE

[6]As this text goes to press, the Oxford University laboratory is processing a piece of the bit-worn tooth from the stallion with bit wear for radiocarbon

Horseback riding was not sufficient by itself to release steppe societies from their dependence on the forest and river-side meadow resources of the steppe river valleys. Horses were not used for bulk transport during the early millennia of horse exploitation[7]. And it was bulk transport that finally opened the Eurasian steppe.

In the drier portions of the Eurasian steppe, herds of cattle and sheep were required to move frequently and across large horizontal distances between major river valleys in order to find sufficient pasture. Bulk transport was needed to help the herders move their tents and supplies with the herd. In the absence of such transport, early steppe herders like those of the Sredni Stog culture remained tied to the major river valleys, where all of their settlements and cemeteries were located. When wheeled vehicles were introduced, the combination of vehicular bulk transport and horseback riding made large-scale herd management possible and freed steppe herders from their logistical dependence on residential bases in the river valleys. This change led to a dispersal of settlements and cemeteries across the steppes and greatly increasing the productivity of steppe pastoralism.

The earliest wheeled vehicles in the Eurasian steppes appeared west of the Caspian Sea in the context of the Yamnaya culture (3500-2500 BCE), which grew partially from Sredni Stog, but occupied a much larger area, from the Danube delta eastward to the Ural River (Map 2). Yamnaya vehicles were slow, solid-wheeled wagons and carts, probably pulled by oxen, but they could carry enough tents and supplies to enable herders to live in distant pastures with their herds

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dating by the accelerator mass spectrometry method. A piece of bone from this horse yielded an anomalously recent date, compared to the other dates from Dereivka, although it still is a very early date for a bitted horse (see Ki 5481 in note 5). We are concerned about the reliability of this date because the piece of bone that yielded the date came from the skull of the cult stallion, which had been on display in the Institute of Zoology for 20 years and was covered with thick, brown layers of shellac or glue when we examined it in 1989. The bone submitted to the Kiev laboratory for dating almost certainly was contaminated by modern glue, and the Kiev laboratory does not have the equipment needed to separate glue proteins from horse bone proteins and date them separately. The Oxford results should put the chronological question to rest.

[7]There has been a long debate over the suitability of early yokes, designed and developed for cattle, for heavy horse draft. Commandant Lefebvre des Noëttes (1931) proposed in a highly influential study that the ancient systems of harness would have strangled horses if they were required to draw any great weight, which explained the lightness of construction in ancient chariots. Spruytte (1983) challenged and revised des Noëttes' conclusions through a series of experiments with reconstructed chariots of different types (see also Littauer 1968). However, it seems clear that horse harnesses were relatively inefficient prior to the invention of the rigid horse collar in the 10th century CE.

for months at a time. The earliest Yamnaya wagon is dated about 2900 BCE at Bal'ki on the lower Dnieper[8].

Yamnaya was the first steppe culture to really exploit the steppe, a development documented by the establishment of Yamnaya kurgan cemeteries in pastures located far from the major river valleys. Yamnaya kurgan cemeteries contained from 4 to 25 burial mounds, often placed on the top of a ridge. Beneath the kurgan, the deceased was placed in a grave pit that was roofed with logs, reed mats, or stone slabs, in a supine position with the knees raised (in early Yamnaya graves). The ground surface around the grave pit often was dug out, creating an inclined surface leading down to the grave opening. A similar grave type and burial posture appeared in Xinjiang over a thousand years later. Yamnaya cemeteries were visible, stable reminders of ancestral territories in the steppe landscape, and were re-visited and re-used over many generations, but Yamnaya settlements became so mobile and insubstantial that they virtually disappeared from the archeological record—a settlement pattern consistent with increased reliance on pastoralism. In addition, Yamnaya was the first steppe culture to intensively exploit steppe copper ores, a probable result of increased movement over and familiarity with the steppe landscape. Yamnaya metalworkers used arsenical bronze to make tanged daggers (Anthony 1997), pins, flat axes, and in one

[8]The first wagons (four wheels) and carts (two wheels) were complex creations. The wood parts had to be chiseled and carved to fit precisely, so that the wheels would not wobble on the axle. A fixed axle had contradictory mechanical requirements: it needed as small a diameter as possible to reduce friction at the point of contact with the wheel, where the wheel revolved around the axle arms; but it also needed to be sufficiently strong to support the weight of a heavy wagon. Early wagons were quite narrow, because a broader wagon bed would have required thicker axles, which would have increased the drag on the wheels. The wood itself had to be cut from the right kinds of trees in the proper way. Substantial knowledge and craftsmanship were invested in even the most primitive wheeled vehicles. Wagons and carts appeared over a large area almost simultaneously: between about 3300 and 3100 BCE they appeared in Mesopotamia (the evidence here is in the form of Late Uruk written symbols), in eastern Hungary (3-dimensional ceramic models in Baden graves), in southern Poland (a 2-dimensional incised drawing on a Trichterbecker, or TRB pot), and in the steppes (actual vehicle burials in graves of the Yamnaya and Novotitorovskaya cultures). It is impossible to say where they were first invented. In the steppes, the earliest dated examples are a cart buried in a Yamnaya grave at Bal'ki on the lower Dnieper, dated to 4370 BP ± 120, or about 2900 BCE (3292-2883 BCE, one sigma range); and two wagons buried in Novotitorovskaya graves at Ostanni on the lower Kuban, dated 4440 BP ± 40, or about 3050 BCE (3261-2929 BCE, one sigma range); and 4270 BP ± 40, or about 2890 BCE (2911-2879 BCE, one sigma range). The Novotitorovskaya culture is thought to have been derived partially from North Caucasian and partially from Yamnaya influences, and was contemporary with middle or late Yamnaya.

exceptional grave, a metal staff or club 48 cm. long, weighing 1.5 kg.[9] Yamnaya metal workers also experimented with iron—Yamnaya iron objects include a short dagger and the welded head of a bronze pin.

Wagons and carts were buried beneath many Yamnaya kurgans. Approximately 250 wagon or cart burials dated between 3000 and 2000 BCE have been excavated in the steppes between the Danube estuary on the west and the middle Ural River valley on the east (Izbitser 1993). Nearly half of these (118) were deposited in graves of the Novotitorovskaya culture in the Kuban River region in the steppes north of the North Caucasus Mountains(Gei 1992). In most cases, the vehicle was disassembled and the wheels were placed on the ground surface at the corners of the grave pit, while the vehicle body was placed over the grave. In some cases, the vehicle was placed in the grave pit, and in others, particularly in the Kuban River delta, the wagon was not disassembled but was placed beside the grave and then was buried when the burial mound was constructed.

The eastern boundary of the Yamnaya culture remained at the middle Ural River, around Orenburg. In the forests to the north were cultures (Volosovo, Lipchinskii, Ayatskii) that continued to rely on fishing and the hunting of elk, bear, and deer throughout the Yamnaya period, until the middle of the third millennium BCE(Kovaleva and Chairkina 1991). In the steppes to the east, in northern Kazakhstan, were cultures like Botai, Tersek, and Surtanda (3500-2700 BCE) that relied largely on hunting and fowling (Map 2). They occupied substantial settlements and kept domesticated horses—we have found bit wear on the teeth of five horses from the site of Botai—but they had few other domesticated animals except dogs (and perhaps cattle for Surtanda), no wheeled vehicles, very few copper tools, and no formal cemeteries. South of these groups, in the Aral basin, was the Kelteminar culture, also primarily dependent on foraging, fowling, and fishing (Dolukhanov 1986).

Except for their reliance on domesticated horses, the steppe cultures east of the Urals were quite different in almost every way from the Yamnaya culture until about the middle of the third millennium BCE. The only exception to this rule was the Afanasievo culture, which appeared as an intrusive complex high in the Altai Mountain steppes with domesticated animals and kurgan graves very much like those of Yamnaya, during the early Yamnaya period, 3500-3000 BCE. Most Russian archeologists derive Afanasievo from Yamnaya, a hypothesis that has gained support recently from multivariate analyses of Afanasievo cranial measurements (Christensen, Hemphill, and Mustafakulov 1996). Many see in Afanasievo a possible source for the

[9]This Yamnaya grave, at Kutuluk, near Samara, Russia, has been radiocarbon dated to 4370 BP ± 75 (Arizona 12570) and 4400 BP ± 70 (Oxford 4262). The most probable calibrated date is about 2930 BC, with a one-sigma range from 3254 to 2901 BC.

development of the later Tocharian languages, although the reason for such a long-distance eastward migration—from the Ural steppes to the Altai—remains unclear.

The Yamnaya culture represented an economic watershed in the Eurasian steppes. It was the first steppe culture that possessed the essential triad of domesticated grazing animals, horseback riding, and wheeled vehicles. This combination revolutionized pastoral economies in the steppe. I have argued elsewhere (Anthony 1995), following Mallory (1989), that Yamnaya also represented a linguistic watershed: the Yamnaya culture probably can be equated with the proto-Indo-European language community. At its eastern margin, peoples that can be identified as Indo-Iranian developed a new culture complex that included chariotry, by about 2000 BCE

3. *The Chariot and Indo-Aryan Ideology*

The appearance of chariotry in the steppe is indicated earliest by the burial of chariots, sacrificed horses, and horse-driving gear (antler or bone cheekpieces with interior studs or prongs that pressed into the horses' lips, bone whip handles) in graves of the Sintashta and Petrovka cultures, east of the Urals. These chariot burials[10] developed from a long tradition of vehicle burial that had earlier been confined to the steppes west of the Urals. The Sintashta and Petrovka cultures were new groups that appeared east of the Ural Mountains between about 2200/2100 and 1800/1700 BCE in the steppes drained by the upper Tobol and Ishim rivers (Kuzmina 1994; Gening, Zdanovich, and Gening 1992; Anthony and Vinogradov 1995)[11]. Sintashta and

[10]A chariot is defined here as a light vehicle with two spoked wheels, pulled by horses, and designed for speed. The invention of the spoked wheel–a very complex device–made the light, high-speed vehicle possible. The earliest spoked wheels in the Middle East are documented in seal impressions from Karum Kanesh II in central Anatolia, dated about 1850-1950 BC, and in a terra-cotta image from Uruk dated to the Isin-Larsa period, broadly 2000-1750 BC (Littauer and Crouwel 1979:50-56). The spoked wheels of the Sintashta-culture chariot burials might date a little earlier than these images from the Middle East, but the standard error associated with radiocarbon dates makes it difficult to be certain (see note 11). In forthcoming publications Littauer narrows her definition of the true chariot by adding the requirement that true chariots must have a yoke saddle. The yoke saddle (Littauer 1968) was a harness device that seated the yoke more firmly on the withers and shoulders of chariot horses, preventing slippage of the yoke and keeping the weight off of the horses' throats and chests. By this definition the vehicles of the steppes would be classified as light carts, since their draft poles and harnesses are not preserved. I continue to prefer a broader definition, and refer to the Sintashta vehicles as chariots.

[11]Radiocarbon dates processed by Russian laboratories for the Sintashta culture have been extremely diverse. However, the author obtained four readings, processed at the University of Arizona (AA) by the accelerator mass

Petrovka were the first steppe cultures (with the exception of Afanasievo) east of the Urals that exhibited strong links to the west, through traits such as ceramic types, bronze weapon and ornament types, horse gear, the establishment of formal cemeteries, and the construction of kurgan graves very much like those of the western steppes in both form and associated ritual. Late Yamnaya/Poltavka graves have been found near Arkaim, an important Sintashta site, and it is probable that these graves represent the ancestors of the Sintashta culture. Graves of the Sintashta culture also exhibit many specific parallels with mortuary and sacrificial rituals described in the *Rig Veda* (Anthony and Vinogradov 1995). Finally, Sintashta-Petrovka is accepted by virtually all steppe archeologists as representing the formative phase in the development of the Andronovo horizon.

It is possible to draw a line of development that begins with Yamnaya in the western steppes and continues through Sintashta-Petrovka into Andronovo—and Andronovo is widely seen as the archeological expression of early Indo-Iranian ritual identity (Kuzmina 1994; Chernykh 1992). Through Andronovo, contact was established with the fortified city-states of the Bactria-Margiana

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spectrometry method, from a single chariot burial of the Sintashta culture at Krivoe Ozero. The samples were from two horse skulls buried on the floor of the grave with the chariot. In addition, the Oxford University (OxA) laboratory has processed several readings from the Potapovka culture group on the middle Volga near Samara. Potapovka was very similar to Sintashta in mortuary rituals, metals, ceramics, horse gear, ornaments, and sacrificial rites. The two groups almost certainly were contemporary.

Calibrated dates, one sigma range:

Sintashta culture

AA9874A, Krivoe Ozero kurgan 9, grave 1, horse skull 1: 3580 BP ± 50, 2009-1782 BCE Most probable: 1888-1918 BC.

AA9874B, Krivoe Ozero kurgan 9, grave 1, horse skull 1: 3740 BP ± 50, 2201-1983 BCE Most probable: 2072-2136 BCE

AA9875A, Krivoe Ozero kurgan 9, grave 1, horse skull 2: 3700 BP ± 60, 2194-1965 BCE Most probable: 2036-2110 BCE

AA9875B, Krivoe Ozero kurgan 9, grave 1, horse skull 2: 3525 BP ± 50, 1918-1740 BCE Most probable: 1781-1876 BCE

Potapovka culture group

OxA 4263, Utyevka VI, kurgan 6, grave 6: 3470 BP ± 80, 1885-1680 BCE Most probable: 1748 BCE

OxA 4264, Utyevka VI, kurgan 6, grave 6: 3585 BP ± 80, 2030-1778 BCE Most probable: 1919 BCE

OxA 4265, Potapovka I, kurgan 5, grave 13: 3710 BP ± 80, 2197-1972 BCE Most probable: 2045-2128 BCE

OxA 4266, Potapovka I, kurgan 5, grave 3: 3510 BP ± 80, 1927-1699 BCE Most probable: 1781-1872 BCE

AA 12568, Utyevka VI, kurgan 6, grave 4: 3760 BP ± 100, 2316-1985 BCE Most probable: 2143-2178 BCE

Complex in the upper Amu-Darya region, and with the desert oases of Xinjiang (Map 3).

What was it that led to the expansion of the Andronovo horizon and the resulting relative homogenization of steppe culture west of the Altai after 1900/1800 BCE? The answer to this question lies partially in the recognition that the Andronovo horizon was locally quite varied—some regional variants, particularly of the Federovo type, probably represent distinct ethnic groups. Nevertheless, all of these groups adopted similar settlement and house forms, a similar pastoral-agricultural economy, ceramic vessel types of similar form and decoration, many shared kinds of bronze ornaments and weapons, and a broadly similar mortuary ritual (Kuzmina 1986, 1994). Perhaps they also adopted Indo-Iranian languages.

The stimulus towards assimilation was partially economic. Cattle and sheep herding spread into the steppes and into the northern forests east of the Urals after about 2500 BCE, laying the foundation for a new kind of shared economy. With the somewhat later development of metallurgy east of the Urals, copper was extracted on a large scale from mines such as Kargali in the south Urals and Kenkazgan in north-central Kazakhstan—the latter produced an estimated 30-50,000 metric tons of smelted copper during the Bronze Age (Chernykh 1992:212). Tin, a rare metal in Europe and the Near East, came from deposits on the upper Irtysh. This probably was the source of the tin for the beautiful tin-bronzes of the Seima-Turbino horizon. Metallurgy and agro-pastoralism together gave steppe societies a new source of wealth. But both metallurgy and agro-pastoralism had existed under the Yamnaya culture without diffusing eastward. An additional stimulus was ideological and technological—the combination of chariotry, a wealthy and competitive elite, and the power of Indo-Iranian poetry and sacrificial rituals.

Some aspects of Indo-Iranian religion and ritual can be reconstructed on the basis of similarities between early Vedic traditions as encoded in the *Rig Veda* (probably compiled about 1500-1300 BCE), and early Zoroastrian beliefs as preserved in the *Avesta* (the oldest parts of which, the *Gathas* of Zarathustra, probably were composed about 1300-1200 BCE). From these texts some aspects of Indo-Iranian identity emerge clearly. For example, the speakers of Indo-Iranian counted their wealth in fat cattle and fast horses. The clouds were envisioned as dappled cows full of rain, Indra was compared to a mighty bull, and milk and butter were the metaphors for bounty. They also knew how to cultivate grain, but farming was probably a small-scale seasonal activity. Herding played a central role in their ritual life, and probably also in their day-to-day economy.

Cattle were given to them, the Aryans, by the gods, and one of the most important duties of an Aryan was to return this divine favor through regular animal sacrifices (Lincoln 1991). The Indo-Iranian

social order was based on these kinds of reciprocal, gift-for-gift exchanges; in this case, they were extended to the relationship between humans and the gods. The ancestral Aryans believed that the first human was the first sacrificer, who created an ordered world through the act of sacrifice (Keith 1925: 228-30; Malandra 1983: 175-182). They identified outsiders, non-Aryans, as those people who failed to conduct sacrifices to the Aryan gods. Cattle were ordinarily the proper sacrificial animals, but on some occasions they were joined by horses, sheep, or goats. When the sacrifice was conducted, the gods to whom it was dedicated came and sat among the human participants on a strew of grass prepared for them; thus a righteous man in both Indic and Iranian traditions was one 'who spread the strew'. Proper sacrificial ritual was the determining factor in Indo-Iranian identity.

The widespread adoption of a broadly similar Andronovo mortuary ritual, with attendant sacrifices of horses and cattle, might therefore be seen as something more significant than just the spread of a new burial custom. It might well represent the adoption of a larger Indo-Iranian ritual identity, a necessary part of which was the Indo-Iranian language(s). The link between Indo-Iranian ritual and language was religious poetry of great power and sophistication, documented first in the hymns of the *Rig-Veda* and *Avesta*, but certainly much older in origin. The spread of Indo-Iranian ritual and language was facilitated by their incorporation in easily memorized and aesthetically powerful verses. One part of the ancestral Indo-Iranian culture was a complex poetic system that included two verse forms with distinctive syllabic structures (Boyce 1989:7):

> *Yashts*, songs of praise, simple and direct in content and expression, perhaps derived from a secular tradition of poetry composed by bards for chiefs, later elaborated into a religious tradition of praise for the gods, and composed in a strict form with an 8-syllable line in both the Vedas (*udgaatr*) and the Avesta; and
>
> *Zaotar* (Vedic *hotar*) poetry, extremely elaborate "wisdom" poetry with 11-syllable verses, full of obscure, enigmatic metaphors and allusions, the product of a long tradition of inquiry and speculation, perhaps connected particularly with prophecy and divination.

The manipulation of Indo-Iranian poetry and ritual by priests and their attendants during sacrifices, and by cattle-rich, metal-rich, chariot-driving chiefs during feasts and competitions might have made these practices superficially attractive to the indigenous societies of the steppes. If Indo-Iranian tribes then deployed a relatively simple package of power-enhancing strategies (Anthony 1995:562-563), they could have encouraged a widespread shift to their language and ritual customs. The result was the spread of Indo-Iranian ritual identity and its material correlate, the Andronovo horizon. The movement of

Caucasians into Xinjiang was connected in some way with this phenomenon.

The Eurasian steppe was now open. It had been transformed gradually, over the course of 3,000 years, from a hostile ecological barrier to a trans-continental corridor of communication and exchange. That transformation permanently altered the dynamics of Eurasian prehistory and history. Many important developments would occur later—the evolution of true pastoral nomadism (not characteristic of Andronovo), the spread of Turkic and Mongolian peoples, the rise of vast grassland political confederacies—but the essential economic and political basis for these developments was established in slow but recognizable stages between 5000 and 2000 BCE.

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Aryan Languages, Archeological Cultures, and Sinkiang: Where Did Proto-Iranian Come into Being, and How Did It Spread?

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The following is yet another update of the model that I have been developing to correlate the linguistic-philological and archeological data relating to the prehistory of the Aryan or Indo-Iranian branch of the Indo-European language family. It more or less follows a chronological order and concentrates on the main issues. The Sinkiang evidence has induced me particularly to reconsider the problem concerning the basic split of the Indo-Iranian languages into their two main branches, 'Indo-Aryan' and 'Iranian'. When and where did Proto-Iranian come into being and can its spread be traced archeologically? An alternative hypothesis of eastern Siberia as the home-land of Proto-Iranians is pondered and rejected in favor of the earlier candidate, the Pontic steppes. Proto-Iranian seems to have spread with the plain pottery decorated with applied clay cords (in Russian, *valikovaya keramika*), which for the first time culturally unifies the Eurasian steppes from the Danube to the Altai during the latter half of the second millennium BCE.

Proto-Indo-European and the Chalcolithic cultures of the North Pontic steppes

The Indo-European problem.

I have to start with the old question: Where was the homeland of the Proto-Indo-European speakers? What appears to me as the best solution was sketched as early as 1926 by Gordon Childe, who proposed the Pit Grave culture of the North Pontic steppes as the archeological correlate. This correlation was developed during many decades by Marija Gimbutas, who spoke of the "Kurgan culture". It has been further elaborated and most forcefully formulated by James Mallory (1989) and David Anthony (1986, 1991, 1994, 1995a, 1995b, 1996), and reference to their work makes it possible for me to be fairly short here. In its present form, the hypothesis connearly phase with the Chalcolithic cultures of the North Pontic steppes, from Srednij Stog in the Ukraine to Khvalynsk in southern Russia, dated to c. 4300-3500 BCE, and the last phase of Proto-Indo-European, during which the dispersal began, with the succeeding Pit Grave (in Russian, Yamnaya) culture of the same region, dated to c. 3500-2500 BCE. (In

the archeological correlations of Harmatta 1992: 359, the Srednij Stog and Pit Grave cultures are seen as Proto-Aryan, which seems impossible for the reasons given below.)

Contacts between Proto-Indo-European and Proto-Uralic speakers.

One of the main arguments in favor of the above hypothesis is provided by loanwords. Only one language family outside Indo-European provides clear evidence for contact with Proto-Indo-European. This is the Uralic family, which consists of two main groups, the Finno-Ugric languages, spoken in the forest zone of North-East Europe from Finland to the Urals, and the Samoyedic languages, spoken in northwestern Siberia. The Uralic languages contain numerous loanwords from Indo-European languages (for an older general survey see Joki 1973). Among the oldest loanwords, which go back to Proto-Indo-European (or its daughter branches before they had developed their own post-Proto-Indo-European features), 6 can be reconstructed for Proto-Uralic, 13 for Proto-Finno-Ugric, and 21 for Proto-Finno-Permic (Koivulehto 1995a, 1995b; cf. also id., 1991; 1993; 1994).

The Proto-Uralic/Proto-Finno-Ugric speakers have long been identified by many researchers with the cultures characterized by sub-Neolithic Comb- and Pit-Marked ceramics, which are distributed throughout the same forest areas on both sides of the Ural mountains as the Finno-Ugric speakers. In their early phase, these Comb- and Pit-Marked pottery cultures are dated to c. 5000-3900 BCE, in their classical phase to c. 3900-3200 BCE, and in their late phase to c. 3200-2500 BCE (C. Carpelan, personal communication 1996).

The direction of borrowing, from Proto-Indo-European to Proto-Uralic/Proto-Finno-Ugric, suggests that the loanwords came from a neighboring culture that was on a technologically higher level. Concrete evidence for contact between these two archeological spheres has been scarce, however. Mallory cites only one example. The distinctive shell-tempered ceramics of the late fourth millennium Samara culture in the middle Volga forest-steppe have "ceramically influenced the forest cultures to the north" (Mallory 1989: 206f., citing Igor Vasil'ev). The Samara culture was succeeded by the Khvalynsk culture, which shares many cultural traits with the Srednij Stog, Lower Mikhailovka and Repin Khutur cultures of the Pontic steppes. These Chalcolithic cultures, dated to c.4300-3500 BCE (Anthony 1994: 190) are among the immediate ancestors of the Pit Grave culture and very probably represent an earlier phase of the Proto-Indo-European culture (Mallory 1989: 197-210).

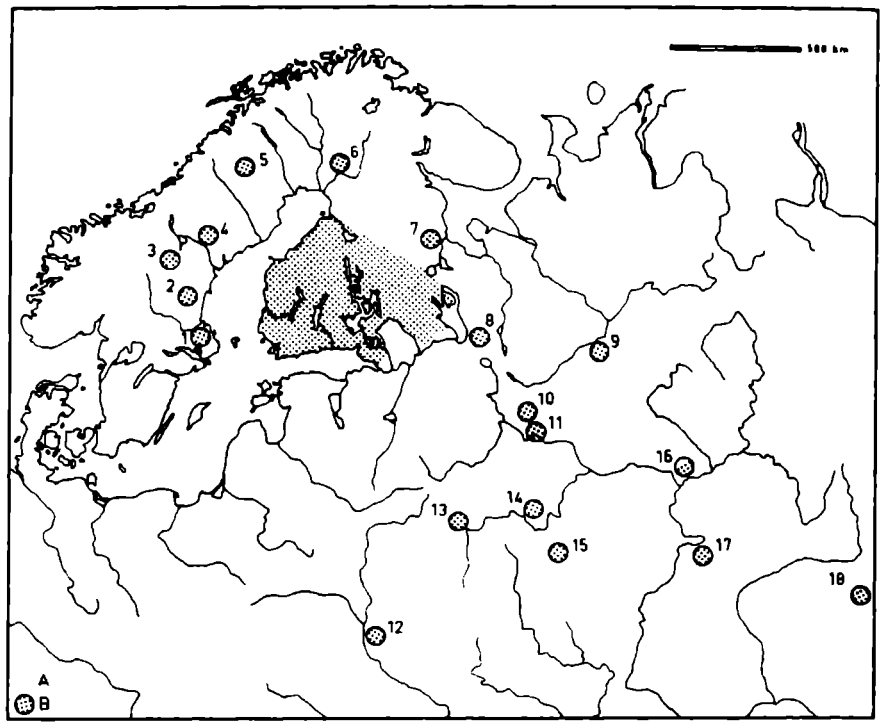


Fig. 1a. Distribution of the knobbed stone mace-head in cultures characterized by the classical Comb- and Pit-Marked Pottery. After Carpelan 1976: 18 (fig. 8). Southern Finland (dotted) is the principal area of distribution. The dotted circles show individual find spots.

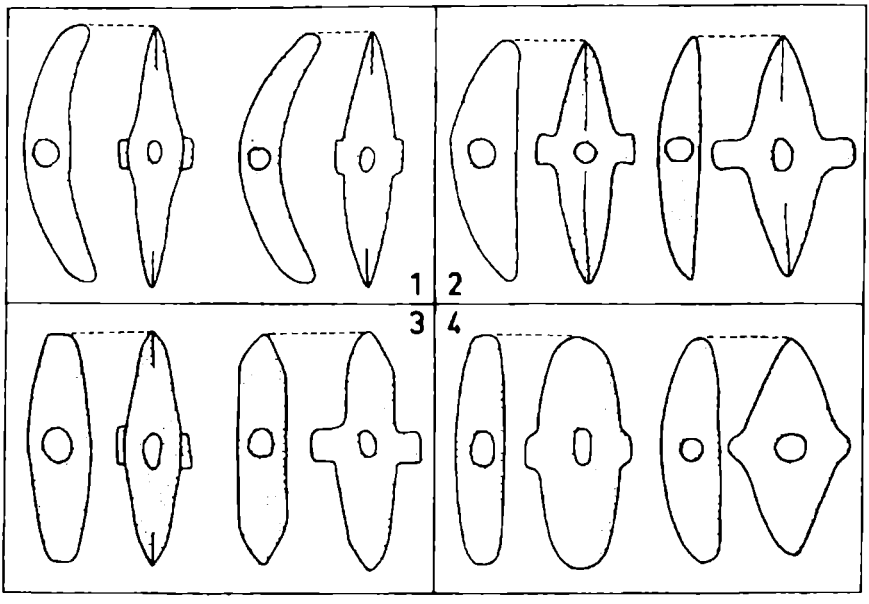


Fig. 1b. Types of the knobbed stone mace-head in cultures characterized by the classical Comb- and Pit-Marked Pottery. After Carpelan 1976: 7 (fig. 1).

Another interesting example has very recently been pointed out by Christian Carpelan (1996). The culture characterized by classical Comb- and-Pit marked pottery seems to have had a lively distribution

network (and probably also a fair linguistic uniformity) over a wide area. This is suggested by the distribution of the knobbed stone mace-head, which is found from Finland to the Urals (fig. 1) (Carpelan 1976: 18). New evidence makes it likely that this highly distinctive artifact has its origin in the Khvalynsk culture, for it has been found in several Khvalynsk burials (Agapov et al. 1990: 114, 117, 120, 154).

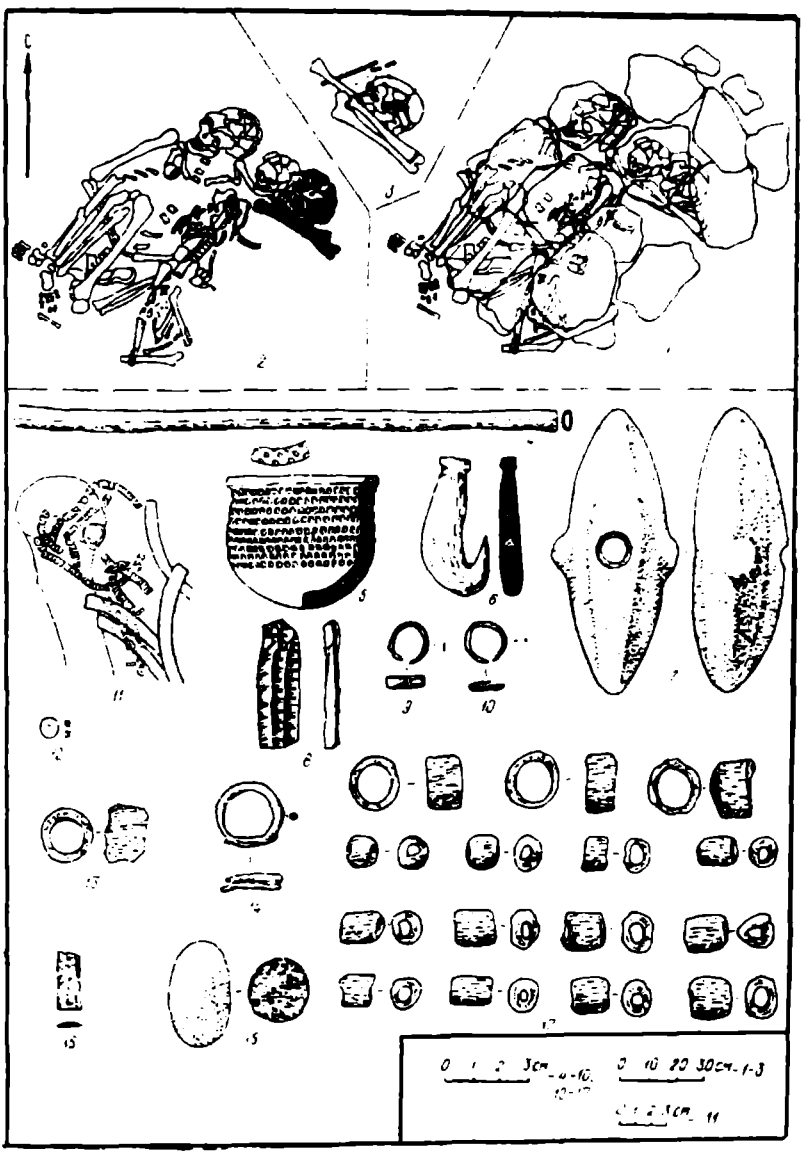


Fig. 2. Contents of burials nos. 36, 55-57 of the Khvalynsk culture barrow excavated in 1977-79 in the Khvalynsk Circle between Saratov and Kujbyshev on the Middle Volga. 7: knobbed stone mace-head. After Agapov et al. 1990: 114 (fig. 18).

The wheeled vehicle

The most crucial clue for the Proto-Indo-European homeland is provided by the clear linguistic evidence for the knowledge of wheeled vehicles in the Proto-Indo-European language (Anthony

1995a; Gamkrelidze 1994: 40-41; Meid 1994; Oettinger 1994; Zimmer 1994: 32f.). The ox-drawn cart or wagon with solid wheels was with great probability invented in the ancient Near East around 3500 BCE, whence it spread, apparently over the Caucasus, very widely over Eurasia within a couple of centuries (Piggott 1983). Anthony (1995a: 557-8) has rightly underlined the importance of the fact that six terms associated with the wheeled vehicle can be reconstructed for the Proto-Indo-European language from widely dispersed daughter languages, and that these terms in those daughter languages are clearly inherited from their mother language through regular sound laws and not borrowed after the dispersal of that mother language from some Indo-European sister language. Dialects of a language start to differentiate from each other if they are no longer in constant contact, as happens at the dispersal of a protolanguage over wide areas, especially if those dialects are carried to areas where they come in contact with quite different languages. The vehicle terminology implies that Proto-Indo-European speakers had not yet dispersed when they adopted the vehicle terminology, which gives c. 3300 BCE as a fairly certain terminus post quem. On the other hand, the vehicle technology gave the Proto-Indo-European speakers a means for a quick and wide dispersal, which is likely to have taken place simultaneously with the spread of wheeled vehicles.

The Pit Grave culture of the Pontic steppes, dated to c. 3500-2500 BCE, extended to the steppes north of the Caucasus on the assumed route of the wheed vehicles from the Near East. This region of the Kuban river has the heaviest concentration of the earliest vehicle burials, 118 out of the total of c. 250 Pit Graves with wagons or carts dating from the third millennium BCE. The earliest datable Pit Grave wagon is from c. 3100 BCE at Bal'ki on the lower Dnieper (Anthony 1995b: 195; 1996).

Pre-Tocharian and the Chalcolithic Afanas'evo culture.

Equating the Pit Grave culture with the late phase of the Proto-Indo-European culture seems to offer the only reasonable archeological explanation for the presence of the centum language called 'Tocharian' in Sinkiang. So far the Afanas'evo culture of southern Siberia and (cf. Novgorodova 1989: 81-89) western Mongolia has been dated to c. 3000-2000 BCE and fairly generally accepted as an offshoot of the Pit Grave culture. The similarities with early Pit Grave culture (c. 3500-3000 BCE) are indeed striking and multiple: burial rites, material culture including pottery and metallurgy (Chernykh 1992: 183), as well as stockbreeding as economy. The recent cranial measurements of Christensen, Hemphill and Mustafakulov (1996), too, demonstrate affinity with the Pit Grave people and difference from the Siberian Neolithic population (Anthony 1996), although anthropologists at Minusinsk claim the

Afanas'evo people to be of local anthropological type (H.-P. Francfort, personal communication 1996). According to Henri-Paul Francfort and Jim Mallory (personal communication, 1996), however, recent radiocarbon datings cluster around 3600 BCE for the beginning of the Afanas'evo culture, which is about the same as the beginning date of the Pit Grave culture.

A few related sites have been located in the vast intervening area: two cemeteries reminiscent of the Khvalynsk culture on the Tobol river east of the Urals and a Pit Grave-like burial farther east near Karaganda in Kazakhstan (Mallory 1989: 56-63, 223-226; 1995). It seems we now must assume a Khvalynsk rather than Pit Grave origin for Afanas'evo culture, which would have moved some 2000 km east without wheeled vehicles. In that case the language of the Afanas'evo people would have been a relatively early variety of Proto-Indo-European and would therefore naturally have escaped the innovative affrication of palatal stops which took place in eastern Indo-European languages in the old homeland soon after the dispersal of Proto-Indo-European.The very early new datings (3600 BCE) and derivation from the Khavalynsk culture would exclude the knowledge and use of the wheeled vehicles, while Tocharian has Proto-Indo-European vehicle terminology—but if the fourth millennium wagon burial from the Sarazm (see below) is ascribed to the Afanas'evo culture, this casts doubt on those early datings and supports Tocharian affinity of Afanas'evo. As there are numerous Afanas'evo-related traits in the Keremchi culture of the Jungghar Basin right up to the eastern oases of Sinkiang (Chen and Hiebert 1995: 269-272), there is also an acceptable link to northern Sinkiang where Tocharian was spoken and written from at least the 5th to the 10th century CE. E. E. Kuz'mina (1996) affirms the Afanas'evo attribution of the Qāwrighul I culture (c. 2000-1500 BCE) southeast of the Tāklimakan desert in Sinkiang, which has been suggested by Chen and Hiebert (1995: 250-257).

Proto-Aryan and the Early Bronze Age cultures of mid- and lower Volga and the southern Urals

Proto-Finno-Ugric loanwords from Proto-Aryan

Among the earliest Indo-European loanwords in Finno-Ugric languages are about 30 etyma which can only have been borrowed from an early form of Aryan. A case in point is the word for 'hundred': **śata* in Proto-Finno-Ugric < Proto-Aryan **ćata/*śata*, which differs from Proto-Indo-European **(d)k'ṃtóm* and from its derivatives in all other sister branches (Latin *centum*, Greek *he-katón*, Lithuanian *šimtas*, etc.) (Joki 1973: 311.). In spite of the skepticism (based on semantic grounds) expressed in the recent etymological dictionary of the Finnish language (*Suomen sanojen alkuperä* 2, 1995:

271), the Baltic Finnish (and possibly also Lappish) loanword *orja* 'slave' may go back to the ethnic name *Ārya*: the meaning 'slave' is more easily explained from the self-appellation of Aryan-speaking war captives (cf. below on the Dāsas) than from 'servant' < ? 'relative' (by marriage)' < 'guest' < 'stranger' (Joki 1973: 297).

Some other loanwords, like PFU **porśas/*porćas* 'pig(let)' < Proto-Aryan **porćas* < PIE **pork'os*, reflect a stage where only part of the sound changes characteristic of the Aryan branch have taken place (PIE **ḱ* > **ć*, but not yet PIE **o* > **a*). Still other Aryan loanwords like PFU/Proto-Volga-Finnic **kešträ / *kesträ* 'spindle' are in their phonetic shape still in the Proto-Indo-European stage (< **ket^{s}tro-*); yet these words are likely to have been borrowed from the Proto-Indo-European dialect ancestral to the Aryan branch, because on the Indo-European side cognate words are often found in the Aryan languages alone (Koivulehto 1979; 1993). The loanwords prove that Proto-Aryan must have been a close neighbor of Proto-Finno-Ugric for a considerable period of time.

There are also numerous Indo-European loanwords in early Finno-Ugric which have been borrowed from Pre-Germanic and Pre-Baltic dialects but which in their shape are still so close to Proto-Indo-European that distinction can only be made on the basis of distribution (Koivulehto 1995b). These are likely to have been borrowed from the Corded Ware / Battle Axe cultures through which the Indo-European language probably spread to Finland and large parts of northern and eastern Europe, including among their variants the Finnish and Baltic Battle Axe cultures and the late extension into Central Russia called Fatyanovo, with the mid-Volgan Balanovo as its easternmost group (Mallory 1989: 243-257). The area of Baltic river names extends from Prussia to Moscow and the upper Volga (Mallory 1989: 83f.).

On this basis it is likely that Proto-Aryan was spoken in an eastern descendant of the Pit Grave culture immediately south of the Fatyanovo/Balanovo area, that is, the Abashevo culture of the forest steppe from mid-Volga to southern Urals, and the closely related (slightly earlier) Poltavka or (better) Poltavkino culture of the lower Volga steppe. They date roughly from the second half of the third millennium BCE. (An up-to-date tabulation of the cultural sequences of the steppes and forest steppes from the river Don to northern Kazakhstan in the Bronze Age is given in Vasil'ev et al. 1994: 165, fig. 61, but the absolute dates given here are too low, cf. Anthony 1995a: 560f.; 1995b.)

Position of the Aryan branch within the Indo-European language family

The identification of Pre- and Proto-Aryan with the Poltavkino-Abashevo culture is supported by the position of the Aryan branch within the Indo-European language family. According to the recent

sophisticated calculations by Don Ringe et al. (1996), the Aryan branch has closest associations with the Balto-Slavic group and then with Armenian, Greek and Tocharian (cf. also i.a. Gertsenberg 1972: 8ff.). As we have seen, the earliest ancestor of Tocharian may have originally belonged to the Khvalynsk culture and thus been a close neighbor of the Pre-Aryan dialect. It was also suggested above that the ancestor of the Baltic languages may have been spoken to the north and northwest of Proto-Aryan. The ancestor of the Slavic languages, again, would have been its northwestern/western neighbor. According to Mallory, "The earliest that Slavicists are generally willing to push the concept of a linguistically differentiated Proto-Slavic is 2000-1500 BCE. The most widely accepted archeological representative of this earliest Slavic period is the Komarov complex which dates to about 1500 BCE and occupies the region of the middle Dnieper to the upper Vistula" (1989: 81).

Traditionally it has been assumed that after the early phase of Proto-Indo-European, Pre-Aryan developed some innovations together with Pre-Greek and Pre-Armenian, which would have been its westerly neighbors, notably the replacement of sonantic nasals by *a*, the augment, and the genitive sg. m. and n. of the *o*-stems in **-osyo* (Burrow 1973a: 15f.). The last-mentioned feature has proved to be a retention of an inherited feature rather than an innovation, as the form has been located in the second oldest Latin inscription as well (*Popliosio* = *Publii*, cf. Beekes 1995: 192). The augment, too, may be a retention (cf. Szemerényi 1989: 322), and even the development of the vocalic nasals is seen differently now (cf. Beekes 1995: 136f.). Nevertheless, as the research by Ringe et al. (1996) suggests, the Proto-Indo-European dialects that gave rise to the Greek and Armenian branches are likely to have been spoken next to Pre-Aryan. David Anthony (personal communication, 1995) has suggested that Pre-Greek might be connected with the Catacomb Grave culture, the Late Pit Grave variant of the North Pontic steppes contemporary with the Poltavkino culture of the lower Volga steppes; he points out that the custom of death masks known from the Mycenaean graves prevailed also in the Catacomb Grave culture of Ukraine (Kruc et al. 1991; Mallory 1995: 372). Greek is a centum language and must have left the Pontic steppes before the affrication characteristic of the satem languages took place, while the satem language Armenian (which shares numerous features with Greek alone) would have left after it. This would be in agreement with the most widely accepted view, which makes the coming of the Greeks responsible for the archeological discontinuity between Early Helladic II and Early Helladic III, about 2200 BCE (Mallory 1989: 70). Armenian is supposed to have forced its way through northern Anatolia via the Balkans, perhaps c. 1200 BCE (cf. Mallory 1989: 33-35).

The Sintashta-Arkaim culture and the earliest horse-drawn war chariots

Another reason for identifying the Poltavkino/Abashevo culture with Pre- and Proto-Aryan is that its late phase in the southern Urals near Chelyabinsk appears to have created the horse-drawn spoke-wheeled war chariot (Anthony and Vinogradov 1995; Anthony 1996). The horse was well known already to Proto-Indo-European speakers and was in all likelihood domesticated already in the Srednij Stog and related Chalcolithic cultures (Anthony and Brown 1991; Anthony 1996), but at any rate in the Pit Grave culture. It could not, however, be harnessed to pull heavy wagons (which alone are known from the Pit Grave culture), and only the construction of light-wheeled vehicles made it possible to take advantage of the speed of the horse. Significantly, only Proto-Aryan among the early offshoots of Proto-Indo-European has a word for 'war-chariot' (Meid 1994: 59f.).

The sites of Sintashta and Arkaim have yielded fortified ceremonial centers with circular, concentric walls and cemeteries where armed warriors have been buried in pit graves with spoke-wheeled chariots, two-team horses and rich animal sacrifices. (Gening et al. 1992; G. B. Zdanovich 1988, 1992; S. Ya. Zdanovich 1991; Chernykh 1992: 231f.; Anthony 1994: 192f.; 1995a: 560-562.) Four recent dates from the skulls of two horses in a chariot grave at Krivoe Ozero yield calibrated midpoints between 2032 and 1990 BCE (Anthony 1995a: 561). This is by far the earliest date for the spoke-wheeled chariot. Many other things, too, speak for its local origin, such as the axle length which agrees with the earlier steppe wagon, and the number of spokes, ten or twelve, which is greater than the number of spokes in the chariots from the ancient Near East (Anthony and Vinogradov 1995). Piggott (1983: 90, 103f.) has argued for a steppe origin of the spoked-wheel chariot also on the basis of the woods used and the techniques of bending them for the felloe.

The Dāsas and the early diffusion of the horse-drawn chariot

Petrovka II and the Andronovo culture

The Sintashta-Arkaim culture with its chariot burials quickly spread both east and west. In the steppes between the Tobol and Ishim rivers in northern Kazakhstan, similar but less rich chariot burials characterize the Petrovka culture (c. 2000-1800 BCE). The Sintashta-Petrovka (alias Novyj Kumak) culture has been considered as the earliest phase of the widely spread Andronovo culture that came to cover most of Kazakhstan and Turkmenistan as well as southern Siberia up to Minusinsk, together with Tian Shan and Sinkiang (Kuz'mina 1985, 1994a, 1994b; 1996; Chernykh 1992: 232).

During the foregoing Chalcolithic period, the area of the Petrovka culture had been occupied by horse-hunters of the Botaj-Tersek culture, whose "Geometric" pottery (with either comb or pit

decoration) makes it part of a larger cultural area that covers the forests of western Siberia and that may have spoken Uralic languages. (Zaibert 1985; 1993; Bökönyi 1994: 116; Anthony 1994: 194; 1995a: 561; Parpola in press.)

In Vogul, a Ugric language spoken just north of the Tobol and Ishim rivers, there is a word *tas* 'stranger', which several scholars have connected with the ethnonym *Dasa/Dāsa*, to be discussed below. This etymology has not been generally accepted, however, mainly because the source has been assumed to be Iranian, where the name had changed into *Daha*(Joki 1973: 81, 149f., 177); this objection is invalid, however, if the source was in fact Proto-Aryan or early Proto-Iranian.

Potapovka culture.

The Sintashta-Arkaim culture also spread to the west: the Potapovka culture of the the southern forest steppe of the Volga also had similar chariot burials and other characteristic artifacts. This culture succeeded the Poltavkino culture and was the immediate ancestor of the Timber Grave (in Russian, Srubnaya) culture, which prevailed in the Volga steppes until the beginning of Scythian times (Vasil'ev et al. 1994).

Introduction of the chariot into Greece

The use of the horse-drawn war chariot, undoubtedly together with bands of armed warriors, seems to have spread soon much more widely, not as a means of transport (it is too delicate for longer distances), but as a prestige vehicle of the elite, used in war, hunting and racing competitions. Bone cheek-pieces of the same type as in the Volga and Ural steppes have been discovered all over southwestern Europe up to Mycenae, where they come from Shaft Grave IV (late Middle Helladic / early Late Helladic) (Kuz'mina 1994b: 406-408; D.G. Zdanovich 1995). In fact, some scholars have ascribed the sudden rise of Mycenaean chiefdoms to:

> a small body of warlike intruders who introduced the horse and chariot, new weaponry such as swords and the body shield, and status burials under a tumulus. These appear during the Middle Helladic period and culminate with the tumulus burials at Marathon which include rich burials that extend from the Middle Helladic into the Mycenaean period (Mallory 1989: 69).

Proto-Aryan speakers and the BMAC.

If Proto-Aryan speakers from the southern Urals and the Volga steppes travelled far east and west, it would be surprising if they altogether avoided the southern direction. Actually sherds most probably coming from the Poltavkino culture of the Volga steppes have been found as far south as Margiana and Bactria. These early sherds come from the floors of the central part of a fortress in

Togolok-1 (P'iankova 1993: 115-117). A much earlier connection of southern Central Asia with the Pit Grave culture is suggested by the Afanas'evo-like wagon burial which, according to H.-P. Francfort (personal communication, 1996), was recently discovered within the context of the Zaman Baba culture near Sarazm in the Zerafshan Valley and dated to the 4th millennium BCE.

However, Bactria and Margiana form the southernmost limit of ceramics from the Eurasian steppes (Kuz'mina 1985; 1994a). As the Aryan language nevertheless did penetrate farther to India as well as to the Mitanni kingdom of Syria by 1500 BCE at the latest, it must have been transmitted through some other culture or cultures. A key culture in this transmitter role seems to have been the Bactria and Margiana Archeological Complex (BMAC: Sarianidi 1986, 1990), now dated to c. 1900-1700 BCE (Hiebert 1994). Burials related to this culture in fact appear in Baluchistan and Sindh (Mehrgarh VIII) around 1900 BCE (Jarrige 1991, 1994). It is hardly likely that the BMAC people who arrived at the gates of India stopped there: the discovery of BMAC-type swords in Gangetic Copper Hoards suggests that the language of BMAC people may be the root of the later Bengali and other eastern Indo-Aryan languages (Parpola 1988: 207, 264). On the other hand, several traits (e.g. iconography of cylinder seals) connect the BMAC with Syria and thus with Mitanni (Amiet 1986: 190, 198f.).

The BMAC grew out of a colony established in Margiana by the Late Namazga V urban culture of the Kopet Dagh region around 2200 BCE (Hiebert 1994). Around 1900 BCE this culture of Margiana was transformed into an unbelievably dynamic cultural force with rich metallurgy and other crafts and a strong social stratification. It seems that the rule of the BMAC was taken over by a band of powerful warriors from the north, who quickly assimilated the local culture. This is exactly what happened some centuries later in the Mitanni kingdom of Syria.

Fred Hiebert and C.C. Lamberg-Karlovsky (1992; see also Hiebert 1995) have postulated that the BMAC spread very rapidly to the Gurgan region in northeastern Iran (Hissar IIIc) as well as to Kerman (Shahdad) and Seistan besides eastern Baluchistan. They suspect that this spread was through organized warfare. No chariots or horsebones have been discovered so far, but there is a cylinder seal depicting a horse-drawn chariot from Tepe Hissar IIIb (Littauer & Crouwel 1977). Other indirect evidence includes horse heads on bronze axes and mace heads, as well as miniature trumpets. Roman Ghirshman (1977: 17f., 31f.) interpreted the significance of these trumpets by pointing out the fact that the Egyptians (who got their horses and chariots from the Mitanni Aryans of Syria) used trumpets in giving signals while training chariot horses. According to the excavator, Igor' B. Vasil'ev (personal communication, 1995), a

Potapovka chariot burial at Samara on the Volga contained what was interpreted to be a bone flute; but a signal trumpet would better suit the context, as the bone lacks perforations.

A further connection of the BMAC with the northern steppes is provided by the monumental fortified cultic centres with circular concentric walls at Sintashta and Arkaim (Gening et al. 1992; G. B. Zdanovich 1992; S. Ya. Zdanovich 1991). Those south Uralic constructions appear to have been the model for the 'temple-fort' at the BMAC site of Dashly-3 in northern Afghanistan (cf. Kuz'mina 1994b). Sintashta and Arkaim, in their turn, partly continue Pit-Grave traditions—fortified settlements are known from Mikhailovka in Ukraine and some other sites (Mallory 1989: 211f.)—but partly they may have been inspired by the urban culture of southern Turkmenia, as suggested by Fred Hiebert (personal communication, 1996).

The BMAC and the Dāsas.

I have compared the Dashly-3 'temple fort' with its triple circular walls with the forts (*pur*) of the Dāsas mentioned in the *Ṛgveda.* The Dāsa forts are described as having concentric circular walls (Rau 1977). The Ṛgvedic Indo-Aryans themselves did not have forts (though they knew the word for it), but they crushed a number of enemy forts and found wonderful riches in them—a description that suits the BMAC well. They had to fight hard, however, for the Dāsas had sharp weapons and horse-drawn chariots (Parpola 1988: 211-218; 1994: 149f.). The ethnicon Dāsa connects these people with the ancestors of the Dahas, who according to Old Persian and Greek sources lived in Bactria and Margiana around 500 BCE. (Parpola 1988: 219-224.) The Greek word *doûlos,* Mycenaean *doero,* 'slave', has been compared by John Chadwick (Ventris & Chadwick 1973: 541) with Sanskrit *dāsa* 'slave'; the etymology **doselos* (< **dosos*) proposed on this ground has not been generally accepted, but makes good sense if the Greek word originally was the ethnic name of war captives taken by Pre-Greeks in skirmishes with their Poltavkino neighbors on the Volga steppes.

Ṛgvedic Aryans and the Bishkent and Gandhāra Grave cultures

Thus the BMAC seems to have been ruled by Late Proto-Aryan speakers coming from the Volga steppes and taking possession of the sedentary culture of Bactria and Margiana c. 1900 BCE. About two centuries later, the BMAC in turn appears to have been taken over by a wave of Proto-Indo-Aryan speakers connected with the *Ṛgveda.* Archeologically they may be related to the arrival of those Andronovo pastoralists who founded the Bishkent culture (c. 1700-1500 BCE) in Ferghana (Mandel'shtam 1968; P'yankova 1986). Part of these newcomers, with memories of fights with the Dāsa, crossed the

Hindukush mountains to Swat Valley in northern Pakistan, founding there the Bishkent-related Gandhāra Grave (Ghalegay IV) culture dated to c. 1600-1400 BCE (Müller-Karpe 1983; Stacul 1987). After 1700 BCE, the BMAC continued for another 200 years in a much impoverished form, including Tureng Tepe, where the Gurgan Grey Ware culture (earlier overtaken by the BMAC culture) continued until 1600 BCE.

The problem of Soma

The Ṛgvedic Aryans make it clear that the religion of the Dāsas differed greatly from the Aryans' own religion: it is expressly said that these enemies did not worship Indra nor press Soma. Indra is the most popular deity of the *Ṛgveda*, the god of war and thunder, and a central element in Indra's cult was a drink originally called **Sauma*: Vedic *Soma* corresponds to Avestan *Haoma*, the cultic drink which the Zoroastrian religion may have inherited or may have adopted from the *Ṛgveda*-related Late Bronze Age religion of Central Asia and eastern Iran. Indra was undoubtedly associated with Haoma also in that religion against which Zarathustra rebelled – Indra is invoked by the Mitanni Aryans in 1380 BCE – but he was dethroned and made a demon by Zarathustra. Other early Indo-Europeans did not drink Sauma (cf. Norman 1990: 292f.). Therefore it seems unlikely that this cult was started in the Pontic Caspian steppes, which probably was the Indo-European homeland, or by the Proto-Aryans – unless the Dāsas voluntarily relinquished the Sauma cult while taking over the BMAC together with its religion. The use of Sauma may have started only during the Petrovka-Alakul'-Fëdorovo phase of the Andronovo culture, and this could have taken place anywhere in the vast Andronovo territory, including the Tian Shan mountains on the borders of China, where "Ephedra... has been recognized for many centuries as a medicine" (Flattery and Schwartz 1989: 72f.). The evidence from Sinkiang, to be discussed in a moment, actually suggests that Sauma may have been taken over from the Afanas'evo people.

The botanical identity of the Soma plant has been debated for a long time, but most specialists nowadays opt for *Ephedra* (Falk 1989; Nyberg 1995; contra, Wasson 1968; Flattery and Schwartz 1989). In Margiana, Viktor Sarianidi has discovered vessels which, he claims, were in chemical analysis shown to contain organic remains of Ephedra (Sarianidi 1987; 1990: 102ff., 203ff.). These vessels come from Togolok-21 and Gonur-1, from white-plastered rooms having platforms along walls with sunk-in vessels, and adjoining rooms having ceramic stands and sieves with holes at the base. Their ritualistic function is also suggested by other finds from these temples. A third 'temple' of the same kind was found at Togolok-1, with lime-plastered grooves on the floor. At Gonur-1 the ritualistic vessels are said to have

also contained remains of poppy and cannabis, while at Togolok-21 traces of poppy were found on stone mortars and pestles (Sarianidi 1993a, 8; 1993b; Kussov 1993).

These finds, potentially representing the earliest available evidence of the Soma cult, have roused great interest, but it seems that the conclusions drawn may be somewhat premature. Scrapings of the "Soma" vessels were analyzed independently at the Department of Botany in University of Helsinki with negative results (Nyberg 1995). And Fred Hiebert (1994: 124-129) interprets the plastered rooms as communal rooms for large-scale production or storage. Only *if* such "Soma" vessels can irrefutably be proved to contain Ephedra, can we assume that the alleged Dāsas of Margiana did in fact press Soma, and that the Proto-Aryans had introduced that cult.

Andronovo culture and Sinkiang

According to Chen and Hiebert (1995: 250-257), the Qäwrighul I culture southeast of the Täklimakan desert, with calibrated radiocarbon dates clustering between 2000-1500 BCE, is related to the Afanas'evo culture through the physical type of the bodies, which are buried in shaft pit graves; "in several instances, small parcels containing twigs of *Ephedra* sp. were found on the chest of the bodies" (p. 253).

Stratigraphically, later Qäwrighul II graves have Andronovo-like physical types and resemble Andronovo burial traditions also through marking the graves with large circles of stones, although their material remains differ (Chen & Hiebert 1995: 253-7). Almost identical graves at the nearby Lopnor (Luobubo) burial site on the Töwän River (Tieban He), with a radiocarbon date of 968-661 BCE, had parcels with twigs of Ephedra on the chest of the dead. Ephedra twigs, bound together with woollen strings into loose packets, or tied up into small pockets of the funeral mantle, have been found in a number of graves belonging to five separate cemeteries of the Han period (c. 200 BCE) in this same region (Stein 1928; Bergman 1939). As other similar bags placed in these same graves contained grains of wheat, "there could be little doubt about the contents being meant to represent provisions for the dead in another life" (Stein 1930-32: 502-3).

Around 500 BCE, Old Persian inscriptions refer to Sakā Haumavargā, Sakas who had something to do with Haoma (<*Sauma) (cf. Oranskij 1979: 13); they are supposed to have occupied the area around Fergana, from Tashkent to the Alei Valley (Gershevitch 1974: 54).

Mitanni Aryans and the Early West Iranian Grey Ware

Cuyler Young (1985) has plausibly linked the arrival of the Mitanni Aryans in Syria with the sudden appearance of the Early West Iranian

Grey Ware in great quantities all along the Elburz mountains, in Azerbaijan and around Lake Urmia c. 1500 BCE. Young sees this intrusive ceramic as an evolved form of the Gurgan Grey Ware of the Tepe Hissar IIIc horizon. As noted above, this Gurgan culture was probably taken over by the BMAC elite c. 1900 BCE and continued in impoverished form at Tureng Tepe until c. 1600 BCE.

It is generally agreed that the Aryan language of the Mitanni kings of Syria, dated between 1500 and 1380 BCE, represents 'Proto-Indo-Aryan' rather than 'Proto-Aryan' or 'Proto-Iranian' (Thieme 1960; Burrow 1973b; Mayrhofer 1966, 1974). Only the ruling elite of the Mitanni kingdom spoke this Aryan language; their subjects spoke the local Hurrian language. The Mitanni Aryans, who obviously were foreigners, seem to have been able to seize power with the help of their superior war machinery. It is most likely they who introduced the horse-drawn light war chariot to the Near East, where before only donkeys had been used for pulling chariots (Diakonoff 1985: 46f.; according to Angela von den Driesch [personal communication, 1995], the donkey was much bigger than now in the ancient Near East in the second and third millennium, while it would have been impossible to domesticate the onager, which is often mentioned in this connection; cf. also Becker 1994: 159, n. 30, and 163, n. 39). The Kassites, who also made good use of this new war-machine (Diakonoff 1985: 40), would have adopted it a little earlier from the Proto-Indo-Aryans. We possess a manual of horse and chariot training written in Hittite by a Mitannian called Kikkuli, abounding in technical terms of Aryan etymology; and the Egyptian kings, among others, acquired horse chariots from the Mitanni kings (Mayrhofer 1966; 1974; Kammenhuber 1961; Horn 1995; Starke 1995).

I have pointed out (Parpola 1988: 224-229) that on textual evidence, the Mitanni coup postdates the Ṛgvedic takeover of the Dāsas, for the Mitanni oath of 1380 BCE ends by invoking Indo-Aryan gods (Thieme 1960) who include both Indra *and* Varuṇa. These two gods appear in the *Ṛgveda*, too, but this text collection makes it clear that Varuṇa was the chief of the Asura. Asura originally denoted the 'gods' worshipped by the Dāsas, but they were 'demons' for the Vedic Aryans, and Indra at an early stage had the epithet 'slayer of the Asura'. In one Ṛgvedic hymn (10,124,5), the god Indra, pointing out that the Asuras have suffered defeat as they have lost their magic power, offers Varuṇa a high rank among the Vedic gods, the Devas, if Varuṇa will only love Indra, i.e. remain loyal to him. As the Mitanni Aryans in all likelihood from the beginning of their rule (c. 1500 BCE) worshipped the gods they worshipped in 1380 BCE, these cultic data support the identification of the Dāsas with the rulers of the BMAC, and the dating of the Ṛgvedic invasion leading to the impoverishment of the BMAC around 1700 BCE.

Proto-Iranian and the cord-decorated ceramics of Late Bronze Age

The Timber Grave culture and Proto-Iranian

Elsewhere (Parpola 1995: 356f.; in press a) I have proposed that the basic split of the Aryan or Indo-Iranian language into its two main branches, the 'Indo-Aryan' and the 'Iranian', which Thomas Burrow (1973b) assumed to have taken place around 2000 BCE, has its archeological counterpart in the bifurcation of the Poltavkino/Abashevo culture into the eastern Andronovo culture (to be equated with the 'Indo-Aryan' branch) and the western Timber Grave culture (to be equated with the 'Iranian' branch). In contrast to the Andronovo cultures, which early on expanded widely towards east and south, the Timber Grave culture long remained in the area once occupied by the Pit Grave culture. My suggestion was that the 'Iranian' speakers became mobile and imposed their language upon former 'Indo-Aryan' speakers in the eastern steppes, Central Asia and Iran only towards the end of the second millennium when mounted pastoral nomadism was adopted all over the Eurasian steppes.

However, this model has seemed to involve several difficulties. It is true that Old Slavonic *bogŭ*, Serbo-Croatian *bog*, Bohemian *bŗuh*, Polish *bóg* and Russian *bog*, all meaning 'God', correspond to Proto-Iranian **baga-* 'god' < Proto-Aryan **bhaga-*, which survives in Indo-Aryan in the meaning 'part, portion, share, good fortune; god of welfare', a derivative of the verbal root 'to divide'. The general word for 'god' in Proto-Indo-Aryan is **daiva-s*, which the Proto-Finno-Ugric loanword *taivas* 'sky' attests for Proto-Aryan, and which continues Proto-Indo-European **deivo-* 'god, sky'; in Old Iranian **daiva-* is found only in the meaning 'demon' (i.e. 'god' of the 'Indo-Aryan' adversaries of ancient Iranians). But according to Burrow (1973a: 20-23), with the exception of this one case, "attempts to find examples of Iranian loanwords in Slavonic have been singularly unsuccessful", whereas the impressive list of common words and other features peculiar to Indo-Iranian and Balto-Slavic must in its entirety "be referred to the period of Primitive Indo-Iranian."

The Slavic word for 'God' has in fact been considered "perhaps an early loanword from Iranian through the Scythians" (Buck 1949: 1464). There is no doubt about the Iranian affinity of the languages as spoken by the Scythians of the North Pontic steppes between c. 800 BCE and 400 CE, nor about their influence upon Slavic languages (Vasmer 1923, 1928; Harmatta 1952; Zgusta 1955; Abaev 1979); the fortunate survival of ancient Scythian in modern Ossetic spoken in the northern Caucasus region (Abaev 1949; 1958-89; 1964; Thordarson 1989) has made it possible to chart the Scythian influence upon other European and especially the Slavic languages more accurately (Abaev 1965). But the problem is that Scythian loans in Slavic, mostly dating from the first millennium BCE, are not so helpful in locating Proto-

Iranian, particularly as the origin of the Scythians continues to be a matter of debate: are they descended from the carriers of the local Timber Grave culture, or have they come from the east?

Yet, as pointed out to me by Alexander Lubotsky, Burrow (as quoted above) was quite mistaken. In fact numerous Iranian loanwords in Proto-Slavic have been discovered. A. A. Zaliznyak (1962, 1963) gives a comprehensive survey and bibliography of earlier research and documents 38 specifically Slavic-Iranian lexical comparisons and 40 Slavic-Aryan comparisons, besides a few grammatical similarities, and thoroughly discusses this material, especially from the phonological point of view. Although a part of the comparisons (such as Proto-Slavic **bū-* > Russian *byt'* 'to be' and Proto-Iranian *bū-* 'to be(come)') represent inherited vocabulary that has undergone parallel sound changes, Zaliznyak has made it apparent that Proto-Slavic has borrowed numerous words from Proto-Iranian in the Pontic steppes before the Scythian period. Very recently, V. V. Ivanov (1996) has critically sifted the material.

One major point in favor of the Timber Grave/Andronovo split as the divide between the Iranian/Indo-Aryan sub-branches is that this model gives ample time for the Iranian linguistic innovations to develop; some of the distinctions between these two branches, such as the different realizations of Proto-Indo-European **-T^{s}T(h)- / *-D^{z}D(h)-* (**-st- / *-zd-* in Proto-Iranian, **-tt(h)- / *-dd(h)* in Proto-Indo-Aryan, cf. Mayrhofer 1986: 110ff.; 1989: 9), are likely to be dialectal features of Pre- and Proto-Aryan (thus the earlier mentioned Proto-Volga-Finnic loanword **kešträ / *kesträ* 'spindle' might be from Pre-Iranian). We shall return to another case shortly.

However, innovations can also develop quickly when a language comes in close contact with a different language. As an alternative scenario, one could hypothesize that Proto-Iranian came into being at the other end of the vast Aryan-speaking continuum rather late, namely in the south Siberian steppes during the final phase of the Andronovo culture. In any case, the Iranian languages seem to have started spreading over Central Asia and Iran only during the latter half of the second millennium BCE with mounted nomadism. While migration in the Eurasian steppes seems to have been predominantly in the west-east direction during the Early Bronze Age migration, once this spread of technology had opened up the steppes, transcontinental cultural diffusions started taking place in all directions (Anthony 1996), notably also from east to west, starting with the spread of the Sejma-Turbino type of metal objects from the Altai to the Carpathians in the late third millennium BCE (Chernykh 1992: 215-234; Anthony 1996) and continuing until the Turkic and Mongol invasions in Medieval times. Particularly significant from the point of view of the origin and spread of the Iranian languages is the fact that mounted pastoral nomadism appears to have first evolved in

the eastern steppes. Also many other typical elements of the Scythian/ Saka culture of the Iron Age, including the so-called deer stones, weapon types and animal style art, seem to be derived from the Karasuk culture of south Siberia and Mongolia, where they go back to the Sejma-Turbino tradition (Brentjes 1994).

The Karasuk culture

Around 1500 BCE (1300 BCE in traditional chronology), the Andronovo culture is replaced by the Karasuk culture in southern Siberia, in central Kazakhstan, along the lower course of the Syr Darya river (Tagisken) and in the Tian Shan mountains. M. P. Gryaznov assumed the Karasuk culture to continue the traditions of the Andronovo culture, and thought that the cultural change resulted from the shift from settled agriculture and animal husbandry to a seminomadic way of life, which involved periodic migrations. Winter was spent where the agricultural fields were; after the fields were sown in spring, people left with their animals for a summer camp in the mountains or open steppe, and returned in the autumn to harvest the crop. This enabled them to double the amount of their herds. The migrations led to the development of riding gear and eventually to full pastoral nomadism, in which animal husbandry was supplemented by mounted warfare. Tribal chiefs emerged, as can be seen from the monumental graves of the Karasuk-derived Dandybaj-Begazy culture in central Kazakhstan and the mausoleums of Tagisken in the delta of Syr-Darya. This new mode of livelihood became so effective that other, settled tribes had either to adopt it or perish, and so mounted pastoral nomadism spread very quickly all over the Eurasiatic steppes (Grjasnow 1981: 134ff.; Jettmar 1981; Askarov et al. 1992).

The Karasuk culture, however, is also found in the the Baikal region, Mongolia, and in the Ordos region of China. Several authorities nowadays consider it so different from the Andronovo tradition that Gryaznov's derivation is impossible. The deer stones and metallurgy rather suggest derivation from the earlier Okunevo and Afanas'evo cultures (Novgorodova 1989: 120-235; Chernykh 1992: 268-271; Brentjes 1994). The physical type of the Karasuk people was Europoid with a slight Mongoloid admixture, as was that of the Okunevo culture which had replaced the Afanas'evo culture in the same region, and that of the bodies unearthed in the Pazyryk kurgans of the Altai (Askarov et al. 1992: 466f.).

Mongolia is supposed to be the homeland of the Proto-Turkic speakers (Janhunen 1996: 228f.). If the mounted nomadism, weaponry, and the animal style art of the Scythian / Saka culture are derived from the Karasuk culture, conceivably Proto-Iranian might have come into being when Karasuk culture overlaid Andronovo culture in eastern Kazakhstan. Thus the most important innovation of the Iranian branch, namely the deaspiration of Proto-Aryan voiced

aspirates (**bh* > **b*, **dh* > **d*, **gh* > **g*, **ǰh* > **dz*) (Schmitt 1989: 2; Mayrhofer 1989: 6), might be due to a superstratum influence of Pre-Proto-Turkic. Proto-Turkic had no aspirated stops (Poppe 1965).

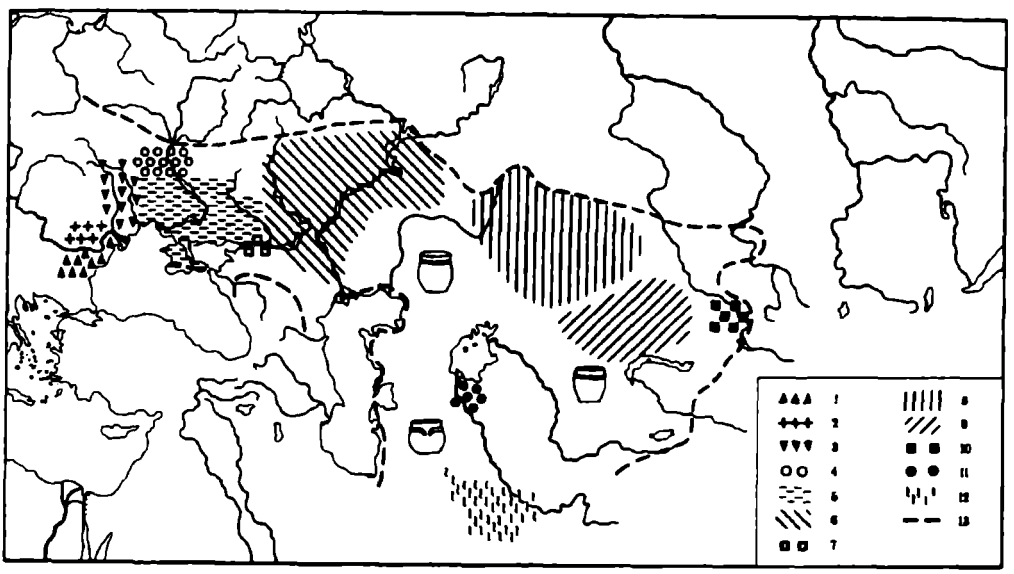
It is, however, much more likely that the Proto-Iranian deaspiration of voiced aspirates took place in the North Pontic steppes, as a similar sound change has taken place in other Indo-European languages that can be assumed to have been spoken in the immediate neighborhood, namely in Balto-Slavic and Armenian, and also further in Celtic and Germanic (Szemerényi 1989: 55ff.; Beekes 1995: 127). In fact, in his systemic analysis of these changes, Frederik Kortlandt (1978) suggests that the Iranian deaspiration did not take place after the Proto-Aryan (Indo-Iranian) period, as is usually assumed (cf. above), but already during the Proto-Indo-European period as an innovation common to several contiguous dialects. This suggests that the basic bifurcation of the Aryan branch would go back to times preceding the Timber Grave/Andronovo split, i.e. the differentiation would have started already in the Poltavkino / Abashevo cultures. This would be in agreement with the above suggested identification of the BMAC elite with Dāsas as Poltavkino-derived speakers of Late Proto-Aryan, for it has long been noted that the rare phoneme *b* occurs unusually often in the names and other vocabulary related to the Dāsas (cf. Wackernagel 1896: I, 184; Kuiper 1991: 6).

Pottery with applied cord decoration

If Proto-Iranian evolved in the Pontic steppes of Ukraine and South Russia rather than in southern Siberia, as seems to be the case, how did Iranian reach the eastern steppes (several Iranian loanwords have been identified in Proto-Samoyedic, cf. Janhunen 1983) and Sinkiang early on?

The Scythian/Saka cultures are separated from the Timber Grave/Andronovo cultures by the final phase of the Bronze Age in the Eurasian steppes, which is characterized by an amazing uniformity of culture that extended all the way from the Balkans to eastern Kazakhstan. It is everywhere characterized by plain pottery decorated with applied clay strips or "little walls", whence its Russian name *Valikovaya keramika*; these decorative strips are supposed to represent cords with which the pastoral nomads bound their pots during migrations. Various regional styles of this pottery are known (see fig. 3), and the earliest ones among these would seem to be those of the Sabatinovka culture in Ukraine (followed by its later Belozerka variety) and the Ivanovo or Ivanovka culture of the Volga steppes, which gradually replaced the Timber Grave culture. Eastward cultural expansion from the Pontic steppes into western Kazakhstan had started already during the Timber Grave period, resulting in the mixture of Timber Grave and Andronovo culture; this expansion

seems to continue in the appearance of the Sargary-Alekseevka type of Valikovaya pottery in western Kazakhstan and that of the Dandybaj-Begazy variety of eastern Kazakhstan (Grjasnow 1981: 145-7; Chernykh 1992: 235-241; Kuz'mina 1994a: 122-130, 236-7; Lyudmila N. Koryakova, personal communication 1996). This pottery is accompanied by the metal objects of the 'post-Sejma horizon' (Chernykh 1992: 241-263), which differ both from those of the earlier 'Sejma-Turbino horizon' (Chernykh 1992: 215-234) and from those of the approximately contemporaneous Karasuk culture (Chernykh 1992: 264-271).



The area occupied by the Valikovaya Pottery cultural community; individual cultures or types of sites: (1) Pshenichevo-Babadag; (2) Coslogeni; (3) Noua and Moldavian 'Thracian Hallstatt'; (4) Belogrudovka and Chernoles; (5) Sabotinovka and Belozerka; (6) 'Srubnaya-Khvalynsk' - basins of the Don, Volga, and eastern Ural region; (7) Kobyakovo; (8) Sargary culture or Sargary-Alekseevka-Zamaraevo type; (9) settlements of the Beghazy-Dandybai type; (10) sites of the Trushnikovo type; (11) Amirabad culture; (12) Yaz-I-Tillya-tepe-type sites; (13) inferred borders of the community.

Fig. 3. The area occupied by the Valikovaya Pottery community. After Chernykh 1992: 236 (fig. 79).

I trust that the distribution of the Valikovaya ceramic can be taken as a reliable guide concerning the early expansion of Proto-Iranian. This spread must have been quick, rather like that of the Turkic languages more than one millennium later (Mallory 1989: 147 fig. 81): the comparison is fully justified as both speech communities were mounted nomads.

Yaz-I culture of southern Central Asia and the early Iranians

Most archeologists studying the Late Bronze and Early Iron Age of southern Central Asia have been puzzled by the origins of the handmade painted ware characteristic of the widely spread Yaz-I

culture, which is dated to c. 1500-1000 BCE (Francfort 1989: 343, 440). Among the most noteworthy explanations are comparisons with similar handmade painted ceramics of the Chust-culture in Ferghana (Zadneprovskij 1962; 1978) and the Yambulaq culture of the easternmost oasis in Sinkiang (Chen and Hiebert 1995: 262). Both of these cultures date from about the same time as Yaz-I. Hiebert compares the massive tombs and walled structures of Yambulak with the BMAC architecture in western Central Asia, but perhaps the earlier mentioned tombs of Tagisken and Dandybaj-Begazy provide a closer parallel, not only geographically. The painted potteries also may have their prototype in the incised handmade pottery of Dandybaj-Begazy with very similar decorative motifs (Zadneprovskij 1978: 44-48; E. E. Kuz'mina, personal communication 1995).

The cord-decorated plain pottery (Valikovaya keramika) has been left out of consideration in many recent discussions of southern Central Asia, though it—together with wheel-thrown pottery of the earlier period—actually predominates over the painted pottery (which rarely exceeds 3-5%) (Chernykh 1992: 273). But this is not the case with Chernykh (1992: 241), who thinks that "these Valikovaya vessels may provide the clearest archeological evidence for the existence of close contacts between the steppe peoples and the dispersing early Indo-Iranian peoples of the Iranian plateau and Afghanistan at the end of the second and start of the first millennium BCE." I would only replace Chernykh's expression "Indo-Iranian" with "early Iranian". The distribution of this ceramic suggests the arrival of the historically known East Iranian tribes in their attested locations in the Pamirs and Afghanistan around this time. At Pirak in eastern Baluchistan, horse-riders having birds' faces are represented in terracotta (Jarrige et al. 1979). Nor is it a long way from Margiana to the Gurgan Plain. It is to the Gurgan Plain of the 11th and 10th centuries BCE that Cuyler Young (1985) has traced back the Late West Iranian Buff Ware (c. 900-700 BCE), which is associated with the appearance of the early Medes and Persians. The Yaz-I culture does not have any known necropolises, nor is even a single tomb known from this region before the coming of the Greeks, which has been plausibly interpreted as the arrival of the Zoroastrian mode of disposal of the dead by exposure (Francfort 1989, I: 430-438; Lyonnet 1994). It has some parallels among other cultures characterized by the Valikovaya ceramic: namely, these tend to place the body in an extended position instead of the flexed position of the preceding period, and to bury it in a very flat cemetery or to reject the earlier kurgan burial ritual altogether (Chernykh 1992: 240).

The Sakas of Sinkiang

According to Old Persian, Greek, Indian and Chinese sources, Iranian-speaking tribes called Saka lived in areas east of Sogdiana in Central Asia at least from the sixth century BCE. From c. 100 BCE,

kings of Saka origin ruled large parts of India for several centuries. Typically Saka words occurring in northwest Indian inscriptions made it possible to identify the East Iranian language of the documents found in Sinkiang about a hundred years ago as two dialects of the Saka language, called Tumshuqese (the more archaic dialect in the northwest influenced by Tocharian) and Khotanese (in the southeast). For the most part, the documents are manuscripts written in the Indian Brahmi script and contain translations of Buddhist texts dating from c. 400 CE (Tumshuqese) and 600-1000 CE (Khotanese). Khotanese possesses a few words testifying to an earlier contact with the Zoroastrian religion (thus *urmaysde* 'sun' goes back to **ahura-mazdāh*, and *śśandrāmata* 'Buddhist goddess of fortune' is the Khotanese equivalent of Avestan *spəntā-ārmaiti-*) (Emmerick 1989).

Corinne Debaine-Francfort (1990) has analyzed the Sinkiang archeological cultures potentially identified as Saka in the light of Chinese texts of the second century BCE. She finds that the presence of Sakas is attested between the valley of the Ili river and Tian Shan from the 5th to the 3rd centuries BCE, and (after the coming of the Yuezhi from Gansu) c. 200 BCE from the Pamir region near Tashkurgan. Archeological criteria including nomadic pastoralism, animal style art, Saka type weapons, bronze cauldrons, and horses with or without horse harness further suggest the presence of the Sakas at some other localities in Sinkiang, namely in the counties of Barkōl (Balikun) and Guchung (Qitai) near Tian Shan (lst mill. BCE), and at Alwighul (Alagou) near Ürümchi (4th-3rd cent. BCE).

The Saka language may have come to Sinkiang as early as 1000 BCE, when a fundamental change took place in the economy of the region: at that date horse nomadism and iron tools were introduced to the region (Chen & Hiebert 1995: 285). The culture of Tört Erik (Sidaogou), which flourished in eastern Sinkiang around the Turfan oasis in the beginning of the first millennium BCE, had among its unpainted pottery some vessels with "an applied clay band around the neck" (Chen & Hiebert 1995: 272-3).

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Summary: list of suggested correlations

Srednij Stog and Khvalynsk cultures (c. 4500-3500 BCE): Early Proto-Indo-European
Pit Grave culture (c. 3500-2500 BCE): Late Proto-Indo-European
Afanas'evo culture (c. 3600-2000 BCE): Pre-Proto-Tocharian
Poltavkino / Potapovka and Abashevo / Sintashta cultures (c. 2500-1900 BCE): dialectally differentiated Proto-Aryan
BMAC (c. 1900-1700 BCE) and Gurgan Grey Ware: Proto-Dāsa (offshoot of Proto-Aryan, probably representing a Pre-Iranian dialect; in Bactria and possibly in Hindu Kush, these Dāsas were the enemies subdued by Proto-Ṛgvedic Aryans c. 1700 BCE)
Mehrgarh VIII / Sibri / Jhukar / Cemetery H / Late OCP-Gangetic Copper Hoards (c. 1900 ff.): "Indian Dāsa" (offshoot of Proto-Dāsa), whence "Proto-Vrātya" [= substratum of Middle Vedic] and Proto-Māgadhī)
Andronovo (Petrovka-Alakul'-Fëdorovo) (c. 1900-1500 BCE): Proto-East-Aryan or Proto-Sauma-Aryan (principal ancestor of the 'Indo-Aryan' branch)
Early Gandhāra Grave culture (Ghalegay IV) (c. 1600-1400 BCE) Proto-Ṛgvedic/Proto-Dardic (offshoot of Proto-Sauma-Aryan via Bishkent)
Takhirbaj-Mollali culture (Late phase of BMAC) (c. 1700-1500 BCE): Proto-Sauma-Dāsa (= Proto-Dāsa conquered and assimilated by Proto-Sauma-Aryan = Daiva worshipping substratum of Proto-Avestan)
Early West Iranian Grey Ware (c. 1500-1000 BCE): Proto-Mitanni (an offshoot of Proto-Sauma-Dāsa)
Timber Grave culture (c. 1900-1500 BCE) Proto-West-Aryan (ancestor of the "Iranian" branch)
Karasuk culture (c. 1500-1000 BCE): Pre-Proto-Turkic
Cultures of cord-decorated (Valikovaya) pottery (c. 1500-1000 BCE): Protoforms of the different branches of Iranian (including Yaz-I = Proto-Avestan and Proto-Śaka), overlaying and assimilating East Aryan languages formerly spoken in Kazakhstan and southern Central Asia
Gurgan Buff Ware (c. 1100-1000 BCE) -> Late West Iranian Buff Ware (c. 900-700 BCE): Proto-West-Iranian (Proto-Median and Proto-Old-Persian), overlaying and assimilating Proto-Mitanni
Early Painted Grey Ware (c. 1100-800 BCE): (Late Indian-Dāsa becoming overlaid and assimilated by an offshoot of Late Ṛgvedic / Late Dardic) Middle Vedic / Early Epic Sanskrit (Kuru kings: possibly an elite of newcomers of Proto-West-Iranian origin)

Early Megalithic culture of India (c. 800-500 BCE) = possibly an offshoot of Proto-Scythian (lineal descendant of Proto-West-Aryan) becoming assimilated to Dravidian (in the Deccan) and to Sanskrit (in North India: see next)

Late Painted Grey Ware culture of north India (c. 800-400 BCE) = Late Vedic / Late Epic Sanskrit (the 'pale' Pāṇḍavas being possibly an elite of Megalithic newcomers subduing the old Kuru rulers)

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Central Asians on the Iranian Plateau: A Model for Indo-Iranian Expansionism

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Introduction

The recent opening to western scholars of archeological sites in the former Soviet Union has provided a new perspective on the ancient cultures of the greater Near East and Central Asia. For many years, separate schools of archeology formed on either side of the Iron Curtain. Differences in methods, motives for archeological research, and differences in the presentation of data made almost impossible the integration of information from the Soviet archeological excavations with information from western excavations. Only since the end of the 1980's have western archeologists been able to use their own methods and techniques to test questions of mutual interest to western and former Soviet counterparts (Lamberg-Karlovsky 1994). One of the most important aspects of this new access to the archeology of Central Asia is that it allows us to examine the previously excavated data from Iran with new perspective.

The origins of Iranians

For many years, scholars of ancient Iran have studied the significant cultural differences between the Bronze Age (through the second millennium BCE) and the Iron Age (from the first millennium BCE) on the Iranian plateau (for example, Dyson 1973, Dandamaev and Lukonin 1989). Old Persian, an Indo-European language, appeared together with Zoroastrianism during the first millennium BCE, replacing the previous non-Indo-European Elamite language and culture found during the Bronze Age throughout Iran (Skjaervo 1995). This transition has traditionally been interpreted as a migration of new people (Iranians) to the Iranian plateau. The myths and vocabulary of both Persian (Avestan) and Indian (Vedic) texts suggest that their speakers originated to the north. The linguistic similarities indicate a common Indo-Iranian culture and most linguists placed it in the *terra incognita* of Central Asia (Mallory 1989), although some scholars placed it west of Central Asia, in the Caucasus (cf. Ghirshman 1977).

Archeologists have added to this debate by attempting to correlate archeological sequences across the Iranian plateau, suggesting that broad similarities in material remains indicate mass migrations. However, once the reconstructions reached the modern

international border, the archeologists' ability to extend this model ceased. The barriers of the Iron Curtain prevented archeologists from (or relieved them from the obligation of) scrutinizing the implications of their reconstructions across all relevant parts of this region. Neither the western nor the Soviet school satisfied the criteria of the other group to explain the shift from the Bronze Age to the Iron Age (cf. the debate between Medvedskaya [1988] and Dyson and Muscarella [1989]).

During the last decade, the exchange of information between western archeologists and former Soviet archeologists has finally allowed for a comparison of equivalent data between the Iranian plateau and Central Asia. New details are available about the nomadic cultures on the steppes of Eurasia and northern Central Asia, cultures which are associated with Indo-European and Indo-Iranian symbols and attributes such as horse riding and chariots (Anthony 1991). New data from collaborative excavations in Central Asia suggests that during one period, at the beginning of the second millennium BCE, Central Asian influence on the Iranian plateau was considerable (Hiebert and Lamberg-Karlovsky 1992). The question then arises as to how the debate about "Iranians" on the Iranian Plateau is to be evaluated in terms of these new data.

Language and archeology

With texts, ethnic affinity of a certain group and region is often reflected in vocabulary, grammar, and content (i.e. place names, regional descriptions, myths, etc). Historical linguistics can provide information on linguistic divergence, borrowing and isolation, providing complex and informative histories and genetics of language groups. While certain words in the texts can be linked to archeological attributes, the correlation of ethnicity and the material record studied by archeologists is very problematic (Shennan 1989).

Archeological cultures are typically defined by a number of shared attributes of artifacts, such as ceramic styles. When traits are distributed over a certain number of sites they are said to form an archeological horizon. In particular, the appearance of a greyware ceramic horizon on the Iranian Plateau has often been correlated with the appearance of early Iranians. This "pots equals people" correlation, however, ignores the many reasons that a ceramic horizon could exist. Such a ceramic horizon may be due to economic, political or ideological contacts, or even simply similar types of technology, and may have nothing to do with ethnic boundaries (Kramer 1977).

Further, ethnicity and language are separate phenomena and must be separate cases of correlation with the material record. Cases of language replacement have shown that changes in language use have not necessarily been tied to major geographic displacement of a particular group. Rather, language boundaries are independent of

ethnic boundaries, and language change can occur within a culture (Erdosy 1995). The same is true for religious transformation, where social identity, as seen in ritual and religious practices, can be transferred across barriers of vast areas and different cultures (cf cases of Islamization, Levtzion ed. 1979).

Figure 1: Archeological cultures of the Iranian Plateau and Western Central Asia of the early second millennium BCE.

By observing geographic changes in the distribution of a complex of archeological traits, rather than a single feature, ethnicity and language affiliation can be traced archaeologically. David Anthony notes that archeological correlates of movements of specific cultural or ethnic groups can be found. Care must be taken not to assume mass migration but to focus on smaller groups or even on individuals (Anthony 1990). Language and religious change can result when small numbers of people with a distinct language move into an area and accept cultural and linguistic converts into their group. In this paper, I first outline the archeological assemblages of Iran and

Central Asia at the end of the Bronze Age. Then I use a historically documented case of local language and religious change in an already populated region, where a model of language shift and religious conversion is more appropriate than a model of mass migration.

The late Bronze Age of Iran and Central Asia

During the late Bronze Age (early second millennium BCE) the Iranian plateau and its borderlands to the north and east were divided into distinct cultural areas. The primary evidence for these cultural areas is the distribution of ceramic horizons (Figure 1). At the end of the Bronze Age, most urban sites of the Iranian plateau, the Indus valley, and southern Turkmenistan were abandoned for the first time in centuries. In many areas of this large region, the next occupation (the early Iron Age) includes indications of an entirely new social identity which is characterized by horse riding, ceramic precursors, and iconographic precursors to the Persian-speaking, Zoroastrian Achaemenids.

In Western Iran, the late Bronze Age (third/early second millennium BCE) archeological complexes have their closest stylistic similarities to the ceramics of the northwestern area of southern Anatolia. There is a clear chronological and cultural break between the late Bronze Age sites and the early Iron age occupation with its characteristic greyware. The earliest Iron Age (early first millennium BCE) sites, characterized by a grey ceramic horizon of early western greyware (EWGW), are associated with Iranian iconography, horse riding and chariots (Young 1985).

Eastern Iran has been proposed as a large region of Bronze Age interaction called Turan (Tosi 1979). While the identity of this large region as a single cultural unit is not always clear, the stylistic and artifactual assemblages from the mid-third millennium BCE indicate widescale interaction if not some form of integration (Lamberg-Karlovsky 1975). By the late third/early second millennium BCE, the region of Turan changed to a series of culturally heterogeneous regions: Seistan, the Gurgan region, Iranian Khorasan, and the Helmand valley (Kohl 1984). The early second millennium settlements of southeastern Iran can be characterized as the final stages of occupation on the "urban" sites of the mid-third millennium. By the mid-second millennium BCE practically all of the Bronze Age sites on the plateau had been reduced in size or abandoned. Ongoing research on archeological collections suggests that the early second millennium BCE occupations at Malyan (Kaftari), Tepe Yahya (period IVa), and Bampur (period VI) have separate archeological assemblages which do not overlap in local style (Hiebert nd).

North of the Iranian plateau, in Western Central Asia, at the end of the third millennium people from small urban sites of the Namazga V culture moved out into the desert oasis of the Murgab River delta

(Sarianidi 1990). This shift represents not a mass migration, but a colonization from a vigorous cultural source on the Kopet Dag foothill plain. These new Murgab delta agricultural settlements were only possible with a complex system of irrigation and radical modification of the natural deltaic environment (Moore et al 1994).

By the beginning of the second millennium, the occupation of the desert oasis takes on a cultural tradition entirely different from that of the late Namazga V. This new archeological complex and settlement type is found in several of the oases of the deserts of Central Asia: the oasis sites of Margiana located in the ancient delta of the Murgab River of Turkmenistan (Sarianidi 1990, Hiebert 1994b); and the Bactrian sites, located in small deltaic fans found on either side of the Amu Dar'ya river (southern Uzbekistan and northern Afghanistan) (Sarianidi 1977, Askarov and Shirinov 1996) (Figure 2).

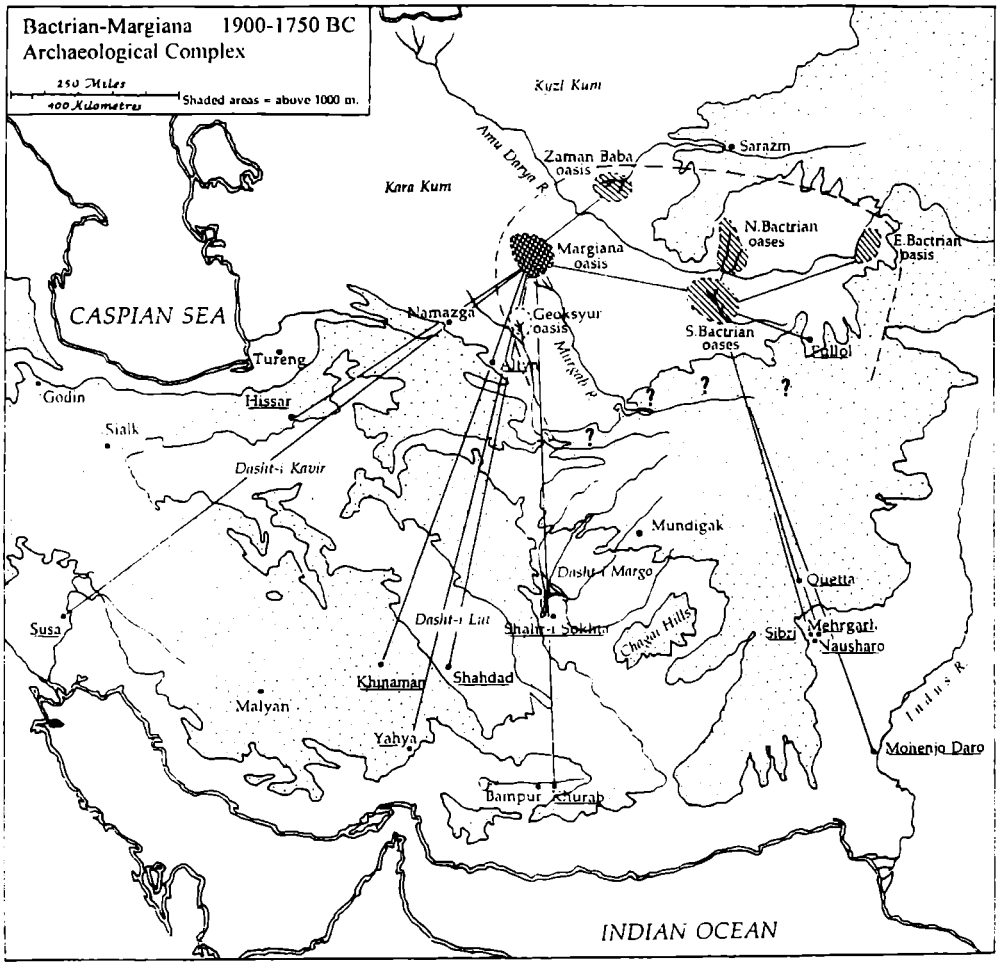

Figure 2: Distribution of BMAC finds on the Iranian Plateau and South Asia.

The ceramics, small finds, architecture and new settlement pattern are so similar between each oasis that V. Sarianidi has referred to these finds as a single Bactrian-Margiana Archeological Complex

(BMAC). These desert oases settlements and their large scale irrigation systems became the dominant geographic feature of Central Asia. This has been called the "Oxus Civilization" and its earliest formation is the Bactrian-Margiana Archeological Complex. Importantly, the Oxus civilization came into contact with nomadic groups such as Tazabag'yab and Andronovo nomads of the Alakul' and Fedorovo cultures to the north. The BMAC included new artistic styles and motifs which were part of the culture change associated with a new environment, new adaptation, and new landlord-based political organization (Hiebert 1994b).

While the BMAC desert oases have ample evidence of contact with the northern steppe nomads, it is important to note that no steppe nomadic complex has been found on the Iranian plateau, not even any evidence of indirect contact or interaction has been found either on the plateau or from steppe nomadic sites. The only evidence for interaction of the northern world with the Iranian plateau comes from the Central Asia desert oasis cultures. Thus, the notion of nomads from the north as the original Iranians is unsupported by the detailed archeological sequence available.

Figure 3: A Central Asian burial from southeastern Iran. Burial Li from Khurab (from Hiebert and Lamberg-Karlovsky 1992).

Central Asians on the Iranian Plateau

Re-examination of the early second millennium BCE sites on the Iranian plateau and the borderlands has revealed a number of Central Asian BMAC features within assemblages otherwise typical of the local cultures. These include particular types of metal artifacts, semi-

precious stone amulets, alabaster and steatite artifacts (miniature columns, seals) and distinctive burial types. Although primary contexts for these artifacts have seldom been recorded, in several cases it is possible to identify archeological contexts from the Central Asian BMAC materials which have been discovered outside of Central Asia.

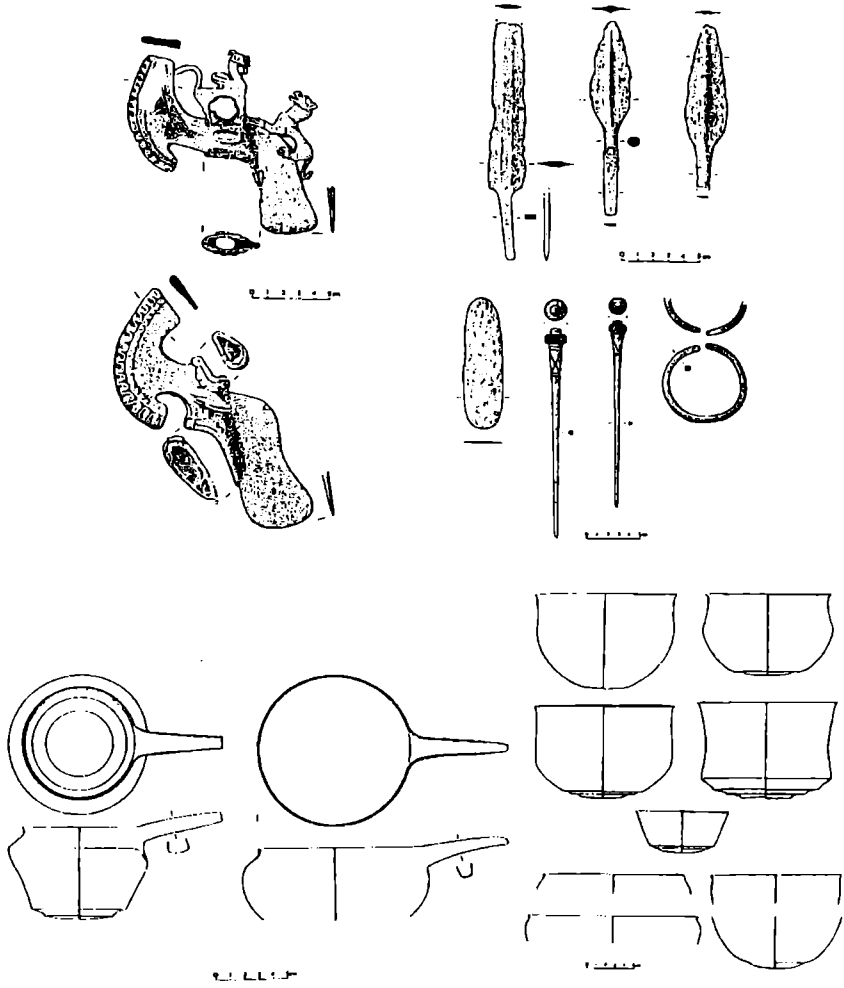

Figure 4: Central Asian metal artifacts from the burials at Khinaman (from Curtis 1988).

First, in southern Iran and on the edges of the Indus valley, a number of burials have been excavated which clearly reflect Central Asian rather than local funerary traditions. Several Central Asian burials have been identified at Khurab (Stein 1937) (Figure 3), Khinaman (Curtis 1988) (Figure 4), and Shahdad in Iran (Hakemi and Sajjidi 1989), and at Quetta (Jarrige and Hassan 1989) and Mehrgarh (Santoni 1988) in Baluchistan. On the basis of the distinctive ceramics and a rich and characteristically Central Asian small finds assemblage (Figure 4), these burial assemblages have been suggested to be interments of Central Asian individuals in the Indo-Iranian borderlands (Hiebert and Lamberg-Karlovsky 1992). Even

more interesting is that some cemeteries have other burials of the same date, with occasional Central Asian artifacts together with local elements of their funerary assemblage.

Second, several apparent Central Asian cenotaphs may be identified outside of the desert oases in the uppermost levels of the urban sites of the foothills in southern Turkmenistan, at sites such as Altyn depe, Yangi-kala, Namazga depe, and Anau depe. The so-called hoards of ritual bronze and stone objects found in the upper levels of Hissar Period III may also represent Central Asian type cenotaphs. Possible cenotaphs are also found on the edges of the Indus valley at Quetta, Fullol, and in the Mehrgarh south cemetery (Hiebert 1995).

Finally, a few BMAC artifacts and ceramic types have been found in the excavations of early second millennium levels at sites from Susa to Chanu daro. In contrast to this pattern of Central Asian items and presumably people spreading from the desert oases areas of Turkmenistan, very few well-documented small finds from the Indus valley, Mesopotamia or the Iranian plateau have been found in the Central Asian desert oases. The oases did import raw materials, such as alabaster and steatite, metal ingots, and many large grinding stones. This lop-sided pattern of exchange of finished objects suggests some kind of expansion out from the desert oases.

In southern and eastern Iran, local cemeteries contain a few foreign burials and cenotaphs. Additionally, there are some burials with a local funerary assemblage but a few Central Asian style artifacts. In a few instances, BMAC artifacts were recovered from the excavations of settlements. These Central Asian artifacts are found in the latest deposits of the Bronze Age, primarily in Eastern Iran and Baluchistan. Following this period, these sites are all abandoned (Dyson 1973, Voigt and Dyson 1992).

In northwestern Iran some indicators of cultural continuity from the late Bronze Age of eastern Iran with the Iron Age can be identified (Young 1985)—although the chronological gap between the Bronze Age and the early Iron Age occupations is still unresolved (Muscarella 1994). Even here, though, Central Asian influence was evident where some Central Asian (or Gurgan) type ceramics have been reported from late Bronze Age burials (Period III:2) at Godin depe in western Iran, and at Hissar tepe, where the period IIIC hoards appear to be Central Asian cenotaphs.

At the end of the Bronze Age the Iranian plateau was widely settled in separate but neighboring polities. Small numbers of Central Asians apparently interacted with these polities in varying degrees in northern, eastern and western Iran. In evaluating these patterns, we must keep in mind the great gaps in our knowledge of the archeology of the Iranian plateau, the huge areas of known but unexcavated late Bronze Age settlements and cemeteries (such as at Shahr-i Sokhta), and the crude excavations of the Central Asian burials from such sites

as Shahdad, Khurab, and Khinaman. Despite our inability to measure the flow of materials out of Central Asia, the presence of these late Bronze Age Central Asian artifacts represents outside influences on insulated local cultures of the Iranian plateau and greater Indus valley. This period of influence took place on the eve of a major shift in settlement and occupational pattern at the end of the Bronze Age. The amount of Central Asian materials in any one site is very small. In most cases, the Central Asian finds have been found clumped together, isolated from materials produced by the local culture.

When compared with historically known situations of migration and culture change (Anthony 1990) this pattern of exotic finds does not indicate mass migration or major displacement of peoples. In fact, we have good evidence of the continuity of settlement in the desert oases of Central Asia from the BMAC period to the subsequent local cultures in each region of desert oases (Takhirbai, Molali and Vashk cultures). On the other hand, on the Iranian plateau, the end of the Bronze Age represents a period of culture change that may have been influenced by outside contact with the Central Asian populations. Most likely, the deurbanization on the Iranian plateau and in south Asia represents the destabilization of the late Bronze Age cultures which allowed the Central Asian influence to flourish.

Historical analogy

The few Bronze Age Central Asian people penetrating into various separate but neighboring cultures may have been a situation similar to the historical case of the culture transfer which took place upon the conversion to Islam of the feuding chiefdoms of West Africa during the 16th-18th c CE (Last 1967, Levtzion 1979). West Africa was exposed to Islam in the early medieval period but experienced several periods of re-Islamization and expansion in subsequent centuries. The best documented of these waves of conversion is the most recent and the information comes from detailed Islamic sources (Last 1967).

Prior to the Islamization of Hausaland in the 16th c. CE, Nigeria consisted of feuding, competing non-Islamic chiefdoms with very little peaceful interaction (as we now perceive the Iranian plateau in the early second millennium BCE). Into this situation came Islamic traders and sufis, around whom gathered customers, disciples, and converts. These Islamic travelers (and Arabic speakers) moved more freely through the area than did the local people and thus spread the Arabic language and Islamic religion. The success of the Muslim traders led to large-scale conversion with only a few individual foreigners involved. In the West African case, as in many cases of Islamization in other regions, the tombs of sufis (who were involved in trade) often had shrines built over them. A pattern of local burials around these shrines is similar to the pattern of Central Asian burials seen on the Iranian plateau (Levtzion 1977, Phillipson 1985:188-189).

While this process is only preliminarily supported by archeological evidence (Levtzion 1973, 1977), the process of linguistic and religious change is explicitly recorded in the historical documents. This is a clear-cut case of language and ideological change with little change in the population structure or biological character of the local cultures, a pattern similar to that on the Iranian plateau at the end of the Bronze Age.

Conclusions

The Central Asian burials in southeast Iran (and possibly north-central Iran) provide convincing archeological evidence for a small number of Central Asian people on the Iranian plateau just before the period of change to the Iron Age and Iranian language and religion. The evidence comes from a small number of discrete contexts, rather than general trends in the ceramic records such as the development of the greyware horizon. To verify this reconstruction, it is important to reexamine the archeological data from sites on the Iranian plateau which might also have late Bronze Age Central Asian artifacts in discrete contexts. It would be valuable to have contextual information about the late Bronze Age Central Asian finds from Susa (in the west) to the Indus valley (in the east). This large area is comparable in extent with the region of Islamization in Africa and the comparison offers some useful insights for archeological research design.

Textual data must also be re-examined to integrate them with the archeological data. Recently P. Steinkeller has been working on the identification of historical derivations of Persians, suggesting that they are not from northwest Iran, but from the southeast. Steinkeller suggests that the term for the Parsi might not be derived from the Assyrian Pars or Fars (indicating a northwest Iranian origin), but could be derived from Parashi (earlier Marhashi/Parahshum)—suggesting a root area in eastern Iran (Steinkeller 1989). Again, this situation would call for a language replacement of Elamite speakers by Iranian speakers, but the source for Iranian speakers falls in the area where BMAC finds are best represented. In fact, this reconstruction might help us understand some of the regional differences observed in the distribution of the Central Asian materials, which are more common in southeastern Iran than central or northern Iran.

Along with the need to look at the context of archeological artifacts, biological analysis of human remains may also add to the cultural reconstruction. Rather than assuming that cemetery populations represent ethnically uniform units, it would be interesting to organize the biological characteristics, including possibly DNA analysis, of individuals associated with specific archeological assemblages. When correlations with specific archeological features are made explicit, such anthropometric and other data will become

part of the archeological complex informing us about the complex interactions of groups at the end of the Bronze Age.

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On the Relationship between the Tarim and Fergana Basins in the Bronze Age

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The Tarim Basin is noted in Chinese history because of the oasis states there during the period from the Han through Tang dynasties. But no bronze cultural remains were found there before 1976. Thus, in the past, the situation concerning the Bronze Age of the region around the Tarim Basin was not clear. Now things have changed.

In 1976, a bronze cultural cemetery was found at Shanbabay of Tashqurghan County, near the southwest edge of Xinjiang.[1] Forty tombs were discovered here, each one having a round or oval heaped mound of stones on the ground above it. Some of these mounds have a ring of stones forming a facing at their base, while some used round wood as a cover. Two kinds of burials, earthen burials of whole bodies and burials of cremated ashes, were found. The orientation of burials in earthen tombs nearly all fall within a range from west through north to east. Orientations toward the south are rare.

Grave goods are few. They consist of pottery, bronze, bone, and stone objects. Usually an individual is accompanied only by a single vessel, more rarely by two, and in exceptional cases by three or four. Funeral objects were mainly placed at the person's head.

Pottery vessels were shaped by hand and consist of pots, jugs, and bowls. The pots are round-bottomed and were used for cooking food. Jugs from this site are flat-bottomed, while bowls are of various types, round-bottomed or flat-bottomed. Usually there are no decorations on the surface of pottery vessels.

Most bronze artifacts from Shanbabay are ornaments. They include earrings, rings, waist band ornaments, and pendants. In addition, there are a few small weapons and tools such as arrowheads, knives, and so forth. Beads made of agate, stone, and bone were also found. Iron wares are few. They include a small knife, a ring, a small tubular ornament, and two bracelets.

Another cemetery of Late Bronze Age or perhaps Early Iron Age at Bozdöng, Aqsu-Konashähär County, near the northwest edge of the Tarim Basin, was found in 1985.[2] One of these tombs, M41, is an oval-

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[1] "Ancient Tombs on the Pamir Plateau" 帕米尔高原古墓, *Kaogu xuebao* (*Acta Archaeologica Sinica*) 考古学报, 2 (1981), 199-216.

[2] "The Excavation Report of the Bozdöng Cemetery in Aqsu-Konashähär County" 温宿县包孜东墓群的调查和发掘, *Xinjiang wenwu* (*Cultural Relics of*

shaped grave with a mound of stone on the ground above it. In the grave, about twenty skeletons consisting of 8 males, 11 females, and 1 child were placed in confused positions. Grave goods include pottery, bronze, iron, bone, stone, and golden wares. The pottery includes bowls with round bottoms, cups with handles, and teapots with handles and spouts. All of the pottery is shaped by hand and has no decorations on the surface. Bronze objects are mainly ornaments, consisting of buttons, rings, beads, bracelets, hairpins, goat-shaped ornaments, bells, and pendants. Iron objects are small tools and weapons. They include knives, arrowheads, nails, and band hooks. Bone objects are mostly pendants, as well as ornaments and the like.

The Sampul cemetery located in Lop County, near the southern edge of the Tarim Basin, was discovered in 1984.[3] Those tombs, about 52 burials in all, can be divided into two kinds: single burials and group burials. The tombs with group burials usually have a long passage and a cover made of round wood on the surface of the ground. In tomb No. 2, 146 skeletons of different sexes and ages were placed. Funeral objects are varied, such as pottery, bronze, iron, and wooden implements, as well as wool coats and foods. The pottery at Sampul was shaped by hand, and bowls from there are round-bottomed. Pots were used for cooking; cups are flat-bottomed with handles. Some of the pottery ware is similar to that found in the Shanbabay cemetery.

The most important discovery was in Charwighul, Khotunsumbul County, near the northeast edge of the Tarim Basin.[4] A total number of a thousand burials was found there. They were divided into five cemeteries. All of these tombs are marked with stone enclosures or barrows on the ground.

The tomb pits, vertical in shape, are lined with cobbles, usually with the top opening covered by large slabstones. Except for a few single burials, most burials at Charwighul are multiple. The skeletons are generally found lying sideward with limbs contracted and the head pointing to the west or northwest. Funeral objects consist of pottery, bronze, iron, stone, and wooden wares, plus wool coats, and so on.

Xinjiang) 新疆文物, 2 (1986), 1-14.

[3]"Ancient Cemetery at Sampul, Lop County" 洛浦县山普拉古墓地, *Xinjiang wenwu* (*Cultural Relics of Xinjiang*) 新疆文物, 1 (1985), 109-111.

[4]"Cemetery No. 1 at Charwighul, Khotunsumbul County, Xinjiang" 新疆和静县察吾乎沟口 一号墓地, *Kaogu xuebao* (*Acta Archaeologica Sinica*) 考古学报, 1 (1988), 75-99. "Cemetery No. 2 at Charwighul, Khotunsumbul County, Xinjiang" 新疆和静县察吾乎沟口二号墓地, *Xinjiang wenwu* (*Cultural Relics of Xinjiang*) 新疆文物, 4 (1989), 12-33. "A Preliminary Report on the Excavation of Cemetery No. 4 at Charwighul, Khotunsumbul County, Xinjiang in 1987" 新疆和静察吾乎沟口四号墓地 1987 年度发掘简报, *Xinjiang wenwu* (*Cultural Relics of Xinjiang*) 新疆文物, 4 (1988), 3-15.

Most of the pottery consists of pots with spouts which were used for cooking milk. There are, as well, some pots with handles, bowls with round bottoms, and cups. The painted pottery has red decorations on a pale yellow background. Usually it is the upper part of a vessel that is painted with patterns characterized by a slanted band on one side of the belly or a horizontal band around the neck. On many vessels, there are various kinds of painted bands. They usually include designs made out of the following shapes or patterns: triangles, mesh, chessboard, rhombus, or vertical lines. All of the pottery wares were shaped by hand. Bronze ware found at Charwighul includes small tools, weapons, and ornaments, such as knives, arrowheads, spearheads, awls, rings, hair clasps, and pendants. Stone wares include grindstones, spindles, and beads. Bone items consist of spindles, arrowheads, tubular ornaments, goat-shaped ornaments, and beads. Some golden earrings and golden strip ornaments were also found. Wooden objects include dishes, spindles, ladles, arrowshafts, and arrowheads.

Remains similar to those of the Charwighul Culture are found in Chong Bagh cemetery, Bügür County[5] and other sites along the southern slopes of the Tängri Tagh.

Chinese archaeologists have paid a great deal of attention to these new finds, and many research reports and articles have been published recently,[6] so we are now in a position to draw some preliminary conclusions about the Bronze Age cultures of the Tarim Basin.

Among these discoveries, we find that similar cultural elements existed in each of these cemeteries. For example, tomb structures are usually marked on the ground by stone mounds or barrows. Some of them are surrounded by rings of stones beyond the limits of their piled mounds. Burial structures tend to be oval or short rectangular shaft tombs, some with a wooden chamber and some with a chamber made of cobblestones. Most of the burials are multiple burial tombs and were used more than once. Generally, the skeletons on the lowest level are extended in a supine or contracted position, but the skeletons above are secondary burials. This custom of burial was prevalent in the Tarim Basin at the time of Bronze Age and Early Iron

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[5]"First Season of Excavation of Ancient Tombs at Chong Bagh, Bügür County, Xinjiang" 新疆轮台群巴克墓葬第一次发掘简报, *Kaogu* (*Archaeology*) 考古, 11 (1987), 987-996. "A Preliminary Report on the Second and Third Excavations of Tombs at Chong Bagh, Bügür County, Xinjiang" 新疆轮台县群巴克墓葬第二、三次发掘简报, *Kaogu* (*Archaeology*) 考古, 8 (1991), 684-703.

[6]Shui Tao 水涛 "A Comparative Study of the Bronze Cultures in Xinjiang —With a Discussion of the Process of Early Cultural Exchange Between the East and the West" 新疆青铜时代诸文化的比较研究—附论早期中西文化交流的历史进程, *Guoxue yanjiu* (*Studies in Sinology*) 国学研究, 1 (1993), 447-490.

Age. It is different from the types of tombs found in the eastern part of Xinjiang.

Grave goods in the Shanbabay cemetery are few, while in other cemeteries described above they are relatively numerous. They consist of pottery, bronze, bone, and stone artifacts, and even small iron objects. In the western part of the Tarim Basin, such as the cemeteries of Shanbabay, Bozdŏng, and others, the pottery is often undecorated, and the shapes consist of bowls, jugs, and pots. In the central part of the Tarim Basin, such as the cemeteries at Charwighul and Chong Bagh, in addition to these kinds of undecorated pottery wares, there is also some painted pottery with red background and black decorations. The shapes consist of pots with spouts, jugs, and jars with handles. So the cultural elements in the Charwighul cemetery may have been constituted from different origins.

Bronze wares both in the western and the central parts of the Tarim Basin are similar. The finds often include small knives, arrowheads, and ornaments. These tools and small weapons were used by nomadic people in common life. In fact, it is very difficult to distinguish the origins of these small bronze objects since they were found on a large scale throughout the Xinjiang region during the Bronze Age. On the other hand, large bronze vessels and large weapons such as swords and axes have not been found in the Tarim Basin, while they were often found in the eastern and northern parts of Xinjiang. This suggests that bronze wares found in the Tarim Basin are not connected with the northern and eastern parts of Xinjiang.

According to these features shown in burial structures, pottery, and bronze ware, we may say that the bronze cultural remains found in the Shanbabay, Bozdŏng, and Sampul cemeteries belong to essentially the same bronze culture, while the Charwighul cemetery belongs to another culture. Nonetheless, these two types of cultures had a certain relationship during the period of the Bronze Age and Early Iron Age of the Tarim Basin.

The painted pottery of the Charwighul cemetery is a special cultural element that can hardly be found in the western and southern parts of the Tarim Basin. But it is a common element that existed in the Turfan Basin.[7] Based on radiocarbon dates, bronze cultural remains in the Turfan Basin existed from about 3145±75 BP to 2225±70 BP.[8] Dates for the Charwighul cemeteries range from about 2770±90 BP to 1900 BP.[9] The Chong Bagh cemetery is dated

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[7]Liu Hongliang 柳洪亮, "Ancient Tombs at Subeshi, Pichan County, Xinjiang" 新疆鄯善苏巴什古墓葬, *Kaogu* (*Archaeology*) 考古, 2 (1984), 41-50.

[8]"Report of Radiocarbon 14 Dating" 碳14年代测定報告, *Wenwu* (*Cultural Relics*) 文物, 4 (1984), and 7 (1990).

[9]"Report of Radiocarbon Dating" 放射性碳素测定年代报告, *Kaogu* (*Archaeology*) 考古 7 (1985), 7 (1986), 7 (1987), and 7 (1990).

from about 2795±100 BP to 2490±90 BP.[10] So the time when painted pottery elements existed in the Charwighul and Chong Bagh cemeteries is later than the time when they existed in the Turfan Basin. This means that these elements appear to have originated from the eastern part of Xinjiang and spread toward the eastern edge of the Tarim Basin.

In the Tarim Basin, the Shanbabay cemetery is dated from about 2750±65 BP to 2465±70 BP. Dates of the Sampul cemetery are from about 2290±65 BP to 1995±75 BP. The Bozdöong cemetery is later than the Shanbabay cemetery and is near to the period of the Sampul cemetery, even though there are no radiocarbon dates from this cemetery. It is certain that the undecorated pottery elements appeared firstly from the western part of the Tarim Basin and then spread to the southern and eastern parts. Since there have been no Bronze Age or even Stone Age remains that are earlier than the remains of the Shanbabay cemetery found in this region up to now, the chief problems of the bronze cultures of the Tarim Basin are to determine when and where the undecorated pottery elements come from: from the east or the west?

In the eastern part of Xinjiang, there are some bronze cultures dated to more than 3000 years BP, such as the Yanbulaq Culture. But these bronze cultures are well-known for their painted pottery wares.[11] Although there is some undecorated pottery found in the eastern portion of Xinjiang, it is different from that found in the Tarim Basin. It seems that we can only see some possible influences from the east in the remains of the Charwighul cemeteries. But this influence apparently did not spread into the innermost part of the Tarim Basin.

Beyond the western part of the Tarim Basin lie the Pamirs. Beyond the Pamirs, in the Fergana Basin of Central Asia, we know that there have been some important discoveries of the Bronze Age or Early Iron Age (i.e. the Chust Culture). Based on the research of Soviet scholars, the beginning date of the Chust Culture is in the mid- to late-second millennium BCE.[12] All of the pottery of this culture was handmade. Most of it is unpainted, there being only 1.2% painted with simple geometric designs. Some small houses of mudbricks were found at the sites of Chust and Dalverzin. Stone hoes, stone sickles, knives, and possibly bronze sickles were also unearthed from Chust and other sites which are similar to those found at the site of Aqtala in

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[10]Ibid.

[11]"The Yanbulaq Cemetery in Qumul, Xinjiang" 新疆哈密焉不拉克墓地, *Kaogu xuebao* (*Acta Archaeologica Sinica*) 考古学报, 3 (1989), 325-362. Chen Ge 陈戈, "On the Yanbulaq Culture" 略论焉不拉克文化 *Xiyu yanjiu* (*The Western Regions Studies*) 西域研究, 1 (1991), 81-96.

[12]Philip L. Kohl, "Central Asia, Palaeolithic Beginnings to the Iron Age." *Synthèse*, 14 (Paris, 1984), 189.

the Tarim Basin.[13] The burial structure of the Chust Culture is not clear because there have been hardly any tombs unearthed from Fergana. But in Southern Tajikistan, some important excavations have been reported.

Along the lower reaches of the Vakhsh and Qizilsu rivers, a considerable number of burial grounds was discovered, five of which have been excavated in part or totally.[14] This kind of bronze remains is classified as belonging to the Vakhsh Culture and dates to the first quarter of the second millennium BCE. The burial structures of the Vakhsh Culture appear as round or oval heaped mounds of loess. A majority of these mounds have a ring of stones forming a facing at their base. All the burial structures are graves of the lined-chamber catacomb type. The entry pit, or dromos, is filled with loess and packed with rocks of various sizes, usually very large. All the burials were interments. Most of them are single, and paired burials are rare. A northern orientation is predominant. The population that created the Vakhsh Culture burial grounds was of the Europoid Mediterranean type.

I have previously carried out a comparative study of bronze cultures found in the Tarim Basin and Central Asia.[15] After this research, we can now say that the bronze cultures found in the Fergana Basin and nearby regions are closely related to the bronze remains of the Tarim Basin. Concurrently, we can obtain a conclusion from the studies of physical anthropology. The famous Chinese physical anthropologist, Professor Han Kangxin, has studied cranial remains found in a pit tomb of the Shanbabay cemetery. In physical morphology, the population of the Shanbabay cemetery has a close relationship to the eastern branch of the Mediterranean subgroup of the Indo-Afghan racial type.[16]

Professor Han has also studied some skulls found in the Sampul cemetery. He has determined that the population of the Sampul cemetery is likewise closely similar to the east branch of the Mediterranean subgroup of the Indo-Afghan racial type. They do not resemble the Mongoloid racial type.[17]

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[13]"Reconnaissances of Aqtala and Other Neolithic Sites in Qāshqār-Konashāhār County, Xinjiang" 新疆疏附县阿克塔拉等新石器时代遗址的调查, *Kaogu* (*Archaeology*) 考古, 2 (1977), 107-110.

[14]*The Bronze Age Civilization of Central Asia—Recent Soviet Discoveries* (Armonk: M. E. Sharpe, 1981), pp. 287-310.

[15]Same as note 6.

[16]Han Kangxin 韩康信, "The Human Skulls of the Shanbabay Cemetery, Tashkurghan County, Xinjiang" 塔什库尔干县香宝宝古墓出土人头骨, *Xinjiang wenwu* (*Cultural Relics of Xinjiang*) 新疆文物, 1 (1987), 32-35.

[17]Han Kangxin 韩康信, "Racial Characteristics of the Human Skulls from Sampul Cemetery in Lop County, Xinjiang" 新疆洛浦山普拉古墓人头骨的种系

The results coming from physical anthropological research strongly support the conclusion we obtain from studies of the cultural relics found in the same places; thus, generally speaking, our conclusions are credible.

The Tarim Basin is a large region about which we have come to know just a little concerning the Bronze Age and Early Iron Age cultures that existed long ago. We can say next to nothing about the details of the life of the Bronze Age people now. But according to the research described above, the outlines of the Bronze Age of the Tarim Basin are becoming increasingly clear. It was in the first half of the first millennium BCE (or perhaps even earlier in the second half of the second millennium BCE) when some Caucasian people, mainly members of the east branch of the Mediterranean subgroup of the Indo-Afghan racial type, from the Fergana Basin and the Vakhsh River valley of Southern Tajikistan, crossed the Pamirs and entered the western part of the Tarim Basin. From there they separated into two branches and continued forward toward the East. Some of them skirted the northern edge of the Tarim Basin and drove straight through the Qarashähär Depression, meeting with Mongoloid people in the Charwighul area. Another branch moved along the southern edge of the Tarim Basin and arrived in the region of Lop (near Khotan), even going as far east as the region of Lopnor in later times.[18]

Bronze Age and Early Iron Age finds of the Tarim Basin show us how the historical process of cultural exchange between the East and the West took place in the southern part of Xinjiang already long before the period of the Silk Road. Since early cultural exchange in the Tarim Basin and surrounding area lasted for a long time, the emergence of the Silk Road, which straddled both sides of the Tarim Basin, became not only possible, but inevitable.

问题 *Renleixue xuebao* (*Acta Anthropologica Sinica*) 人类学学报, 7.3 (August, 1988), 239-248.

[18]Han Kangxin 韩康信, "Anthropological Characteristics of the Human Crania from Kroran Site, Xinjiang" 新疆楼兰城郊古墓人骨人类学特征的研究, *Renleixue xuebao* (*Acta Anthropologica Sinica*) 人类学学报, 5.3 (August, 1986), 227-242.

A Brief Report on the Mummies from the Zaghunluq Site in Chärchän County

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The ancient Zaghunluq cemetery is located on the tableland north of the old course of the Chärchän River, across from the Lälilik site, and 6 kilometers southwest from the seat of Chärchän County, covering 800,000 square meters and having an elevation of 1,270 meters. Its geographical coordinates are 89°28'29" E and 38°07'16" N. Since there are no apparent marks on the ground and no comprehensive excavation has been carried out, we are not sure yet how many tombs exist in this cemetery.

In August, 1989, the Office of Cultural Relics Preservation and Management of the Bayingholin Mongolian Autonomous Prefecture carried out a rescue excavation at Zaghunluq. Two tombs were salvaged during this excavation. In Tomb No. 1 human bones, including skulls and separate skeletons which belonged to six individuals, were unearthed. In Tomb No. 2, which is located approximately 8 meters northwest of Tomb No. 1, 4 mummies—including a male infant, a male child a little over one year old, a young woman, and an old woman (probably the main occupant of the tomb)—were discovered. The male infant's body disintegrated after it was unearthed, but the remaining three mummies are well preserved in the Museum of the Bayingholin Mongolian Autonomous Prefecture.

1. The Structure of the Tomb and the Burial Style

89QZM2 is a two-layer vertical earthen tomb with a direction of 210°, a little sunken from the ground, without any mark or mound on the surface which is covered by fine sand.

The earth was dug in a rectangular shape 3.5 meters long from west to east, 2.8 meters wide from north to south, and 0.4 meters deep. In this layer the immolated young woman and the abandoned male infant were buried. Under the first layer was the tomb chamber which was covered by poplar logs and covering mats woven from tamarisk branches, reeds, and cattails which were 0.4 meters thick. In the center of the cover of the tomb chamber there was a hole 0.3 meters in diameter. The head of the male child was forced down into the hole. Therefore he was hung upside down in the tomb chamber when he was unearthed. This second level consisted of a two-layer platform which was 2.3 meters long from west to east, 1.9 meters wide from north to south, and 0.6 meters deep. The platform was 0.6

meters in width. Above the tomb cover there were some funerary objects like millet cake, pottery, and fragments of a woolen blanket. The earth was not filled in beneath the covering material nor was there a coffin in the tomb chamber which was 1.2 meters long, 0.6 meters wide, and about 0.9 meters deep. The distance from the surface to the bottom of the tomb chamber was about 1.9 meters. The gravel in the walls of the tomb chamber did not protrude and the walls crumbled easily if touched slightly. The bottom of the chamber was made of soft, loose gravel without any mattress or padding.

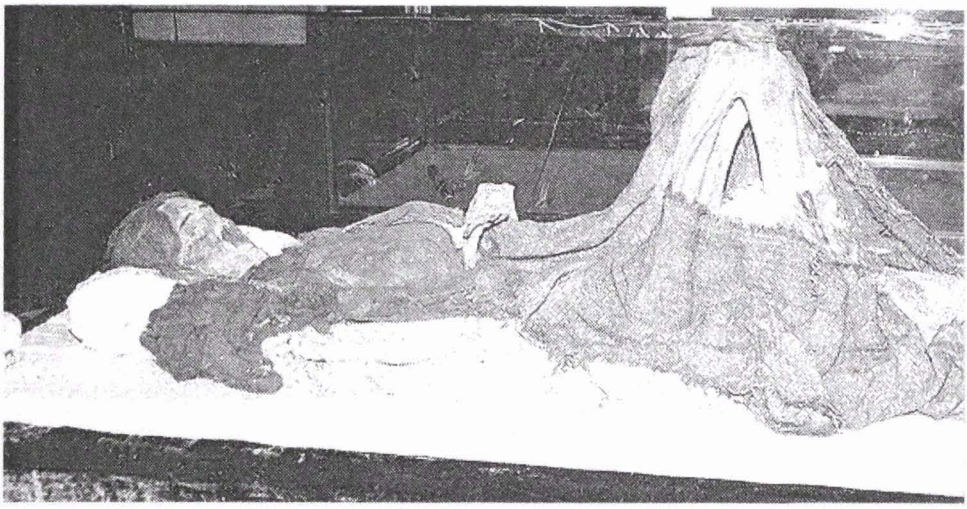


Figure 1. Full-length view from the right side of the main occupant of tomb 89QZM2 before cleaning.

The body of the tomb occupant had been cut into three parts which were put in different places. Her head had been cut off from her upper body at the fifth cervical vertebra and placed on her abdomen. Her upper body had been separated from her lower body at the lumbar vertebra and put beside the west wall. Her lower body, which seemed not to have been moved from the original location, lay supine in the east part of the tomb chamber. Her knees were crooked at a 60 degree angle, and her feet were touching the east wall. It is inferred that the tomb occupant was originally lying supine with her legs crooked, but that later the tomb chamber was opened and badly disturbed. There were only a few funeral objects in the tomb, including a broken wooden comb, a bunch of reeds used for worship, a spindle whorl with an inserted staff, a bovine horn cup, and a tree branch with a hook. Under the body of the tomb occupant there were a piece of coarse, white felt and a woolen blanket.

2. The Appearance of the Unearthed Mummies

The main tomb occupant was an old woman with white hair. As we see her now in our museum, two braids tied with red woolen strings hang down beside her ears. She has a long and thin face, dry skin, deep eyes, a delicate and high nose, and rather prominent

cheekbones. Her thin eyebrows are black and look as though newly painted. Semilunar tattoos are shown on her upper eyelids, while two oblate tattoos appear in the center of her forehead right under the hair. In each of her nostrils there is a skein of wool which is dyed red, yellow and blue. The same kind of wool skein is also stuck to her right cheek near the ear. Above her upper lip is fine, light brown hair and in her mouth may be seen pure white teeth.

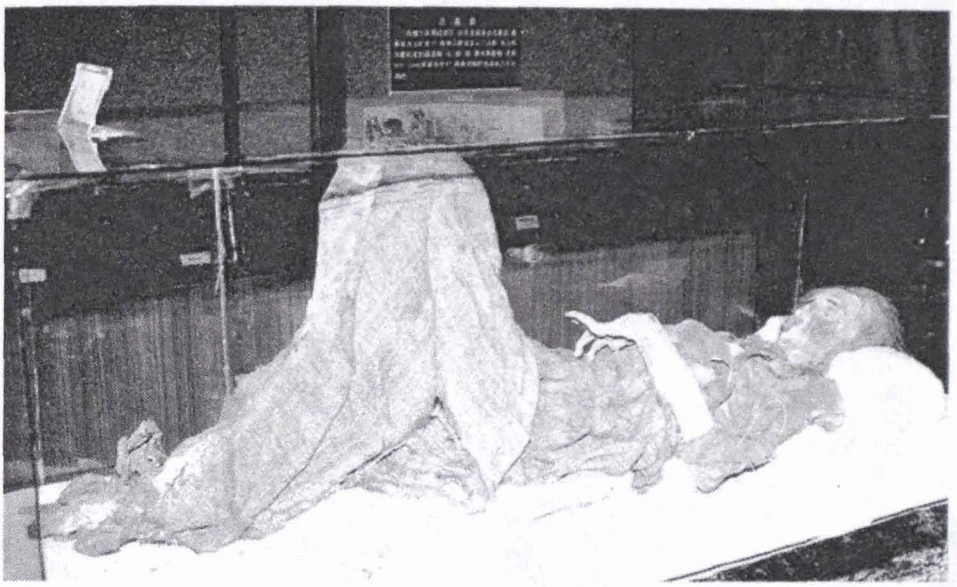
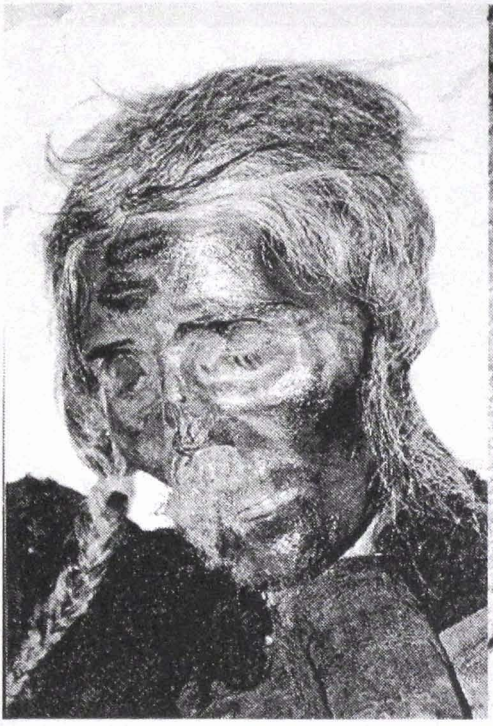


Figure 2: Full-length view from the left side.

Figure 3: View of upper body from above and to the left after cleaning to reveal tattoos.

On her upper body she is wearing a purple-colored, coarse woolen robe that is round-collared with facing lapels, but without button loops. Her left arm emerges from the sleeve of her robe at the elbow. On the back and wrist of her left hand, which is crooked in front of her chest, there are dark bluish-green tattoos made up of a combination of beautiful 卐 patterns which extend all the way up the

index finger, middle finger, and ring finger. This proves that the custom of tattooing the body and face was already popular at that early time. The lady has exceedingly long and thin fingers with nails that appear to have been painted orange. Her ring finger and little finger are bent upwards, quite like the "orchid gesture" in performances of Chinese popular operas. From the elbow down, the flesh of her right arm has putrefied because it was pressed beneath her body and came in contact with the bottom of the tomb.



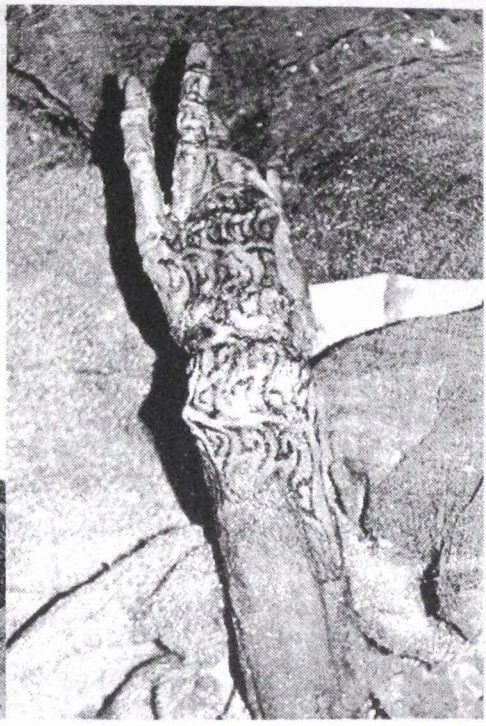


Figure 4 (left): Frontal view of face. Note that, while cleaning has made the tattoos on the arms and face easily visible, it has greatly darkened the skin. This has happened to many of the Tarim Basin mummies during conservation.
Figure 5 (right): View of left hand from directly above.

The lady's lower body is nude with only a brown woolen blanket on it. Her feet are wrapped in a white woolen fabric and wear high boots made of deer leather with the fur facing inward. The boots are about 23 centimeters long and 28 centimeters high.

She is 1.7 meters in height. Her head is 19 centimeters long, and her shoulders are 33 centimeters wide.

The little boy who was buried alive with the tomb occupant is about 1 year old and 72 centimeters high. His head is 15 centimeters long and his shoulders are 16 centimeters wide. He has light brown hair of the same color as the immolated young woman from the surface of the grave. At the top of his head a small braid is tied with a red woolen string. His neck is strapped with a knitted yellow woolen band, which is about 1 centimeter wide, and which passes over the

back of his head. His arms and legs are bound tightly with printed woolen cloth. His tightly closed eyes and opened mouth show the pain of being buried alive. [Editor's note: For an explanation of the woolen strap around the chin and the wide-open mouth, see Paul T. Barber, "Mummification in the Tarim Basin," *Journal of Indo-European Studies*, 23.3-4 (Fall/Winter, 1995), 309-318.]

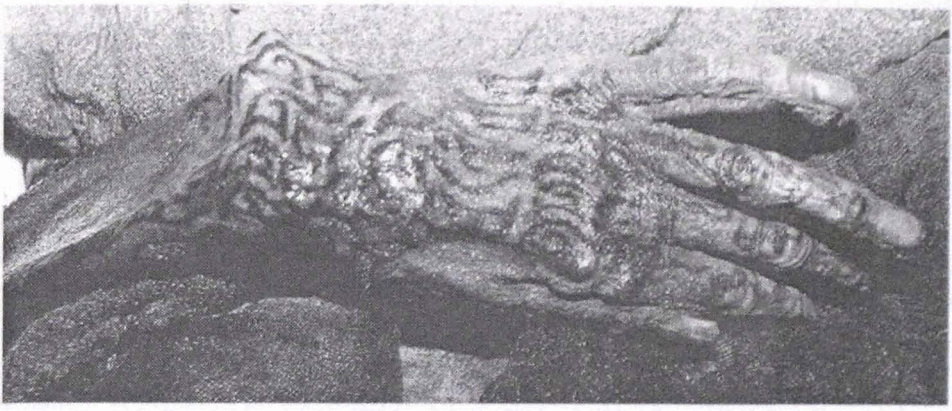


Figure 6: Closeup of left hand.

The young woman who was also buried alive and who is now likewise in our museum is about 20 years old. She has yellowish-brown hair and wears an orange-colored and round-collared woolen robe with facing lapels. Her eyes were gouged out, and her arms and legs were cut off. With her tongue bit tightly by her teeth, she appears to be in terrible pain. [Editor's note: My personal observation is that several mummies from the Tarim Basin have their tongues protruding through tightly clenched teeth. Paul Barber pointed out to me that this was due to natural physiological processes of decomposition such as bloating, dehydration, and capillary action.] Her remaining body is 80 centimeters high, her head about 20 centimeters long, and her shoulders are 33 centimeters wide.

Figure 7: One-year-old boy from 89QZM2.

The nude immolated male infant is about 45 centimeters in height. His hands with clenched fists are placed on his abdomen. His legs are lightly crooked with the right foot crossing over the left foot.

On each of his eyes there is a small green stone. [Editor's note: This reminds us of the blue stones placed over the eyes of the well-preserved baby from Zaghunluq in the Ürümchi Museum who is wrapped in a reddish-purple woolen shroud and wears a blue cashmere cap.]

3. Related Problems

The dating of the mummies: After another tomb at Zaghunluq was excavated by the Xinjiang Museum in 1985, five specimens were submitted for C^{14} testing, which resulted in a range of dates from 3200 to 2700 BP, roughly equal to the Western Zhou and the Spring and Autumn period in Chinese history.

As to the reasons for the preservation of the mummies, my opinion is that the following five factors have to be taken into account: 1. The climate in the Chärchän area is absolutely dry. 2. The altitude of the cemetery is relatively high, while the groundwater level is low. 3. The tomb occupants probably died in midsummer, so their corpses quickly lost fluids and dried. 4. The tomb chamber is relatively shallow and was not filled in with earth, therefore it was very well aerated. That also made the moisture in the tomb easily volatilized. 5. The sands around the tomb have a high salinity which prevented bacteria from rapid reproduction. It is probable that the combination of these natural factors has preserved the Chärchän mummies so well for thousands of years.

The ethnic and racial identities of the mummies: Shao Xingzhou and Wang Bo have made a preliminary study on this issue that was published in *Xinjiang wenwu* (*Xinjiang Cultural Relics*), the fourth issue of 1989. The mummies were determined to be Europeans, but possessing local characteristics. Considered from the related accounts in Chinese sources, they were probably a branch of the Western Qiang people. [Editor's note: The Qiang are generally recognized to be a Tibeto-Burman people attested already in the Shang period oracle bones (c. 1200 BCE). It is more likely that the Zaghunluq people were Indo-Europeans, perhaps Iranians or Tocharians.]

The social and economic situation of the mummies: As seen from the excavated relics, the Zaghunluq people were a relatively settled nationality that developed from a tribal union. Their economy was dominated by animal husbandry, but supplemented by agriculture and hunting. Possessing a rather high technology in handicraft industries, the Zaghunluq people were able to weave and dye beautiful woolen fabrics. They basically lived in a self-sufficient way.

Translated by Jidong Yang
and Victor H. Mair

Note: All photographs accompanying this article are courtesy of the author, He Dexiu.

Victor H. Mair, editor

A European Perspective on Indo-Europeans in Asia

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One of the most frequently violated principles of establishing the homeland of the Indo-Europeans states that there can be no solution to the Indo-European homeland problem that does not solve the distribution of *all* the Indo-European stocks (Mallory 1996c). In the history of research into Indo-European origins, a traditional dichotomy has generally been proposed between the Asiatic Indo-European stocks (Indo-Iranian, Tocharian) and those of Europe. This has governed discussion of both the economy and the historical trajectories of the various IE stocks. These matters can be placed in sharper focus by viewing the cultural and geographical differences between European and Asiatic stocks as comprising four fault lines which must be transgressed to explain the distribution of all Indo-Europeans. Explorations of these fault lines also suggest that in terms of explaining Indo-European dispersals, the models and arguments proposed for Asia have considerable import for competing models of European dispersals.

Asia before Europe

The derivation of the Asiatic Indo-Europeans from an Asian homeland is as old as the study of the Indo-European languages itself. All too often scholars have forgotten that in Sir William Jones' Third Anniversary Discourse to the Royal Asiatick Society in 1786, he not only outlined the nature of the relationship between Sanskrit, Greek and Latin (and perhaps Iranian, Germanic and Celtic) but also alluded to his belief that they 'all proceeded from some central country, to investigate which will be the object of my future Discourses' (Jones 1799:34). He completed his investigation in his 'Ninth Anniversary Discourse' in 1792 where he concluded that the ancestors of the Indo-Europeans (as well as of other major language groups) 'proceeded from Iran, where they migrated at first in their great colonies'. Among Jones' arguments for a (greater) Iranian origin was his adoption of the principle of least moves, i.e., as Iran either included or touched on the various other major language groups (Indo-Europeans, Semites and Turks), an Iranian homeland more easily explained the historical distribution of all these languages than setting their origin anywhere else (Jones 1799:93).

The model of an Asian origin for the Indo-Europeans represented the common opinion of scholars of the early half of the

nineteenth century where the homeland was generally set between India and the Caspian Sea, usually Kashmir or Bactria (e.g., Pictet 1859-63; see Mallory 1973 and Day 1994 for other examples). The reconstruction of the Proto-Indo-European vocabulary, which had begun at least as early as Adalbert Kuhn (1845), recovered the terms for domestic animals and plants; and it was generally presumed that it was the Indo-Europeans who had migrated out of (Central) Asia to carry the benefits of agriculture into Europe.

The latter half of the nineteenth century saw a general shift in opinion that dismissed the Asiatic homeland and rather sought it in Europe. The reasons for this were many. Some were based on linguistic evidence that employed principles of argument still invoked today, e.g., the 'center of gravity' principle that argued that as the majority of the Indo-European stocks were to be found in Europe, it was far more likely that the Indo-Europeans had occupied Europe first and only more recently dispersed into Asia (Latham 1851). Other reasons employed physical anthropology in order to associate the earliest Indo-Europeans with a European, often specifically Nordic, physical type (Mallory 1992; Day 1994). The development of prehistoric archeology in Europe also emphasized either the local origins of the various European cultures or sought their origins in those parts of Asia from which one traditionally did not draw the Indo-Europeans, e.g., Mesopotamia.

By the twentieth century, most homeland solutions were confined to Europe, although several models have still survived to provide an Asiatic homeland, albeit divorced in space and often in time from those suggested a century earlier. One solution emphasized what was regarded as the pastoral nature of Proto-Indo-European society and looked for the homeland in the steppe region of Asia (e.g., Brandenstein 1936; Nehring 1936; Koppers 1934). This latter hypothesis was primarily founded on then-contemporary models of anthropological cultural 'circles' rather than hard archeological evidence and the steppe model *per se* is now more usually presented with an origin closer to Europe, i.e., a point of origin west of the Ural River. More recent hypotheses seek the homeland in Anatolia and associate the dispersal of the Indo-Europeans with the spread of agriculture through population movements (Renfrew 1987; Cavalli-Sforza, Menozzi and Piazza 1994: 263-301; Barbujani, Sokal and Oden 1995), the formation of some form of later Neolithic Anatolian-Pontic interaction sphere (Sherratt and Sherratt 1988), an ill-defined, if not invisible, population movement from east Anatolia/Armenia (Gamkrelidze and Ivanov 1995), or the spread of chariot warfare in the second millennium BCE (Drews 1988). Finally, there are some who still seek the homeland in or near northwest India (Misra 1992). These latter theories are, on the whole, confined entirely to publications emanating from India and rest on a negative logic: the

difficulty (archeological [or political?]) of tracing Indo-Aryan movements into India suggests, it is argued, that they were there from the greatest antiquity, and it is rather all other IE stocks who must have migrated outward from these. This theory enjoys little if any support beyond the borders of India and, it must be emphasized, is also heavily criticized in India itself (Sharma 1995).

Only the Anatolian homeland (or Neolithic dispersal) solution provides models for discussing the spread of all Indo-Europeans. Colin Renfrew (1987, 1991) indicates two possible models. The first, Plan A, sets the dispersal of all Indo-European speakers to the beginning of the Neolithic and hence just as (IE) Europeans moved east to west so also did (IE) Asiatics move from west to east from Anatolia, across Mesopotamia, and onwards into Iran and India. This latter model appears to have been tacitly dropped in his most recent exposition on Indo-European dispersals (Renfrew 1996:76-81). In terms of the 'symmetry' of the theory that the major language families expanded with the spread of agriculture, Plan A was a hypothesis worth proposing, even if it enjoyed little support as it ran into extremely substantial objections. As experience has repeatedly shown that no theory remains permanently dormant in Indo-European homeland discussions, it is also worth rehearsing here why a southwest Asiatic origin for the Indo-Europeans of Asia seems so improbable:

1) It presumes a unique IE nuclear area for the development of agriculture in southern or eastern Anatolia to account for farming communities in both Europe and in western and southern Asia. But Anatolia is a most unlikely source for early South Asian agriculture, as the Neolithic transition also appeared in regions much more proximate to India. For example, the site of Mehrgarh in Baluchistan is as early as the Anatolian Neolithic and so it is difficult (if not impossible) to understand why populations separated by *c* 3000 km should both possess the same basic vocabulary and create the same words for domestic livestock and cereals. While it is entirely probable that the initial impetus and some of the taxa, e.g. wheat, came from farther west (Meadow 1996:395), this certainly need not entail a derivation all the way from Anatolia. The concept of Proto-Indo-European distributed across a 3000 km front as early as 7000-6000 BCE would also appear to be inherently improbable. In his own most recent assessment of the situation, Colin Renfrew (1996:81) has suggested that in the case of the early Neolithic of Baluchistan and India we are probably talking about the spread of Elamo-Dravidian, a conclusion which seems reasonable enough (Mallory 1989:44-45).

2) The proposed migration route of the Asiatic Indo-Europeans takes them across northern and southern Mesopotamia and southern Iran, territories which, when we have our earliest written testimony (3rd millennium BCE onwards), are occupied by non-Indo-European families, e.g., Hattic (central Anatolia), Hurrian (south Caucasus,

eastern Anatolia, northern Mesopotamia), Semitic (southwest Asia to central Mesopotamia), Sumerian (southern Mesopotamia), and Elamite (southern Iran). Plan A uniquely privileges the Indo-Europeans in their earliest migrations and then has most of their territory later occupied (by at least the 4th millennium BCE) by non-Indo-Europeans.

3) Plan A (because of item 2) indicates a major break between European and Asiatic Indo-Europeans from the Neolithic onwards. This renders it impossible to explain why the same vocabulary for later technological items, such as wheeled vehicles, should be shared in both European and Asiatic stocks.

4) Plan A poses such an early break between the Asiatic and other IE languages that it renders it very difficult to accommodate the dialectal position of Indo-Iranian which shares late IE innovations with Greek-Armenian.

5) The limits of Iranian speech were not confined to the territories south of Central Asia (the early agricultural zone) but also embraced both the Asiatic and European steppe. The only way this could be explained in terms of Plan A is to argue that the steppe tribes derived their language and economies from the early farmers of Central Asia, a suggestion that has so far found no archeological support (but see below).

6) Finally, there is a sizeable portion of loan-words that have passed between Indo-Iranian (and late Indo-European) and the Uralic languages of the forest zone both west and east of the Urals (Parpola 1995:355-356). The most likely contact zone should have been the steppe and forest-steppe of the Ural region, which argues for the early presence of Indo-Iranians in the steppe. Plan A would seem then to have almost nothing to recommend it and quite a few reasons to reject it.

Renfrew's Plan B suggests that the population movements envisaged from Anatolia into southeastern Europe continued around the northwest shores of the Black Sea and eastward across the steppe. The Asiatic Indo-Europeans are then explained by later (Bronze and Iron Age) movements from the steppe region into Iran and the Indian subcontinent where Indo-Iranians, emanating from the north, spread their language through 'elite dominance' (reiterated in Renfrew 1996:76). In terms of the immediate origins of the Asiatic Indo-Europeans, this theory does not differ in substance from most other homeland solutions that seek an Indo-European origin somewhere in Europe.

The logical consequences of abandoning Plan A (a total Neolithic dispersal model for IE expansions) and accepting a Neolithic dispersal model for only the Indo-Europeans of Europe and other mechanisms for the Indo-Europeans of Asia have not been much commented upon. In actual fact, such a Europe-centered

Neolithic dispersal model proposes precisely the same type of population movements for Asiatic Indo-Europeans (elite dominance, etc.) that its proponents find unconvincing for the dispersal of Indo-Europeans in Europe (the spread of the Yamna, Corded Ware, Urnfield, La Tène, etc.). Or, conversely, it admits that early agricultural *non*-Indo-European languages dispersed across territories (possibly even leaving their genetic trails; see Cavalli-Sforza *et al.*, 1994:254) that would only later come to be occupied by Indo-European speakers: a phenomenon that is again rejected by some for Europe.

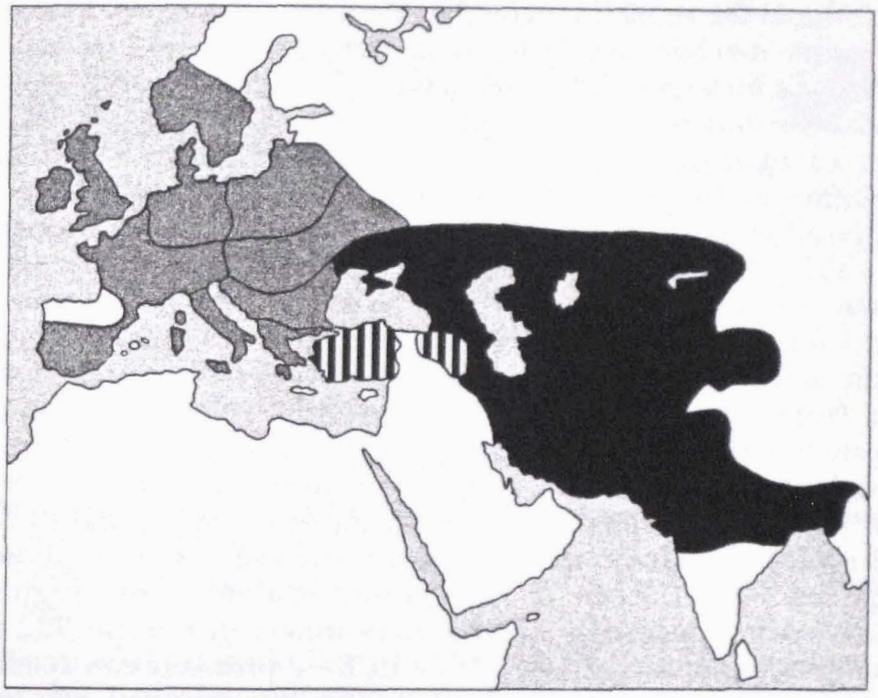

Fig. 1: The Indo-European world *c* 100 BCE divided into 'European' and 'Asiatic' linguistic groups.

In a recent discussion of the spread of language families, Peter Bellwood (1996:467-471) has argued that in cases such as Indo-European, which enjoys a continental-wide spread, only a mechanism such as farmer-colonists could explain such an enormous language area. He suggests that 'families such as Indo-European...cannot be explained by postulating that unmoving indigenous peoples, whatever their cultural background, adopted an in-moving target language...across anything more than a few localized cultural borders' (Bellwood 1996:468). Like Renfrew, he associates the spread of agriculture in South Asia with that of Elamite and Dravidian. The logical consequences of such a statement do not seem apparent to him. If one draws a chronological line at about the 1st century BCE and attempts to draw a line around the IE world (Fig. 1), a crude estimate will reveal that the area occupied by the Indo-Iranian and

Tocharians (comprising here a large portion of Kazakhstan, Uzbekistan, Tadjikistan, Iran, Afghanistan, Pakistan, most of northern India and parts of Xinjiang) would easily match if not surpass the area occupied by the Indo-Europeans of Europe (who would have to yield parts of Iberia, the Baltic and almost the entire forest-zone of Russia to non-IE languages) while most of the European steppelands would also be assigned to Asiatic stocks (and that this area was not colonized in a 'wave of advance', see below). In short, the Neolithic dispersal model itself only claims to account for a portion of the spread of Indo-European and much, probably the majority, of the Indo-European world, even in the models accepted by Renfrew and Bellwood, require explanatory mechanisms other than agricultural dispersals. With regard to the non-agricultural dispersion models, Bellwood goes on to write that 'such massive chain- or mesh-like language shift through a region of existing linguistic diversity would lead to sufficient interference in the target language concerned that no genetic family could possibly be the eventual result on anything like a continental scale' (1996:468). But here again, in order to explain the spread of the Asiatic Indo-European languages, he must presume that they did spread over diverse language families (certainly Elamite, Dravidian, partially over Hurrian, and probably others that remain anonymous) which formed civilized states and certainly reflect the type of 'linguistic diversity' that one might have regarded far more difficult to supersede than that obtaining in Europe at the same time.

It might be countered that this argument is logically deficient in that the Asiatic languages spread only very late with respect to those of Europe and that there is far greater evidence for linguistic fragmentation (suggesting much greater time?) in Europe. But this too is a dubious approach. By *c* 2000 BCE we probably can speak of both an already independent Indo-Iranian superstock (with Indo-Aryan at least by *c* 1600 BCE in Mitanni) and Proto-Tocharian. In Europe, other than Greek which emerges by the mid 2nd millennium BCE, all of our other sources are silent. Estimates of the dates of the various European proto-languages are going to be notoriously intuitive, but there are some grounds to believe that whatever form of Indo-European was being spoken over much of Europe, it was relatively undifferentiated up until the Bronze Age, i.e., after 2000 BCE, if not much later (Mallory 1996b). One could at least make a case that the Indo-European languages of Europe were far less undifferentiated, more tightly confined, and to the east (central and eastern Europe) up until *c* 2000 BCE.

In short, while some have seen in agricultural dispersals a panacea for explaining language dispersals, even by their own arguments they are left having to explain most of the distribution of the Indo-European family according to models that do not depend principally on 'waves of advance' from nuclear agricultural zones.

The European/Asiatic Conceptual Fault Line

While it may be impossible to discuss the Indo-Europeans of Asia without reference to those of Europe, it is by no means clear where in Europe one must begin such a discussion. This problem can be most easily conceptualized in terms of four 'fault lines' which divide Europeans from Asiatic populations. The first of these is conceptual while the latter three (numbered here I to III on Fig. 2) are geographical.

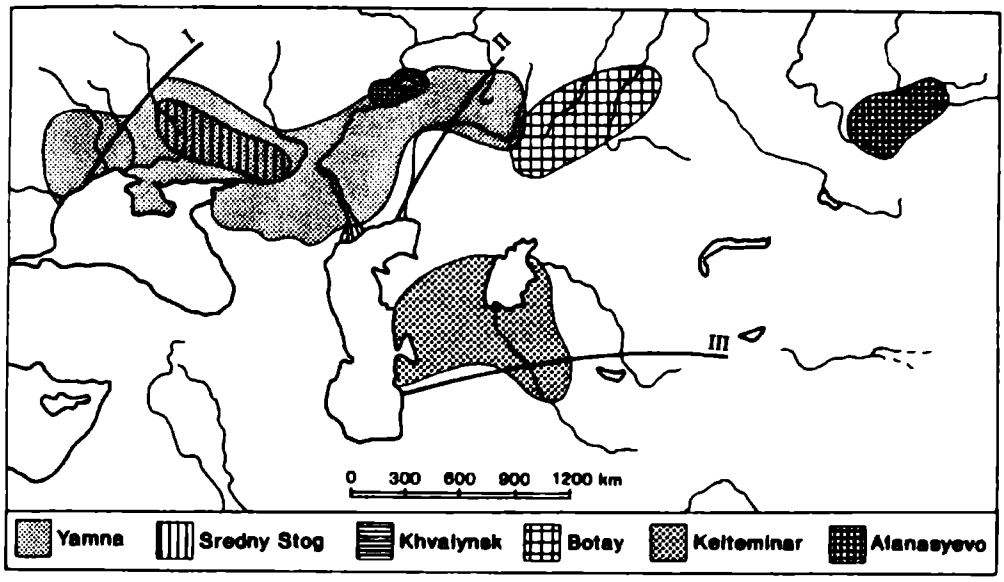

Fig. 2: The three geographical 'fault-lines' relating to the Indo-Europeans of Asia.

Textbooks of Indo-European studies have often observed a dichotomy between our ability to reconstruct to PIE terms for domestic livestock with the difficulty one encounters in reconstructing the vocabulary of cereal agriculture. This split has generally been seen as a division between primarily European stocks and those of Asia. Both show excellent correspondences for domestic animal names but appear to share far fewer cognates in the sphere of agriculture, e.g. both a PIE 'cow' and 'sheep' are ubiquitous in all major IE stocks; on the other hand, the most widely attested cereal name (for 'barley' or 'grain') is to be found in only six stocks and there is no word that specifies 'wheat' that is found in more than three stocks. What we are often given is a picture of an Asiatic 'steppe' versus the European 'sown'. The chronological priority of one mode of subsistence over the other is then hotly debated with three models emerging:

1) If one set the Indo-European homeland in Europe (or Anatolia with a dispersal through Europe according to Plan B), then we can account for the loss of agricultural terms as the ancestors of the Asiatic Indo-Europeans moved west to east across the Ukrainian-

Russian-Kazakhstan steppe into their historical seats. In these new environments, stockbreeding would have predominated at the expense of agriculture, the vocabulary of the latter then being gradually discarded.

2) If one set the Indo-European homeland in the steppe region, then we could explain the dichotomy in vocabulary by presuming that the Proto-Indo-Europeans were originally pastoralists and that the Asiatic Indo-Europeans best preserved the original situation. As Indo-Europeans migrated into Europe, here through a bottle-neck in southeast Europe as they came northwest of the Black Sea along the Danubian corridor, they would have adopted the agricultural vocabulary of the earlier (presumably non-IE) inhabitants of Neolithic Europe.

3) A third solution would dismiss chronological priority for either of the two subsistence models and argue that the IE homeland was large enough to accommodate both types of environment and economies. The Asiatic Indo-Europeans would then have developed in the steppe while those of Europe arose in the agricultural regions of eastern Europe.

A closer review of the actual evidence for agriculture and stockbreeding among the early Indo-Europeans (Diebold 1992; Mallory 1996a) reveals that the conceptual dichotomy between the 'steppe and the sown' with reference to Indo-Europeans is difficult to sustain. While there is no question that all Indo-Europeans shared words pertaining to all the basic livestock, so also can we find at least twenty words relating to agriculture where cognate sets consist of at least one European and one Asiatic language. Hence general terms for 'grain' (five cognate sets), 'field' (two sets), 'plow' (one, possibly two sets), 'sickle' (one set) and basic processing stages, e.g., 'harrow', 'thresh', and 'grind', are all attested as well as parts of cereals such as the 'awn' and the residue of threshing, the 'chaff'. Wherever one wishes to set the IE homeland, the ancestors of the various Indo-European stocks did possess the vocabulary of mixed farming. This, it should be emphasized, says almost nothing about the location of the homeland, since there were few areas south of the forest zone that did not practice some form of mixed stockbreeding and agriculture. It does, however, have a bearing on our discussion of the other fault-lines, or hurdles, which the Asiatic Indo-Europeans were required to cross.

The Dniester-Dnieper Line (Fig. 2, Line I)

The first geographical border that we encounter is the Dniester-Dnieper line (Kośko 1991) which is generally seen to divide populations who placed a greater emphasis on settled agriculture (southeast Europeans) from those who not only exploited the river valleys but who also began the exploitation of the open steppe and

hence required more mobile economic strategies for the south Ukrainian-south Russian steppelands (Anthony 1986). This environmental and economic dichotomy is often regarded as the geographical expression of the conceptual dichotomy—the steppe and the sown—outlined above. Obviously, this dichotomy is not so sharp as the model might seem since mixed agriculture was practiced in the river valleys of the steppe region and the area of the north Caucasus (Yanushevich 1989), and the growing dependence on mobile pastoralism is regarded as a process that developed slowly in this region.

The Dniester-Dnieper border is widely regarded as critical for establishing the location of the IE homeland and discerning the immediate staging area of Indo-European dispersals into Asia. There are (at least) two aspects of this fault-line that require special emphasis.

That the earliest Indo-Europeans possessed a mixed agricultural economy is universally acknowledged and supported by the evidence of the reconstructed Proto-Indo-European lexicon. It is natural then to ask: when and how did an agricultural economy come to appear to the east of the Dniester-Dnieper fault-line? There are three basic hypotheses.

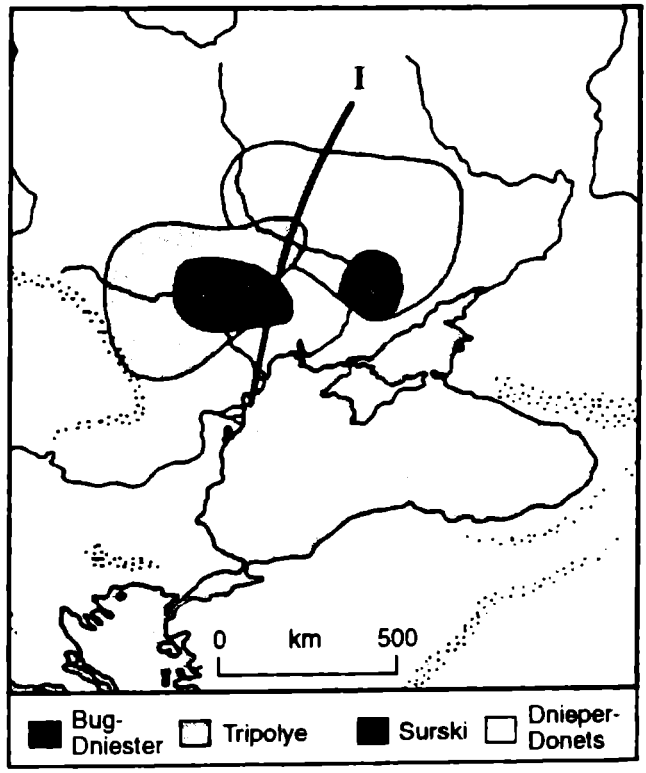

Fig: 3: The early Neolithic cultures of the Dniester-Dnieper region.

The most widely accepted explanation for the existence of domesticated livestock and plants in the region north of the Black and

Caspian seas argues that the Neolithic economy transgressed the Dniester-Dnieper border from the southwest (Videiko 1994). As agriculture passed northwards through the Balkans, it progressively advanced to the northwest corner of the Black Sea and marched eastwards. The nature of this process is debated. The 'wave of advance' model would presume the progressive movement of farmers eastwards, replacing the earlier hunter-gatherer societies. The alternative is the adoption of agriculture from neighboring farmers by local Mesolithic populations (Dolukhanov 1986:113). The matter is extremely complicated in that the earliest of the Neolithic cultures of the northwest Pontic region, the Bug-Dniester culture, shows a combination of ceramic influences from the southwestern farmers but retains much of its earlier lithic tradition (Fig. 3). Here, the local element may well predominate. However, its successor in this region is the Tripolye culture which does appear to be a genuine push eastwards from a staging area in Romania whence it derives much of its material culture. The Tripolye culture advances to the middle Dnieper but no farther. Although Tripolye imports (pots, figurines) are found farther east, they occur in a very different cultural environment. It has been suggested that the more easterly cultures (the Sredny Stog and later Yamna cultures) were primarily pastoralists. On the presumption that pastoralism is a specialization of settled mixed farming, it has been argued (Goodenough 1970; Renfrew 1987) that the origins of these pastoralists must lie in the (eastern) Tripolye culture. Anticipating the direction of our review, the greater implications of this would be that Eurasiatic steppe pastoralism, including that of Kazakhstan and the eastern steppe that forms the staging areas for migrations into both the Indo-Iranian world and that of Xinjiang, would have found their origins in a shift to pastoralism among some component of Tripolye society around the fourth millennium BCE.

While the Balkans may have provided an impetus toward stockbreeding and agriculture, there are serious reasons to doubt that this involved a demographic 'wave of advance'. Evidence for the local adoption of agriculture east of the Dniester-Dnieper line (beyond the Bug-Dniester and Tripolye cultures) occurs quite early and in situations in which some form of acculturation by local groups makes far greater sense than any presumption of population movements from the Balkans. Traces of agricultural economy can be found in the Surski culture (Fig. 3) of the lower Dnieper (Danilenko 1985) and in the Dnieper-Donets culture (Telegin 1985) as well as farther east. Moreover, the early phases of the Sredny Stog culture (Fig. 2) may similarly be derived from acculturated local populations and can in no way be described as Tripolyeans who had moved eastwards. These local early agricultural cultures in the Dnieper, for example, usually employ pointed- or round-based vessels, typical of what we regularly

find on the farming periphery of Europe (e.g., the Ertebølle and Pit-Comb Ware cultures of northern and northeastern Europe). The hunting component of these more easterly sites remains relatively high, perhaps even higher than some of the published faunal reports suggest, since it is not always clear what criteria have been employed to separate wild from domestic cattle and pig. Finally, even the physical type is markedly different between the Balkan-derived populations and those of the Dnieper.

The second hypothesis suggests that the origins of agriculture in the steppe and forest-steppe regions of Europe derive from the southeast Caspian (Danilenko 1969). The arguments were originally devised to explain the round-based ceramics of the Yamna culture which had a generic similarity with round-based vessels at Djebel cave in the southeast Caspian. The presence of sheep bones in the Caspian were also tied to the appearance of early sheep-raising in the southern Urals (Matyushin 1986). This hypothesis has found few supporters (but see below) as there are no intervening mixed agricultural sites between the south Caspian and the steppe.

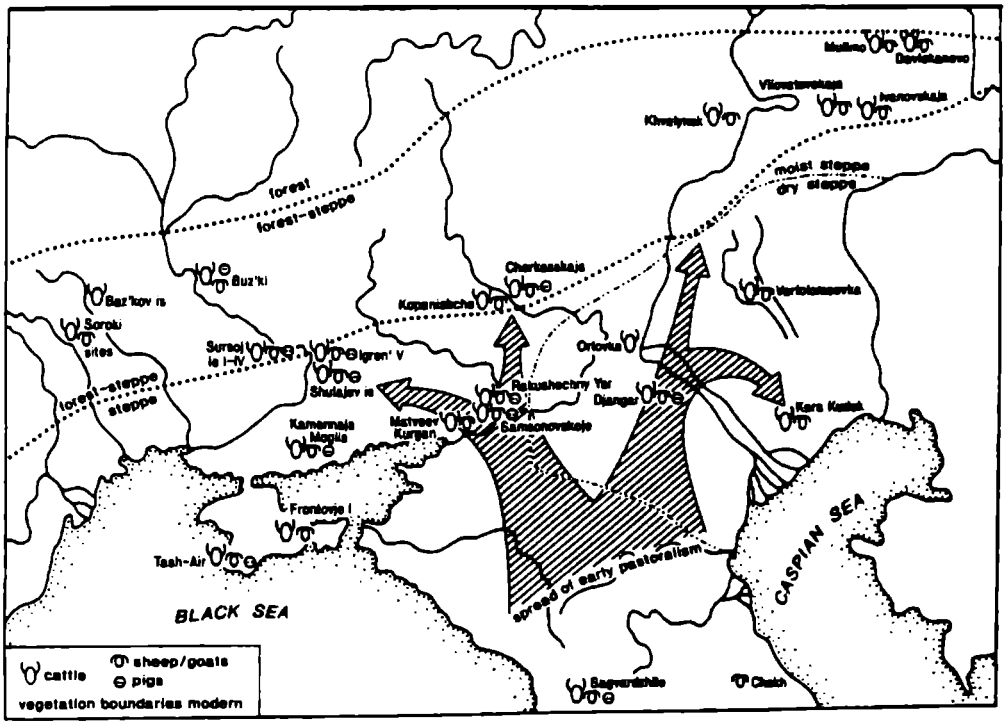

Fig. 4: The hypothesis of Neolithic dispersals from the Caucasus (after Shnirelman 1992).

The third and most recent hypothesis looks to the Caucasus (Fig. 4) as a possible source of the Pontic-Caspian Neolithic economy (Shnirelman 1992). Here, a much stronger case can be made since we now have considerable evidence that the Neolithic economy penetrated the Caucasus by the 7th millennium BCE and that some of the earliest evidence for domestic livestock in the Pontic-Caspian

tends to be proximate to the north Caucasus. Moreover, osteological examination of the earliest domestic sheep in the east Pontic-Caspian-southern Urals reveals a larger variety than is found in the Balkans but one which accords well with the morphology of sheep of the Caucasian Neolithic. The palaeo-zoological arguments have been augmented by lithic analysis that suggests that the southern regions of the Ukraine-south Russia, i.e., the steppe regions, were heavily influenced by both the Caucasus and more distantly, the Zagros region (Domańska 1990) which were effecting a shift to incipient agriculture, seen, for example, in the production of sickle-blades, in advance of any putative contacts with the Balkans.

The implications of multiple or divergent sources for the Neolithic economy in the steppe and forest-steppe are obvious to anyone interested in locating the early Indo-Europeans. All the evidence at hand suggests that the Proto-Indo-Europeans shared a common vocabulary for domestic livestock and basic cereal agriculture: there is no reason to propose that the core PIE agricultural and stockbreeding lexicon was apportioned differently on an east-west gradient as one might expect, for example, if the vocabulary were to be derived both from Neolithic languages penetrating from the west (the Balkans) and from the south (the Caucasus). The word for sheep (*$h_2$óuis), for example, is ubiquitous across the IE world from Ireland to Xinjiang. According to the Anatolian homeland model, this word (and animal) should have come out of Anatolia in the 7th millennium BCE where it passed eastwards across the Black and Caspian and then was carried on into the rest of the Indo-Iranian and Tocharian world. According to the Kurgan model, the sheep may have been brought from Anatolia, or it may have been acquired via the Caucasus (or the southeast Caspian), but its name should have originated somewhere proximate to the Pontic-Caspian and then was carried out, both east and west, by those migrations attributed to the steppe populations. If the current wisdom concerning the origins of woolly sheep being attributed to the 4th millennium BCE is still valid (Ryder 1983), then the fact that a PIE word for 'wool' (*$u̯lh_2neh_a$-) is solidly reconstructed (from Welsh to Indic and including Hittite), then one might well be attracted to a model that sees the dispersal of a word for sheep and wool at a later date rather than the earlier one demanded by the Anatolian solution. The question of the linguistic as well as geographical source of agriculture in the steppe region remains critically open but it has an obvious bearing on how one constructs solutions to the homeland problem.

A second aspect of the Dniester-Dnieper border concerns its ethnic identity. There is probably no one who would deny that by the Copper Age this area possessed some form of Indo-European identity. It is the specific nature of that identity which occasions debate.

Generally, there are two schools of thought. The first ascribes to the Pontic-Caspian populations the entirety of Proto-Indo-European which expands both west and east to account for the distribution of the IE languages (Gimbutas 1993; Anthony 1991). Alternatively, most of the theories that place the homeland somewhere else than the steppe region tend to argue that the Pontic-Caspian is the homeland only of the Indo-Iranians (e.g., Makkay 1992; Safronov 1989; Killian 1983).

Although the problem of which ethno-linguistic identity one assigns the Pontic-Caspian may ostensibly appear to be a problem of geography, it is also basically a question of the time depth of both Proto-Indo-European and Proto-Indo-Iranian (Mallory 1996b). For the sake of illustration, let us assume, as many do, that Proto-Indo-European was essentially a linguistic phenomenon of *c* 4500–3000 BCE and that Proto-Indo-Iranian should be sought *c* 2500–2000 BCE. Two of the steppe and forest-steppe cultures, the Khvalynsk culture of the middle Volga region and the Sredny Stog of the middle Dnieper (Fig. 2) both date to the first period, i.e., *c* 4900–3500 BCE, which could fall within the period commonly ascribed to Proto-Indo-European. But the largest cultural phenomenon of the steppelands is the Yamna culture whose dates range from *c* 3600 to 2200 BCE, i.e., somewhere within and between the dates we set for PIE and Indo-Iranian. On the one hand, the Yamna culture would appear to provide the parent culture for expansions farther east into the Asiatic steppe. This might predispose one readily to accept that it refers to some form of early Indo-Iranian. On the other hand, it is also the Yamna culture that expands westwards into southeast Europe (the equivalent of Marija Gimbutas' "Third Wave" steppe invasion; see Gimbutas 1993:213–214) and the case for this is probably the strongest of any of her evidence for expansions from the European steppelands. With regard to expansions into the Balkans, there is obviously much greater difficulty in assigning the western Yamna dispersals to an Indo-Iranian stage of development rather than some form of European proto-language. One could, perhaps, presume then that the Yamna culture reflects a Graeco-Armenian-Indo-Iranian continuum (=late Indo-European) prior to the differentiation of these into their individual language stocks. Accommodating linguistic relationships with archeological evidence is clearly then both a chronological and geographical enterprise. Lest anyone find the solution outlined above perfectly acceptable, it is useful now to remind ourselves that ascribing such a broad linguistic continuum to the Yamna culture does not explain the Tocharians, who on dialectal grounds are unlikely to be placed in this continuum but who must still be able to achieve their historical seats in Xinjiang, far to the east of this same Yamna continuum.

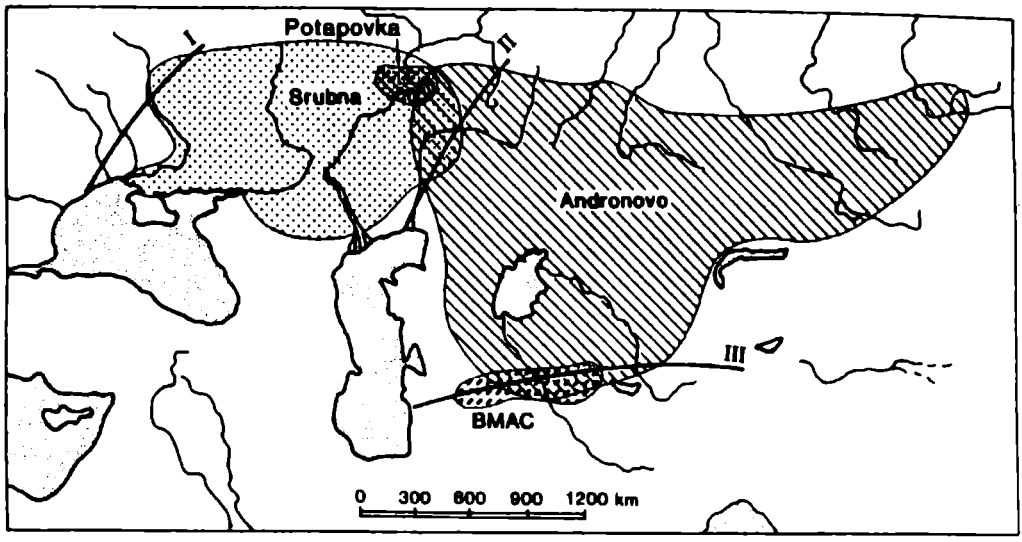

Fig. 5: Distribution of the Bronze Age Potopovka, Srubna, Andronovo and the Bactria-Margiana Archeological Complex.

The Ural Line (Fig. 5, line II)

The second fault line is the Ural River, the notionally convenient border between Europe and Asia. East of the Ural emerges those cultures most closely identified with the early Indo-Iranians, in particular, the Andronovo cultural-historical area which comprises a number of regional and chronologically different groups (Kuzmina 1986, 1994). In general, the Andronovo culture (in the widest sense of the term) makes a reasonable fit with the culture and the geographical positioning of the Indo-Iranians prior to their descent into their historical seats in Iran and the Indian subcontinent. As the Andronovo culture is set to the period *c* 2000–900 BCE, it is clear that in its later phases it represented already independent Indo-Iranian (presumably Iranian) groups. The earliest that we are able to push the origins of this culture now is probably the Sintashta culture which began at least by 2000 BCE, possibly somewhat earlier (Gening *et al* 1992). East of the Urals there is very little evidence for local antecedents in its area (we can retreat to the Botay culture [Zaibert 1993] of *c* 3300-2700 BCE but this represents specialist horse hunters and possibly horse-riders, and does not provide obvious cultural antecedents for the Andronovo culture). Rather, one is directed farther to the west where we find the newly defined Potapovka culture (Vasil'iev, Kuznetsov and Semenova 1995) in the middle Volga region. This culture appears to date to the period *c* 2600–2000 BCE and with its domestic horse, horse gear, and other parallels with more easterly cultures, provides evidence that the cultural trajectory at this time would seem to run from west (of the Urals) to the east. In his discussion of the origin of the Petrovka culture (another early variant of Andronovo), Gennady Zdanovich notes that it still remains unknown but 'was undoubtedly formed on a local basis through very

close relations with the more westerly Abashevo and Early Srubna tribes and not without the influence of the southern agricultural cultures' (Zdanovich 1988:139). While there may have been a local input into the steppe and forest-steppe cultures east of the Urals, the primary roots of the Bronze Age cultures of Kazakhstan would still appear to rest in Europe. At the present, then, we explain the transgression (both cultural and presumably linguistic) of the Ural fault line by a movement from west to east.

As suggested in the last section, a movement eastwards must not only explain Indo-Iranians but also Tocharians. To group these two language stocks together poses serious difficulties. While the precise dialectal position of Tocharian is a hotly debated topic (cf. Adams 1984; Ringe 1988-90; Huld 1995), there does seem to be fairly general agreement that it was not in any particularly close dialectal relationship with Indo-Iranian until contacts existed between independent stocks, e.g., Iranian-Tocharian loans of the mid-first millennium BCE. Many would also agree that Tocharian separated from the other Indo-European languages at a relatively early period. In an attempt to maintain the requirements imposed by these linguistic arguments and identify a potential archeological candidate for Proto-Tocharian, I have argued on several occasions that the Afanasievo culture of the Altai and the Yenisei (Fig. 2) would provide a possible candidate (Mallory 1989:62; 1995). The Afanasievo culture, which dates to *c* 3500–2500 BCE (Yermolova and Markov 1983), would certainly reflect an early 'separation' from the rest of the IE continuum and its position, on the extreme east of the steppe cultures, would provide it with a suitable distance to explain the dialectal separation between it and Indo-Iranian. While there is no clear evidence of an Afanasievo migration into Xinjiang, there are at least some similarities between mortuary rituals, e.g., the use of enclosures for the burial of the deceased, the physical types, and the ceramics between the two regions (Chen and Hiebert 1995). In this scenario, the Afanasievo culture might reflect the ancestors of the Tocharians while the Andronovo represented the Indo-Iranians who came to fill out the area earlier held by the Afanasievo culture.

While this model of Tocharian origins has some attractions, the difficulties of sustaining it require some emphasis as well. The calibrated radiocarbon dates for Afanasievo show it to have come into existence by the mid-fourth millennium BCE or earlier which is astonishingly early with respect to cultures found to its west whence it is supposedly derived, that is to say, it would coincide with Khvalynsk, Sredny Stog, or possibly the very beginning of the Yamna culture. The chronological difficulties are nothing compared with the geographical problem of deriving Afanasievo from *c* 1500 km away with almost no evidence in between for a migration (Fig. 2). While Anthony (1990) describes a 'directed' form of migration as one possibility, the

motivation which might draw steppe pastoralists over such a distance is by no means clear. It has also been suggested that the Afanasievo culture had local roots in the Yenisei region (e.g., Semenov 1980) which, if this were the case, would make it difficult, if not outright impossible, to relate it linguistically to developments west of the Urals. Some Afanasievo burials have been found west of the Altai near Karaganda (Vadetskaya 1986; Francfort, pers. comm.) which may suggest a much greater area of occupation. Much of the intervening area is archeologically unknown and it is at least a possibility that much of the eastern steppe was occupied by the (?Proto-) Afanasievans. If this were so, what are the further implications of identifying the ancestors of the Tocharians with the Afanasievo culture?

In a separate paper (Mallory 1995), I have discussed some of the archeological problems involved with the deeper origins of the Tocharians but here wish to raise an issue previously undiscussed. Generally, we imagine that with the emergence of semi- or fully nomadic pastoral economies, as are being proposed for the Bronze Age cultures of the steppe, there would have emerged a series of tribal confederations. These, one might speculate, would have been both ethnically and linguistically mixed, and one might expect that in this case the different language groups would be linguistically permeable, loanwords spreading from one group to the next. In short, if we imagine the Andronovo or, perhaps, the later Karasuk cultures (which have been presumed to be even more mobile) as a series of interacting tribal confederations, the linguistic result might be a number of different stocks sharing certain common items of vocabulary. One of the reasons for rejecting the derivation of both the Tocharians and the Indo-Iranians from the Andronovo culture was the fact that it seemed likely that the mutual interactions of the Andronovans should have been so intense that one could hardly expect that two different language stocks would emerge, each wholly intact with little or no evidence of linguistic borrowing. In other words, a common archeological entity would seem to have precluded the type of linguistic distance we imagine to have existed between the Tocharians and their Indo-Iranian neighbors before the first millennium BCE. What is remarkable is that there really does not appear to be much if anything in the way of lexical loans between Tocharian and Indo-Iranian until well into the Iron Age (Old Iranian loans into Tocharian). If we invoke a model where the ancestors of the Tocharians were the first to cross the Ural fault-line and expand eastward, then it is remarkable, for example, that we have no evidence whatsoever for Tocharian loanwords in Indo-Iranian (Adams, Winter pers. comm.), i.e., no evidence of Bronze Age interactions where residual Tocharians provided the substrate and Indo-Iranians the superstrate. Richard Frye (1991) has recently suggested that the

Tocharians might have crossed the steppe at a period during which the Iranians had moved off of it, leaving an ethno-linguistic vacuum in the steppelands *c* 900 BCE; both the motivation for this abandonment and the requisite problem of demonstrating that the empty steppe was coursed by Proto-Tocharians are exceedingly difficult to imagine. Alternatively, if the Tocharians were part of the Bronze Age system of confederations, we might expect them to have served as at least an adstrate to Indo-Iranians; yet there is little or no solid case for Indo-Iranian loan words into Tocharian prior to the first millennium BCE. Either way, the evidence of the lexicon at least suggests mutual exclusivity between the Tocharians and Indo-Iranians until either the Iron Age or, at least, whatever period one feels confident of speaking about an already differentiated Iranian stock.

If the conclusions of the last paragraph are accepted (and, obviously, they can be reversed by any linguist who can establish an earlier horizon of Tocharian-Indo-Iranian loans) then we find ourselves backed into a tight logical corner. As has sometimes been suggested, the Tocharians may have come from the west but at a date later than that envisaged by all of the previous discussion, viz., at some time in the first millennium BCE. In this way they would be permitted to pick up essentially Iron Age terms from their Iranian neighbors (for which we do have evidence). There is some hint that this may have involved contacts between Proto-Tocharians and Iranians who were practicing irrigation agriculture (Adams 1997), presumably in Central Asia, where it predates its appearance in Xinjiang by at least a millennium. By the first millennium BCE the general cultural trajectory has been reversed and moves from east to west with the expansion of Iranian-speaking steppe nomads (Kimmerians, Scythians, Sarmatians) being pushed westwards. While it would not have been impossible for the ancestors of the Tocharians to have swum upstream of the general cultural movements, the evidence for such a phenomenon relies almost solely on long-distance comparisons between textiles from Xinjiang and those of Europe (Barber 1995). The problem of the archeological identification of the Proto-Tocharians before they appear in Xinjiang still remains very much open.

The Central Asian Line (Fig. 5, line III)

The fourth fault line is marked out by the Central Asian urban sites that separate the steppe tribes to their north and the historical seats of the Indo-Iranians to their south. This fault line engenders an irony: we appear to have little difficulty in ascribing some form of Indo-Iranian identity to the Bronze Age cultures of the steppe and forest-steppe to the north, i.e., the Andronovo culture(s), even though we do not require (Indo-)Iranians there until the first millennium BCE. On the other hand, we find it extraordinarily difficult to make a

case for expansions from this northern region to northern India, for example, where we would presume Indo-Aryans had settled by the mid-second millennium BCE.

It is generally argued that steppe tribes penetrated the Central Asian towns during the early second millennium BCE (the Namazga V period) (P'yankova 1994; Masson 1996). In some cases it is suggested that the steppe tribes of the Andronovo culture settled down themselves and adopted irrigation agriculture, e.g., the Tazabagyab culture to the south of the Aral Sea. In other cases there is an argument for "hybridized" cultures involving steppe-type burials and metallurgy coupled with a high percentage of Central Asian material culture. This is argued, for example, for the Bishkent and Vakhsh cultures. Some would also include the Swat (or Gandhara Grave) culture among these. What is important here is that other than the Swat culture (which might explain the current distribution of the Dardic languages), this form of explanation only gets the Indo-Iranians *to* Central Asia, but not as far as the seats of the Medes, Persians or Indo-Aryans. What is now considered by some to be the most attractive hypothesis for explaining Indo-Iranians south of Central Asia involves the Bactrian-Margiana Archeological Complex (BMAC; Hiebert 1995; Parpola 1996). Although localized in the oases of Central Asia, traces of the BMAC are found in burials far to its south at Sibri and Mehrgarh, the approaches to northwest India. The problem here is that the BMAC shows strong local roots in Central Asia; to employ it as a vehicle for spreading an Indo-Aryan language to the south requires us to presume that the BMAC was dominated by steppe tribes. While there is no doubt that there was a steppe presence on BMAC sites (Andronovo ceramics are found; Masson 1996), this is very far from demonstrating the adoption of an Indo-Iranian language by the Central Asia urban populations.

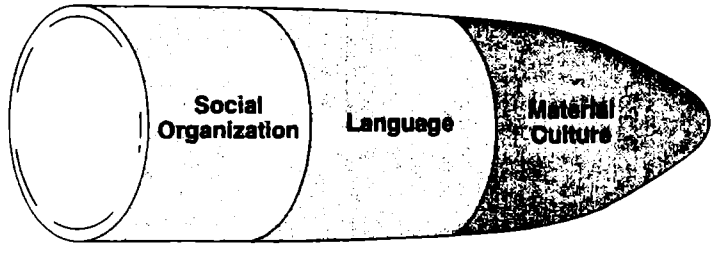

Fig. 6a: The *Kulturkugel.*

In dealing with the process of steppe tribes penetrating the veil of Central Asian urbanism and emerging on the other side as Indo-Iranians, one might (not entirely facetiously) propose the model of the *Kulturkugel* (culture-bullet; Fig. 6a). The *Kulturkugel* (German is employed here to enhance the respectability of an already shaky model) is envisaged as an explanatory projectile which is driven by

social organization (here the type of hierarchical structure seen in the Sintashta burials which presumably extends to the creation of BMAC *khanates*, small fortress-states; Lamberg-Karlovsky 1994). It carries a linguistic package (here presumably Indo-Aryan) and, to pursue the metaphor farther, it has a nose of malleable material culture (Andronovo ceramics, metalwork, etc.). When, for example, an Andronovo *Kulturkugel* penetrated the BMAC (Fig. 6b), the force of its delivery (social organization) helped it carry through the BMAC with its linguistic package intact, although its material culture was shed or modified radically by that obtaining in the Central Asian sites. At the other end emerged a bullet, armed with a BMAC (cultural) head but otherwise carrying an Indo-Aryan language.

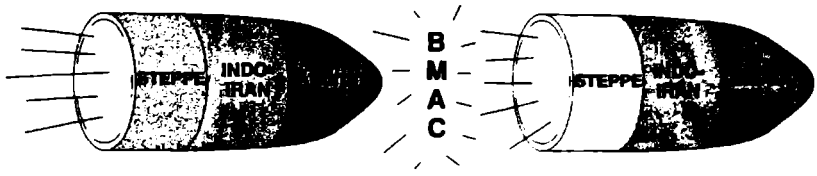

Fig. 6b: A steppe-originated *Kulturkugel* carries Indo-Iranian through a presumably non-Indo-Iranian BMAC as it passes southwards.

The introduction of the *Kulturkugel* emphasizes the tendentious nature of any arguments for the dispersals of the Indo-Iranians into their historic seats south of Central Asia. Appeals to 'elite dominance' (Renfrew 1996:76), in the face of the truly meager evidence that we have seen so far, seem feeble indeed, and certainly far less impressive than the evidence for steppe expansions into southeast Europe which are employed by supporters of the Kurgan theory of Indo-European origins to argue an IE homeland in the Pontic-Caspian steppe and forest-steppe (or later Bronze Age 'expansions' tied to such phenomena as the Urnfield culture). But here too, it might be suggested, the Asian case in hand provides an additional perspective on the European evidence. As proposed by the late Marija Gimbutas (1991:351-401; 1993) the expansion of Indo-Europeans across Europe was not a uniform invasion of steppe-pastoralists but rather involved a complicated process of "Kurganized" local cultures sent in a billiard-ball like fashion farther and farther west by continuous pressures from the steppe. Whatever its merits, this model should certainly not be reduced (as recently in Renfrew 1996:82-84) to an argument solely dependent on the proposed military dominance of horse-riding steppe cultures over central and west European communities (unless one also wants to caricature the Anatolian 'wave of advance' as the aggressive assimilation of hunter-gatherers by chick-pea and pulse-propelled farmers). In Gimbutas's model we again find the interface between cultures of steppe origin and local agriculturalists, and a presumed shedding of many aspects of (steppe) material culture, while both social organization and (putatively) an Indo-European language were carried across Europe. It is not a question of

determining if this movement was agriculturally or horse-propelled (surely one of the clearest examples of the fallacy of false dichotomous questions; cf. Fischer 1970:9-12): the mechanisms involved in explaining the expansion of the Indo-European languages according to the Kurgan model—mobility (both economic and social), increased reliance on stockbreeding, opportunistic seizure of territories during agricultural systems collapse, formation of defended centers, establishment of military or religious sodalities that attracted non-IE membership, etc.—have barely been explored in detail (e.g., Milisauskas and Kruk 1989). But as is the case with Asian expansions, European dispersals also would require major alterations in the original expanding culture, and it is difficult to imagine how one can escape the employment of some form of *Kulturkugeln* in the discussion of Indo-European dispersals; it is equally difficult to imagine how such a concept could be verified in the archeological record or, to continue the metaphor, could be traced back to reveal the original 'smoking gun'.

Asia without Europe?

I have so far presumed that the expansion of Indo-Europeans through Asia must ultimately derive either from Europe or (adopting Anatolia as the homeland and Plan B) at least through Europe. Arguments for a homeland in Asia (outside of Anatolia) seem to have but a marginal following. One new theory, however, does resurrect a Central Asian homeland for the Indo-Europeans (Bomhard 1996; Nichols 1996) that carries us almost back to the Bactrian homelands of the 19th century. Parts of the argument are purely linguistic: Central Asia, for example, provides a convenient contact zone between the Proto-Indo-Europeans and Proto-Semitic speakers to account for a number of presumably Semitic-IE loanwords. Alternatively, it keeps Proto-Indo-European not too distant from staging areas for other related language families of the Nostratic group. Nichols suggests that Indo-European was one in a series of language dispersals that filled an east-to-west 'spread zone' across the steppelands of Eurasia; subsequent spreads involved the dispersal of Iranian, Turkic and Mongolian. Temporally, according to Bomhard, PIE would have originated *c* 7000 BCE in Central Asia and then spread across the steppeland into the Pontic-Caspian region *c* 5000 BCE (Bomhard 1996:105). From this point onwards, the model of IE expansions resembles that of the Kurgan theories of Marija Gimbutas.

This new Bactrian theory has been argued extensively by Johanna Nichols (1996) but, until formal publication of her arguments, I will confine myself to the archeological plausibility of her homeland theory. Essentially, her new improved Bactrian model sees Proto-Indo-European emerging among (semi-)nomadic populations who were interfacing with the urban centers of Central Asia. These contacts

would account for the loan of non-IE (e.g., Semitic) cultural vocabulary into PIE before the Indo-Europeans spread westwards. It does not identify the earlier inhabitants of these Central Asian villages and towns as Indo-European, although later (by the Bronze Age) they presumably were ruled by Indo-Europeans. The westward spread in Europe might be attributed to the Yamna culture which, at least arguably, had an east-to-west trajectory. It might be noted that in his most recent exposition, Colin Renfrew (1996:81-82) suggests that the origins of the Altaic family derive from this same interface of the earliest Central Asian agriculturalists and the occupants of the steppe. This theory can be best left to the tender mercies of Altaicists; yet one cannot help but marvel how this Proto-Altaic-speaking population concealed itself so well and for so long in their putative homeland region which, from the inception of historical records until the historically recorded entry (now, I suppose, 'revelation') of Altaic-speaking populations in the 1st millennium CE, was occupied by Iranian-speaking tribes.

Nichols' interesting theory, in light of previous discussion, seems to face major obstacles. So far, for the period before *c* 2000 BCE, it is difficult to see any indication of an urban-steppe interface. Before the Andronovo culture, we have little evidence of the existence of these steppe or desert dwellers. If the interface begins only after *c* 2000 BCE, then it is far too late to link these Asian steppe-dwellers with the Yamna culture west of the Urals, much less explain the dispersal of Indo-Europeans into Europe or Anatolia.

On the other hand, a theory of desperation might just be constructed if one does not eschew erecting a model out of what have largely been regarded as the bones of theories discredited by most, but not all, archeologists. There are still those who hold to the belief that there were important cultural links between the southeast Caspian and the Volga-Ural region. These links have been regarded primarily in ceramic terms (most recently, Merpert 1994:565), but also in economic terms, where G. Matyushin has sought to derive the earliest domestic sheep in the southern Urals from the southeast Caspian (Matyushin 1986). Matyushin has suggested that the east Caspian may have once provided a major route of ideas and materials from Iran to the southern Urals (and later minerals from the Urals were traded south to Mesopotamia). This theory, it must be admitted, has but few supporters, since the contact zone, according to Matyushin, would have been along the now-submerged eastern rim of the Caspian. Moreover, the only culture that seems to interface between the southeast Caspian and farther north is the poorly understood and equally poorly dated Kelteminar culture (Fig. 2). If there was a massive revision of archeological evidence and opinion that came to support Matyushin's proposal, one might just be able to substantiate a spread of agriculture and livestock from Central Asia to

the southern Urals which would, presumably, have to continue westwards to the middle Volga and beyond, thus resurrecting at least some form of Central Asian homeland for the Indo-Europeans. But, as matters now stand, the suggestion that the Indo-Europeans originated on the interface between Central Asia and the steppe appears to run counter to everything else we know about the transgression of the Ural fault-line; it requires a movement from east to west at a period when the basic evidence suggests very much the reverse.

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The Tarim Basin, Tocharian, and Indo-European Origins: A View from the West

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The Conference on the Bronze Age and Iron Age Peoples of Eastern Central Asia highlighted a number of important issues for the prehistory and historical linguistics of the area, which have a much wider resonance and relevance. When the Tarim Basin human finds are fully published and interpreted, and once they are set in their wider archeological context, they promise to offer important insights into the origins of the successive populations of Xinjiang, into the origins of the speakers of the Tocharian languages, and into their place within the wider perspective of the early Indo-European languages.

It should first be remarked that the very considerable interest evoked by these remarkably well-preserved "mummies" (i.e., desiccated corpses), the oldest of which date back as far as 1800 BCE (Xu 1995:359) arises from a number of assumptions. It is the physical appearance of the corpses, on superficial examination in a general sense more "European" than "East Central Asian," which has led to the rapid surmise that they may represent a population whose origins lie far to the west of Xinjiang. This point has immediately been linked with the circumstance that at a much later date (from the seventh century CE) documents are found in this area written in the Tocharian languages, classified as belonging to the Indo-European family, of which they represent the easternmost outliers. Could these early human remains represent the ancestors of those people who, more than two thousand years later, were speaking Tocharian in this very area?

The underlying assumption here is that the Tocharian language, being Indo-European, must have come from the west, and that those persons who first spoke it in the Tarim Basin might themselves have been immigrants from much farther west in Eurasia. It is appropriate then to undertake molecular biological studies (e.g. Francalacci 1996) to see what may be learnt about the affinities and population histories of these individuals. But nonetheless there are ethnic or even racial assumptions here which should not go unremarked, and perhaps the underlying inference that: "if they look western, perhaps they sounded western". Thus Xu (1995:358) remarks: "The most notable however is the ethnic character of these ancient residents. Most of them belong to the White (Caucasian) race." Or as Mair (1995:281)

puts it: "They are splendidly attired in colorful robes, trousers, boots, stockings, coats, and hats. What is most startling is that they are virtually all caucasoid. Where did these people come from, and how did they end up in the heart of Asia?" The accompanying caption (Mair 1995:29) states: "Caucasoid peoples are believed to have been the first inhabitants of the Tarim basin." Embedded here are issues about the correlation between linguistic, ethnic, genetic and archeological/cultural phenomena which are of general relevance and which require cautious treatment.

Such cautionary words should not, however, detract from the remarkable personal experience of contemplating these wonderfully preserved corpses, with their exceptional accompanying finds of clothing, which are providing a wealth of new data. An important new chapter in the prehistory and early history of textiles is now being written in consequence. At the same time, these are finds made (or at least reported) virtually in isolation. They presumably come from cemeteries, but no coherent archeological information about these cemeteries has been made available in the west, nor is it clear what investigation has been made of the settlements which must no doubt accompany them, where preservation, through the dry conditions, may be equally favorable. The strong focus upon the physical anthropology of the finds in the papers so far published (references in Xu 1995), while understandable, perhaps undervalues the importance of archeological context. It is from the settlement remains and the artifacts accompanying these burials, in life as in death, that we shall come to understand better their antecedents. Moreover we certainly need to know more about the subsistence economy of the day. These were farmers, no doubt, and probably also herders; but what were the crops and the animals? And how did they cope with conditions which must also have been arid at the time in question, in view of the excellent preservation of the remains?

Proto-Tocharian in an Early Context

Let us accept, for the moment, the inviting assumption that these "western-looking" and hence "caucasoid" people, living in the Tarim Basin around 2000 BCE, were indeed ancestral to the population there some 2500 years later who at that time were speaking the Tocharian language (or rather one or other of the two attested Tocharian languages). This at once gives rise to the hypothesis that Proto-Tocharian was spoken here as early as 2000 BCE, and perhaps earlier.

What then was the nature of the process that brought this new population to Xinjiang? The early date takes us back before the period when horses were ridden for military purposes, back in this area even before the time when horse-drawn chariots can be attested. Indeed before 2000 BCE we are in the period when nomad

pastoralism was developing on the steppelands, aided undoubtedly by intensive use of the horse (for the horse by then was a domesticated food resource in the same way as sheep or goats) but without the military overtones which the horse later acquired.

Here it is pertinent to contrast two views for the origins of the Indo-European languages. The standard view, advocated by Childe (for a while), Gimbutas, Anthony, and Mallory (1989), associates the spread of the Indo-European languages, from the region north of the Black Sea, with the domestication of the horse, its use for riding and the military efficacy of mounted cavalry. This view finds concise expression in the words of Diamond (1991:244):

> With horse domestication the steppe peoples became the first to put together the economic and military package that came to dominate the world for the next 5,000 years.

Against this notion of the motivating military power of the horse for the dispersal of the early Indo-European languages can be set the view of Kuzmina (1994) and most Russian scholars that the first use of the horse and chariot can be set in the early second millennium BCE. Recent discoveries from Sintashta-Petrovka, north of the Aral Sea (Anthony and Vinogradov 1995) set the earliest horse-drawn chariots as far back as 2000 BCE: all the other finds from the Near East and from Greece, and indeed from western Europe, are later than this. And as for horse riding for military purposes, its inception is set by Kuzmina (1994) much later than the inception of the chariot, towards the end of the time span of the Andronovo culture of the Eurasian steppes around the twelfth century BCE. Horse riding in warfare is seen more widely in the Near East and in Europe from the early first millennium BCE.

It may be suggested that for the Eurasiatic steppes, including those of Central Asia, we have four significant phases or episodes:

1. *Farming dispersal.* I have proposed (Renfrew 1973; 1987) that the earliest Proto-Indo-European (or as Igor Diakonoff (1982) would prefer, Pre-Proto-Indo-European) homeland was in Anatolia, some 10,000 years ago. This view has been taken on linguistic grounds by Aharon Dolgopolsky (1988; 1993), and also by Gamkrelidze and Ivanov (1984), although the latter initially suggested a later date. Zvelebil (1995) takes a comparable view, although the mechanism for the dispersal which he offers is a different one. The farming dispersal brought farming and Indo-European speech to what is now Greece, and then to the Balkans (to Diakonoff's Proto-Indo-European center) and so north and west to Europe, and east to the Ukraine.

2. *Development of pastoral nomadism.* It was in the steppe lands to the north of the Black Sea, including the Ukraine, that pastoral

nomadism developed by the fourth millennium BCE, based on intensive animal husbandry. This was a secondary adaptation, in that animal husbandry of this kind also requires the use of domesticated plants (wheat, barley, etc.). It can no longer be assumed, as it once was, that pastoral nomadism preceded agriculture. On the contrary, mixed farming is a precondition for the development of the special adaptation to the steppe environment which pastoral nomadism–or, perhaps better to adopt the terminology of Shishlina and Hiebert (in press) and speak of "movable herders"–represents.

At this time, at some sites such as Dereivka, the horse was used as an intensive food source (hippophagy). In that sense the horse became a domesticated animal, in the same way as sheep, goats, and cattle. It has been argued by Anthony (1986; Anthony and Brown 1991) and then by Diamond (1991) that the horse was ridden at this time, and it is possible that horse herds were managed in this way. But such riding, if it existed, had no military significance, nor was it a matter of prestige. The horse may also have been used as a traction animal, both for the plow and for four-wheeled carts. This is well documented for the Near East, but in central and western Europe it was the ox and not the horse which was used in this way (although local domestication of the horse in different parts of Europe including Iberia seems increasingly well documented).

This steppe adaptation, which was a peaceful one, had expansive potential. It is probably at this time that Indo-European speaking groups first expanded into Central Asia (speaking a language ancestral to proto-Tocharian) and perhaps onto the Iranian plateau (with a language ancestral to proto-Indo-Iranian).

3. *Social Hierarchy and Chariots.* It was at a later stage, during the developed Bronze Age from about 2000 BCE, that the horse-drawn chariot with two, spoked wheels came to be developed. Russian scholars have documented such finds, both from burials with chariot wheels and with horse remains, and from the distribution of *psalia* (horse mouth pieces) which are widely found. Kuzmina (1994) has stressed the crucial role of the Andronovo culture at this time.

It is at this time, for the first time, that it might be appropriate to speak of elite dominance. Certainly it is during the second millennium BCE that the first Indo-European speakers may have reached what is now India and Pakistan. The hymns of the *Ṛgveda* are eloquent about horses and chariots. They do not speak about mounted warriors.

4. *Mounted Warriors.* Although there are depictions of horse-riders in the Near East in the final centuries of the second millennium, they are in general subsidiary figures to the charioteers which figure so prominently in battle scenes. The mounted warrior becomes significant only in the first millennium BCE, at the end of the Bronze Age and with the onset of the Iron Age. It is now that the horse becomes an instrument of elite dominance. It is here that the Scythians, for instance, and their predecessors the Cimmerians, are seen as the first mounted warriors of European prehistory.

It is necessary to distinguish these successive phases in the use of the Eurasian steppe lands. In practice there is widespread agreement among the two schools of thought indicated above on the sequence of events and on their chronology for the Eurasian steppelands, although there may be some divergences concerning the significance of horse riding. For a view of the broader picture, however, it is necessary to consider also the associated questions in Central and Western Europe, west of the steppe lands.

The European Picture

The position of central and western Europe, it may be argued, is broadly in harmony with the picture which I have outlined here for the steppe lands to the east.

The significance of the spread of farming is undoubted, although there is still discussion as to the extent to which this represents an episode of demic diffusion, and to what extent it may be seen in terms of acculturation. Certainly many scholars see the molecular genetic evidence (based mainly upon classical genetic markers) as confirming some degree of demic diffusion (Cavalli-Sforza, Menozzi and Piazza 1993; 1994; Sokal, Oden and Wilson 1991; Barbujani, Sokal and Oden 1995). On the other hand, the evidence from mitochondrial DNA has been interpreted to suggest that much of the genetic patterning in present-day European populations may have an earlier, Upper Palaeolithic origin (Richards et al. 1996; see also Torroni et al. 1994). One problem there is that the data for Anatolia and western Asia are not yet available, and those from the 'Middle East' (i.e. southwest Asia) are so far limited in quantity and scope. It is possible therefore, as first indications suggest, that the European population after the inception of farming may have been genetically similar to the Anatolian population around 7000 BCE and an episode of demic diffusion would not then be excluded. But more Anatolian data are certainly necessary.

However it is not necessary to follow Cavalli-Sforza in positing demic diffusion in order to explain the association of the dispersal of proto-Indo-European speech with the agricultural transition. Zvelebil

(1995) has recently argued that while demic diffusion may have been the mechanism operating for Greece, the Balkans, and the German loess lands, beyond that the process may have operated without the migration of any significant number of individuals. Instead he postulates a process of "Neolithic creolisation", whereby hunter-gatherer populations who took up farming by a process of acculturation may also have come to adopt proto-Indo-European speech, or modified versions of it.

In the late Neolithic it is clear that four wheeled wagons with solid wheels were used, and some are found in burials in central Europe. They were drawn by oxen.

From the beaker period onwards, horses are sporadically found in central and western Europe. They may have been largely a food resource. There is no evidence that they were ridden (although that is not impossible); certainly they seem to have had no military significance. It is difficult to see how the horse could have been the motive force for population movements at this time (Renfrew, in press).

From about 1600 BCE, the horse-drawn chariot with two, spoked wheels was used in Europe: it is depicted in the Shaft Graves at Mycenae, it occurs in Hungary (with cheek pieces or psalia), and it is depicted in Scandinavia.

Not till the time of the Cimmerians and the Scythians do we find mounted warriors in Europe: this is the Iron Age in the first millennium BCE (although there are just one or two terracotta figurines from around 1100 BCE in late Mycenaean Greece). Mounted warriors were undoubtedly of great social significance in some areas—for instance, Homer speaks of chariot warfare, yet by the seventh century there was cavalry in Greece—in other areas of Europe (e.g. Ireland) chariot warfare continued.

The picture in western and central Europe is thus very much in harmony with what we see in the steppe lands of eastern Europe and central Asia (Kuzmina 1994), and indeed in Egypt and the Near East. It belies completely the statement of Diamond, quoted above, that from c. 3000 BCE the horse was part of a military package that came to dominate the world. Diamond is in error by a margin of some 2000 years. If we discount the military significance of the chariot, which came into widespread use around 1500 BCE as principally an instrument of prestige, the horse was not of appreciable military significance in Europe until around 1000 BCE, and in some regions very much later.

These arguments, I believe, serve to undermine the principal rationale sustaining the "Kurgan migration" theory for the origin of the Indo-European languages. There is no clear underlying reason for such a migration, and indeed no evidence for it in central and western Europe, while the evidence which does exist in eastern Europe is

certainly open to other interpretations. The role of the horse has been greatly exaggerated, so far as Europe is concerned, and there is little evidence for its use other than as a food source until c. 1700 BCE. This is an important point for the present discussion.

Linguistic Questions

In harmony with the view of Dolgopolsky, and of Gamkrelidze and Ivanov, and following Sturtevant (1962), I suggest that the basic division in the early Indo-European languages is between the Anatolian languages on the one hand and all the other members of the Indo-European family on the other. Such a view arises directly from the "farming dispersal" hypothesis, since farming came to Europe from Anatolia. It is suggested that all the other branches of the Indo-European languages (except possibly Armenian) were derived from the western branch of the divide (ancestral to the Indo-European languages of Europe, including those of the steppes, and thus also those of the Iranian plateau, central Asia, and south Asia). The eastern branch is of course represented simply by the later Anatolian languages, including Hittite. The Hattic language has been related by Diakonoff and others to the North Caucasian languages, and it might therefore be regarded as entering north-east Anatolia perhaps during the Bronze Age.

The secondary center, as Diakonoff realized, is the Balkans (around 5000 BCE), and from there one must envisage a division with the bulk of the early Proto-Indo-European languages of central and western Europe (the languages of "Old Europe" in some terminologies, although emphatically not that of Gimbutas) on the one hand, and those of the steppe lands to the north of the Black Sea on the other (4th millennium BCE).

It now seems possible that the ancestors of the Tocharians were in the Tarim depression by at least 2000 BCE, and I predict that further evidence will be found going back to c. 3000 BCE. I suggest that this population was part of the early nomad pastoralist adpatation to the east European steppe lands, from a time long before horse riding was of military significance. I am led to suggest, therefore, that at an early date around 3000 BCE one should think of a Proto-Indo-Iranian-Tocharian sub-family. By analogy with Krahe's term "Old European" (Krahe 1957) one might term this sub-family "Old Steppic" or "Old Steppe Indo-European". Indeed to be more precise, we can imagine three emerging and related components at this time, each derived from Old Steppe Indo-European:

(1) European steppes: Proto-Scythian
(2) Iranian plateau: Proto-Indo-Iranian (including, later, the Mitanni chariot vocabulary)
(3) Central Asia: Proto-Tocharian.

Of course it is over-bold to posit a possible linguistic relationship on the basis of arguments which are mainly archeological. Rather one should perhaps ask whether there is any linguistic basis for suggesting that the proto-Tocharian language some four thousand or more years ago might have had such affinities with early Indo-Iranian and also with the distant ancestor of Scythian, that all three groups of languages (with descendents) could be considered closely related. Some early but deep relationship of this kind might seem to be implied.

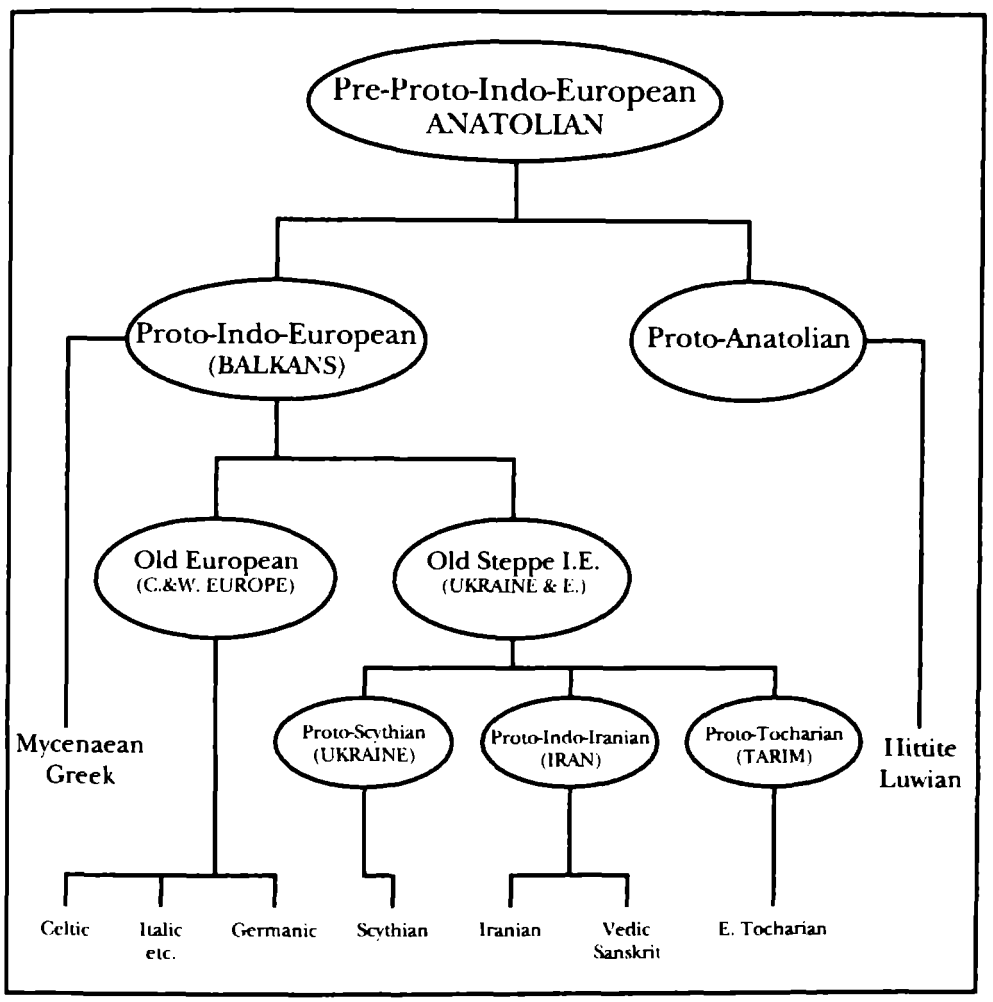

Figure 1: Proposed relationship between Tocharian and other languages of Eurasia.

By 1500 BCE these groups may well have developed into early Scytho-Cimmerian, early Indo-Iranian and early Tocharian. But, of course, it was some 2000 years later that the mature form of Tocharian now known to scholars was to emerge among the important finds from Kucha, Turfan and Dunhuang.

This account is in the first place archeological. The linguistic relationships are predicted from the model of Indo-European origins

advocated, namely that of farming dispersal from Anatolia. It remains to see how far the real linguistic relationships—that is, those based upon a close study of the languages in question—correspond with these predictions.

Ringe, in an interesting paper to the Conference (Ringe, this volume), has used quantitative methods (which might broadly be described as lexicostatistical, athough they involve grammatical or morphological isoglosses also) to compare the relationships among the various language families which together comprise Indo-European. They are in general consonant with the sequence of events proposed here, and in particular with the early separation of the Anatolian languages from the rest. A single diagram, such as he employs, naturally cannot portray the full complexity of the situation. For, while the steppe proto-languages were evolving and differentiating (i.e. proto-Tocharian, proto-Indo-Iranian and proto-Scythian), comparable processes were at work in Europe, and indeed had been for a longer period, so that the Italic, Germanic, Celtic, and Slavic families will have been evolving all the while. It is likely that, since the area where proto-Slavic languages were first spoken was not far removed from the territories where proto-Scythian was spoken, there might be some relationships between the two. But Scythian proper is generally classified as an Indo-Iranian language and may have separated rather recently from Indo-Iranian.

Ultimately, most of these questions are linguistic ones, and they must be answered by linguists employing linguistic data. But at the same time, it should be possible to bring the historical picture which emerges from linguistic considerations into some sort of adjustment with the history as documented by archeology or indeed by genetic data. For while there is not necessarily any easy correlation between genetic and linguistic data, it is nonetheless the case that all three data sets must have arisen from a single set of concrete historical circumstances relating to real people at well-defined locations in space and time. That is the hypothetical (but surely inescapable) reality which underlies the notion of an "emerging synthesis" in this complicated area of study. The recent Tarim finds offer one very graphic example of such a concrete reality, and they have an important contribution to make to the broader historical picture.

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Migration and Nomadism

Early Migrations in Central Asia

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From now on, the members of the archeologic establishment of the former Soviet Union shall have to work in Central Asia under reduced material and impaired administrative conditions. So they may hardly keep up the dominant position in the field which they have attained by the sole privilege to excavate in a tremendous territory for many decades.

The successors are already entering the stage. The scholars of the Peoples Republic of China have now a precinct of similar dimensions and aspects at their disposal. So they may henceforth amaze colleagues and the lay public by their fascinating discoveries. Certainly the monopoly is not so exclusive, as it was for a while in the former Soviet Union. Our Chinese collegues need technical equipement and funds from the Western world. In the new era of austerity, that seems inevitable, not only governmental agencies but private donors as well may support the ongoing fieldwork. So publicity is an essential precondition for further collaboration.

More effectively than anyone else, Victor Mair directed the attention of the general public and the scholars to the "prehistoric desiccated corpses from the desert sands around the edges of the Tarim Basin" (Mair 1993, 1994a, 1994b:1). The main challenge for him was the fact that many of the deadbodies have features of a definite "European" character, they are "Caucasians" according to the terminology, used in the USA. That became generally known by a popular article in the journal *Discover,* inspired by Mair. It was written by Evan Hadingham (1994) and illustrated with photos by Jeffery Newbury. The corpses do not form an utterly homogenous group but belong to different types (Mair 1994:6). In this area, Mongoloid partners show up only later, and then in gradually growing proportions up through the Han-period.

According to the overview of the Chinese archeologist Han Kangxin on which Mair has based his report, in the earliest graves skulls were found, which are clearly Europoid of a dolichocephalic strain. They closely resemble "the Proto-European pattern with some Nordic features".

According to Han Kangxin, quoted by Mair, these earliest settlers might have entered the area of Lop Nor, along the Kōnch Darya from the northwest before 1800 BCE. Han suspects that they came from the territory of the Afanasievo culture in Southern Siberia. Whether or

not this is correct remains an open question, and even Mair (1994:12) is somewhat sceptical.

Mair had already previously suggested the possible identification of the "Caucasian corpses" in the Tarim Basin with the ancestors of the Tocharians. He now reduces this attribution to "at least some of the corpses" and he has especially those of the Könch Darya in mind, who were present there "at the twentieth century before our era". That is in agreement with the observations made by the scholars studying the written documents preserved in this area, but 2,000 years later. Then the Lop Nor Region formed an independent or semi-independent state under Indian rulers, in the 3th and 4th centuries A.D. called Kroraina. The documents, written in a local Indian language, have many Iranian loanwords borrowed at different times. Underlying this language was a Tocharian substratum, attested by 100 words, and almost a thousand proper names (Brough 1965, 1970, Burrow 1936). Only the preservation of two Tocharian languages in Kucha, Karashahr, and Turfan allows the clear identification (Vorob'eva - Desjatovskaya 1992:77-84).

Due to its eccentric position in the frame of the other Indo-European languages, as a centum language in two variants (A or B)—even farther east than the (expected) satem-idioms—Tocharian has been intensely studied. When the isoglosses and the grammatical similarities are properly arranged, we are able (following the proposal of Ivanov), to assume the following sequence: The homelands of the Proto-Tocharians were situated in a distant past (fourth millenium BCE) in the southeastern border zone of the Indo-European community (perhaps then as a "Sprachbund"). That was near to the areas where the "Anatolian" Indo-Europeans lived, in contact with North Caucasian tribes. Their neighbors during the following phase were Indo-Iranians, Proto-Greeks and Proto-Armenians, but even at this time they appear to have been in contact with Celtic and Italian dialects. On the other hand, the Proto-Tocharians subscribed to special prosodic rules used for ritual songs and dances. Such metrical correspondences were perhaps survivals of the time when the Proto-Indo-European tribes formed a religious community (Merpert 1988:22-26).

Afterwards, their neighbors were tribes who lived in Central and Eastern Europe, not only Proto-Teutons, but Proto-Balts or Proto-Slavs as well. From this position, the Proto-Tocharians (already in contact with East-Iranians) moved to the steppes of Middle Asia, where they associated with Finno-Ugrians and received through this mediation even East-Iranian pecularities (Ivanov 1992:10-13). Perhaps a Dravidian substratum was also involved in this process.

Not much later, the areas in the east and northeast were affected, Tocharo-Turkish relations are evident, and some loanwords connected with spiritual concepts indicate contacts with the emerging

Chinese civilization (Ivanov 1992:15). According to Ivanov, that made it easier for some groups of the Tocharian-speaking populations to proceed even farther to the east, far beyond the area where they are later on attested by written sources. Perhaps through such advances the Austroasiatic name of the elephant was integrated in both Tocharian languages (Ivanov 1992:16). Together with Iranians and Tibetans, the Tocharians formed the core of a powerful nomadic confederation. When the Yuezhi were defeated by the Xiongnu, they moved to the west, dislocating other tribes, finally forming the empire of the Kushans.

It is evident that Tocharians adapted themselves to the chances offered by different niches of the environment. But the route of immigration, as designed by modern linguists using varying isoglosses and other arguments for ethnic contacts, is as though by mutual agreement founded on the assumption that the Tocharians moved as a solid block, or at least as a wave of almost contemporary steps which might be identified as one coherent culture—in case the excavations could be directed to the right places. So Mair, in accordance with Han's researches, referring to the results of Soviet archeology, proposes this sequence: 1) Yamna, 2) Afanasievo, 3) Sintashta-Petrovka, 4) Andronovo. From here the way of the immigrants may have diverged; one line branching off in a southern direction appears to have reached the Kōnch Darya (Mair 1994:6). The main movement would proceed along the northern fringes of the steppes; here the Tocharians met Turks and other Altaic peoples, then finally Chinese.

In this context the affinities to several linguistic complexes in Middle and Eastern Europe—typical for the Tocharians—would remain enigmatic. Are they only the heritage of a distant past? This—in fact very conventional—attempt to bring archeology in line with the linguistic postulates cannot be maintained when the recent discoveries and investigations are taken fully into consideration.

The Afanasievo culture is now attested by more and earlier radiocarbon dates than before. Most of them belong to the 3rd millennium. Apparently cattlebreeding was the main production and caves like Denisova were used as sheepfolds (Derevianko-Molodin 1994: 253-256).

During the following period (22nd-17th centuries BCE), a different population entered from the northern forests, but the symbolic system is related to that which was diffused by migratory tribes in the eastern part of the Great Steppes. It is evident that the direction of the cultural diffusion was directed westwards. Perhaps innovations, like inhumation in stone cists put together from slabs which had previously been decorated by polychrome paintings representing animals and masked dancers were introduced by priestly communities that had transasiatic connections. In Southern Siberia, this phase is represented by the Okunev culture.

During the 16th and 15th centuries BCE, a similar network was spread among cemeteries and sanctuaries west of the Urals, in Western Siberia, and in the Altar-Sajan region (Černych 1976, Černych-Kuzminych 1989). In this network, it is possible to observe social stratification: the chiefs were metallurgists and horse-breeders, most probably also priests, while the workmen and followers lived as hunters and fishermen. A superior technique allowed the production of thin-shelled bronzes which may have been stimulated by contacts with Southeast Asia. The datings however are supported by relations to Early Greece. The decorative system observed in the hoard of Borodino and in the shaft-graves of Mycenae was created under such conditions. On the other side, large knives which belonged to the equipment of the charioteers in the royal burials of the Shang dynasty may be explained in the same context.

One more part in this many-voiced concert was discovered only recently—the Bactrian-Margiania Archeological Complex (investigated by Sarianidi 1993). The background was elucidated by the solid and fascinating studies of Pierre Amiet (1986. 1989). By influences radiating from Elam, a "zone of exchanges" was built up, connecting centers of handicrafts and artistic production which had existed since the 4th millennium. They were supported by the work of peaceful farmers. Early in the second millennium, however, the "zone of exchanges" was transformed into a powerful confederation with a division of labor between tribal units under the management of a religious community. Consolidation as an urban society was inhibited for a while and the traditions of the past were maintained in "Ceremonial centers" with mock fortifications (Sarianidi 1990:102-166).

When the Iranians conquered these areas, they took over the organization among sedentary and nomadic tribes that persisted even when they founded states on the Iranian plateau (as Medes and Persians). As one of the tribes, the priests were integrated, albeit with problems mentioned in the written sources. The Maguš remained dangerous outsiders.

So far the speculations on the identification of the Tarim Basin mummies, starting from the linguistic material, have used a conventional ethnogenetic model: the Proto-Tocharians were imagined as a wave of western immigrants, their languages ramifying when they spread over enormous distances. Only one branch, with two related idioms, is attested by written documents.

The alternative would be to postulate a series of bold advances, perhaps by specialists for the breeding of various gregarious animals, some of them using wagons as moving houses. The integration took place in Central Asia and scarcely could have had a homogenous result. Only the settlers along the northern branch of the Silk Road are attested by the written documents.

Evidently Mair was fully aware of this possibility. He correctly observed that the "extraordinary situation" is not properly explained, but he is not ready to divulge his own suppositions, as long as the linguists have not reacted to the new archeological evidence. However. the linguisls would need many years to became accustomed to the new situation. So in this case a kind of shock therapy might be salutary. In any case, he claims that "it is best not to rule out the possibility of lengthy nomadic migrations" (Mair 1994:12). The assertion that the Tocharian complex was formed in Central Asia by the merging of tribes who had arrived at different times from different European territories seems to be a very bold challenge, but it is only one step more beyond that what is contained in Mair's request, namely not to refute migrational interpretations.

The question of what ecological conditions favored the participation of many foreign groups in the process of settlement in Central Asia so far has no clear answer. At least for a while, the area was relatively inviting for immigrants from the Far West—from Europe. (Cf. the article by K. Hsü elsewhere in this volume.)

Now we have to reckon with the fact, established in the meantime, that on the eastern borders of the steppes, there were neighbors who turned very early to a producing economy allowing a high density of the populations involved. It was not only the cradle of the Chinese civilization which was radiating to all areas which were fit for agriculture. A similar focus existed in Dongbei (Manchuria) where radiocarbon dates (Nelson 1995:8-9) indicate a progressive development between the 5th and the 2nd millennium BCE. The early metallurgy in this area was not taken over from the southern neighbors; it was independent, although its origins remain enigmatic.

Perhaps the eastern impact was too much oriented to agrarian expansion, so that climatic changes and human activities were destructive for the necessary delicate climatic equilibrium. Brentjes has presented his actual deliberations on this matter. He reminds us that the plague had a center of diffusion in the mountains of Mongolia, with the result that digging in the soil may have led to an epidemic catastrophy.

In any case, the few places where we can assume a continuity of development since the Paleolithic period are very far away—in the territory of the so-called Hissar culture in Tajikistan (Ranov 1973, 1975, 1986).

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The Steppe and the Sown: Interaction between Bronze Age Eurasian Nomads and Agriculturalists

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The Eurasian steppe is a region of continental semi-arid grasslands stretching from the Black Sea to Mongolia, with rich Central Asian agricultural regions interspersed between mountains and deserts to the south. Bronze Age herding cultures have been defined across the Eurasian steppe in macro-cultures (Yama, Katakomba, Srub, Andronovo) on the basis of generally similar ceramic assemblages and burial forms. These have been treated as monolithic blocks of ethnically homogeneous nomadic cultures migrating across the vast steppelands. In contrast to this general view, this paper presents a model of pastoral and agricultural interaction based upon *local* adaptations on the western Eurasian steppe and in the desert oases of central Asia.

There are three important aspects to our collaboration: first, the diverse areas of which we are specialists including steppelands and desert oases; second, our respective specialties as an archeologist focusing on archeological materials of nomads and pastoralists (N.S.), and the other as an archeologist looking at village and urban agricultural sites (F.H.); and finally, our determination to bring together the different academic traditions of Russian and American perspectives on the growth and development of cultures. While this is a preliminary attempt at collaboration, we feel that it is interesting to put together a trial model.

Steppe pastoralists

Both historically and ethnographically, the pastoral cultures on the steppe and in the desert were closely adapted to local topographies and environments (Bacon 1954, Khazanov 1984). On the treeless Eurasian steppe, severe environments limited the economies to specialized animal husbandry rather than primarily agriculture. We employ the term "mobile herders" for the specific adaptation of herding on the Eurasian steppe. These pastoralists had mobile base camps, often as complex as villages or towns, which were carried to various areas of the steppe using wheeled carts, wagons and chariots, and moved *en masse* when necessary. We get the impression of "floating villages" with local migrations from the basecamps to pasturelands. The ability to move the basecamps across the steppe

permitted a higher degree of mobility of the steppe pastoralists than nomads of Arabia, Africa or other areas (Barfield 1993). The ancient herding adaptation on the steppe included ideological, economic, and social aspects which continued in specific regions (for attempts at reconstructing such systems, see for example, Razumova 1991). The similarities of the material culture of the ancient pastoralists between regions were often due to similar adaptive responses to the severe and widespread environmental features of the steppe.

This mobile pastoralism has usually been considered to be an Iron Age development, identified with the origins of the Scythians (Khazanov 1984:94). Recently, it has become clear that mobile pastoralism is a much earlier phenomenon than previously suggested (Shishlina 1992). This way of life was the predominant adaptation on the steppe from the late third millennium BCE; in this paper we will describe the stages in which it developed.

Desert oasis agriculturalists and pastoralists

South of the steppe, in the desert and desert-steppe region, pastoralism has a different structure and organization. The primary mode of life in the desert oases of Central Asia since the late third millennium BCE was irrigation agriculture (Hiebert 1994). The traditional buildings of the oases, fortified building complexes (called *qala*, or *khovli*), typically had a considerable amount of space devoted to stables, storage areas, etc. (Pugachenkova 1958, Szabo and Barfield 1991). The agricultural settlements scattered throughout the oases also represented the home bases for the oasis pastoralists (Markov and Orazov 1973). Pastoralists based in the Central Asian agricultural areas, as in other pastoral societies, modified their herding strategies in relationship to their access to surrounding pasture (Lees and Bates 1974, Bates and Lees 1977). During the Bronze Age, as the irrigation systems pushed deeper into the thinly vegetated deserts of the Central Asian deserts, the size of the region needed to pasture animals increased dramatically, bringing the Central Asian groups into contact with the steppe pastoralists for the first time.

Stages

Developing a single coherent chronology is difficult in these regions. This is because there are separate chronological sequences for the Caucasus, western steppe, eastern steppe, desert oases, and surrounding neighbors, such as Xinjiang.

We propose a preliminary structure of several widespread stages of changing economies on the Eurasian steppe. This allows us to compare the extremely broad reconstructions of the Eurasian steppe and oasis agricultural economies:

Stage 1 was the initial development of mobile herders on the Eurasian steppe, developing from the close relationship which local

herders had with sedentary agriculturalists.

Stage 2 was the development of a fully mobile economy and the widescale exploitation of the steppe by these societies. Small scale societies were transformed into a much larger scale of steppe exploitation through the incorporation of some elements which were previously part of the sedentary cultures, such as pottery production, metallurgy and small scale agriculture.

Stage 3 was the development of complex mobile steppe populations which incorporated traits of settled populations, such as irrigation agriculture, within the context of the steppe environment. In many cases this involved political or military domination across the steppe into the forest to the north and the desert oases to the south.

West Eurasian Steppe

There is a general consensus that Eurasian pastoralism developed earliest on the western part of the Eurasian steppe: developing from the Sredni Stog and Khvalynsk eneolithic cultures (4th millennium BCE) near the Volga between the lower Don and Volga, near the Black Sea coast (Agapov et al 1990). Burials provide the primary evidence for occupation in the steppe at this time with few settlements having been identified or excavated (Merpert 1974, Shilov 1975). The development of a mobile pastoral economy was stimulated by the need to react to a rapidly changing climate of regional aridization during the third millennium BCE (Krementskii 1991). The change was enabled by the existing technology of carts, horses, and herd animals such as sheep and cattle which permitted mobility. Not all regions reacted in the same way to the environmental change. In the eastern steppe, for example, hunting and fishing adaptations continued, and we do not find clear evidence of mobile herding economies until the beginning of the second millennium BCE when the environmental changes became more pronounced.

According to palynological data there are several periods of ecological change on the steppe (Kremenetskii 1991). Recent data shows a regional aridization in the steppe at the middle of the third millennium BCE. During two hundred years at the end of the third millennium BCE, the forest quickly turned to steppe in the lower Don (Spiridonova 1991) and in the north Caucasus (Aleksandrovskii nd). In both regions, the border of the steppe moved to the north and the climate became more continental and dry. The adaptation to the environment in these regions also changed. For example, at the end of the Maikop period some of the sedentary populations became quite mobile (Gei 1989, 1991).

In the mid-third millennium, hundreds of kurgans appear suddenly on the western Eurasian Steppe: from Bulgaria to the Ural Mountains, including the Black Sea steppe, Kalmykia, Volga steppe, northern Caspian steppe, and Urals. These have been grouped

together as a macro-culture called the Yama culture (Merpert 1974). The widespread appearance of these burial mounds, the material assemblage of the burials (including herd animal remains), and the lack of associated settlements is indicative of a specialized animal husbandry economy. The distribution and chronology of the kurgans suggests that this pastoral mode of life spread across the western steppe very quickly. The diversity of the local Yama variants suggests that this reflects adoption of a successful steppe adaptation rather than migrations of a specific "Yama people." The pastoralists of the western steppe, for instance in Kalmykia, had relationships with the agriculturalists of the north Caucasus mountains, and Yama pastoralists were also in relationship with the Tripole culture. In the west Ukraine, some Yama cultures were sedentary; and some Yama cultures, such as those in the Ural region, apparently were not in relationship with any agriculturalists, but with hunter-gatherers. This particular group remained quite conservative and the Yama culture here lasted much later than the other groups. There is little evidence of Yama cultures developing in the forest-steppe region.

Figure 1. Kalmykia steppe. Zunda-Tolga kurgan 5.

Stage 1: 2200-1900 BCE

At this stage we can begin to model the emergence of a new scale of herding economy on the steppe. Beginning around 2200 BCE, the archeological evidence from the northern Caucasus indicates fewer settled populations. At the same time there are more mobile herders expanding their pastoral range to the previously uninhabited steppe with the use of horse-riding and wheeled vehicles, such as around Zunda-Tolga in Kalmykia (see Figures 1 and 2). The origins of the

Katakomba are very complex but the Katakomba economy was apparently much more mobile and wide-ranging than in the Yama cultures (Shishlina 1992, 1993). As the environmental conditions deteriorated, Katakomba pastoralists become almost entirely mobile pastoralists.

This is true not only for the Katakomba groups, but also for other contemporary groups. For example, the Poltavka groups along the Volga river have almost no settlements (Kusnetsov 1989). Interestingly, in both the earlier local Yama and later mobile Katakomba steppe pastoralists, there were a variety of goods imported from the sedentary populations, for example, jewelry of the north Caucasus type (Shishlina 1992).

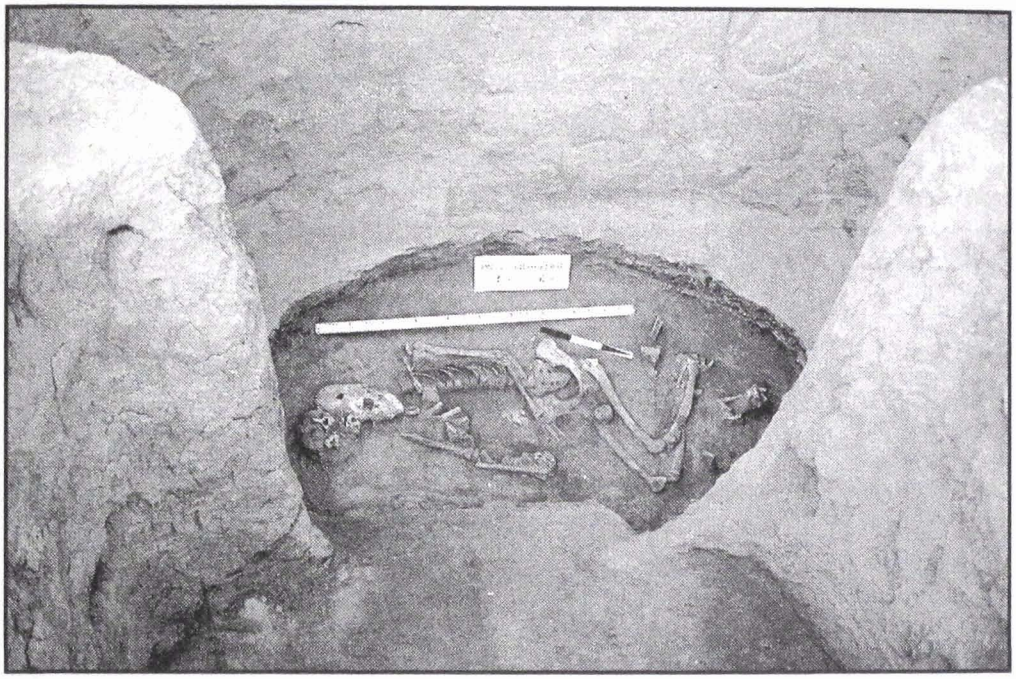


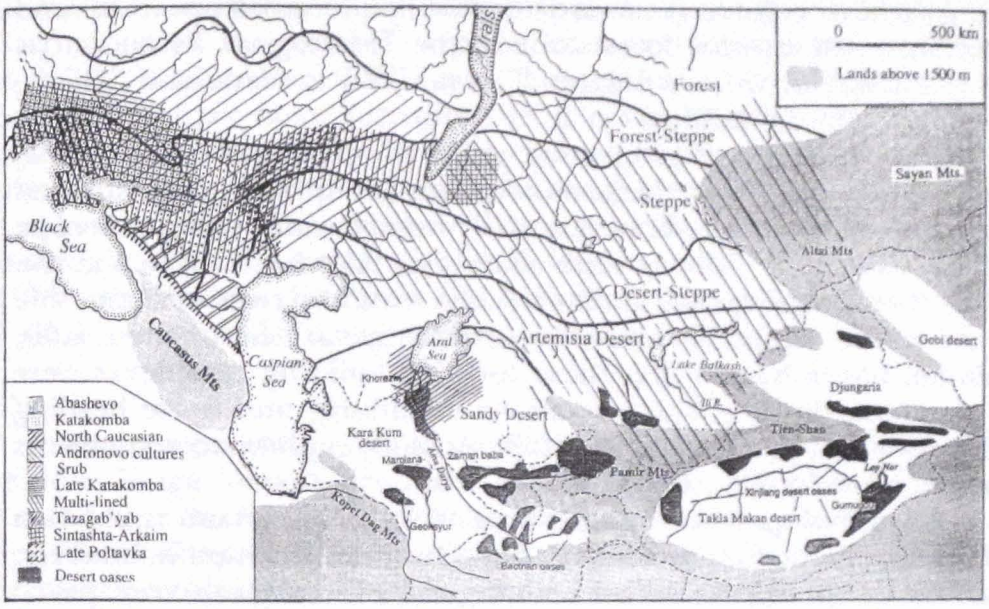
Figure 2. Excavations of Zunda-Tolga kurgan 5, burial 1 (Katkomba culture).

Stage 2

The time period from 1900 to 1750 BCE was a period of great mobility on the Eurasian steppe. The development of the pastoral adaptation employing mobile base camps allowed for large regions of the Eurasian steppe to be exploited. During this period several factors strongly influenced the interregional relationships of the pastoral populations on the western Eurasian steppe: the metals of the Caucasus began to be depleted, the desiccation of the environment continued (Krementskii and Shishlina nd), and Eurasian pastoralists first came into contact with the oasis dwellers of Central Asia. The appearance of the short bow at this time strongly suggests horse-riding (Shishlina 1990, nd).

While the metals of the Caucasus were still available, the north

south corridor of the Caucasus remained open. As the metal resources of the Caucasus became depleted, the corridor itself began to be less important than the vast regions of steppe to the east and to the west of the north Caucasus (Shishlina 1992).



Map showing the relationship of the steppe and desert regions of Eurasia. Based on Hiebert and Shishlina 1996, and Dergachev 1989.

Late Katakomba and north Caucasus mobile pastoralists were still in the Kuban, Stavropol' and southern steppes around the Caspian and Black Sea in a scale much reduced than before. Pastoral groups appear to have moved north to the forest steppe zone, and at this time a portion of the steppe may have been empty. Part of the Kalmykia steppe may even have been entirely desert (Aleksandrovskii, nd).

The late Poltavka culture existed along the banks of the lower and middle Volga. Here the herders simply migrated along the lower terrace of the river plain leaving kurgans and the remains of small seasonal campsites behind them (Kusnetsov 1989). The Poltavka culture remains rather conservative, since the conditions on the river terraces were better than on the open steppe. In many ways the Poltavka culture represents a continuation of the older Yama-type local adaptation, in contrast to the new cultural developments on the steppe.

Mobile herders of the Abashevo developed in the forest-steppe zone to the north (Pryakhin 1976, 1977, 1980). The Seima-Turbino culture developed near the Altai foothills in the eastern steppe region (Chernykh 1970). Their material culture included some of the most widely distributed artifacts across the Eurasian steppe—from the Altai to eastern Europe, exemplified by the Borodino hoard from the Moldavian steppes. This culture has often been considered to be the core culture for many of the contemporary cultures, but in our

opinion, the Seima-Turbino phenomena is just one of several important new developments on the Eurasian steppe at this time (Hiebert and Shishlina 1996). It appears that there was territorial expansionism in both the Seima-Turbino culture (westward) and of the Abashevo culture (eastward) across the forest-steppe zone and possibly north into the forest zone to the Tula region, Ryzan and as far north as the Moscow region (Ganyani, Kaverzneva, and Salikov, personal communications).

One of the most interesting cultures which has only recently been discovered is the Sintashta-Arkaim group of settlements and kurgans in the area between the western and eastern steppe (Zdanovitch 1995). About thirty such sites have been located in the Chelyabinsk region, each situated at the turn of a river with one side open to the steppe. Excavations carried out at one of these sites, Arkaim, has indicated that these fortified building complexes were settlements, possibly with a focus on metallurgy and horse herding (Zdanovich 1995). Such large scale, possibly multi-year, settlements were unusual for the steppe.

The development of settlements at Sintashta-Arkaim could be a general response to increasing aridity. Our interpretation is, however, that the Arkaim-type fortified building complexes were a very special reaction which took place only in a small region and which was short-lived. The fortified building complexes have various forms: oval, round and square. The burials are commonly found with chariots and horses. There is no direct evidence of agriculture or preserved traces of irrigation, but on the basis of their scale and organization these appear to be permanent settlements, more akin to building types found in southern agricultural regions than the steppe. One possibility is that the plan of the fortified buildings belonged to either the Central Asian desert oasis or north Caucasus agricultural village tradition. Another possibility is that a small group of southern oasis people created an encampment in the north as part of the expansion of the Central Asian desert oasis culture. In support of the Central Asian connection, late Bronze Age Central Asian desert oasis ceramics (BMAC period, see below) have been found on northern Kazakh steppe sites, although usually in small proportion in comparison to the local steppe ceramics (Maliutina 1991). Arkaim perhaps further demonstrates the cultural influence of the southern oases on the steppe peoples, who then quickly incorporated some of these features. A similar pattern is documented for the Seima-Turbino culture which expanded along the Volga river, through Eastern Europe to Hungary, Rumania and Bulgaria, and was quickly incorporated into local cultures around the Ural Mountains.

The Eurasian steppe to the east of the Urals was occupied by the Andronovo culture as early as 1900 BCE (according to calibrated radiocarbon dates). The eastern steppe cultures were constrained by

the same severe environment as other parts of the steppe, and here there developed mobile sheep and cattle herding economies like those in the western steppe region. The emergence of mobile herders in the eastern Eurasian steppe clearly occurred later than that in the west, with no evidence of pastoral occupations contemporary with our Stage One on the western steppe. Since the Andronovo was first defined (Teploukhov 1927), over 250 Andronovo settlements and burial sites have been identified (Kuz'mina 1994). In reality this macro-culture consisted of a variety of regionally distinctive mobile pastoralist groups. The main area of the Andronovo was the steppe and forest steppe of Kazakhstan (Chernikov 1960) though Andronovo materials extended as far as the Enisei river valley (Maksimenko 1978), and up into the Pamir and Tian Shan mountains (Bernshtam 1952, Litvinskii 1988, Vinogradova and Kuz'mina 1996).

Stage 3

Settlements and graves of the Srub culture appeared first in the middle Volga region around 1750 BCE, and Srub pastoralists expanded to the west into the Kuban region, Black Sea coast and Azov Sea (Tsimondanov 1988), possibly representing military or political domination. Abashevo and other local cultures persisted while Srub cultures moved into their regions. At this time, remains of a late Katakomba culture are found in the Caucasus, and their isolated nature apparently indicates that the north-south corridor through the Caucasus was closed. To the north, the Srub culture expanded into the forest, forming such syncretic forest zone cultures as Pozdnaykova or Prikazanskaya. Contact between Seima-Turbino and Srub cultures is also clearly documented (Chernykh and Kuz'minykh 1989). Srub expansion went as far east as the Tashkent oasis and as far south as the agricultural oases settlements of Central Asia. Srub pastoralists came into contact with the local Suyargan village settlements in Khorezm, and this apparently sparked the development of the agro-pastoral Tazabag'yab culture of Khorezm (Itina 1977). In this way, Srub and various late Andronovo cultures transformed cultures in the desert-steppe and in the forest-steppe zones, on the fringes of the steppe.

The steppe from the perspective of the sown

The long-term settlements of village and later urban agriculturalists of Central Asia have their origins along the foothills of the Kopet Dag mountains of southern Turkmenistan. Here, agricultural settlements date back to at least the seventh millennium BCE (Masson 1971, Harris et al 1993). Similar to their Near Eastern neighbors, the Central Asian village agriculturalists tended sheep, goat and cattle. The focus of village settlement was on dry farming along the foothill band, and hunting and herding in the various environments of the mountains and nearby deserts. Large scale

economies and trade networks developed during the fourth and third millennium BCE with agricultural regions to the south and east, but there is no evidence of contact with the steppe world (Yama or Katakomba) to the north.

Stage 1

At about 2200 BCE (late Namazga V), agricultural colonies spread for the first time from the dry farming regions of the Kopet Dag. This population shift has been attributed to an ecological or economic crisis as urbanism developed and the dry farming agricultural techniques became inadequate for the larger population concentrations. New agricultural lands were formed through clearance and irrigation of the deltas of rivers which fan across into the Central Asian deserts (Moore et al 1994). The pioneering settlements appeared with large fortified building complexes instead of villages and towns. At first these farming colonies differed little in terms of material culture from the foothill Namazga V culture, but the agricultural potential of the oases was so great that the oasis cultures took on a life of their own (Hiebert 1994).

Collaborative archeological investigations have focused on describing the Bronze Age oasis agricultural and pastoral economies (Miller 1993, Moore 1993, Moore et al. 1994). The analysis suggests that the new environment led to different strategies, such as farmers who tended animals taking on a much more mobile herding routine. Our impression is that a mixed economy of herding and farming was initiated with the first occupation of the desert oases.

Stage 2

By 1900 BCE, the adaptation of the desert oases became successful enough that it spread and developed in many oasis areas (i.e., the river deltas of northern, southern and eastern Bactria) as well as those in Turkmenistan. The desert oasis culture of Bactria and Margiana characterized by the Bactrian-Margiana Archeological Complex (BMAC) expanded as reflected by the identification of distinctive BMAC desert oasis finds to the south in Baluchistan, in southeastern Iran, and in northern Iran (Hiebert and Lamberg-Karlovsky 1992, Hiebert 1995, Hiebert this volume). In the agricultural states to the south—along the Kopet Dag foothills of southern Turkmenistan, the Indus valley, Iran Plateau and Mesopotamia—a shift to a less stratified and complex organization occurred during the second millennium BCE. There is an almost synchronic development of the very expansionistic BMAC adaptation throughout the desert oases of Central Asia, and the development of complex mobile herders on the Eurasian steppe, such as the Abashevo and the Seima-Turbino pastoralists. The expansions of desert oases and agricultural sites of southern Central Asia fit the pattern of the

Eurasian steppe much more closely than they resemble the contemporary de-urbanized world of the older civilizations.

The very earliest steppe ceramics in the desert oases are associated with materials of the Bactrian-Margiana Archeological Complex (BMAC), dated by calibrated radiocarbon dates to 1900-1750 BCE (Hiebert 1993). These steppe ceramics are quite rare in the southern oases, and become common only in the subsequent Takhirbai phase (1750-1500 BCE) in Margiana (Sarianidi 1975) and in the Bustan phase of the Bactrian oases of Uzbekistan and northern Afghanistan (Rakhmanov and Shaidullaev 1985). Interestingly, at this time, the metals of the desert oases shift from arsenical copper bronzes (which were typical of the Kopet Dag) to tin bronzes (Rusanov 1982, Hiebert and Killick 1993). This shift may coincide with the first exploitation of copper deposits in northern Bactria and the western Tian Shan near Djungaria, areas into which mobile herders of the early Andronovo had moved.

It is at this time that some of the mobile pastoralists of the eastern steppe, such as the Alakul' and early Fedorovo variants of the Andronovo (1900-1750 BCE), first encountered the rich agricultural oases which had been transformed from natural desert basin deltas through irrigation. We can identify the impact of the oasis adaptation on pastoral cultures of the steppe of northern Kazakhstan, and of the highland regions of the Pamirs and Tian Shan. In many cases, so-called Namazga VI (BMAC period) ceramics are imitated in local handmade wares (P'iankova 1996). Actual wheelmade Central Asia oasis ceramics and other oasis products have been found, and in addition, technology seems to have been exchanged, including agricultural techniques, metalworking and possibly even architectural traditions. On the basis of the new finds from Xinjiang, it appears quite clear that the desert oases of the Tarim Basin were first settled by the complex eastern steppe pastoralists familiar with irrigation agricultural techniques adopted from the western Central Asian oases (Chen and Hiebert 1995, Wang 1996).

Stage 3

In the eastern steppe, several regions become key in the development of the steppe herders into complex cultural entities. Complex forms of mobile herders developed in the zone between the steppe and the desert. This desert-steppe region of Khorezm saw the development of the Tazabag'yab culture, a mixture of steppe and oasis cultural traditions of ceramics and burial forms. By 1750-1500 BCE the Tazabag'yab culture was a mobile steppe adaptation with large-scale irrigation in a complex pastoral-agricultural system. Tazabag'yab steppe materials include both isolated finds and campsites and are common in the desert oases and foothill agricultural towns during this time. Similarly, in south Tajikistan north of the Bactrian oases, the Vashkh/Bishkent cultures combined

steppe and oasis cultural systems in a complex highland mixed economy (Mandelshtam 1968).

Conclusions

We now have a framework for integrating the economic developments on the Eurasian steppe and deserts. These large-scale patterns are difficult to explain in terms of block ethnic movements or migrations.

1) Mobile herders on the steppe and pastoral herders in the agricultural oases appear in several areas, and are clearly local adaptations linked with small-scale regional systems. 2) The contemporary appearance of new and expansionistic cultures in Stage 2, on the steppe and in the desert oases, is a reflection of the changes all over Eurasia at this time. The Seimo-Turbino steppe culture appears to have had an elite stratum which employed many symbols of power similar to the BMAC (Chernykh and Kuz'minykh 1989). 3) Finally, we can model a development of mobile economies which incorporate many features of the sedentary world (e.g., agriculture and metal production), in a complex mixed economy which gained great political power in relationship to its neighbors. This influence was felt in the forest zone to the north and in the oases and agricultural zones to the south. This political or military power of the steppe represents the 3rd stage in our model.

It is difficult to single out any particular culture during these periods which was a prime mover behind the large-scale changes on the Eurasian steppe and deserts. We suggest focusing future research on large-scale environmental and ecological changes which may have affected many parts of Eurasia at these times. Our preliminary research, both from the Eurasian steppe and from the central Asian agricultural areas, indicates that the delicate environments of the steppe and oases could be greatly affected by aridization and amelioration of the climate. We can begin to outline climatic degradation and dynamic environmental systems throughout this time period which may have driven some of the large-scale political and economic changes described above.

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Tribal Interaction between the Early Iron Age Nomads of the Southern Ural Steppes, Semirechiye, and Xinjiang

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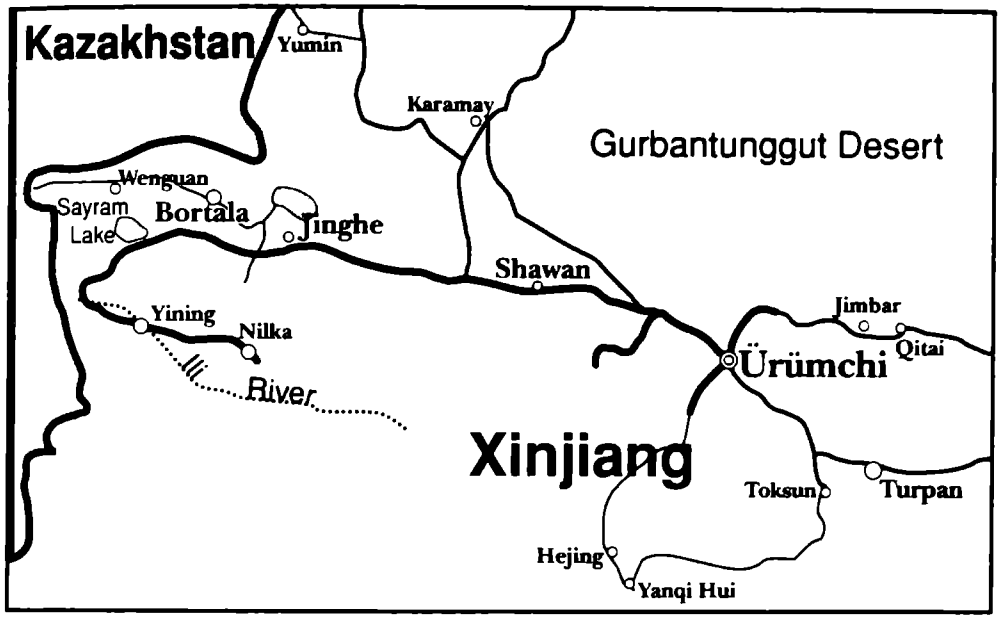
The arid and very hot climate which dominates the Täklimakan Desert has preserved the remains of ancient Indo-Europoid peoples who lived during the second and first millennia BCE and inhabited the region today known as Xinjiang, China. The amazing preservation of facial features, tattoos, and textiles belonging to these populations has provided an unexpected glimpse into the unrecorded history of this region. However, these peoples did not live in isolation from similar cultural groups who were also Indo-Europoids, who spoke Indo-Iranian languages, and who controlled the lands to the north. During the first millennium BCE many cultural parallels existed between the tribes living both north and south of the Tian Shan Mountains. This fact is quite apparent when comparing burial rituals and mortuary offerings that belonged to the Early Nomads (the first nomads to begin horse riding and to practice transhumance while grazing their herds) in Xinjiang, the Saka in southern Kazakhstan, and the Sauromatians and Sarmatians in the southern Ural steppes.

Map 1. The Eurasian steppes from the southern Urals, through Kazakhstan, to Xinjiang, China.

*Thanks are due Bruce Williams, University of California, Berkeley for Chinese translations.

Following several seasons of Early Iron Age archeology and ethnographic research in the Semirechiye (Seven Rivers), the region in southern Kazakhstan on the northern perimeters of the Tian Shan Mountains (Map 1), in 1991 we surveyed archeological artifacts and sites in Xinjiang province of China (Map 2) under the auspices of the Kazakh/American Research Project, Inc.



Map 2. Western Xinjiang, China. Area covered by 1991 survey indicated by the darker line.

We also documented contemporary Chinese Kazakhs at summer pasture on the southern slopes of the Tian Shan, and in 1992 Mongol nomads in western Mongolia. It was apparent at that time, based upon comparative materials in museums at Ürümchi, China and Almaty, Kazakhstan, that tribes with similar mortuary offerings had inhabited Xinjiang, the Semirechiye, and parts of Mongolia during the first millennium BCE. Since 1991 we have conducted excavations at Pokrovka located approximately 120 km south of Orenburg, Russia, in the Kazakh steppes (Map 1) (Davis-Kimball 1995, 1997b; Yablonsky, et. al. 1993, 1994, 1995, 1996). The kurgan (mound) cemeteries are composed of burials belonging to Sauromatian and Sarmatian nomadic tribes dating between the 6th and 2nd centuries BCE. Mortuary offerings from the Pokrovka and other Sarmatian burials in the southern Ural steppes revealed that these tribes had interacted with regions and empires south and west of the Ural steppes, with nomadic tribes including the Saka of the Tasmola Culture in central Kazakhstan, the so-called Scythians of the Altay, with the Saka of the Semirechiye (all dating to around the 6th-4th centuries BCE), and with the Xiongnu (Hsiung-nu) who are noted in Chinese sources beginning in the 3rd century BCE but do not appear in the Eurasian steppes until sometime after the beginning of our era. At this time the

Xiongnu made a strong appearance in Xinjiang (Érdy 1995:49-53), are documented archeologically in the Semirechiye, and as indicated by the excavation of two Hunnic burials from Cemeteries 02 and 10, appeared in the Pokrovka region of the southern Ural steppes during the first or second centuries CE. Although beyond the scope of this paper, it should be noted that a recent reassessment of excavations in Tuva (southern Siberia) indicates that during the 5th-3rd centuries BCE Ujuk Culture also had strong ties with southern Kazakhstan (Semenov and Chugunov: 1995: 311-334). Because of its central location, it appears that the Semirechiye functioned as the fulcrum for the dissemination of certain Early Iron Age nomadic belief systems practiced over an immense region of the Eurasian steppes, including Xinjiang, for approximately six centuries.

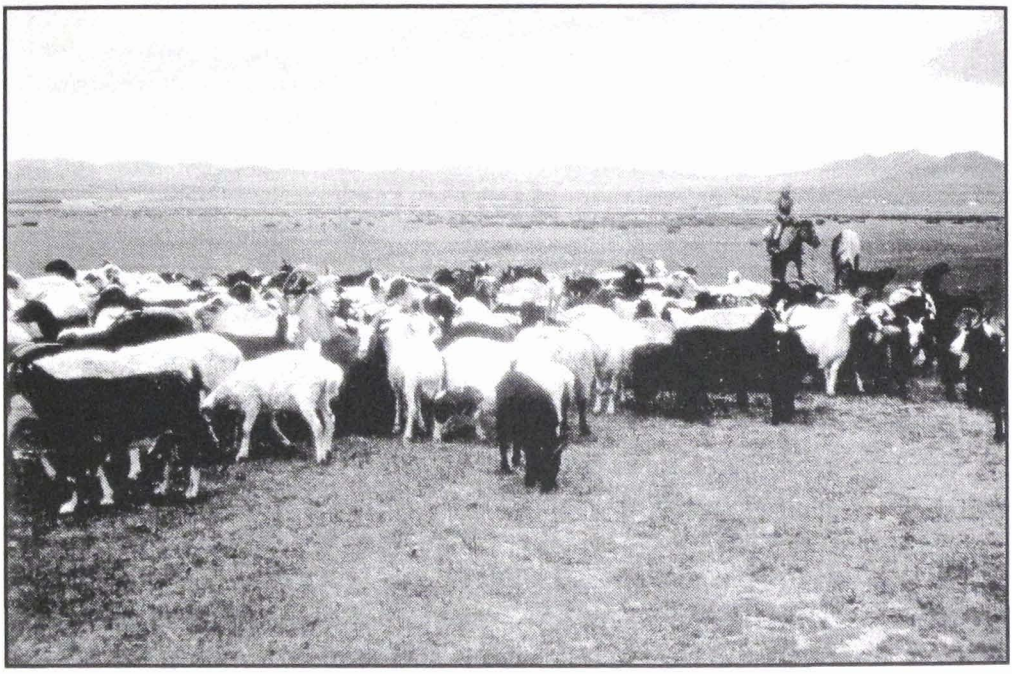


Fig. 1. Mongol woman herding. Western Mongolia. (July 1992)

Horseback riding in the early first millennium BCE was the catalyst that created the shift from a Bronze Age sedentary lifestyle to one of nomadism (Fig. 1). Although nomadic tribes are and were only minimally dependent for their subsistence upon the agricultural produce of the oases, they did not exist in isolation from farming communities. In reality, the relationship between the two socioeconomic systems was completely symbiotic and interdependent, and was always fluid. For example, as a result of adversity that could include the loss of a herd, or because a nomad had learned a profitable trade such as metallurgy, the family became sedentary. Those that were mobile bartered for some food stuffs, particularly grains, from the oases. Economically, a good lamb crop or tribute obtained from traders increased the nomads' wealth. If there were

surplus wealth the nomad augmented the herds and made investments using ancient exchange mechanisms to obtain cultic necessities, personal adornments, and other luxury items.

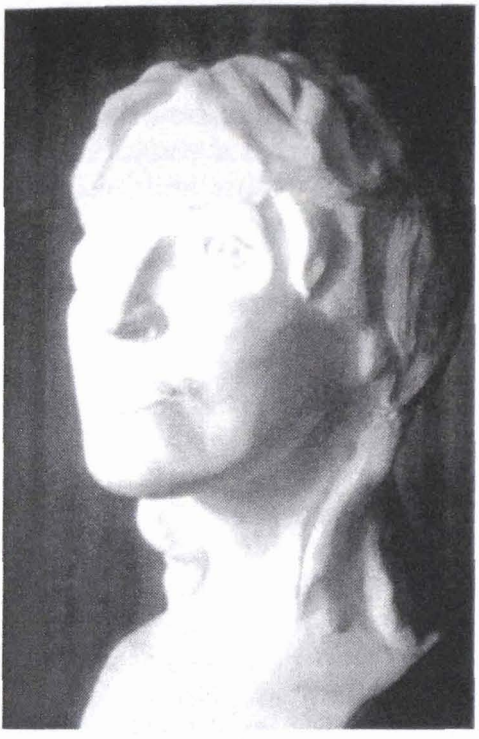


Fig. 2. Reconstruction of a 1st millennium BCE skull of a nomadic woman with Indo-European features. Reconstruction by Leonid T. Yablonsky, Russian Institute of Archeology, Moscow.

Fig. 3. Sculpture of a warrior who originally held weapons, now lost. Although he wears a kilt his chest and feet are bare. The bronze helmet is said to be of Greek origin but the stylization of sculpture with short body and large feet and hands is not Greek. Bronze, cast. Künäs County, Warring States Period, 480-222 BCE.

The Sauromatians and Sarmatians belonged to the Early Iron Age nomads who also include the Scythians and Saka. Political stability among these tribes between the 7th-3rd centuries BCE allowed the development of the "Scythian triad" composed of horse harness accoutrements, weaponry, and artifacts embellished with the animal style, particularly artifacts showing zoomorphic images of the bird, the hoofed animal, and the beast of prey (Petrenko 1995:36). Occupying the steppes of Eurasia from southern Russia, through southern Siberia, south to include all of Kazakhstan, and into northwestern Mongolia, the early nomads were Indo-Europoids (Fig. 2) (other Sarmatian reconstructions are illustrated in *Stepi,* 1989:353, Fig. 48, 3) and historical texts document that they spoke an Indo-

Iranian language. At about the same time Indo-Europoids were also represented in the art of Xinjiang (Fig. 3).

During the first millennium BCE the nomads practiced either vertical or horizontal transhumance and should be considered nomadic as they trailed herds into the high summer pastures or out across the steppes in the spring, summer, and fall but wintered in protected valleys and along rivers where they maintained more permanent habitation sites. Following upon the cultural traditions of the second millennium BCE Bronze Age sedentary cultures, the Iron Age Xinjiang nomadic cultures appeared in the first millennium BCE. Although practicing transhumance they also maintained evidence of agricultural endeavors. This would be expected as these populations, bounded by several mountain ranges and the Täklimakan Desert, would have practiced a relatively confined transhumance. They would have been able to sow grain in the spring and harvest it in the fall after returning from the higher elevations–the summer pastures–with their herds. Moreover, the older generation may have maintained a home base during the transhumance season which would have allowed an even greater exploitation of agriculture.

In Xinjiang, the first millennium BCE archeological cultures have been identified and grouped according to location and types of artifacts found in the burials.[1] Those associated with nomadic societies include the Charwighul Culture (Chawuhugoukou) in Khotunsumbul (Hejing) County, and the Yanbulaq (Yanbulake) near Qumul City (Hami). To the west, the Chong Bagh (Qumbake) Culture is found near Bügür (Luntai) City on the northern rim of the Täklimakan Desert (Debaine-Francfort 1989; Chen and Hiebert 1995: 274-283). South of Ürümchi, the Alwighul (Alagou) tradition is identified as having two phases; the latter one relates more definitively to the Early Nomads. Also located near Ürümchi, artifacts from the Yewirghul (Yu'er Gou) cemetery show close affinities to those from Alwighul (*Xinjiang: 30 Years of Archeology*, figs. 29-34, 40-42).

The Gushi or Jushi Culture includes the Subeshi-Ayding Lake (Subashi-Aidinghu) tradition found in five necropoleis, listed here in chronological order: 1) the Subeshi (Subashi) cemetery located in Pichan (Shanshan) County, 2) Qaghichaq (Kageqiake) cemetery in Toqsun County; those of the Ayding Lake tradition, 3) Yar cemetery in the Turpan District, 5) Chäkman cemetery near Lämjin in Pichan County, and 5) Yengi Yaylaq (Yingyayilake) in Toqsun County (Debaine-Francfort 1989:189-190). To the west of the Ayding Lake tradition several cemeteries comprise the Yengidala (Xintala) group. In addition, the so-called "Saka Culture" is found in the Ili River valley

[1]Some discrepancies in dating exist in the reports by Debaine-Francfort (1988, 1989) and Chen and Hiebert (1995). Xinjiang burials containing typical Early Iron Age artifacts are those included for comparison in this paper.

and the Tian Shan Mountains (Chen and Hiebert 1995: 250-252).

More than a few burial rituals and mortuary offerings of these archeological cultures have striking parallels with those of the Saka, whose kurgans are found in southern and central Kazakhstan, as well as those belonging to the Sauromatian and Sarmatian nomads whose kurgan cemeteries are found in the southern Ural steppes. (Davis-Kimball and Yablonsky, 1995; Yablonsky, et al., 1993, 1994, 1995, 1996). It should be noted that the Sauromatians and Early Sarmatians used the Pokrovka cemeteries over a period of perhaps 400 years, a time span that would naturally allow for changes in burial rituals and for variations in types of artifacts. For instance, it is apparent that an evolution from primarily bronze to primarily iron arrowheads in burials occurred within this period. In contrast, throughout the entire time period, several different kurgan architectural features, including shaft pits, catacombs, and pits with niches (*podboi*), were used simultaneously. We may assume that similar phenomena as we have documented at Pokrovka also occurred in the Tian Shan Mountains cultures under discussion.

Typical archeological assemblages from five Early Iron Age Xinjiang cemeteries, noted below, are used as comparative materials to illustrate the interaction between nomads in three diverse Eurasian steppe regions: Xinjiang, the Semirechiye, and the southern Ural steppes.

1) From the Yanbulaq cemetery burials in shaft graves, the deceased was often placed on a wooden platform with a reed mat. Rich and diverse mortuary offerings that parallel the early nomadic inventory from the Eurasian steppes include arrowheads, plain mirrors, astralagi, (cowry) shells, earrings, beads, and a small assortment of iron objects such as a knife and possibly a sword.

2) Some Subeshi burials[2] have shaft pits employing dromos that allowed collective inhumations. Typical nomadic artifacts include bronze, iron, bone, agate, and felt.

3) The Charwighul Culture (Chawuhugoukou) has the same assemblage as at Chong Bagh (Qunbake) which includes wooden bowls, spindlewhorls, arrowheads, earrings, beads, colored stones, small round-bottomed pots, and horse harness accoutrements. The deceased were placed on wooden platforms and reed mats. Burial customs at Chong Bagh included the use of logs, reeds, and grass mats. Evidence of burning in the burials is also present. As in burials in the southern Urals, the fires may have been squelched as soil and stones were piled to form the mound.

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[2]There is conflicting information concerning the existence of kurgans at Subeshi. Victor Mair indicates he did not see any in 1995 although there were hundreds of seriously disturbed burials (personal communication). Debaine-Francfort (1989:190) reports 40 stone tumuli with a height of 20-50 cm and 1-2 m in diameter. These would be quite small kurgans.

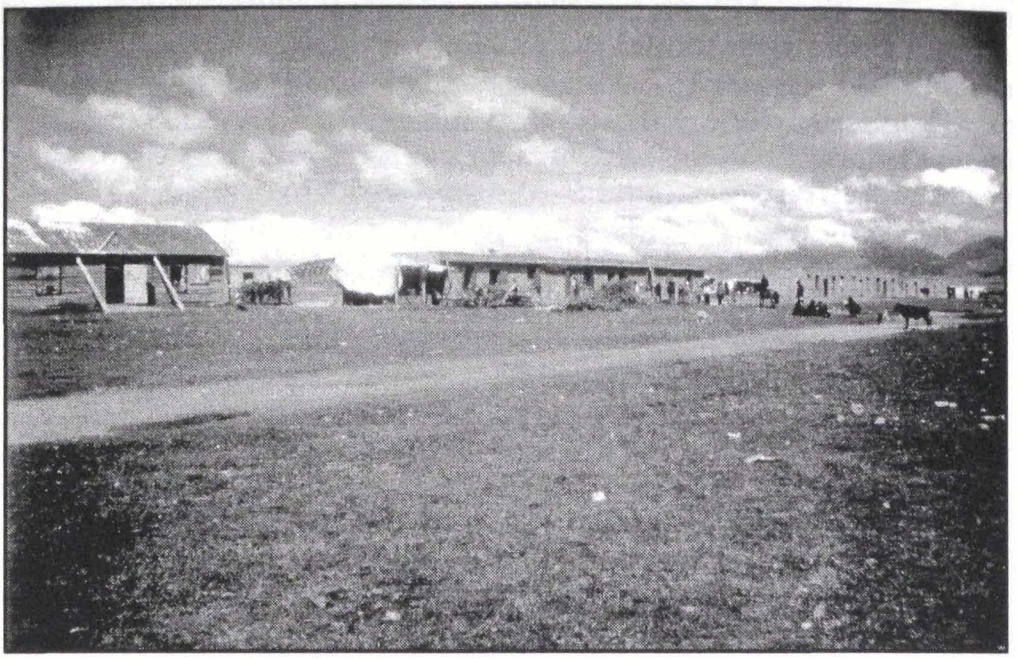

Fig. 4. Kiosk bazaar at Lake Sayram, Xinjiang. Mongol and Kazakh herders and families meet to trade and talk during summer pasture. (July 1991)

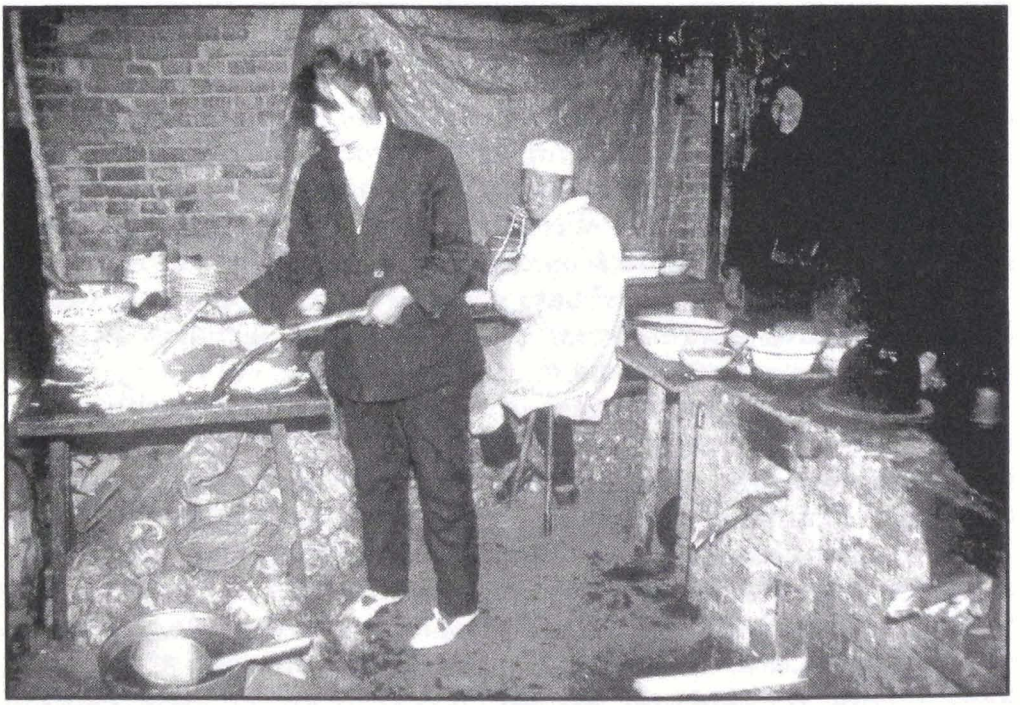

Fig. 5. Hui (Chinese Muslims) making lapshak (noodles) in their restaurant at the Lake Sayram bazaar. (July 1991)

4) The earlier phase of the Alwighul cemetery is represented by fine painted pottery more typical of a sedentary culture. More representative of nomadic culture is the later phase, defined by horse

trappings, fine animal style art, and cultic objects including large bronze cast altars and cauldrons, that is closely associated with Early Iron Age cultures in the Eurasian steppes.

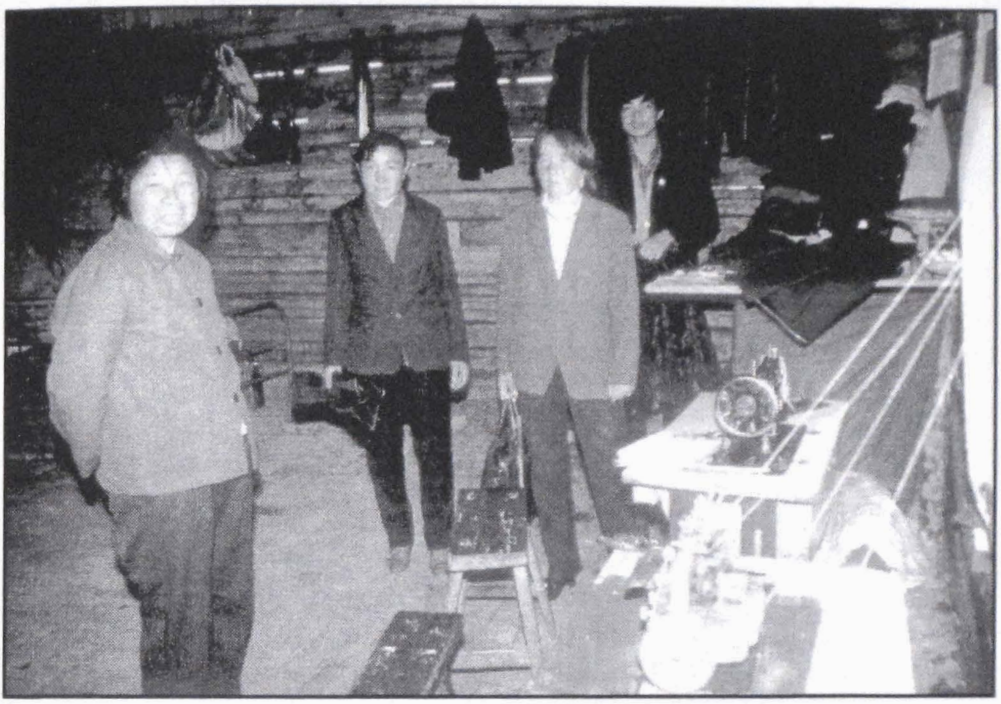

Fig. 6. Han Chinese merchants repair and make new clothing at the Lake Sayram bazaar (July 1991)

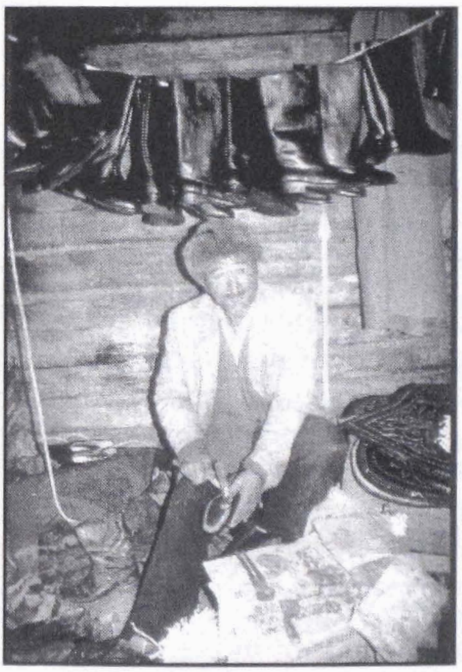

Fig. 7. A Kazakh bootmaker at the Lake Sayram bazaar displays boots that he has made seen hanging in the background. (July 1991)

5) The "Saka" kurgans in the Tian Shan and Ili Valley include ritual altars, bronze mirrors, agate beads, and animal style objects.

These burial rituals and mortuary offerings in Xinjiang share

many common features with those of the Semirechiye in southern Kazakhstan and the southern Ural steppes. Although the distances are great and the unending steppes appear formidable, one mechanism for trade and commerce, documented in 1992, is illustrated by a contemporary, and temporary, bazaar maintained during the summer pasture season in the Xinjiang Tian Shan Mountains (Fig. 4). In the small kiosks placed near the shores of Lake Sayram, Mongol and Chinese Kazakh nomads barter or buy utilitarian and luxury items from the sedentary Uyghurs or Hui (Fig. 5), Han Chinese (Fig. 6), and Kazakh merchants (Fig. 7).

To compare but a small sampling of Iron Age artifacts that reveal a common basis for cultural similarities and cultic beliefs, a few examples have been chosen. In Xinjiang, the Semirechiye, and the southern Urals burial architecture, orientation and position of deceased frequently takes the same form: pit burials, the use of wood and cane mats, and the deceased in supine position (Chen and Hiebert 1995, figs. 7, 13; Davis-Kimball and Yablonsky 1995). From throughout the Eurasian steppes as far west as southern Russia, parallels are found in pottery shapes and decorative motifs (Debaine-Francfort 1989, figs. 3, 5, 6 and 9; Chūgoku Shinkyō Shutsudo Bunbutsu, fig. 34; Chen and Hiebert, 1995, fig. 14) including Early Sarmatian pottery from the Ural steppes (Barbarunova 1995:130, fig. 31) and from the Pokrovka burials (Davis-Kimball and Yablonsky 1995; Yablonsky et al. 1993, 1994, 1995, 1996). Plain bronze mirrors are found in all three regions (Chen and Hiebert 1995, fig. 14; Chūgoku Shinkyō Shutsudo Bunbutsu 1988, fig. 12; Davis-Kimball and Yablonsky, 1995; Yablonsky et al. 1993, 1994, 1995, 1996) as are trilobed bronze socketed and shafted arrowheads (Pokrovka male and female burials, Davis-Kimball and Yablonsky 1995; Yablonsky et al. 1993, 1994, 1995, 1996; *Xinjiang: 30 Years of Archeology*, fig 52; *Rōran Ōkoku to Yūkyū no Bijo*, figs. 29-31, 33), sea shells from priestess burials (Davis-Kimball 1997b; Yablonsky et al. 1995, 1996; Wang Binghua, *Archeological Discoveries*, fig. 32), and beads in a variety of materials and shapes (Davis-Kimball and Yablonsky 1995; Yablonsky et al. 1993, 1994, 1995, 1996; Hall and Yablonsky, "Chemical Analyses"). More specific items such as intricate detailing are seen on conical-shaped temple pendants and rings also from the priestess burial at Pokrovka (Davis-Kimball 1997b). Near identical rings embellished with gold granulation and set with gemstones, revealing Greek workmanship, were excavated from a Lebedevka kurgan in the southern Urals (Uralsk *oblast*) (Akishev 1983:184) and from a Xinjiang burial (Chūgoku Shinkyō Shutsudo Bunbutsu, fig. 20); these are identical to a ring from the Sarmatian Sokolov kurgan located in the Bugh River region, southern Russia (Kovpanenko 1986, figs. 23, 30, 32, 35). The unusual fish motif fashioned in gold comes from the Chilikta Kurgan 5 in eastern Kazakhstan (Akishev 1983, Pls. 56-57) and from Pokrovka

Cemetery 02, Kurgan 09, Burial 01 (Yablonsky, et al. 1995, fig. 68). The diffusion of similar motifs, and in some cases nearly identical adornment, implies that these luxury items entered their respective yurts from a common market.

Fig. 8. Bronze altar with two winged lions, cast bronze. Yewirghul cemetery, Keremchi Commune, Xinjiang, Warring States Period, 480-222 BCE.

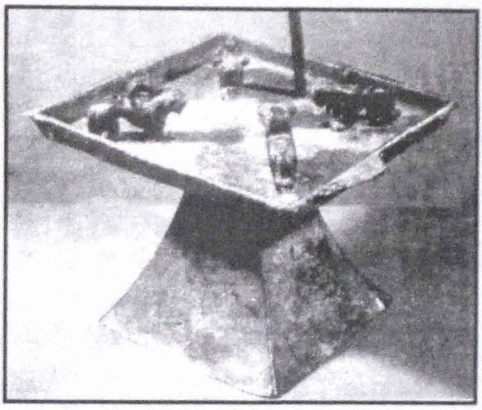

Fig. 9. Bronze altar with four winged lions, cast bronze. Semirechiye, Kazakhstan, Saka Period, 5th-4th centuries BCE.

Small bronzes played the most prominent metallurgical role among the mortuary artifacts from Pokrovka and neighboring Early Sarmatian sites. During the Iron Age metallurgy was a major contribution to the economy of Xinjiang. Moreover, the larger and more sophisticated bronzes found in the Semirechiye and Xinjiang reveal the identification of the distinct nomadic cultures and indicate various degrees of interaction with sedentary cultures (di Cosmo 1994:1108-1109). The sophistication of bronze casting may be attributed in part to two copper mines near the present day city of Nilqa in the Tian Shan which were worked during the Early Iron Age (Debaine-Francfort 1989:184.). In 1992 we visited one of the copper mines located about three kilometers from Nilqa city. The vein had been completely mined out in antiquity. Slag from an ancient smelter had been scooped up with coarse slate-like stones to surface the roadbed which led to a lower mine currently being worked. The copper ore was broken up at the site using large stone hammers, several of which lay on the ground surface near the mine. Apparently only bronze ingots were prepared at the Nilqa mines and the artifacts were cast in another location (Debaine-Francfort, personal communication).

Two types of monumental cast bronzes attest to the cultural, cultic, and economic ties which existed between the Early Iron Age nomadic cultures in Xinjiang and those of the Eurasian steppes. The

first is the pedestaled altar ornamented with several species of zoomorphs and the occasional inclusion of an anthropomorphic image. The second is the cauldron of two distinct types, both used for rituals and ceremonies, and in a smaller format for votive or mortuary offerings.

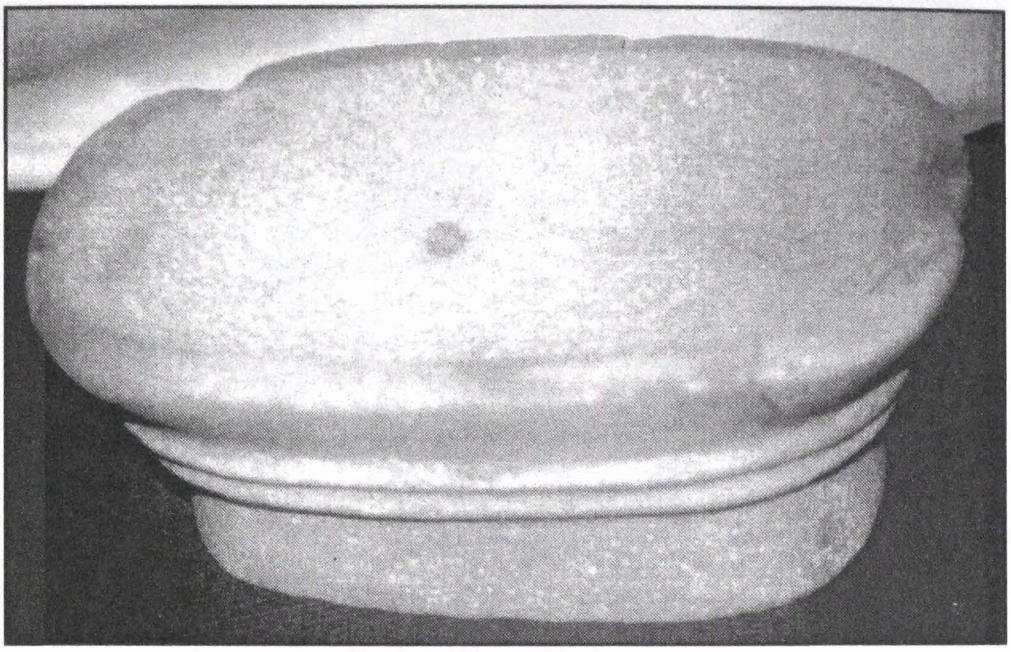

Fig 10. Stone carved altar from the priestess burial. Pokrovka 02, Kurgan 03, Burial 02. Excavated at Pokrovka, Russia by the 1993 American-Russian Ilek Archeological Expedition, Sauromatian Period, 6th-5th centuries BCE.

The similarity in style and motif is extremely striking between a series of monumental bronze pedestaled altars holding cast winged lions and other zoomorphs from the Semirechiye (Artamonov 1973:43-48, 51) including one group which used zoomorphic juncture composed of monster heads on lions' bodies (*Stepnaya:* 1992, fig. 27). One altar from Yewirghul, excavated from the Keremchi Commune, has two winged lions standing in the center of the platform (Fig. 8). Another similar altar from the Semirechiye has four winged lions placed in the corners facing inward (Fig. 9). From a stylistic point of view, it could not be disputed that these altars came from the same workshop, possibly one that received bronze ingots from the Nilqa mines. Other similar bronze pedestaled altars are known: a fragment of a square altar with parading lions around the top rim from the Kyrgyzstan Tian Shan region (Sadykov 1987, fig 14), two lacy-pedestaled altars, one with a seated man and horse on the platform from the Issyk region in the Semirechiye (Telzhanov 1981, fig. 12) and the other from the Issyk Kul region in Kyrgyzstan (Sadykov 1987, fig. 10). An altar with an open-work pedestal, parading lions around the rim, and two Bactrian camels in the center of the platform is also

from the Semirechiye (Telzhanov 1981: 60), while another with four winged lions *passant* was found far to the northwest near Pokrovka village in the southern Urals (Telzhanov 1981: 61). A square altar with the four legs embellished with zoomorphs in low relief from Xinjiang has been dated to the Warring States Period (*Rōran Ōkoku to Yūkyū no Bijo* 1992 , fig. 307).

Perhaps because of the shortage of copper for making bronzes, altars excavated from the southern Urals in a Sauromatian context were carved from stone and frequently modeled in terracotta (*Stepnaya* 1992, fig. 54). A number of elaborate stone examples from the lower Volga River region and the Aktyubinsk area in northwestern Kazakhstan, include those with tripod legs embellished with zoomorphs (Dvornichenko 1995: 114, figs. 24-26). Altars excavated from Sauromatian priestess burials, such as one from Pokrovka Cemetery 02 (Fig. 10), were used in rituals probably maintaining a belief system similar to those in the Semirechiye and Xinjiang.

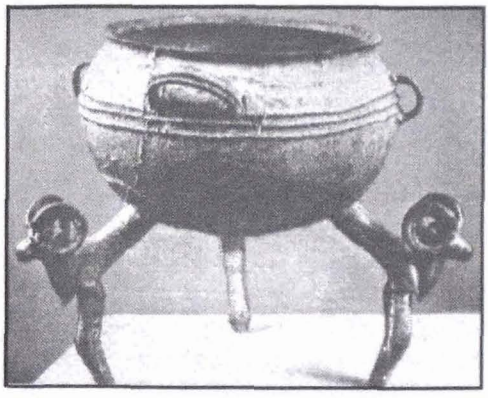

Fig. 11. Type One bronze cauldron with round handles and decorated with mouflon heads set on bent tripod legs. Alma Ata raion, southern Kazakhstan, Saka Period.

Fig. 12. Type One bronze cauldron. Künas County, Xinjiang, Saka Period.

Cauldrons have an extremely wide distribution across the entire Eurasian steppes, from the Danube in the west to south of the Amur River (Érdy 1995: 8, 52, fig. 2). Cast in bronze or copper and molded from ceramics (*Stepnaya* 1992, fig. 89), they were also the theme of petroglyph cultic scenes (Bokovenko 1995: 281, fig. 36, Martinov 1991: 65-66, figs. 96-98). Two general types of cauldrons were cast. Type One, associated with the Saka-Scythian tribes, has three legs or a short stand, is bowl-shaped with a round belly, and has handles are frequently decorated with zoomorphs. Type Two, attributed to the Xiongnu, is cylindrical-shaped, is often placed on a conical-shaped stand, and has rectangular or upright handles that are frequently decorated with mushroom-like projections. The Xiongnu Confederacy, which moved westward from north of the Great Wall, are known to have had a stronghold in Xinjiang and their burials

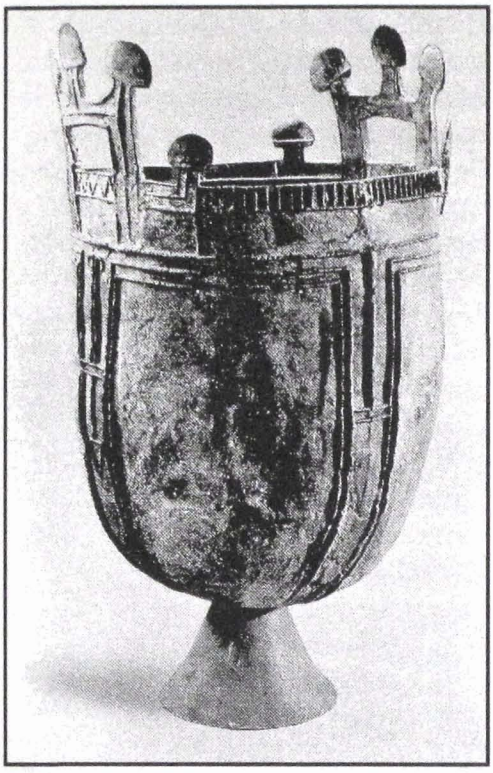

Fig. 13. Type Two bronze cauldron, vase-shaped with a conical pedestal, and three mushroom-shaped projections on each handle. Jungghar (Dzungaria) region, Xinjiang, Later Han Period (25-220 CE).

Fig. 15. Bronze pedestaled cauldron with mushroom projections on upright handles. Kök-tokay, said to be from the Warring States Period (480-222 BCE). However, its configuration with mushroom-shaped projections on the handles dates it to the Later Han Period (25-220 CE).

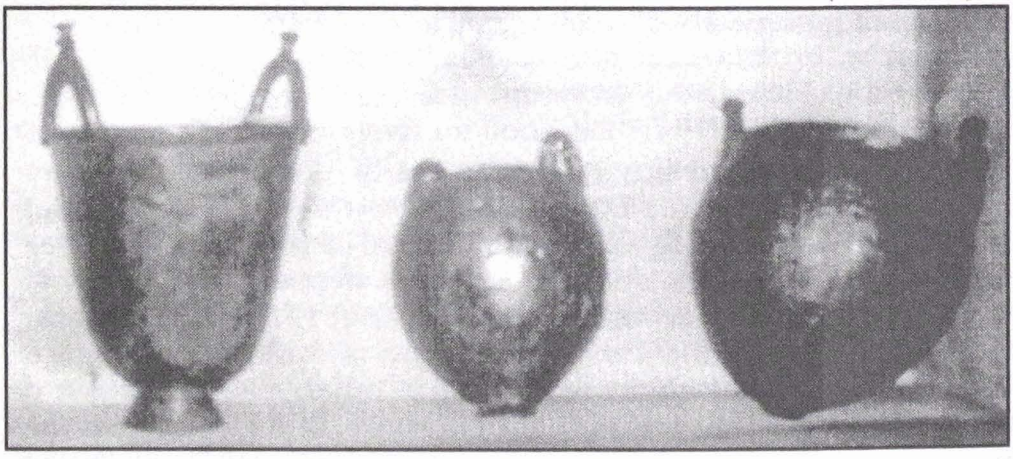

Fig. 14. Three cast bronze Sarmatian votive cauldrons excavated in the southern Ural steppes. Late Sarmatian Period, 2nd-4th centuries CE.

beneath large kurgans have been excavated in the Semirechiye (personal observation). They passed through the southern Urals in the early centuries of our era as witnessed by the excavations from

Pokrovka cemeteries 02 and 10 of two Hunnic burials–males with deliberately deformed skulls (illustrated in Davis-Kimball 1995). It would appear that the Type Two cauldrons were introduced into the Late Sarmatian Culture when the Huns passed through on their march westward. As a Sarmatian mortuary offering they were cast in miniature and in the new cultural context may have assumed a votive nature.

A Saka-Scythian Type One cauldron from the Alma Ata *raion* (region) is bowl-shaped with two strap handles and three raised vertical ribs decorating the sides. It is embellished with mouflon set upon the "knees" of the bent tripod legs (Fig. 11). However, the mouflon are not found on the essentially identical cauldron from, Kūnās County (Fig. 12). Two other cauldrons, one from Semirechiye (Telzhanov 1981:8) and the other from the Lake Issyk Kul region (Sadykov 1987, fig. 15) are identical to the Xinjiang piece. These three cauldrons reveal the firm relationship between Xinjiang and the Semirechiye. The tradition of bronze cauldrons in the southern Urals appears in the 4th-2nd centuries BCE. Early Sarmatian culture, based upon finds from the Alitub and Pyatimary I cemeteries (Barbarunova, 1995:129, fig. 30), and continues into the Late Sarmatian Period.

From the Jungghar (Dzungaria) region, South Mountain area in Xinjiang, some 50 km from Ürümchi and dating to the Later Han Period (AD 25-225) (Érdy 1996:32, tbl. 4,1), comes a vase-shaped cauldron with a conical pedestal and flat upright handles, each with three mushroom-shaped projections (Fig. 13). This is similar to smaller Sarmatian cauldrons from the southern Ural steppes, measuring 17-20 cm, and dating after the middle of the 3rd century CE (Fig. 14) (also see Moshkova 1995:153, 156, fig. 15). Because of their small size and unstable platform they may be considered votive objects. The bowl-shaped tradition from the Saka Period, now with mushroom projections on upright handles (Fig. 14, right), the vase-shaped cauldron (Fig. 14, left), and the near-identical cauldron from Kōk-tokay (Lanzhouwanzi) (Fig. 15) reveal the continued transmission of cultural concepts, cultic practices, and votive beliefs during the early centuries of our era between the Xiongnu and Late Sarmatian tribes.

Among the hoofed animals depicted in petroglyphs carved into the surfaces of rocky outcroppings which served (and continue to serve) as cultic sites throughout Eurasia, hooved animals including the deer and mouflon occupy prominent positions. Petroglyphs are found in such diverse regions as western Mongolia (Fig. 16) and southern Siberia (Francfort and Sher 1995; Martinov). Important cultic sites used over millennia include Tamgaly and Maimak in southern Kazakhstan (personal observation), Saimaly Tash, located high in the Kyrgyzstan Tian Shan (Bernshtam and Pomaskina 1952), and to the southwest in the Xinjiang Tian Shan Mountains (personal

observation; illustrated in *Tian Shan Petroglyphs,* 9-11, 13, 15, and 19).

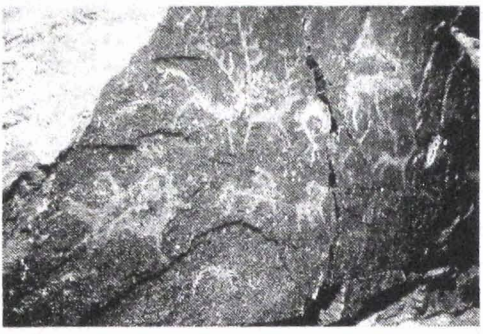

Fig. 16. Mouflon (left), roe deer with long spiked antlers (right), and possibly ibex (below), western Mongolia. Early Iron Age. (Photographed 1992).

Fig. 17. Mouflon in the guise of a sun god. Late second, early first millennia BCE, Issyk Kul region, Kyrgyzstan.

The mouflon, an animal of special significance during the time of the Early Nomads, was defined by virtually identical stylization in diverse media. One of the most frequent forms of representation are those elegantly portrayed on stone in the guise of a sun god at sacred cultic sites in Kazakhstan and Kyrgyzstan (Fig. 17) (other illustrations in Davis-Kimball and Martinov 1993, Pls. 325, 329, 331, 333, and 334, A. Maksimova, et al. 1985; Martinov 1991; Novgorodova 1979). As noted above during the Saka Period the mouflon was represented on cauldrons further emphasizing cultic semantics. From Qumul City (Hami) a mouflon elegantly graces the handle of a bronze mirror (Fig. 18). The same animal was also the primary decoration on horse trappings from a Tasmola Culture female burial in central Kazakhstan (Fig. 19). In a more stylized rendering, possibly dated later than the Warring States Period, abstracted bronze mouflon from Xinjiang were accoutrements for harnessing (Fig. 20).

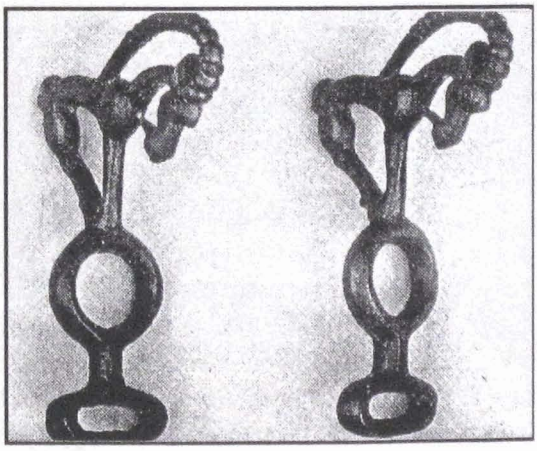

Fig. 18. (left) Bronze mirror with mouflon handle. Saka Period, Qumul City, Xinjiang. Fig. 19. (Right) Mouflon decoration, horse trappings. Saka Period, Tasmola Culture, Central Kazakhstan.

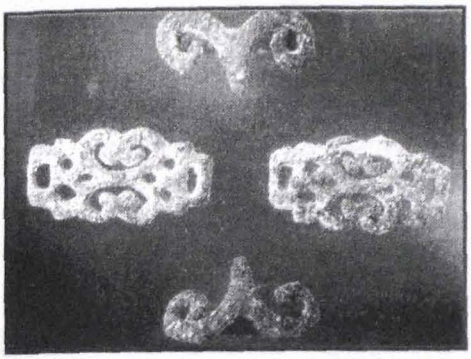

Fig. 20. Decorative plaques probably used on a horse harness, stylized mouflon heads (top and bottom). Possibly Late Saka Period, Xinjiang.

Fig. 21. Gold mouflon, decorative elements for a belt or horse harness. Early Sarmatian Period. Excavated at Filippovka 'tsar' burial, southern Ural steppes. All Filippovka artifacts were excavated by A. Kh. Pshenichnuk, Ufa (Bashkortostan) Scientific Center, Russia Academy Federation, and are reproduced with the permission of Prof. Rael Kuzeev, History and Ethnography Museum, Ufa, Bashkortostan.

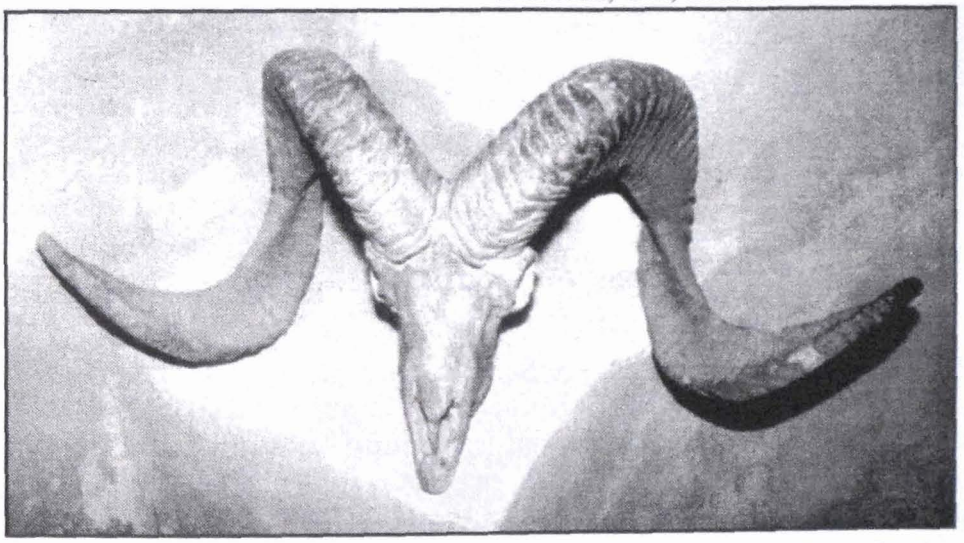

Fig. 22. Mouflon skull venerated at the Akhmed Yasavi Mausoleum. Turkestan city, Kazakhstan (July 1990).

In the late 1980s near the village of Filippovka, located about 50 km northwest of Pokrovka, archeologists from Ufa, Bashkortostan excavated a group of kurgans. The central burial of the largest of the mounds, Kurgan 1, had been robbed in antiquity. However, two lateral 'treasure troves' containing more than 600 gold objects were excavated. Displaying various forms of animal style, the objects were rims and handles for wooden vessels, horse harness accoutrements,

and plaques including those that probably decorated the royal caftan. From this treasure more than 20 representations of the couchant mouflon cast in gold may have been used as decorative elements for belts or straps on a horse harness (Fig. 21). Indicating the longevity of belief systems in this part of the world, many of which are still practiced today, a group of mouflon skulls are preserved in the holy Akhmet Yasavi mausoleum in Turkestan city, Kazakhstan (Fig. 22).

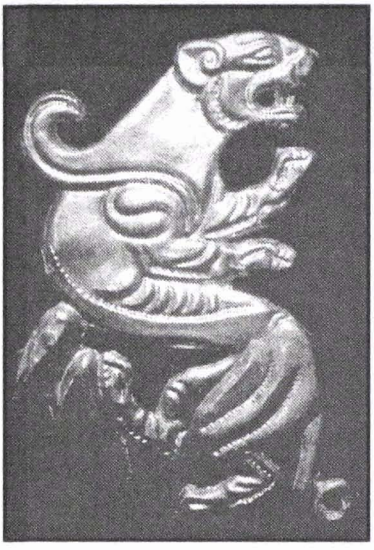

Fig. 23. Winged feline, probably representing a snow leopard in the guise of a sun god. Saka, 5th-4th centuries BCE, so-called "Gold Man"—warrior-priestess burial, Issyk, southern Kazakhstan.

Fig. 24. One of several round plaques embossed with a coiled feline. Alwighul, Xinjiang, Warring States Period, 480-222 BCE

Fifty kilometers northeast of Almaty, in the Semirechiye, a chance find prompted archeologists at the Kazakhstan Institute of Archeology to excavate a large Saka kurgan which was located on the left bank of the Issyk River. Although the central and main burial had been robbed, a secondary burial was found laterally in the mound. Interred was a high status person, originally interpreted to be that of a Saka nobleman, and referred to as the Gold Man because of profuse gold ornamentation including those in animal style found on his caftan, belt, greaves, and pointed headdress (Akishev 1978:25; 1983:78). Subsequently, because of other diagnostic artifacts in the burial, it was felt that the personage was a female warrior priestess (Davis-Kimball 1997). Among the elaborate animal style art in the burial are several representations of a feline depicting the Tian Shan snow leopard (Fig. 23), twisted at the flank in a manner reminiscent of the zoomorphs from the Pazyryk burials in the Altay Mountains. From Alwighul, Xinjiang, gold felines are stylized almost identically to

the Issyk felines, except for deviation in posture (Fig. 24).

The implication for the exaggeration of the racks of horns on deer is unknown but this stylistic feature and certainly its belief system were shared between numerous Early Iron Age tribal units. Although executed in unique postures, the first two-dimensional while the other is three-dimensional, the gold plaque from the Issyk Warrior-Priestess burial (Fig. 25) and the stylized deer carved from wood and covered with gold foil from the Filippovka "tsar" kurgan in the southern Urals (Fig. 26) share overstatements in their racks of horns.

Fig. 25. Gold plaque representing a deer with an exaggerated rack of horns. Saka, 5th-4th centuries BCE, Warrior-Priestess burial, Issyk, southern Kazakhstan.

Felines in "clawing position" are represented on gold plaques from a female priestess burial from Pokrovka Cemetery 02 (Fig. 27) and on three identical gold hammered and repoussé plaques from Alwighul (Fig. 28).

Even metallurgical working techniques, perfected in the ateliers located at sedentary sites, were shared between different regions. Stylistic details such as the representation of the feline's fur on a three-dimensional handle which embellished a wooden bowl excavated from the Filippovka burial (Fig. 29) and the pelt of the Yewirghul gold feline plaque (Fig. 30) are not only similar but also harken back to the Issyk heraldic snow leopard (Fig. 23).

In addition to realistic animals with distinctive stylistic traits, flat minimalization of the animal style also occurred in the southern Urals steppes at Filippovka (moose), the Tasmola Culture in central Kazakhstan (bird of prey) (Yablonsky 1995: 206, fig. 14; *Stepnaya* 1992, fig. 54), and Ayding Lake Xinjiang (horse) (Debaine-Francfort 1989:193, fig. 12). These plaques were probably all imports into their respective regions from unknown workshops.

A bronze plaque, excavated from a male warrior burial at Pokrovka Cemetery 02, originally was one of two belt buckles depicting a well known animal combat scene: two predators attacking a horse whose hindquarters are twisted upward (Fig. 31). The plaque originated in northern China or Xi'an in Shanxi Province and became a trade item to a Sarmatian. Xi'an was the Western Han capital from 206 BCE - 5 CE (So and Bunker 1995:144, fig 64). A second bronze plaque discovered at Dongchengzhen east of Urümchi depicts fighting stallions (Fig. 32). The fighting stallion plaques are known from Mongolia, Inner Mongolia, and southern Siberia, and stylistically relate to gold plaques in the Siberian Treasure of Peter the Great (Bunker 1981: 163-165, and No. 877.)

Fig. 26. Stylized deer, gold foil over wood. Early Sarmatian Period, 4th-2nd centuries BCE, Filippovka "tsar" burial, southern Ural steppes.

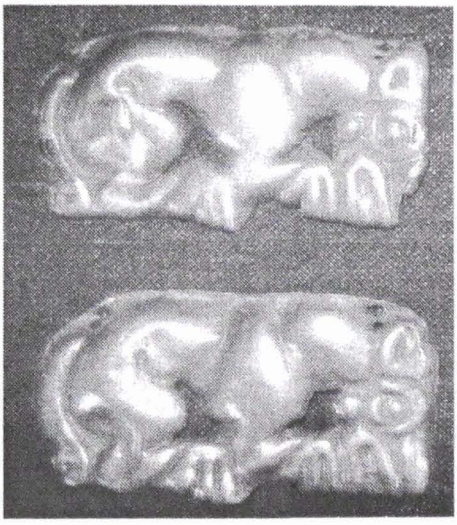

Fig. 27. Gold plaques in form of "clawing" snow leopards. From the priestess burial, Pokrovka Cemetery 02, Kurgan 03, Burial 02, Early Sarmatian, 4th-2nd centuries BCE, southern Ural steppes.

Fig. 28. One of three gold plaques, felines in "clawing" position. Warring States Period, 480-222 BCE, Alwighul, Xinjiang.

Fig. 29. Three-dimensional zoomorph, handle from a wooden dish, cast gold. Early Sarmatian Period, 4th-2nd centuries BCE, Filippovka "tsar" burial, southern Ural steppes.

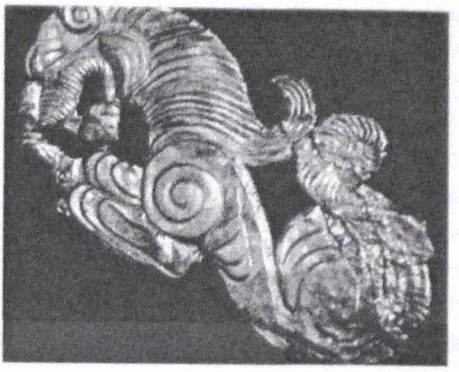

Fig. 30. Feline plaque. Alwighul, Xinjiang, Warring States Period, 480-222 BCE.

Fig. 31. Bronze cast plaque of combat scene, two predators attacking a horse. The plaque was traded to a Sarmatian warrior who was later buried at Pokrovka. He had reworked the plaque and attached it to his quiver with a leather thong. Excavated from Pokrovka Cemetery 02, Kurgan 17, Burial 02, originally from northern China. The burial is dated to the Early Sarmatian Period, 4th-2nd centuries BCE.

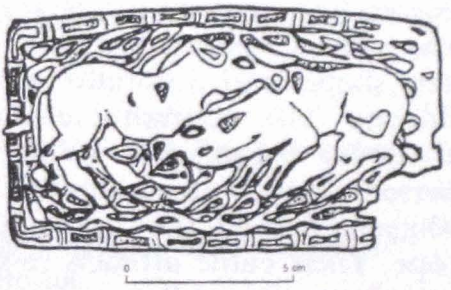

Fig. 32. Fighting stallions. Found in Dongchengzhen "East City", Mori County (Mulei) east of Ürümchi, 3rd-2nd centuries BCE. Similar plaques are known from Mongolia, Inner Mongolia, and southern Siberia.

Summary

These last two animal style plaques emphasize the extent of intratribal movement in Eurasia fostered by trade, disguised as tribute, or perhaps even acquired through booty, from approximately 700 BCE to 300 CE. This period correlates with the Spring and Autumn, the Warring States, and the Han Periods in China including Xinjiang, and with the Saka Period in Kazakhstan, the Sauromatian and Sarmatian periods in the southern Urals, and covers the centuries when the Xiongnu came into being as a confederacy that then pushed

westward across the Eurasian steppes into Europe. During this time cultural identities, traditions, belief systems, and life styles, built upon a common economic system (nomadism), contributed to the strong trading network that was maintained between Indo-Iranian speaking nomads from the Ural steppes, southern Siberia, northwestern Mongolia, Inner Mongolia, Kazakhstan, and Xinjiang. After the development of the new mobile lifestyle, the Semirechiye may have been the primary fulcrum for dissemination of trade and cultural systems. Because of its centralized position and its fertile lands watered by the seven rivers from whence its name derives, its social and political climate were conducive to the maintainance of an early Silk Route linking east with west and north with south. The Saka of the Semirechiye held a dynamic sphere of influence over those with a similar lifestyle in Xinjiang. Their influence penetrated into the Tasmola culture in central Kazakhstan, and included tribes who frequented the southern Ural steppes. Moreover, manifestation of analogous belief systems can be seen in comparable burial customs as well as mortuary offerings such as beads, bronze mirrors, sea shells, pottery shapes and decorative motifs, arrowhead types, altars, and cauldrons. The Xiongnu, a mixed Indo-Europoid-Mongoloid confederacy originating along the northern Chinese border, dispersed westward spreading their traditions from southern Siberia to Xinjiang, through the Ural steppes, into southern Russia thence to Europe. Their cultic artifacts reveal a repetition of early nomadic artistic elements as well as an integration with indigenous tribes they encountered during their movements westward. Further research will undoubtedly correlate more accurate dating of Saka-Sarmatian artifacts with those from Xinjiang. It will also further emphasize that the mummies from Xinjiang were not an isolated cultural phenomenon but rather that they were integral to the vast Eurasian nomadic and sedentary cultures of the Bronze Age and Iron Age.

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The Role of Agro-pastoralism in the Evolution of Steppe Culture in the Semirechye Area of Southern Kazakhstan during the Saka/Wusun Period (600 BCE-400 CE)

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At the northern littoral of the Tian Shan mountains bordering the southern edge of the great Eurasian steppe, recent archeological investigations at Tuzusai, a Saka/Wusun period settlement site, indicate the development of a multiple-resource economy based on the cultivation of wheat, barley, and millet and the herding of sheep, goats, cattle, and horses. We put forth a model for steppe evolution during the Scythian Period along the circumscribed alluvial fans of the Tian Shan Mountains. Environmental data, architectural information, seed, charcoal, phytolith (microscopic opal silicates), and animal bone remains suggest the existence of a year-round or seasonally based agro-pastoral settlement. We hypothesize that the social evolutionary development of Eurasian steppe communities such as Tuzusai was probably dependent upon the ability of the "nomads" to protect the fertile pockets of cultivated land where farming, herding, hunting, and gathering activities were most viable. The nomadic confederacies that could protect this multiple-resource base later became the chief purveyors of goods, military strength, and political clout along the Silk Route.

"Therefore,
The large state wishes only to annex and nurture others;
The small state wants only to join with and serve others.
Now,
Since both get what they want,
It is fitting for the large state to lie low."

Tao Te Ching by Lao Tzu, translated by Victor H. Mair (New York: Bantam Books, 1990), Chapter 24, page 31.

Introduction

Commenting on the authority of the state, the great teacher Lao Zi believed that a large state could subsume the smaller states by lying low. What were the economic foundations for the social evolution of Middle Asian communites during the late Saka/early Wusun period (400 BCE to 100 CE) in the Talgar Region of southeastern

Kazakhstan? What historians, archeologists, linguists, and other scholars do not know is the degree to which the Indo-Iranian Scythian peoples of southeastern Kazakhstan and Xinjiang represented independent polities based primarily upon steppe nomadism or were part of a larger complex of an Eurasian mixed herding and farming economy. Recent evidence of agricultural activities from Xinjiang of Saka and Wusun period sites along the Ili includes tombs with agricultural iron implements, foodstuffs made from wheat (*nan*), and other indications of an agrarian component (Di Cosmo 1994 citing Debaine-Francfort 1988; 1989; Wang 1962; 1987). Semirechye, the larger geographic area bordering the Tian Shan and Alatau Mountains on the southern edge of the Eurasian steppe, was a natural conduit for the development of complex societies based on sedentary farming-herding villages and specialized nomadism. In this paper we focus specifically on the archeological research conducted at Tuzusai, a Saka/Wusun period site, during 1994 and 1995, under the auspices of the Kazakh National Academy of Science, Institute of Archeology.

Our archeological research in Talgar establishes a set of contrasting opinions and hypotheses which refutes earlier models for the evolution of steppe societies from the Saka through the medieval and Mongol periods. By comparing Talgar to the classic Mesopotamian case of urbanism, we ask these questions: What role did the reputed "nomads" play in the transition from settled village to town and urban life on the Eurasian steppe? Did the nomads prey upon the agrarian civilizations or were they essential for maintaining the exchange and communication routes vital for the development of Chinese, Indus Valley, and Mesopotamian agrarian civilizations? We examine the possible answers to these questions by using the Mesopotamian case of social evolution as a comparative framework for understanding Eurasian steppe developments from the Saka period through the medieval Islamic period. According to Maisels (1990), town and urban development along the broad alluvial plains of the Tigris and Euphrates rivers of Mesopotamia was economically fueled by fishing, herding, hunting, and farming activities. The rise of elites and social hierarchy occurred because of the necessity for the temples or kin-based land-owning groups to manage and distribute the products produced by farmers, herders, fishermen, hunters, and artisans participating in the "broad spectrum revolution." Others such as Bates and Lees (1977) argue that pastoral nomadism as a specialization took place in Mesopotamia during the transition to irrigation agriculture during the fourth to third millennium BCE. Land once used for pastures was now claimed for irrigation purposes, thus displacing small local groups of herders, and forcing them to travel longer distances. Rowton (1973) gives a different view altogether, suggesting that Near Eastern nomadism was historically rooted in dimorphic chiefdoms or the dimorphic state, where pastoral

nomads were incorporated within both the structure of the tribal confederacy and the city-state as far back as the second millenium BCE in such states as Mari. The evidence from the Central Asian oases during the Bronze Age provides us with a contrasting view of the relationship between the city and the nomadic confederacy. Lamberg-Karlovsky (1994) speculates that the Bactria-Margiana Archeological Complex (BMAC) architectural styles during the Bronze Age and Iron Age were representative of a *qala*, or a large fortified complex complete with walls, bastions, and a gate that contained a large building within the compound walls which was the house of the community leader or the *khan*. Rather than the nomadic confederacy being attached peripherally to the town or the city, Lamberg-Karlovsky (1994) implies that the settlement itself housed the nomadic confederacy who were the rulers or elites of the town or urban community.

How did pastoral nomadic societies develop in Central and Middle Asia? The hypotheses put forth by Khazanov (1984: 94-95) and Lattimore (1940) suggest that the climatic changes or the " push" of marginal populations by sedentary agricultural societies into fringe areas led to the evolution of pastoral nomadism. Yet we now have substantial evidence that horseriding occurred as far back as 4300 BCE to 3500 BCE on the Eurasian steppe, as reported at Dereivka in the Ukraine, where evidence for bit wear on horse teeth was found in a horse cult burial (Anthony, Telegin, and Brown (1991: 94-100). At Dereivka, the authors describe a mixed economy of agriculture and the herding of horses, cattle, sheep, goats, and pigs. We suggest that there has been an "overemphasis" on the development of specialized pastoral economies based solely upon the evidence for the domestication and the riding of horses. In fact, the notion of the transformation of steppe society through the introduction of horse-based technology is an analogy derived from the historical example of the American plains Indians and their adoption of the Spanish horse (cf. Anthony, Telegin, and Brown 1991). This kind of ethnographic analogy is especially dangerous because it does not always consider the entire set of multiple herding and farming strategies already operative in Eurasian steppe society before horseriding which was absent in the Plains Indian culture of North America. The Plains Indians were maize agriculturalists, buffalo hunters, and foragers, but had not developed the same kind of integrated farming and herding economy of Eurasian steppe peoples.

Thus we wish to return to the hypothesis often put forth to explain the evolution from early agricultural to urban societies in Mesopotamia—"the broad spectrum revolution" (Maisels 1990). Animal herding and keeping, wherever found in the world, is always part of a multi-resource subsistence base; that is to say, herders must either cultivate agricultural products and gather wild foodstuffs, or

trade for these items. How pastoral nomads continued to be integrated into urban communities and even became the force behind the evolution of such nomadic states as the Xiongnu and the later Mongol empire will remain unclear until the archeological record can provide the necessary empirical data to support models based on the historiography of Inner Asia.

We must look beyond the models posited by Lattimore (1940) that emphasize bipolar opposites between the "desert" and the "sown", the nomad and the farmer. In our opinion, Di Cosmo (1994) is correct in characterizing most hypotheses for the evolution of later nomadic states like those of the Xiongnu and the Mongols as asserting "secondary state developments" stimulated by the need to raid, trade, or fight sedentary agricultural civilizations. In his historiographic examination of the *Shi ji* (*Records of the Grand Historian*), Di Cosmo (1991) argues an opposing view: the Xiongnu empire existed before the unification of China, thus possessing its own internal socio-economic development based on nomadic pastoralism and an ability to maintain sedentary agricultural communities within the empire's territories. The romantic stereotype of mounted horse nomadism on the Eurasian steppe has colored our ability to consider the agrarian foundations for these military confederacies or states. No doubt mounted horseriding allowed for the rapid spread and diffusion of languages, religion, and culture, although the foundations for steppe culture probably rested upon a multi-resource economic base. We argue that internal agrarian production contributed as much to the development of Scythian societies and later tribal confederacies and state empires as did the external relations with agricultural civilizations.

In order to achieve our objective of recognizing the agricultural component of nomadic life on the steppes, it is necessary to answer the following specific questions: (1) What was the relationship between herders and farming groups from the prehistoric Iron Age through the medieval period? (2) Did ancient pastoralism develop separately from farming systems based on the cultivation of wheat, barley, and millet? (3) What were the historical and cultural factors for the changing human use of the Talgar region, an area of colluvial foothills opening into broad steppe lands that led to the development of late Iron Age farming-herding villages, the development of specialized herding groups in the Saka/Wusun period, and then the medieval development of cities along the Great Silk Road?

How herders moved across the environmental zones of the Talgar region is essential for understanding their interactions with the farming groups. On the southern edge of the Eurasian steppe, two ethnographic models of nomadic movement have been posited: (1) the short-distance vertical movement along an elevational gradient from mountains to the steppe, from the *jailaq* (summer pasture) in

the mountains to the winter pasture in the steppe zone and (2) the long-distance horizontal movement across the steppe, from the warmer climatic zones of the grasslands in the south where herds of sheep/goats, cattle, and horses were grazed in the cold winter months to the colder climatic zones in the north where these same herds would be grazed in the summer months (Khazanov 1984: 20-22). These ethnographic models serve as "analogies" for considering the nature of herd-human movements across the five environmental zones of the Talgar Region: (1) desert steppe; (2) bunch grass steppe; (3) herb-bunch grass steppe; (4) mountain deciduous forest/meadow steppe; (5) mountain coniferous forest/meadows (Envirs 1995a). Each zone provides a range of possibilities for prehistoric and historic period economies and suggests that the "broad spectrum revolution" of hunting, herding, foraging, and farming in semi-sedentary communities influenced steppe development from the Iron Age throughout the medieval and Mongol periods.

One of the key differences between the physical geography of Mesopotamia and that of Eurasia, especially along the southern border of Eurasia from the Pamirs to the Tian Shan Mountains, is the distribution of fertile alluvial soils. Mesopotamia, flanked by the Taurus and Zagros Mountain Ranges and including the broad alluvium of the Euphrates and Tigris Rivers, was the cradle for early mixed farming and herding communities in the piedmont, and then later at population centers along the alluvium where irrigation agriculture was developed. Along the littoral of the Tian Shan Mountains, in the rain-shadow zone of the northern flanks where the foothills meet the large expanse of steppe, small rivers flow from the mountains into the vast steppe areas creating circumscribed fans. These alluvial fans include the middle zone of herb-bunch grass steppe with rich chernozem soils. The chernozem soil zone is usually the most productive for agriculture in the former Soviet Union (Peterson 1993: 97). The Talgar region, the locale of the famous Silk Route city of Talgar (occupied from the 8th century CE through the Mongol period [13th century CE]), is one such alluvial fan (approximately 144 sq km area) that originates from the base of the foothills (1200 meters in elevation) and slopes down toward the open desert steppe (680 meters in elevation). The region of Semirechye extending from this southern border of the Eurasian steppe, linking the deserts and oases of Central Asia proper to the border of the great Eurasian plain, is characterized by these small alluvial fans. From a geographical viewpoint, this is both a natural conduit between Central Asia proper and the western border of China, as well as being a zone potentially rich in fertile, agricultural land. Here the fans provide rich alluvium that could be dry-farmed or intensively cultivated using simple stream diversion or irrigation channels. In the Talgar area, about 10 to 15 km from the base of the foothills, the geological

situation changes and it is quite possible that the alluvium diminishes, thus rendering that area of the steppe less productive for agriculture because of the more compact and clayey soils.

We put forth the hypothesis that, after the Neolithization of this southeastern region of Kazakhstan for which few Neolithic sites are documented, Bronze Age and Iron Age settlements were probably prevalent along each one of these alluvial fans. In our opinion, the physicial geography and climate of the Talgar Region and neighboring valleys such as the Issyk Region, where the famous 6th-century BCE kurgan of Golden Man (the Kazakh National treasure) was discovered, were ideal locales for the following economies: (1) a mixed economy based on wheat, barley, and millet and the herding of sheep, goats, cattle, and horses; (2) a mobile pastoral economy tied to permanent village settlements in which herders practiced either short-distance vertical animal herding up and down the elevational gradients of the Tian Shan mountains or long-distance horizontal animal herding between the southern edge of the Eurasian steppe and the middle or central zones of the steppe; and (3) a range of multiple resource strategies including sedentary cereal agriculture, hunting and foraging, long-distance horizontal animal herding, and short-distance vertical animal herding. At any rate, archeologists working in these "edge" regions should expect to find a variety of site types ranging from permanent year-round farming and herding communities to specialized, seasonal herding settlements. Khazanov (1984:50) states that in marginal areas such as Semirechye the agricultural practices were ancient; thus nomads, semi-nomads, and agriculturalists often participated in the joint use of niches and zones. While Khazanov describes the competition for these niches and zones among farmers and herders as resulting in clashes and fighting, we speculate that the farmers, herders, and nomads were all integrated into single cultural groupings—and thus autonomous in their allegiance to a single polity. Our speculations are rooted in Rowton's (1973) description of the dimorphic structure of ancient Mesopotamian city-states such as Mari where discrete nomadic confederacies were integrated into the city-state while maintaining separate tribal identities. Barth (1961) describes how the Basseri of South Persia sloughed off the rich herdsmen who purchased land and became land-owning agriculturalists. Often the ruling elite of the *il* (tribe) actually took up permanent residence in the regional capital of Shiraz, thus maintaining the social prominence and political clout of the nomadic tribe within the centralized state. So the dimorphic structure of the Mesopotamian city-state may represent one of a variety of means by which a tribal confederacy could tie itself to an agrarian base and state administration. We might even go so far as to suggest that the three hordes of historic Kazakh groups, described as military units rather than kin-based units, might have existed during

the Saka period. For instance, the nomadic confederacies might have defended their multiple resource base along the rich alluvial fans from other invading steppe hordes.

The development of wheat, barley, and millet cultivation in the Talgar Region also is a crucial issue for charting the articulation of herding and farming systems over time. We need to know whether plant domestication and cultivation systems were indigenous to Talgar and the Eurasian steppe, and not just borrowed economies from the Central Asian oases, Mesopotamia, or East Asia. If the development was in fact indigenous, then it will provide a contrastive view of the processes of social evolution on the Eurasian steppe to these other heartlands of early civilization.

Ultimately we hope to place the development of the complex societies of the Talgar region into the wider context of Old World social evolution. The classic Mesopotamian developmental sequence of village, town, and urban communites took place across a range of environmental zones including alluvial plains, steppes, foothills, and mountains. Our archeological research program is similiar to work conducted in Mesopotamia during the 1960s and the 1970s, notably in the Deh Luran Plain of Southwestern Iran (Hole 1978; Flannery 1965). We focus on a smaller, more circumscribed environmental setting; the major difference is that our study area is situated in the mountain-foothill-steppe zone of Eurasia. Nevertheless our research objectives encompass many of the same goals and problem orientations of the Near Eastern research on the evolution of early farming and herding systems as related to the origins of village-centered and later town-centered communities (Maisels 1990).

Saka/Wusun Agro-pastoralism at Tuzusai

Excavations at Tuzusai contribute to larger regional cultural-historical questions concerning the Saka/Wusun occupation of Semirechye. The Saka of this region are known for their horse-keeping abilities, their strength as warriors, the richness of their burial kurgans and graves (thus indicating a chiefdom level society), and their skills as artisans of bronze, gold, and silver artifacts incorporating the famous Scythian "animal style" (Akishev and Kushaev 1963). The truth is that we know painfully little about the real economy of these migratory populations coming from Iran and migrating east towards China. The romantic stereotype of the horse nomads penetrating the vast steppe and conquering farming villages along the steppe rivers and alluvial terraces is easily promoted when most of the archeological research on Saka culture comes from burial kurgans (mounds) and cemeteries. Tuzusai, first discovered in the late 1970s by Soviet archeologists, was associated with a complex of six burial kurgans. The site itself is a large village settlement which has been excavated by the Kazakh Ministry of Culture since 1992 (Gregoriev

1993; 1994). The questions that we ask at this site are: (1) Was Tuzusai a permanent settlement of herder-farmers? or (2) Was Tuzusai a site used seasonally by migratory nomads who also managed to harvest wheat, barley, and millet? These questions are only answered by reconstructing the past environment and economic strategies used during the Late Saka/early Wusun period. Our excavations have begun to recover ancient plant, phytolith, and animal bone remains in archeological contexts (e.g., house structures, storage pits, floor and wall features, and trash or midden areas).

Tuzusai exists at the northern terminal edge of the alluvial fan which was formed during the middle and upper Quaternary Period. The natural vegetation of Tuzusai at 700 to 750 meters in elevation was steppe bunch grass. These alluvial fans of the piedmont plain below the Tian Shan Mountains were well-suited to dry farming or irrigation agriculture. Since Tuzusai represents the terminal edge of this fan, we suggest that the steppe northwards would be less fertile for agricultural pursuits and probably more productive as pasture areas for sheep, goats, cattle, and horses.

Preliminary geomorphological studies show that the original landscape surface is a product of sheet flooding from the foothills, and channel cutting due to erosional processes (Rosen 1995b; Envirs 1995b). During the period of Saka occupation, there was probably alluvial deposition in the channel. The pre-modern channel was a seasonally active stream running only in the spring and was a dry stream bed the rest of the year (Rosen 1995b). This would be extremely important for ancient human settlement. Livestock might have been watered here during the spring on their way to higher pastures and the stream itself used for watering of the fields during the spring months at the beginning of cereal planting.

The architectural record provides us with some information we can use to determine whether Tuzusai was a permanent year-round settlement or only seasonally occupied. If the site was a summer occupation, one would expect that the primary economic focus was that of cereal cultivation along an intermittent stream. If the site was occupied only in the winter, then herding would have been the major economic activity. Previous field work conducted by Fydor Gregoriev (1991; 1992) revealed a number of intersecting pits and hearths at Tuzusai. During the 1994 field season we uncovered evidence of a large section of adobe wall associated with a plastered floor (this is designated as Level 3 and represents the second period of occupation). The layout suggests that the original architecture may have consisted of a series of mudbrick walls separated into cellular room structures or alternatively it may be interpreted as an enclosure wall surrounding a house or courtyard. Pits #17 and #18 were also excavated in 1994; they occurred at Level 2 and represent the third period of occupation. The interpretations of architectural features at

Tuzusai are problematic and tentative for two reasons: (1) very few actual house structures of the Saka Period have been excavated so we have no type sites for identifying house forms for this period; and (2) Chang and Gregoriev disagree over the identification of Pit #17 as a semi-subterranean house.

In 1995 we extended our excavations southward, opening up another 6 meter by 6 meter block excavation. We established four different occupational periods, indicating that the site was used and re-used as a permanent year-round or seasonally occupied site. We are now able to establish the following sequence. Level 1, the fourth or last occupation level, includes these features: Pit #15B, Pit #21, Pit #23 (a small circular storage pit), Pit #24, and the plaster floor and post moulding associated with Quadrat V-9. The most recent period of the site's occupation can be dated by a radiocarbon sample calibrated 100 BCE to 75 CE. This section of the site is also more intact than the earlier periods. Level 2, or the third period of occupation includes Pit #15, Pit #17, Pit #18, Pit #19, Pit #22, and Pit #25, Fireplace #1, and Fireplace #2. This third period of occupation is characterized by the possible identification of Pit #17 as a semi-subterranean house and fireplace (Fireplace #2). The third period was dated by a radiocarbon sample found in the fill of Pit #17, thus the possible house is calibrated 190 BCE to 25 CE. Level 3, or the second occupation period, was discovered in 1994 by the large adobe or mudbrick wall and accompanying plastered floor. Level 4, or the earliest period of occupation, includes Pit #17 B (a small storage pit that was found below the surface of the semi-subterranean house structure), Pit #15 A (a small storage pit), and possibly Pit #22. According to the radiocarbon sample taken from the fill of Pit #22, conceivably the third or fourth occupation levels (earliest) can be dated from 415 to 345 BCE and 310 to 210 BCE. Gregoriev (1991; 1992), on the basis of vessel forms from earlier excavations, had already charactized the occupation dates for Tuzusai from about 400 BCE to 100 CE, in the Late Saka/early Wusun periods. Agricultural tools included grinding stones.

Our preliminary interpretations for Tuzusai architecture are as follows: (1) this permanent, year-round village site was constructed of mudbrick architecture and plastered floors; (2) semi-subterranean pit houses were probably used as dwellings and storage pits were later filled with midden refuse; and (3) in the most recent stages, houses may have been constructed of post frames supporting wattle and daub architecture. The five hundred years of occupational history at Tuzusai suggest that it was an attractive area for human settlement because of its location on the terminal part of the alluvial fan near an intermittent stream. The permanence of the mudbrick architecture and the general extent of the site (at least 100 meters by 100 meters) would seem to indicate a year-round occupation, a fact that is

supported by evidence showing that Tuzusai was a mixed farming and herding settlement.

TABLE 1: AMS C-14 dates (Oxford) (Beta Analytic, Inc. 1994)

Feature	Stratigraphic context	Conventional date	Calibrated results (2 sigma, 95% probability)
Pit #24	Level 1	2020 +/- 40 BP	100 BCE to 75 CE
Pit #17	Level 2	2070 +/- 40 BP	180 BCE to 25 CE
Pit #22	Level 3 or 4	2310 +/- 50 BP	415 to 345 BCE and 310 to 210 BCE

The 1995 block excavations show that deposits are less buried and have less stratigraphic disturbance than previously thought. The architectural complex of a stone-lined post moulding, plastered floor, and small circular pits with broken ceramic pots was dated between 100 BCE-100 CE through the use of ceramic typology. A vessel, typical of forms found from the Catacomb shaft tombs in the Syr Daria area (south and west of the study area), is preliminary evidence for definite cultural contacts and trading between this region of the Tian Shan and the Syr Daria area to the south and west.

All but one of the six burial kurgans were destroyed during the 1970s when the Great Almaty Canal was built. These burial kurgans are contemporaneous with Tuzusai. Earlier excavations at Tuzusai have uncovered iron knives, belt fragments, and pieces of bone armor. Drawing parallels for the descriptions of the famous Issyk burial kurgan, only 20 km east from Tuzusai, we must assume that the inhabitants of Tuzusai participated in a chiefdom society.

From the 1994 excavations, the paleoethnobotanical analyses showed that deposits within two semi-subterranean pits or pithouses were identified as domesticated barley (*Hordeum vulgare*), *Hordeum* fragments, and domesticated wheat (*Triticum* fragments) (Miller 1994). In 1995, a total of thirty-two soil samples containing seeds were analyzed by Miller (1996). In these samples there was a relatively high proportion of wheat, probably bread wheat (*Triticum aestivum*), relative to barley (*Hordeum vulgare*), especially when compared to the Bronze Age site of Gonur in Turkmenistan (Miller 1996). Millet—either *Setaria italica* (foxtail millet) or *Panicum miliaceum* (broomcorn millet)—was recovered at Tuzusai but not at Gonur (Miller 1996). Although Miller cautions against broad interpretations of the Tuzusai samples due to their small size, she puts forth three possible explanations for the presence of the wild and domesticated seed collections in the archeological features: (1) dung fuel; (2) crop-processing debris; and (3) chance inclusions (Miller 1996). The 1994 single phytolith (silicate opals) sample from Fireplace #1 at Tuzusai shows a predominance of wild grasses over cultivated wheat remains, also confirming the possibility that animal dung was a chief fuel used at Tuzusai (Rosen 1995a). Rosen's (1995a) analysis of five samples from the medieval Silk Road city of Talgar shows a dominance of

wheat husks with barley husks as a secondary component. Miller (1996) notes that broomcorn millet was imported from East Asia into the Near East during the second millenium BCE. The presence of millet at Tuzusai suggests a cultural affiliation with East Asian crop regimes, although it is clearly a secondary crop. These preliminary analyses from the 1994 and 1995 excavations at the Saka/Wusun site of Tuzusai and the medieval city of Talgar suggest that the primary fuel was animal dung (known as *kizyak* in Kazakh) and that wheat cultivation dominated over barley, a crop that may have been used primarily for fodder.

In reconstructing past environments and economic strategies, both Rosen and Miller present preliminary conjectures based on the limited paleoethnobotanical samples. The plumpness of wheat grains indicates that irrigation agriculture might have taken place at Tuzusai (Miller 1996). So far the geomorphological evidence for early irrigation channels dating back to the Saka/Wusun Period does not exist, although Evstifeev suggests that the channel running through the site may have been cut during the prehistoric period and later re-used during the Soviet Period (Envirs 1995b). If an irrigation channel did exist during the ancient occupation of Tuzusai and irrigated wheat and millet cultivation took place at this time period, why was there need for such intensive agricultural activities? These possibilities exist: (1) the alluvial fans provided the richest, most productive agricultural soils, therefore villages with large population densities flourished in these areas; and (2) irrigation in the relatively well-watered, temperate climate of Tuzusai where average rainfall is between 550-650 mm. annually allowed prehistoric farmers to increase the productivity of their cereal and fodder, and perhaps to improve the quality of pasturage.

Forstadt (1996) re-tabulated the zooarcheological samples from the 1992 excavations at Tuzusai (Gregoriev 1993), the 1994 excavations (Ryan 1994), and the 1995 excavations (Forstadt 1996) based on a sample of roughly 4,000 bones (NISP or Number of Identified Specimens) and estimated the following percentages: 53% *Ovis/ Caprine* (sheep/goat), 28% *Bos* (cattle), 15% *Equus* (horse), and 3% *Canis* (dog). These rough percentages are certainly not statistically valid samples but do provide us with a rough indication that sheep/goats predominate, followed by cattle, and then horses. If we compare these percentages to herd composition of contemporary Kazakh populations, this indicates that horses were primarily used for riding, transport, and probably military purposes, while the bulk of economic subsistence relied upon the herding of sheep/goats (Khazanov 1984; Barfield 1993). Cattle could also have been used as draught animals for field plowing. In fact, former Soviet researchers such as Khazanov (1984) and Akishev (1969) have stressed that during the Saka and Wusun Periods agriculture was an important component

of the economy. The herding economy at Tuzusai was not separated from an agricultural economy; rather, it augmented and supported the farming system. In fact, Miller (1996) states that it is likely that the seed remains from the flotation samples represent fuel dung and not crop processing debris because of the high ratio of seeds to charcoal, indicating that wood was scarce and animal dung the preferred fuel. She also discusses the relatively low ratio of wild and weedy seeds to cereal grains, suggesting that the herd animals at Tuzusai were fed cultivated fodder or allowed to graze off agricultural stubble. She hypothesizes that the Late Saka/early Wusun inhabitants of Tuzusai probably lived in a circumscribed area, while grazing areas on the steppe were held by pastoral nomads (Miller 1996: 5).

Conclusions

We speculate that the Saka/Wusun nomadic confederacies must have relied heavily on the ability to extract surpluses from agro-pastoral settlements like Tuzusai. The inhabitants of Tuzusai might have provided both necessary cultivated cereal crops and products from herd animals. Perhaps future research along the alluvial fans of the northern flanks of the Tian Shan piedmont will show a concentration of rich mixed herding and farming communities from the Bronze through the medieval period. In our opinion, it is hardly surprising that the medieval period Silk Route through Semirechye passed through Talgar, in an area of highly productive, fertile soils where the cultivation of wheat, barley, and millet occurred. The urban city, whether situated on the broad alluvial terraces of the Tigris or Euphrates Rivers of Mesopotamia, or along an east-west caravan and trade route, must feed its populace. Pastoral nomads, while providing herd animal products, cavalry, military, and trading skills, were but one of the many human groups tied to the urban centers. As far back as the Late Saka/early Wusun period, the pastoral nomads probably co-existed with sedentary mixed farming and herding folk—often exploiting environmental zones that were marginal and less fertile. Most likely the dichotomy between the "desert" and the "sown" was by matters of degree rather than by acute separation of the pastoral and agrarian economies. In 160 BCE when the Wusun joined forces with the Xiongnu to invade the Tian Shan area (Zadneprovskiy 1994), there continued to be a dual dependence upon sedentary farming communities and specialized nomadic confederacies. If our formulations about the continued importance of mixed herding and farming settlements at sites such as Tuzusai is correct, then we would expect that Rowton's (1973) descriptions of the dimorphic structure of tribal confederacies and city-states in Mesopotamia during the second millenium BCE might forecast the later development of Inner Asian tribal confederacies co-existing within larger nomadic states. The important point is that any nomadic tribal confederacy, state, or

empire that could supply its own agricultural products from the settled, sedentary communities within its territory was far more resilient and economically advantaged than those that depended upon predatory means for obtaining agricultural products and other trade items. At least in southern Kazakhstan, we have good reason to believe that agro-pastoralism was the norm and, even when specialized nomadic groups did occupy the marginally fertile areas of the steppe, they could always rely upon their closest agricultural neighbors to supply them with food stores, personnel, and political alliances that could be directed against other nomadic groups or settled agrarian civilizations.

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Western Yunnan and Its Steppe Affinities

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A. Introduction

The region around Erhai (Lake Er) in western Yunnan played an important role in the development of Yunnan bronze culture, which culminated in the production of the Dian artifacts[1]. The Erhai region was associated with the birth of Yunnan bronze metallurgy.[2] It also was the original center of the bronze kettledrum,[3] whose distribution in Southeast Asia delineates cultural dissemination and exchange. Despite extensive archeological investigations at sites in Yunnan, however, little stratigraphical data can be used to prove that Yunnan bronze technology developed locally. Currently, the origin of Yunnan metallurgy remains a subject of disagreement.[4]

Problems about the inception and evolution of Yunnan bronze metallurgy also have been compounded by a number of distinct bronze artifacts uncovered at the Erhai sites. Typologically, these objects are analogous to artifacts from Bronze Age burials on the highlands north and west of Erhai.[5] These Erhai specimens are thought to be evidence of cultural contacts between the Erhai region and areas on the highlands, where strong influences from Steppe cultures have been recognized.[6] Nevertheless, the incentives for foreign traits to have gained entrance into the Erhai region have not been clearly understood. Consequently, further theories regarding the origin of Yunnan cultures have been generated. They eventually lead to arguments about the ancestry of ethnic groups

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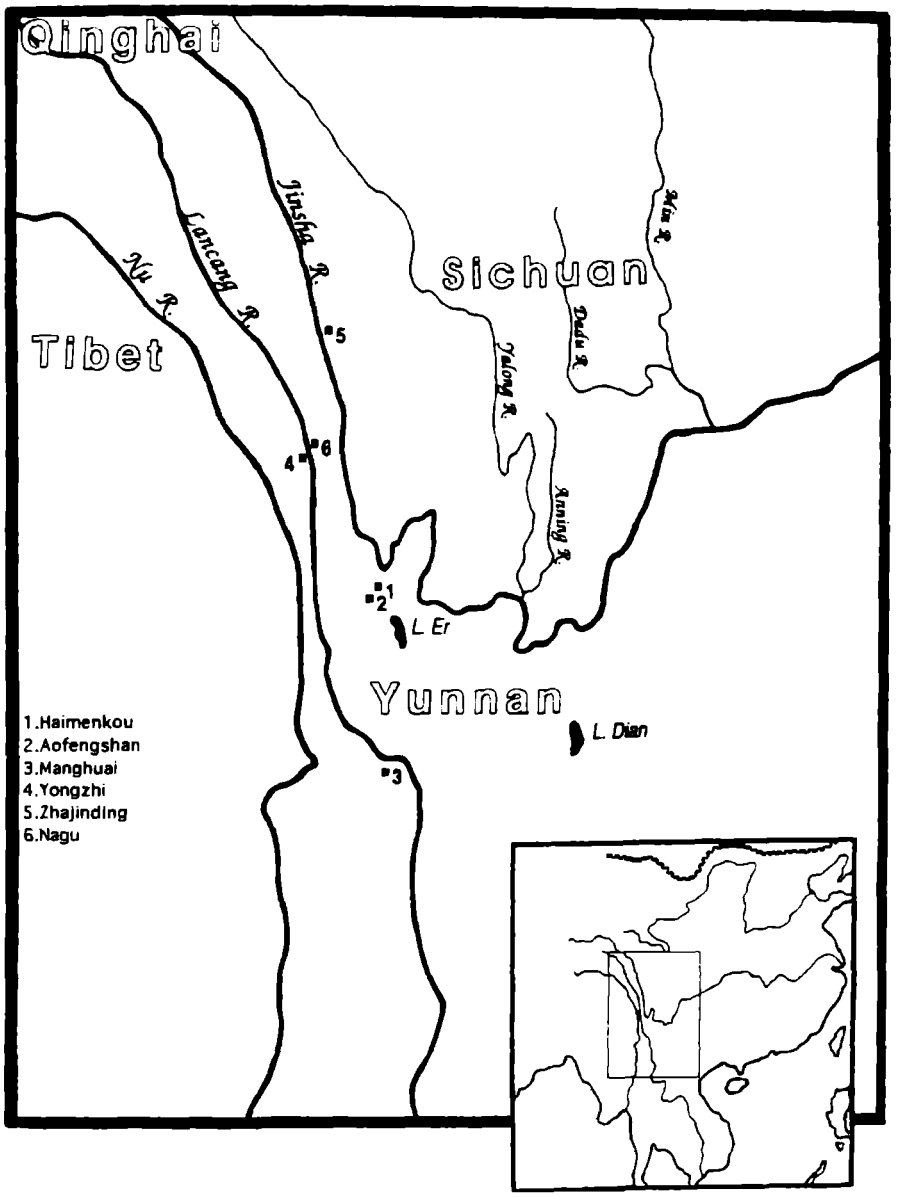
[1]The major Dian sites are: Shizhaishan (von Dewall, 1967; Sun Taichu, 1956; Yunnansheng Bowuguan, 1959; Pirazzoli-t'Serstevens, 1974) and Lijiashan (Yunnansheng Bowuguan, 1972; 1975), Tienziniao (Wang Han, 1983; Hu Shaojin, 1985); Shibaicun (Wang Dadao and Qiu Xuanchong, 1980; Hu Shaojin, 1984); Taijishan (Zhang Zengqi and Yang Tiannan, 1965).

[2]Based on available data, the earliest bronze site in western Yunnan is the Haimenkou site of Jianchuan County near Erhai. For the site report, see Yunnansheng Bowuguan Choubeichu, 1958; Xiao Minghua, 1995 .

[3]As of this writing, the Erhai region has the highest concentration of rudimentary drums known either as the pre-Heger drums or Wanjiaba drums (see Li Kunsheng and Huang Derong, 1990)

[4]See Wang Dadao, 1985, p. 250; Watson, pp. 348ff. This question has now been evaluated with reference to the bronze finds in Southeast Asia.

[5]See Luo Kaiyu, 1992, pp. 413ff. for the sites.



Map 1: Neolithic and Bronze Age sites in Southwest China.

residing in and around Erhai during the 1st millennium BCE.[7]

Through an investigation of the development and distribution of Erhai artifacts that seemingly reflect intrusive elements, this work will address issues concerning the cultural relationship between the Erhai region and highland areas adjacent to it. The analysis will incorporate relevant ethnological data to interpret the reason why alien traits penetrated into Yunnan, and to explore the process through which this occurred.

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[6]See Pirazzoli-t'Serstevens, 1988; Tong Enzheng, 1987, pp. 17-43

[7]One of the most debated issues argues whether the Erhai culture should be labeled as the Kunming (nomads/semi-nomads) culture.

B. Erhai Sites and Artifacts

The Erhai bronze sites are located in the plains around Lake Er, which is about 2000m above sea level. They have been discovered in a relatively large area, from Chuxiong district in the east, Changning in the west, Jianchuan and Yongsheng in the north, to Shuanjiang in the south. Two major types of Bronze Age burials can be identified with reference to their tomb structures: shaft graves and stone-slab graves. The former has a rectangular ground plan and presumably contained a single body.[8] The latter, also called "the Big Rock tomb," was built in a rectangular pit using large stone slabs and rocks to shape the sides and top of a tomb structure.[9] In these stone-slab graves, the remains of multiple bodies were arranged on top of the gravel layered at the bottom.[10] These individuals are speculated to have been related by blood ties.[11] The basic structure of the stone-slab graves is reminiscent of the megaliths in the western hemisphere, except that the Erhai structures were intended strictly to be underground structures. The technical features of these dolmen-like burials also recall the cist graves in northwestern Yunnan, eastern Tibet, and western Sichuan. Among these, a specific type called "slate tombs" along the Upper Min River in Sichuan have been studied most extensively.[12]

The Erhai shaft grave and stone-slab grave developed in parallel, dating approximately from the 7th to 3rd BCE. Generally speaking, the majority of their tomb furnishings share similar typological characteristics. They include artifacts made of ceramic, metal, and lithic materials. The bronze repertoire consists of spades, hoes, spearheads, socketed axes, and a variety of daggers/swords. Other bronze items include sets of bells, arm rings, poletops, and small individual bells (Fig. A). Of particular interest are the animal or avian figures used to embellish some of these items. These decorations find parallels in the art of the Steppe cultures. Additionally, rudimentary kettledrums[13] were found in some richly furnished shaft graves.

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[8]Examples are: two Dapona sites (Xiong Ying and Sun Taichu,1964; Li Chaozhen and He Chaoxiong,1986) and the Wanjiaba site (Yunnansheng Bowuguan Wenwu Gongzuodui et al., 1978; Qiu Xuanchong et al., 1983). The larger and richly furnished tombs frequently contain wooden coffins.

[9]To date, only two such sites have been published in full: the Jiancun site (Li Chaozhen,1983; Tian Huaiqing and Yang Dewen, 1984) and the Juli site (Zhang Xinning,1986). See Zhang Zengqi, 1990, pp. 66ff for a summary.

[10]The placement of skeletal remains in the Juli tombs is the most peculiar: a collection of crania were laid on one side of the tomb in piles that are multiples of 5; the limb bones were disposed on the other side with no reference to a specific order (Zhang Xinning,1986, p. 25).

[11]Zhang Xinning,1986, p. 30.

[12]Cheng Te-kun,1982; Feng Hanji and Tong Enzheng, 1973.

[13]See Li Kunsheng and Huang Derong, 1990.

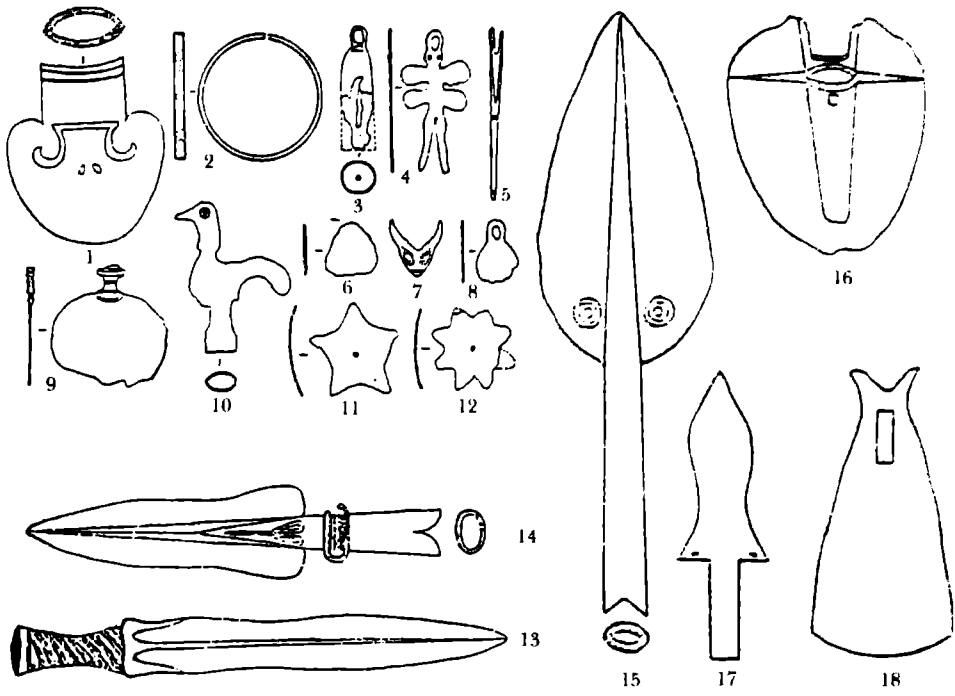

Figure A: Bronze objects from the Erhai sites.

These two types of Erhai graves can be easily distinguished by their construction and burial custom. It is clear that each of them speaks of an individualized cultural experience. However, the homogeneity of their burial goods also implies that these two cultural groups may have been akin to each other.[14] The inclusion of a considerable number of cultivation tools in both tombs, as well as the rice grains found at the site, indicates that the people buried in the tombs were sedentary.[15]

The archeological materials from the Erhai sites also lend credence to documentation concerning the population in the vicinity of Erhai. According to *Shiji* (Book of History),[16] the inhabitants of the Han era known in areas near Erhai were primarily agriculturalists. These people lived in villages and were members of the Mimo confederacy. Among them were two groups called Qiongdu and Dian. The archeological sites of these people have been identified: the Qiongdu were related to the dolmen-like stone graves excavated along the Anning and Dadu Rivers in southern Sichuan;[17] the Dian were the manufacturers of the Heger I drums[18] and a great variety of bronzes

[14]Prior to the Han time, both were known as part of the Pu complex.

[15]See Yunnansheng Buoweguan Wenwu Gongzuodui et al., 1978, pp. 6-7 for the list of tools from the shaft tombs.

[16]Chapter 116.

[17]See Tong Enzheng, 1978, p. 106. The Qiongdu may have been mixed with the the population in the "Slate Tomb" region farther north.

[18]The oldest of the 4 types proposed by Franz Heger in 1902. These drums

discovered in shaft graves in eastern Yunnan.[19] Both could have been closely related to the people buried in corresponding types of graves near Erhai just mentioned.

Among typical Erhai artifacts, two bronze objects are particularly relevant to issues about cultural interactions between the Erhai region and areas on the highlands of Yunnan. They are the shouldered socketed axe (Fig. A-1) and the sword[20] with distinct handle and dagger guard (Fig. A-13). Both types were totally unknown in the Neolithic strata of Erhai culture. The bronze axe has a tubular socket and rounded shoulders that extend to join the arched blade, which may have a slightly pointed tip. Frequently, a relief design appears near the base of the socket. It is composed of two outward-facing hooks that may or may not be connected at the top. The second artifact, the sword, is characterized by a hollow-cast hilt that also is wrapped in an overall relief spiral. It additionally has a three-pronged guard attaching the base of the hilt to the blade. The unique typological features of the sword had been a subject of study long before any Erhai graves were archeologically opened. At least one authority has suggested a possible western connection.[21]

Research into the lithic and ceramic goods from the Erhai sites has revealed that the Erhai Bronze Age culture evolved from the indigenous Neolithic strata, which are characterized by semi-subterranean houses, polished stone adzes and lunate knives, and burial customs comparable to those known at the Banpo site near the Yellow River.[22] Nevertheless, questions regarding the possible existence of a recognizable transitional Neolithic-Bronze phase[23] at Erhai sites remain to be elucidated. Based on the typological and technical aspects of the artifacts, the Erhai bronze tradition in general appears relatively advanced.[24] While it is clear that the Erhai bronze-bearing sites date from the 7th century BCE, our knowledge about the origins of metallurgy in the Erhai culture turns out to be quite meager.

The progenitor of Erhai bronze metallurgy appears to have been

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evolved from a prototype which originated in an area near Erhai.

[19]See footnote 1.

[20]These examples range from 24 to 58 cm and clearly include some that can be more appropriately regarded as daggers. However, they have been collectively called "swords" in the original reports.

[21]Jansé, 1931, p. 123.

[22]See Kan Yong, 1981, pp. 349-368.

[23]The term "Eneolithic" or Chacolithic" has been deliberately avoided here with regard to Southeast Asian metallurgical contexts.

[24]Even the crudely made kettledrums from the Wanjiaba site do not seem to represent the oldest among the group.

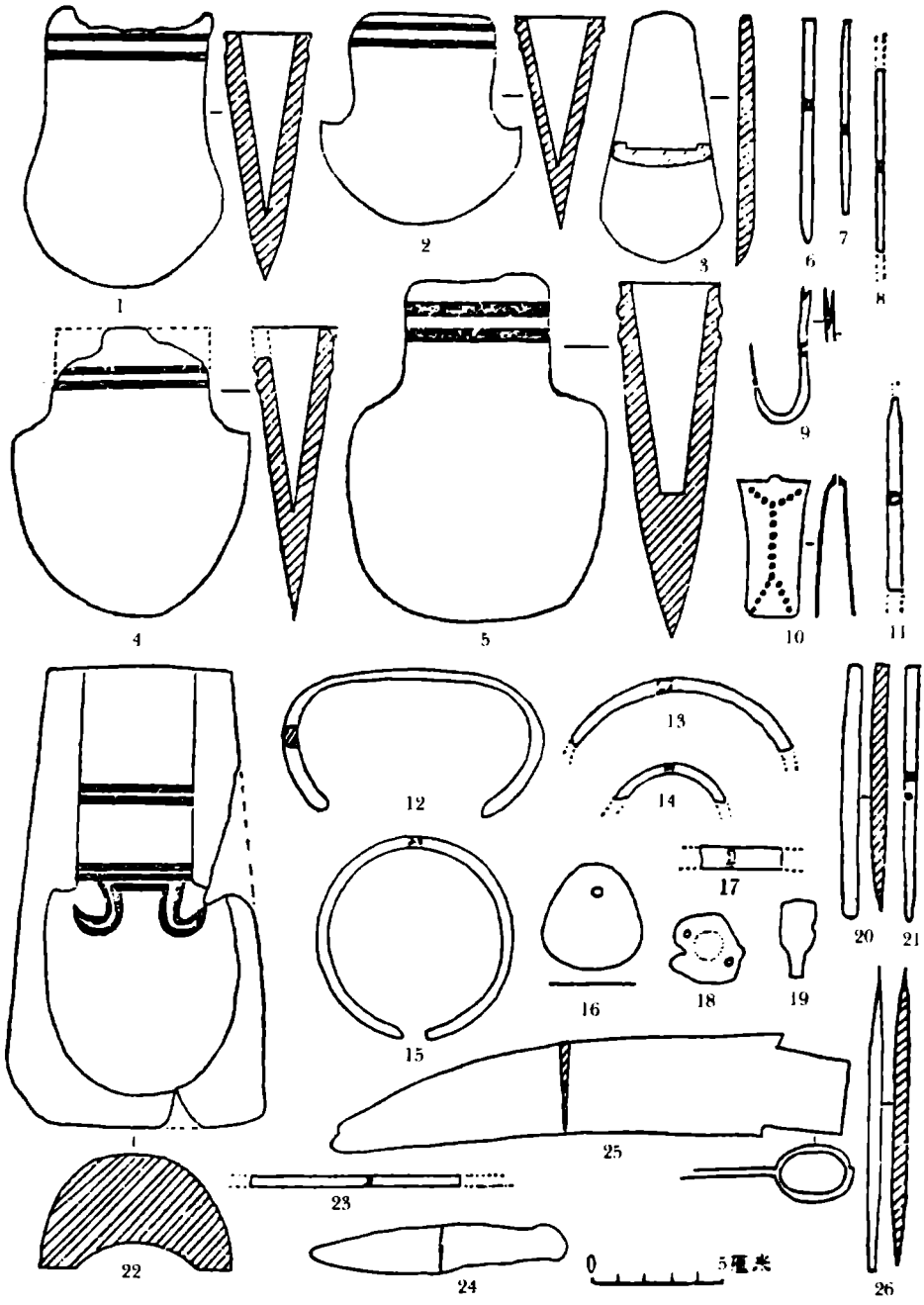

Figure B: Bronzes and a stone casting mold from the Haimenkou site (after *Kaogu*, 1995, 6, p. 777).

similar to that observed at the Haimenkou habitation site (Jianchuan County) north of Erhai.[25] Two excavations at the site uncovered 26 metal objects (Fig. B), pottery shards, and lithic objects along with

[25]Geographically, the Haimenkou site borders the Erhai basin and is immediately adjacent to the highlands to its west. It has been discussed in conjunction with the Erhai sites, but more frequently, as belonging to "Western Yunnan Bronze culture" (Zhang Zengqi, 1981, pp. 92-93) .

carbonized grain samples and architectural remains.[26] The majority of these stone tools belong to types that are characteristic of the Erhai region.[27] In conclusion, the Haimenkou assemblage depicts a hunting-fishing society in which some degree of horticulture may also have been practiced.[28]

The relatively minute portion of bronze tools in the Haimenkou repertoire can be regarded as an indication of the technological level of the site. It appears that the inhabitants relied primarily on stone tools,[29] and that the Haimenkou bronze industry was far from being full-fledged. The metal artifacts include two small objects made of pure copper,[30] a material frequently experimented with during the preparatory stages of a bronze industry. Others are copper-based alloys in which either tin or lead seems to have been deliberately introduced.[31] Among the bronzes were awls, arm rings, and four socketed axes of various shapes and designs.[32] Based on visual examination, at least two of the axes resemble the shouldered axes characteristic of Erhai Bronze Age sites (Figs. B-4, B-5).[33] Discovered at the site also was one half of a bivalve stone casting mold (Fig. B-22). It shows the intaglio design of a shouldered axe which is also embellished with a "double-hook" decoration, the hallmark design of Erhai axes. Although this stone mold does not seem to be directly related to the production of the socketed axes found at the same site,[34] its presence indicates communications between the Haimenkou area and other bronze-bearing sites near Lake Er.

Judging from the close proximity of Haimenkou to Lake Er, finds from the former site suggest that Erhai bronze metallurgy may have commenced within a similar framework. Timber samples taken from the Haimenkou site have yielded radiocarbon dates ranging from the 14th to 11th century BCE.[35] At one time, these dates were thought to be untenable due to issues centering around the "questionable" association between the bronze materials and the wood samples at the

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[26]Two excavations have been conducted at the same site (Yunnansheng Bowuguan Choubeichu, 1958, pp. 1-12 ; Xiao Minghua, 1995, pp. 775-787). They were carried out about 20 years apart.

[27]Xiao Minghua, 1995, pp. 776ff.

[28]Yunnansheng Bowuguan Choubeichu, 1958. See also editor's note on p. 12.

[29]A total of 381 stone specimens have been uncovered (Xiao Minghua, 1988, p. 47).

[30]They are Jianhai #219 and #220 according to Wang Dadao (1985, p. 247).

[31]See Xiao Minghua, 1995, p. 776.

[32]Ibid. They include 1 *fu*-axe and 3 *yue*-axes.

[33]Axes labeled as T1:4-74 and Jianhai 228.

[34]Since the stratigraphy of the Haimenkou site was disturbed during the 1957 excavation, it is not clear how the mold was stratigraphically related to the bronze axes and copper objects.

[35]*Zhongguo Kaoguxue zhong Tanshisi Niandai Shujuji, 1965-1981*, p.114.

site.[36] They can now be endorsed with reference to more recent studies of the site, where one of the bronze axes found in situ was hewed into the surface of a timber post. Of particular note is that this post is similar to the one taken for the radiocarbon test.[37] Viewed in light of the development of bronze metallurgy in Southeast Asia, these dates seem justifiable.

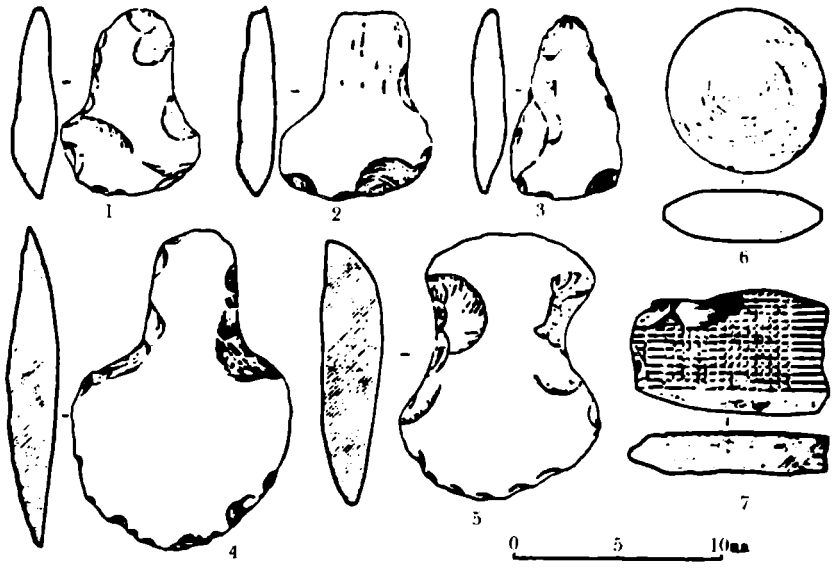

Figure C: Manghuai stone adzes (after *Kaogu*, 1977, 3, p. 177).

C. Cultural affiliations between the Erhai Region and the Northwestern Highland.

An analysis of data taken from Haimenkou and other early sites in Yunnan has provided further insight into the aspects of the beginnings of Erhai bronze technology. It appears that the shape and design of the Haimenkou axes had no precedents in the Neolithic strata of the Erhai region.[38] Instead, these shouldered axes replicated a unifacially flaked adze known as the Manghuai adze (Fig. C).[39] Such shouldered stone tools were versatile for both clearing lands in hilly areas and for rudimentary cultivation. This particular stone adze has a revealing distribution at Neolithic sites near the Middle Lancang (upper Mekong) and Middle Nu (Salween) Rivers.[40] It also has been

[36]See Murowchick, 1989, p. 97; Watson, 1984, p 348. The argument also has to do with the fact that the 1958 report consists of many conflicting data.

[37]Xiao Minghua, 1995, p. 785.

[38]See Kan Yong, 1981, p. 356 for typical Erhai stone types.

[39]Named after the Manghai site near the Lancang River (Yunnansheng Bowuguan Wenwu Gongzuodui, 1977).

[40]Geng Deming, *Kaogu*, 1991, 6, pp. 497ff; *Kaogu*, 1991, 7, pp. 626ff; Wang Jinlin, *Kaogu*, 1992, 4, pp. 289-292 for the distribution of Manghui adzes in Southwest China.

discovered in eastern Tibet[41] and regions farther north. The highland region associated with the stone adzes in Yunnan is a mosaic of topographical relief intersected by north-south oriented valleys, which facilitate access to territories farther north. Since Neolithic times, these passages have culturally connected western Yunnan with areas near the headwaters of the Yellow, Jinsha (Upper Yangzi), and Lancang rivers in Qinghai, Gansu, and eastern Tibet.[42] The western Yunnan sites associated with the production of the Manghuai stone adzes are herein referred as the "Highland" sites.

These Highland sites were situated on steep slopes in narrow gorges or deep valleys where drastic climate differentials occur between wet and dry seasons. The ecosystem clearly dictated the subsistence mode: transhumance.[43] This circumscribed economy was reflected in the local lithic inventory, in which the distinct flaked shouldered stone adze represented the majority among others related to a hunting-gathering economy.[44] Archeological data gained at these Highland sites indicate that such a pattern remained unchanged throughout the Bronze Age, as the flaked stone adzes continued to be produced hand in hand with their metal counterpoints.[45]

The cultural setting which fostered the production of the flaked adze in the highlands of western Yunnan evidently did not pertain to the Erhai region, where irrigated rice cultivation in a sedentary context was the primary food-producing activity. Therefore, it is clear that the "typical" Erhai bronze axes had closer affinities to the Highland cultures than to an indigenous stratum. These axes ultimately exemplified the receptivity of the Erhai culture to intrusive elements,[46] which may already have arrived in the Erhai region prior to the date of the Haimenkou site. Evidence taken from the Haimenkou site suggests that the process of cultural infiltration was possibly initiated in association with the advent of bronze metallurgy in the Erhai culture.

In addition to the shouldered bronze axe, current data also argue for an outside source for the spiral-hilt sword, which was one of the popular burial items at the Erhai sites. To date, around 60 examples have been made known in southwest China. They include both stray finds and scientifically excavated pieces,[47] as the Erhai

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[41]Xizang Zizhiqu Wenwu Guanli Weiyuanhui et al., 1985, p. 65.

[42]Wang Ningsheng, 1992 p. 23.

[43]Geng Deming, *Kaogu*, 1996, 7, p. 635.

[44]Ibid.

[45]Zhang Zengqi, 1990, p. 27. Shouldered axes have been reported in the Changning region near the Lancang river (Geng Deming and Zhang Shaoquan, 1991; Wang Jinlin, *Kaogu*, 1992, 3, p. 265)

[46]At the Erhai sites, these objects possibly were used in a different context. Most Erhai examples came from burials.

[47]They are of varying sizes, ranging from 24-58cm (Zhang Zengqi, 1983, p.

region appears to be the largest repository of the spiral-hilt swords.[48] One of the Erhai sites also has produced the earliest datable examples.[49]

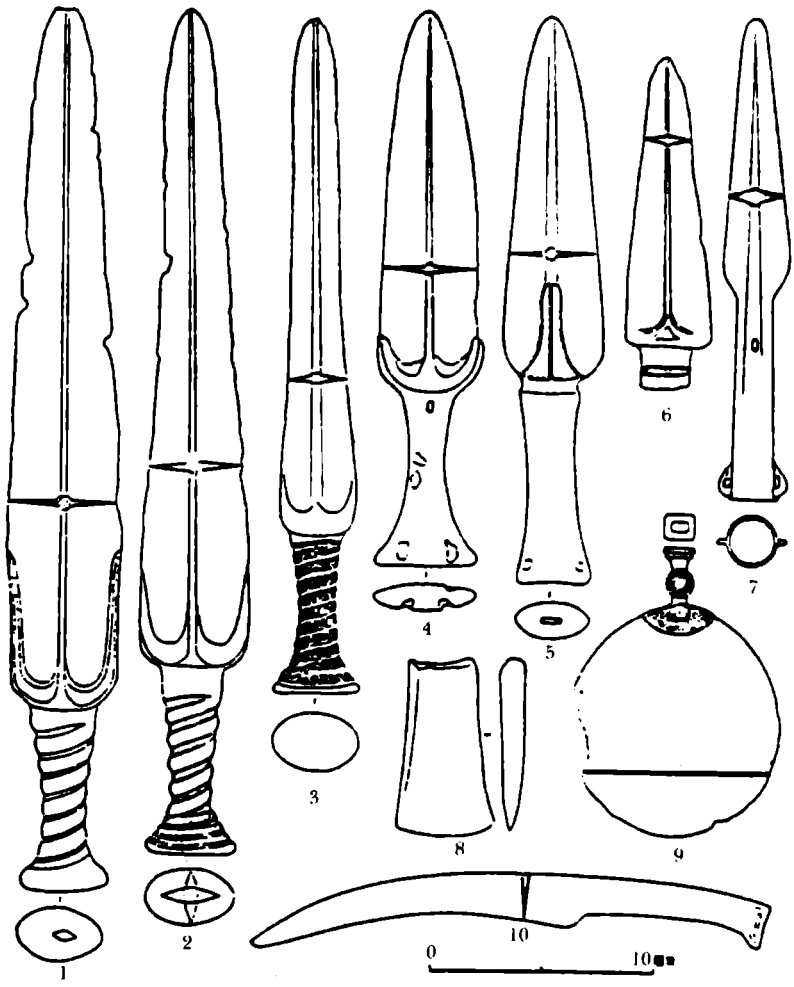

Figure D: Bronzes from the Yongzhi site (after *Kaogu*, 1975, p. 246).

Based on visual examination, the spiral-hilt swords currently known in southwest China have been dated from the 7th to 2nd centuries BCE. It seems that the shorter or smaller specimens are the most ancient ones, whereas the latest versions frequently are furnished with an iron blade. The majority of Erhai specimens exhibit technical and typological refinement that can hardly be credited to the experimental stages of a metallurgical tradition. Since the Erhai Neolithic strata have not produced any lithic objects that can be considered as prototypes of the sword, these artifacts may also be regarded as potential imports. Such a view finds some archeological

641).

[48]See Zhang Zengqi, 1983, p. 641

[49]See Qiu Xuancong et al., 1983, p. 363.

support.

A collection of bronzes found at the Yongzhi site (Deqin county)[50] in northwest Yunnan has shed new light on the origin of the Erhai sword. The site was a large cemetery on a mountain slope 3000m above sea level. Discovered at the site were stray finds[51] including bronze weapons and tools (Fig. D), silver objects, and ceramic jars with single or double handles. Many of these bronzes are analogous to the Erhai examples. They include two swords with prominent spiral-shaped hilts, seen along with a dagger[52] and two short swords with undecorated handles. These artifacts were stripped from their underground burials due to construction works conducted in the area. Subsequent archeological investigations of the site eventually led to the scientific excavation of two cist graves and a shaft grave.[53] Only the shaft grave produced well preserved burial goods: three ceramic jars and a spiral-hilt sword similar to examples collected in the same area. The author of the site report ascribed the date of the spiral-hilt sword to the "Warring States period," although giving an "early Western Han" date to the tomb itself.[54] The typology of the ceramic jars found with the spiral-hilt sword at the site, nevertheless, suggests a date contemporaneous with the Warring States period.

Of all the Yongzhi weapons, the dagger possesses the most rudimentary features (Fig. D-6). It has a short, flat tang[55] that likely was intended to be inserted into a separate handle. Its overall shape compares closely to that of the typical sword of the Ba-Shu culture in eastern Sichuan.[56] This object is crudely made, possibly hammered out of pure copper.[57] The reddish color of its material corresponds to that used for the two smaller swords seen at the same site (Figs. D-4, D-5).[58] Both swords have plain hilts with oval cross-sections and slightly flared pommel. These two artifacts remind one of Scythian daggers.

When viewed as a group, incontestable typological features observed in these three weapons seemingly denote the creation process of the spiral-hilt sword. All three weapons have distinct

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[50]Yunnansheng Bowuguan Wenwu Gongzuodui, 1975, pp. 244-248.

[51]The time and location of the discovery of these objects at the site have been documented (Ibid., p. 244).

[52]This name was tentatively given because of its resemblance to the daggers from the Chinese central plains. This object was subsequently identified to have been the blade of a short sword, now referred as the "sword with no hilt." See Zhang Zengqi, 1983, p. 644.

[53]Yunnansheng Bowuguan Wenwu Gongzuodui, 1975 , pp. 244-245.

[54]Ibid., p. 248.

[55]It measures about 2 cm (Zhang Zengqi, 1983, p. 644).

[56]Luo Kaiyu, 1992, p. 430.

[57]Zhang Zengqi, 1983, p. 644.

[58]Ibid.

designs marked near the base of the blade: a small triangle on the tanged dagger, a quasi-triangular bell on one of the short swords, and a three-pronged fork[59] on the second sword. It can be observed that all these designs are centered at the midrib of the blade. This is particularly evident with the fork design of one of the short swords, whose central prong is extended to serve as the midrib. It is possible that the triangular pattern on the tanged dagger may have been the embryo of the bell-shaped design on one of the swords. It in turn advanced to be the more elaborate three-pronged fork of the second sword. This pattern may have became standardized to be used as the dagger guard for most spiral-hilt swords in Southwest China.

Due to the lack of stratigraphical data at the Yongzhi site, the aforementioned samples can not be dated precisely enough to corroborate this assumed sequence. Nevertheless, visual analysis of a metal knife used by some ethnic minorities in western Yunnan nowadays seems to lend credence to such a presumption.[60] This modern artifact consists of a metal blade and a handle made of perishable materials. The blade of this composite knife recalls the tanged dagger from the Yongzhi site previously discussed. Its handle is composed of two parallel bars of either wood, bamboo, or horn that are tied onto the sides of the tang. The spiral formation created by the cord strands over the handle bear resemblances to the design of a typical spiral-hilt sword (Fig. E).[61] It is possible that the typical bronze spiral-hilt swords may be considered as all-metal copies of such composite artifacts.[62]

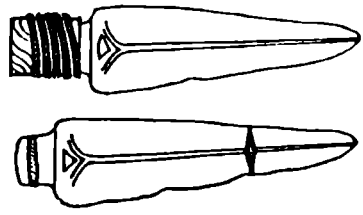

Figure E: Reconstruction of the Yongzhi Dagger (after *Kaogu*, 1983, 7, p. 644).

Both the tanged dagger and the spiral-hilt swords were important bronze artifacts in cist graves and shaft graves similar to the Yongzhi burials just mentioned.[63] These tombs were the characteristic Bronze

[59]This particular pattern also is called the "floral petal" by some Chinese archeologists.

[60]See Zhang Zengqi, 1983, p. 644.

[61]Zhang Zengqi, 1983, p. 642.

[62]An extant example clearly illustrates the existence of swords with separate handles (see Guan Baoguanbu, 1986, p. 20, fig. IA2)

[63]Several similar examples have been reported at the cist graves of Sichuan and Yunnan. See Zhao Zengdian, 1983, p. 44; Chen Xianshuang and Zhaxi Ciren, 1991, p. 220; Tong Enzheng and Zeng Wenqiong, 1981, p. 215.

Age burials on the highlands of western Sichuan and northwestern Yunnan. They were particularly prevalent in regions along the Upper Jinsha River and its tributaries west of the Min River.[64] These tombs represented a regional branch of a diverse array of stone funerary structures in the Eurasian steppes (from Liaoning in the east to the Caucasus region in the west).

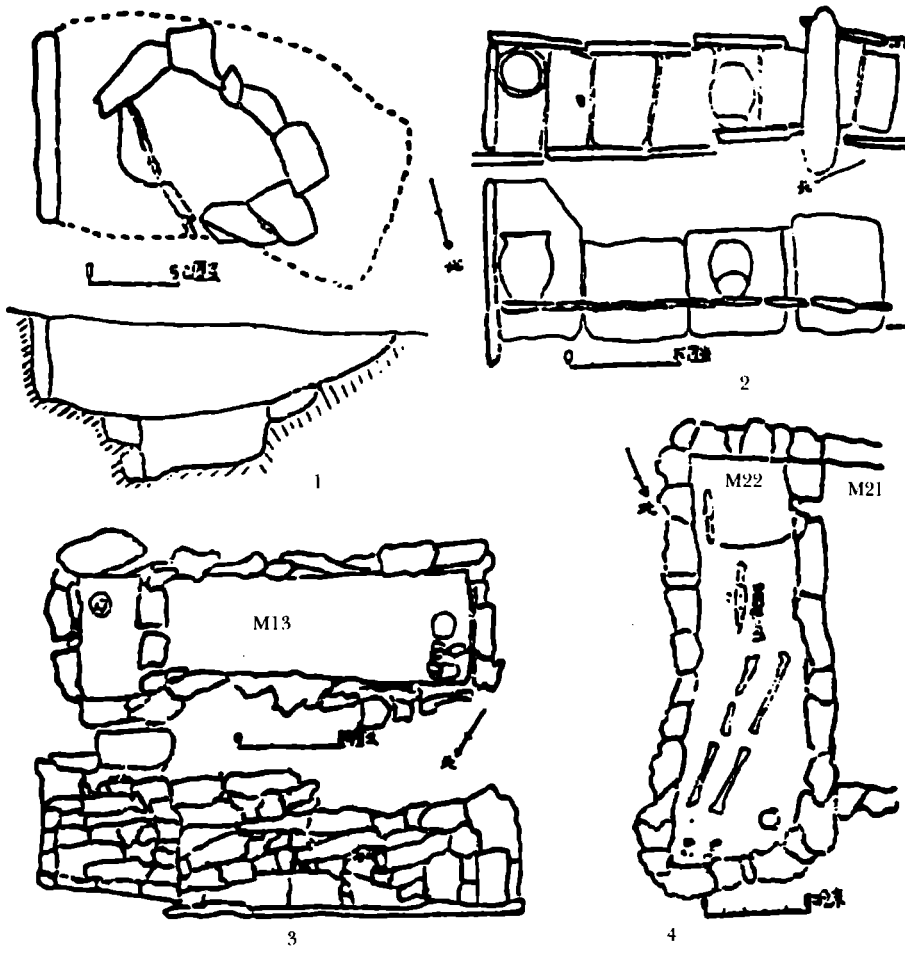

Figure F: Cist Graves of western Yunnan (after *Kaogu Xuebao*, 1992, 4, p. 418).

The typical cist graves on the southwest Chinese highlands are single burials composed of naturally shaped slabs of stone or large boulders against the walls and bottom of a quasi-rectangular pit (Fig. F). Depending on regional preferences, the tombs may or may not have a paved bottom; they may also be furnished with compartments exclusively for the storage of burial goods. The related shaft graves in the same regions were the simplified versions of their stone counterparts when stone materials could not be easily obtained. The

[64]For an extensive bibliography and sub-types, see Luo Kaiyu 1992; Mu Jiyuan, 1995; Feng Hanji and Tong Enzheng 1973. For ethnographic data related to these finds, see Tong Enzheng, 1980.

structure of these shaft graves may also vary from area to area. At times these shaft graves were roofed crosswise with large stone slabs.[65]

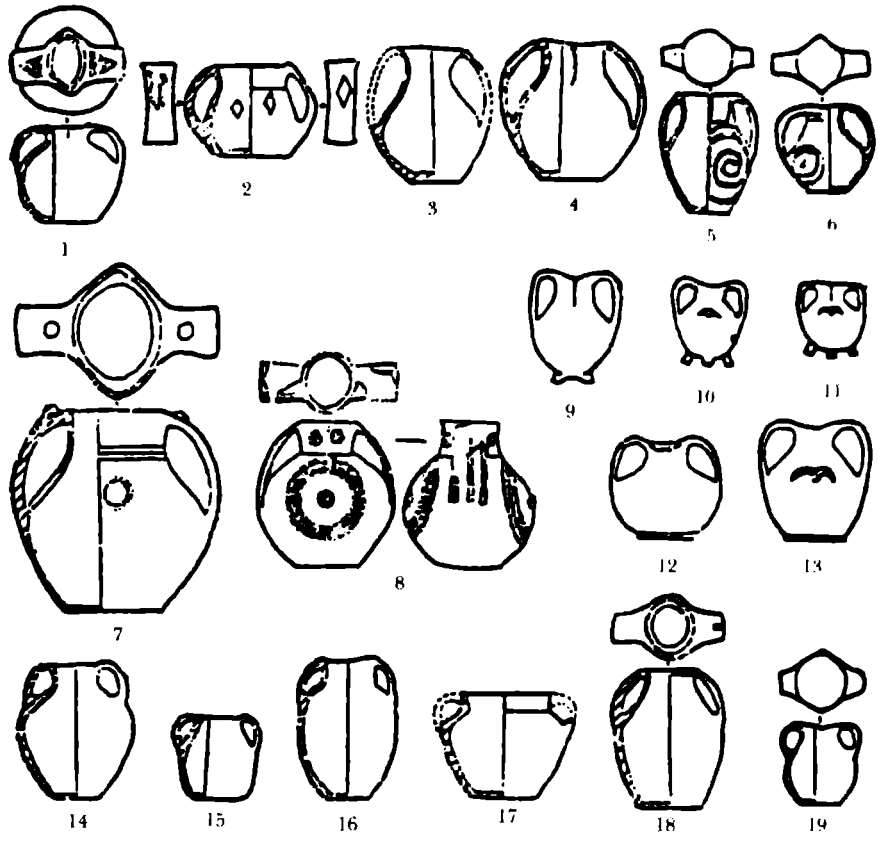

Figure G: Ceramic jars from cist graves in Sichuan and Yunnan (after *Kaogu Xuebao*, 1992, 4, p. 419).

Bronzes and ceramic wares were seen in these cist graves and their variations. Among the standard bronze types are weapons (daggers, swords, spearheads, and curved knives) and ornamental objects (arm rings, small bells, buckles, buttons, poletops, and plaques). Many of them are decorated with motifs of animal themes. Some of these are frequently seen in the Erhai sites and in regions farther east; others find close parallels in the Bronze Age cultures on the Eurasian continent, including the steppes in the Minusinsk Basin, Koban, and, above all, the Chinese northern zone. It is noted that bronze artifacts taken from the southwestern cist graves do not include large bronze vessels. Instead, the typical vessels used in these graves were amphora-like[66] jars similar to ceramic specimens commonly known in Qinghai and Gansu cultures. These vessels, gray or brownish in color, are characterized by a pinched neck, a flared mouth, and a large belly (Fig. G). They have either a single or double

[65]Luo Kaiyu 1992, pp. 415-419.

[66]An observation proposed by J. G. Anderson.

ear lugs shaped like wide bands running from the flared lip to the belly. Some of the rims have a lozenge cross-section and a saddle-shaped profile when viewed from the sides. They have been compared to examples from the Siwa culture of Gansu.[67] Others found in Sichuan also have whirl patterns carved on the belly. The surface decorations of a number of these jars additionally incorporate bronze inlay.[68]

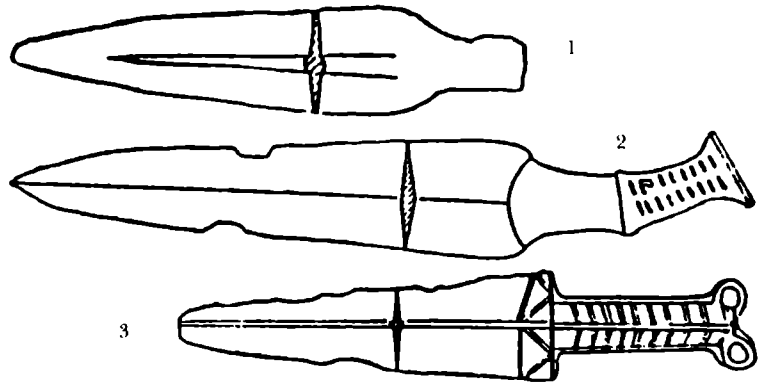

Figure H: 1. Dagger (Zhajinding, Batang district), 2. Dagger (Nagu, Deqin district), 3. Sword (Nagu, Deqin district).

The cist graves in southwest China consist mainly of both Neolithic and Bronze Age burials, dating from the 2nd millennium BCE to Western Han times.[69] The most ancient examples were located near the Upper and Middle Jinsha River.[70] Some of these are strictly Neolithic in context; others witness the use of small quantities of copper and rudimentary bronzes along with lithic objects,[71] signifying the emergence of bronze metallurgy in the area. Datable sites that number among the earlier Bronze Age sites in the area include the Zhajinding site (Batang district, Sichuan)[72] and the Nagu site (Deqing district, Yunnan).[73] Samples taken from these two sites have yielded carbon dates of 1110 BCE[74] and 865 BCE,[75] respectively. Studies of the ceramic wares from these two sites point to affiliations with Neolithic sites in the Upper Yellow River, while an analysis of bronze artifacts

[67]Feng Hanji and Tong Enzheng, 1973, p. 56.

[68]These were found exclusively in the Ganzi region. See Luo Kaiyu, 1992, p. 430.

[69]Luo Kaiyu, 1992, p. 242-245. The earliest date of the stone graves in Southwest China is not clear.

[70]Ibid.

[71]See Chen Xianshuang and Zhaxi Ciren, 1991, p. 228; Mu Jiyuan, 1995, p. 50 and his footnote 15.

[72]Tong Enzheng and Zeng Wenqiong, 1981, pp. 213-218 .

[73]Zhang Xinning, 1983, p. 220ff.

[74]*Zhongguo Kaoguxue zhong Tanshisi Niandai Shujuji, 1965-1981*, p. 111.

[75]Ibid., p. 114.

implies connections with Bronze Age sites farther east in Sichuan (Yalong, Dadu, Min, and Anning Rivers).[76]

No evidence directly related to the spiral-hilt swords can be found at neither of these two early sites. Nevertheless, a tanged object (Fig. H-1) similar to the Yongzhi dagger previously discussed was seen at the Zhajingding site. It was discovered along with amphoras and small bronze objects.[77] At the Nagu site, two dagger/swords were seen as part of the bronze finds (Figs. H-2, H-3). One of them has a curved hilt;[78] the other has a flat handle that terminates with a double disc design. Both compare closely to the saddlery weapons characteristic of the Eurasian steppes. The curved hilt may be considered as a derivative of the bent handles of Ordos daggers and knives that were most popular in the Chinese northern zone around the end of the 2nd millennium BCE. The double-disc design on the Nagu sword may have shared a common prototype with that of the "antenna sword" of the Tagar culture, whose double-bird head pommels were known to have been transformed into double-disc patterns during the second half of the 1st millennium BCE. In the Southwest, several swords with either the curved or double-disc handles have been reported in cist-grave contexts.[79] Current data reveal that the dagger with curved hilt was among the earliest bronze weapons associated with the cist graves.[80] It may have developed in parallel with the rudimentary tanged dagger similar to the Zhajinding and Yongzhi examples.[81]

Of the cist grave sites in western Yunnan, the Aofengshan site[82] is one of the largest. At this site located in a region at an elevation of around 3000m, 217 shaft graves were found below a stratum comprised of mortuary urns and cremated remains.[83] These shaft graves are basically rectangular pits whose walls and bases may incorporate large rocks originally deposited in the soil. Most are single burials with the body laid directly on top of the soil.[84] Of particular note is that mandibles of either pig or sheep were used as burial goods in these tombs.[85] Such practices reflect affinities to the Qijia culture of

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[76]Tong Enzheng, 1980, pp. 432ff.

[77]Tong Enzheng and Zeng Wenqiong, 1981, p. 217.

[78]Previously thought to be a sword but now identified as a dagger (Chen Xianshuang and Zhaxi Ciren, 1991, pp. 228-229).

[79]See Chen Xianshuang and Zhaxi Ciren, 1991, pp. 218ff; Zhang Zengqi, 1990, p. 206.

[80]Chen Xianshuang and Zhaxi Ciren, 1991, p. 229.

[81]A tanged dagger M227:1 (Chen Xianshuang and Zhaxi Ciren, 1991, p. 220) was found with the curved daggers at the same site.

[82]Kan Yong, 1986, pp.1-20; Kan Yong and Xiong Ying, 1990, pp. 239-265.

[83]Kan Yong and Xiong Ying, 1990, p. 240.

[84]Remains of wooden coffins were found only in 13 burials (Ibid., p. 242)

[85]Kan Yong and Xiong Ying, 1990, p. 257.

the Gansu region.[86]

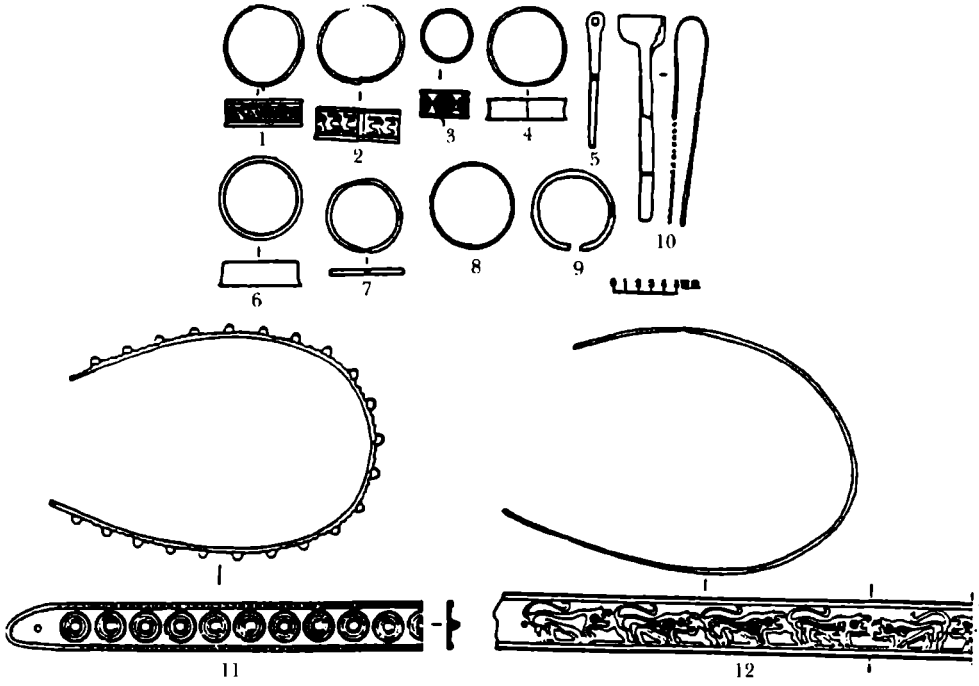

Figure I: Bronzes from the Aofengshan site.

The Aofengshan site dates approximately from the 6th to the 3rd centuries BCE.[87] The tomb furnishings, in particular the amphoras and bronze swords, are predominately nomadic in context.[88] Of the 10 swords discovered at the site, 8 examples are furnished with spiral-shaped hilts and one has a double-disc handle; some of them can be fitted into the bronze sheaths discovered at the same site. Other bronze items include arm rings, hair pins, and U-shaped hair bands (Fig. I). Many are decorated with avian and animal motifs comparable to the patterns used by the nomads in the Steppes. It is worth noting that bronze axes and stone molds for casting similar axes were also uncovered at the site. These axes derived from the shoulder type that was produced at the Haimenkou site, which is less than 30 km away.

The mixture of traits discerned in the Aofengshan assemblage suggests inter-community communications among sites near the highlands of western Yunnan. The cultural interplay could have been extended to the Erhai area and regions farther south and east. Both the Haimenkou and Aofengshan sites bespeak their strategic positions at a cultural crossroad, via which the Erhai sites also had gained artistic and technical inspirations. The original sources of some of these cultural ideas, however, were to be located in the Neolithic

[86]Ibid., p. 259.

[87]Ibid., p. 257.

[88]The Aofengshan bronze inventory does not include regular argricultural tools.

strata of the northwestern frontiers of China.

D. *Ethnological References to Cultures on the Highlands of Yunnan.*

As western Sichuan was not incorporated into Chinese rule until the end of the 1st millennium BCE, very little background about the cist graves has been documented. The earliest references in *Shiji* (Book of History) primarily account for activities occurring during the Han era. These records indicate that regions west of the Min River in Sichuan and in western Yunnan were the habitat of some nomads and semi-nomads generally called Di, who were part of the "Southwestern Barbarians" that encompassed a number of different stocks.[89]

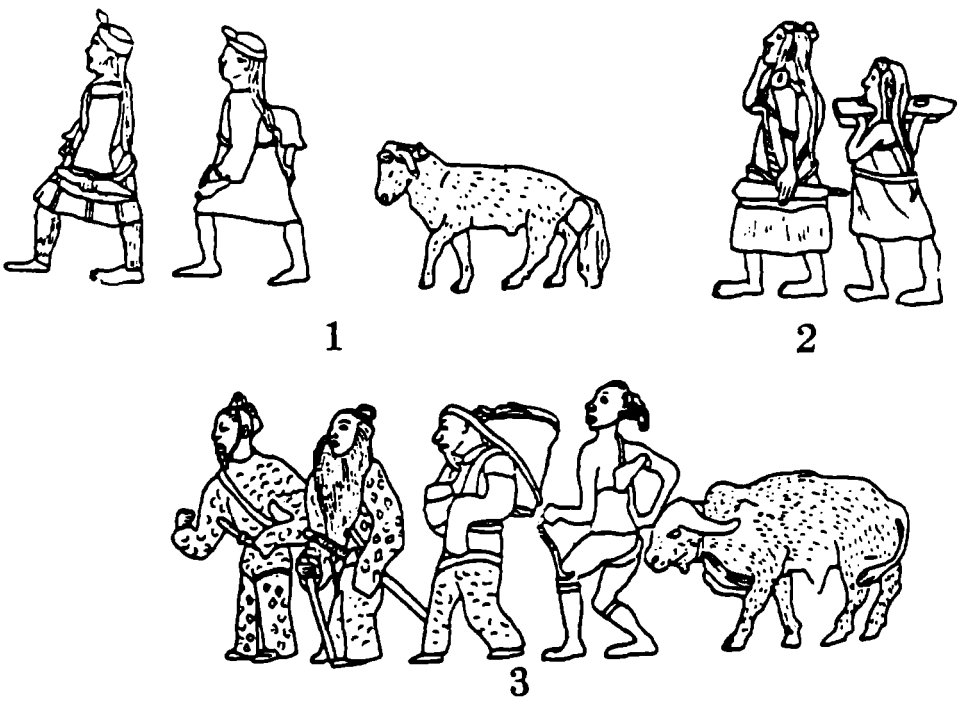

Figure J: Human figures on the lid of a cowrie-container (Shizhaishan M13:2).

Archeological studies have identified some of the southwestern Di cultures with the cist burials in western Sichuan and northwestern Yunnan.[90] However, the people in the graves along the Upper Jinsha River, in particular, can not be clearly recognized. The available data suggest that the Upper Jinsha group were akin to the inhabitants near the upper Min River,[91] where cist graves also have been discovered in abundance. Studies of the legends in the Upper Min River claim that the builders of their stone graves had descended from immigrants

[89] *Shiji*, chapter 116.

[90] Tong Enzheng, 1980, pp. 432ff.

[91] Ibid. These were called the Ranmeng.

originating from present-day Qinghai.[92]

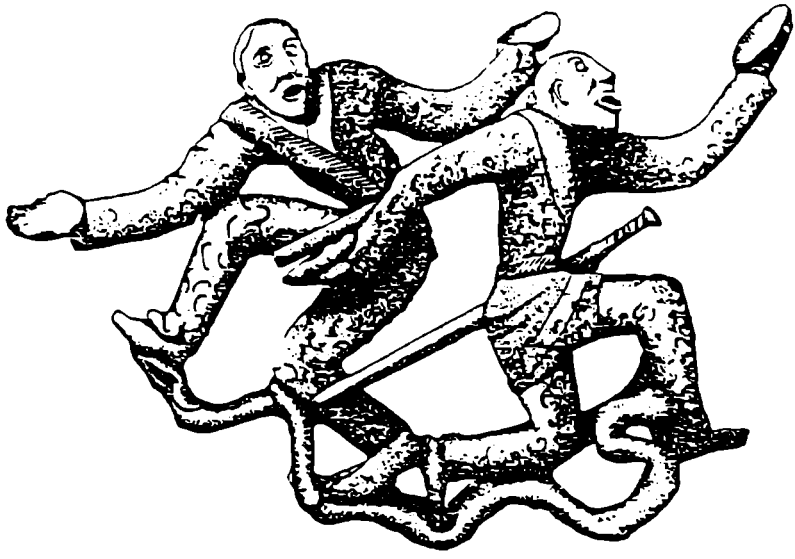

Figure K: Openwork plaque (Shizhaishan M13:38) (after Emma Bunker, "The Tien Culture and Some Aspects of its Relationship to the Dong-Son Culture," *Early Chinese Art and Its Possible Influences in the Pacific Basin*, p. 302).

The Di groups as part of the "Southwestern Barbarians" were also documented to have included two sub-groups, called the Sui and Kunming. During the Han period, both were present in a vast region described as "west of Lake Dian and south of the Jinsha River."[93] They were depicted with braided hair; they lived in the valleys in the winter and migrated to areas of higher elevation during the summer. This profile reminds one of the pastoralists of the Eurasian Steppes, some of whom were known to have braided their hair as well. It is possible that the aforementioned shouldered bronze axes, which had a wide distribution in western Yunnan, were the principle tool used by the Sui or Kunming to clear new lands during their constant movements in the mountains.

Descriptions about the Di communities in Yunnan can be visually born out by the artifacts from the Dian culture in Yunnan. Images of these people are modeled in three dimensional forms surmounted on drum-shaped containers. Among them are stock breeders in a scene with different tribal groups paying tribute to the Dian state. A number of these figures are clearly modeled with braided hair; some also wear hair bands and others are additionally topped with a knotted coiffure (Fig. J-1, J-2). These details serve to illustrate the actual function of the bronze hair bands and hair pins discovered at the Aofengshan site (Fig. I-5, I-10, I-11, I-12). Moreover, some figures seen in the same

[92]Ran Guangrong and Zhou Xiyin, 1983, p. 230.
[93]*Shiji*, chapter 116.

tribute procession are portrayed with long swords at their waist (Fig. J-3). They are heavily clad in long sleeves and trousers. The costume of these figures seems to be a clear indication of their habitat, which is to be situated in the mountains or regions of high elevation. Similar attire can also be found on two figures depicted in an open-work plaque discovered at the same site (Fig. K). Both are noted for non-Chinese facial features, possibly representing Caucasian stock from the Steppe zone. Of particular interest is that these figures are armed with spiral-hilt swords that are miniature facsimiles of actual swords excavated from the cist graves and Erhai bronze sites. It is possible that these Caucasoids were also the principle manufacturers of the spiral-hilt sword. They also may have been part of the Di complex.

E. *Conclusion*

Ethnological data relate the Di to the Rong and Hu ethnic groups inhabiting regions along the northern and northwestern borders of China during the 1st millennium BCE. All these ethnic groups said to be descended from the Qiang originally dwelt in areas near the upper reaches of the Yellow River.[94] They formed a distinct cultural continuum in the eastern Eurasian Steppes in which homogeneous traits were commonly shared.[95] They also used similar criteria in their selection of technical and artistic ideas, such as the production of metal objects, the construction of stone graves, and the use of animal motifs for decoration.

Apparent influences from the Qiang cultures were readily discernible in Southwest China during the Neolithic period. They became increasingly noticeable toward the end of the 2nd millennium BCE, pointing to probabilities that some Qiang population actually drifted from their homeland in Gansu and Qinghai toward southwestern China. The immigrants intermarried with indigenous inhabitants and engaged in semi-nomadic animal husbandry along with rudimentary cultivation. These people eventually became differentiated from their northern brothers, and were eventually called by a different name: Di. They also left a concatenation of traits along the north-and-south directed valleys during the course of their migrations. Many of these traits are exhibited in archeological finds.

Archeological data suggest that some Di immigrants might have started to arrive at western Yunnan during the 2nd millennium BCE. They buried the deceased in distinct stone structures with ceramic and stone objects.[96] Some of the Di population may also have used

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[94]See You Zhong, 1979, pp. 4-5 for the Qiang people. They were responsible for the creation of many Neolithic cultures near the Upper Yellow River.

[95]See Tong Enzheng, 1987.

[96]Neolithic cist graves discovered in Yuanmou and Yongren regions of Yunnan may have belonged to the early immigrants.

cremation, which scarcely appears in archeological records.[97] The amphoras and shouldered stone adzes discovered at the Highland sites in northwestern Yunnan can also be taken as material substantiations of their northern heritage. Thus the infiltrations of the Di extended the Steppe cultural sphere farther into the highland areas of Yunnan.

Subsequently, the Di people could also have transmitted their knowledge related to bronze metallurgy into southwest China along with the use of stone casting molds.[98] Those living near the Jinsha River experimented with their metallurgical skill to produce simple tanged daggers; others near the Lancang and Nu Rivers also succeeded in casting shouldered axes and in replacing the stone tools with bronze ones. These southern Di maintained contacts with their kinsmen in the Steppe zones. They duplicated the Steppe weapon types and embellished their bronze objects with animal motifs that show a distinct Steppe style. Based on a simple tanged dagger, the Di populace in the Highland region also added the innovative spiral-hilt sword to their bronze inventory. They eventually exported the new invention to regions in western Sichuan, central, and eastern Yunnan.[99]

An analysis of archeological artifacts from the highland area of Yunnan also indicates that, toward the second half of the first millennium BCE, the original characteristics of some of the Di subcultures gradually became less intelligible. Artifacts dating from this time period exhibit a mixture of traits originating from different sources, and suggesting extensive interactions among the "Southwestern Barbarians." It is possible that at this time some of these Di populations already became assimilated and integrated into the Mimo communities near Erhai, where bronze kettledrums were the salient artifacts. Some members of the Di complex were probably also responsible for the introduction of both the shouldered axe and the spiral-hilt sword into the Erhai cultures.[100] The occurrence of dolmen-like burial structures and animal style art within the Mimo sphere near Lake Er may also be explained by penetration of the Di cultures into Yunnan.[101]

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[97]A similar practice can be seen in the top layer of the Aofengshan strata.

[98]See Watson, 1984, p. 349.

[99]Some variations of the spiral-hilt swords also have been found in Inner Mongolia, Gansu, and Shaanxi, suggesting cultural exchanges along the Chinese borderlands.

[100]It is possible that these two objects were used merely as "prestige goods" in the Erhai culture.

[101]The diffusion appeared to be from north to south and from areas of higher elevation to lowlands.

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Linguistics

Whose Were the Tocharians? Linguistic Subgrouping and Diagnostic Idiosyncrasy

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Genetic relation between languages in a putative linguistic family cannot be determined by simple visual inspection, by eyeballing word lists for similarities. Often the most diagnostic features involve the greatest dissimilarity (Hamp 1992a). The most diagnostic features normally display a degree of idiosyncrasy; this is an important factor which keeps the relations from being irrelevantly typological or trivially universalist (Hamp 1980a). In order to find the desired relations we must spot not similarities, but *correspondences,* recurrent correspondences if, for a start, they are to be persuasive; e.g. English *sw-* = Armenian aspirate *k'-* = Albanian *d-*, as in *sweat* : *k'irtn* : *dirsë.* The equation in the last pair is even more subtle since the more usually used morphological collective plural *k'rtun-k'* matches the *-ë* < **-ā* of the Albanian, an old neuter collective plural which has routinely yielded a feminine gender. The more transparent Latvian *sviedri* confirms the plural.

In turn, to find *significant,* and not tautologous, correspondences, we must identify our objects of study within the branching of subgroups, or proto-dialects of the language family in question. That is to say, we must meet the paradoxical circular requirement of knowing the answer before starting a comparison (Hamp 1990a); in other words, we do best to know the solid, dependable correspondences in order to establish/reconstruct the source proto-language and its proto-dialects, yet we need to take account of the proto-dialects to assure ourselves of the independent testimony of our data used in arriving at correct and refined correspondences. Clearly, we manage to satisfy this requirement only by successive, persistent, asymptotic approximation, by provisional reconstruction and tentative labeling of our observations. Our work is never done, but we hope that our areas of ignorance and doubt shrink proportionately and definitively; we hope that when they increase it is because new knowledge opens up new possibilities and new vistas.

In order to subgroup within genetic families we must seek shared, or common, innovations; this method has been understood and practised in linguistics for over a century now, although it is still today, and has been, regrettably ignored or violated all too often. The principle was known to Leskien in 1876, and before him it was appreciated by Lachmann. After Leskien the criterion became better known through Brugmann. I here pay my respects to these great masters and predecessors as I did not in what is cited below, since when I wrote that (1949) I had not read these scholars adequately and did not know that I had been anticipated. Such is the price of ignorance.

I insist further that we must additionally discriminate one more category of consideration, innovation by loss, which is labelled B.2.a below, and which is sometimes mistakenly invoked. This fallacy is really a special case of the well known *argumentum ē silentiō*. A commonly encountered instance of this fallacy is the repeated attempt to draw a historical conclusion from the typological classifications known as *satəm* and *centum* in Indo-European studies; each of these patterns of descent results from a merger, which is a loss in phonological distinctiveness.

Karl Horst Schmidt has invoked (1987: 39) the principle of shared innovations and cites earlier appeals to this principle. It is possible, however, to refine somewhat the statement of essential and ordered considerations which must be employed in the correct application of this principle. Years ago I tried to state explicitly what these considerations are, but my statement appeared in a publication that is not very widely accessible. Although this reference has been cited in later literature relating to my work, perhaps it may not be otiose to reproduce the relevant passage (Hamp 1953: 8-9) here:

> So that we may be sure that the conclusions of this study are not prejudged it is imperative that all Welsh-Cornish and Welsh-Breton correspondences be honestly inspected. These are set forth in part A below.
>
> The next, and principal, task is the inspection of all Cornish-Breton correspondences, and this is dealt with in part B. Since all correspondences as such are not of equal weight in determining linguistic affinity, I have divided the points of agreement into the following categories, in ascending order of cogency:
>
> B.1 - W shows innovation; C and B (hereafter written CB) preserve an old feature. This category by itself is not at all convincing for purposes of the present argument, since one cannot tell at what time prior to the earliest written example the innovation occurred in W.
>
> B.2.a - W preserves; CB innovate by loss of a feature. This category by itself is likewise not convincing, since one cannot be sure when the feature was lost, or indeed it was not lost independently by the two languages.
>
> B.2.b W preserves; CB innovate by replacement or redistribution.
>
> B.2.c - W preserves; CB innovate by addition.
>
> The last two categories form the heart of the argument. It would be indeed a remarkable chain of coincidences if all these innovations had been made independently by the two languages. It will be noted that the members of each of these two categories numerically exceed any other, and that taken together they exceed all others.
>
> There are some correspondences for which I am unable to say on which side the innovation lies; there are others where no innovation need be assumed and where the two contrasting features could well have existed side by side in common British Keltic. These I have collected in category B.3. They, of themselves, are not cogent supports to the argument.

> As a working basis for handling categories B.2.b and B.2.c I have interpreted "replacement" and "addition" as follows. Addition means that the innovation implies an addition to the structural pattern of the language as contrasted with its sister dialect. In other words, if we were writing a descriptive grammar of Southern British Keltic, such an innovation would demand a statement which would presumably have no counterpart in a grammar of Northern (or perhaps Central) British Keltic. Replacement means that as a result of innovation different items would appear in the relevant statements in the two imagined grammars; since our knowledge of the details of British Keltic, on a synchronic basis, is so often hazy, such a substitution could conceivably have caused a structural shift, but I have tried to limit this category to cases for which no such assumption is necessary. For purposes of the argument at hand there is no need to separate these two categories, since they are equally valid as showing common positive innovation (as contrasted with the other categories, which are negative from the viewpoint of CB). Indeed, it is difficult in certain cases to decide how the over-all structural balance would have been affected (e.g., the CB analogical extension of vowel affection to the 3 pl. pres. indic. forms of the verb). But I have thought it well, as a contribution to the structural study of British Keltic, to separate these two classes as best I have been able.
>
> The criteria for preservation of a feature are primarily of two sorts: agreement with Goidelic, usually Old Irish, and/or agreement with structural analogues within Brythonic.

The above categories of innovation are akin to but not identical to what is known to textual criticism as common scribal error in the establishment of manuscript stemmata.

I propose now a further constraint,[1] and to illustrate the fact that comparison and subgrouping of languages cannot be based simply upon the equation of surface features or formants, however well justified the genetic relation of such features, taken separately, might be. A relation of proximity in subgrouping can be made plausible only by demonstrating a principled shared chronology of interesting historical depth; this can be best done by identifying traits whose development presupposes other shared features resting upon common innovation. In this way we recognize depth of shared history, and may hope to avoid mere collection of trivial similarities or of likely exploitations of structure (the "parallel tendencies" of Meillet). Such a method, it is claimed, improves upon the simple criterion of shared innovation by structural replacement or addition; this last criterion is necessary but not sufficient.

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[1]This constraint and the two illustrations were first presented to the Circolo Linguistico Fiorentino as homage on the occasion of its two-thousandth session in December 1995, and are presented here with the pleasure of fitting acknowledgement.

1.	Venetic	vha.χ.s.θo	Pa 61
		hva.χ.s.θo	Pa 15

The Venetic perfectum /fagsto/ has been correctly attributed (see Prosdocimi *La lingua venetica* II (1967) 84-6) to IE **dhə-*. The Latin *faxō* (*Aen* 9.154) cannot be strictly equivalent since that should be derived from an irrealis stem. The Venetic, then, must thus reflect an *s*-aorist formation, and therefore is to be equated with Latin *dūxī, dīxī,* etc. It hence presupposes a present equal to Latin *faciō* or Neo-Phrygian (*αδ*)*δακετ*(*ορ*) ≅ *αββερετ*(*ορ*) (thus with **ə* and **e* in their bases, which are here plainly present, or infectum).

On the other hand *fagsto* cannot be formed on a *κ*-aorist like Greek *ἔδωκα* or *θῆκε* (see Schwyzer *Gr. Gram.* 1.741) since these (and probably Neo-Phrygian *δακαρ–εν* [perfectum] < **dhēkēr* : Paleo-Phryg. *matar* < **mātēr*) had a long vowel in the singular which the *κ* rescued from monosyllabism. In fact, within Venetic, *zoto* (: Paleo-Phryg. *e-da-es *dhē-*) must have shown precisely this long vocalism, paralleled in Latin in *fēcit,* and probably Neo-Phryg. *δακ–*.

Therefore we suppose that *fagsto* had replaced the equivalent of Latin **fēced,* which itself is necessary to explain the generation of the regular zero-grade yod-present **fəc-iō* > *faciō*. In turn, we require a Venetic **fac-* or **fəc-* in order to explain the formation of sigmatic *fags-*.

2. Venetic Ca 13 *t[ol]er,* Ca 12 *tuler,* Ca 14-17, 68 *toler;* Gt 3 *tola.r.*

Regardless of questions of vocalism, the presence of these instances in our corpus in the meaning 'obtulit' shows that Venetic had already undergone suppletion within a single semantic range that is vividly reflected in the well known Latin relation of *ferō* ~ *tulī: tollō*. Such a suppletion is not seen in Greek *ἔτλᾱν* or Old Irish *tlenaid.*

These indirect correspondences are far more valuable for subgrouping than e.g. Venetic Es 45 *louderobos* = Latin *līberīs*. Venetic is, then, either Italic or close kin to Italic.

There is another principle which we must always bear in mind: Subgrouping, like familial membership, cannot be demonstrated on the basis of non-relations, which would be another variety of *argumentum ē silentiō*. It is the demonstration of positive relations elsewhere that confirms or makes probable warranted exclusions from an attachment under consideration. This point will arise for us later when we consider North European relations.

We must now make clear, especially for our colleagues from disciplines other than linguistics, a matter regarding quantitative criteria. Judgments in linguistics, under the right conditions of evidence and cleansed data (e.g. philological control, epigraphic clarity, etc.), may be made on the basis of numbers that would surprise the statistically minded because of their small quantities; much more important in linguistics is the systematicity (formulability) of traits, regularity as defined by total

occupancy of a universe of rules, behavior showing no discoverable exception (no matter how minute the number of instances), parallel patterning within categories, total accountability. Languages frequently show small, but salient and measurable classes: in Albanian *jam*, 'I am' and *kam* 'I have' show obvious differences (*është* 'is', *kā* 'has'; *kle* 'was', *pati* 'had'), yet they form a class against all other Albanian verbs. Some of our statements here rest on very small evidential numbers, but those instances will be crucial and conform to the above requirements; they should not be random, and counter-cases when found will destroy the formulation—that is how linguists debate. Inferential directionality assumed for change forms a major strength in such debates.

In judging subgrouping, while crude quantity (numerosity) counts, criteria are strongly of the qualitative sort. This makes counting hard. The problem of genetic subgrouping (inherited distance within a language family) is a problem in node-and-tree structure based on oldest-layer proto-dialectology. The problem of antinomies within this sharp structure is one of diffusion between proto-dialects.

There are areas of our IE knowledge where much progress has been made (e.g. the case inflection of nouns), but from which it may be difficult to extract criterial evidence for our present problem or its like. At some future time we may be able to see patterns useful for our emerging hypotheses, but for now the complexity remains relatively intractable, or at least not strikingly decisive. One example may suffice. It is desirable today not merely to list and document bases (misleadingly "roots") of the proto-language, but to consider attested formations and derivatives and the implied derivational processes and rules. We will briefly summarize **bhergh-* 'rise, raise' -> 'high' -> 'exalted':

factitive: **bhorgh-éie-t-i* > Skt., Avest.
nasal pres.: **bhr-n-gh-é-t-i* > Skt., Armen.
? pres.: Toch.
pple.: **bhrgh-(ó)nt-* > Skt., Avest., Pers., Osset. Gaul., OIr., Brit., Gmc. (OHG)
→ *-iH$_a$* abstract Brit. Celt. > social group
→ *-no-* leader Welsh, Bret.
→ *-(i)on-* singulative Gmc., Gaul.
**bhrgh-tó-* > Skt., OLat. (?) → *-H$_a$-* deadj.vb. > Alb. *zbres*
**bhrgh-uen-* > Gk *παρθένος*
(*-én-* ? > Ind-Ir.)
**bhrgh-mó-* → **bherghmo-* deriv. > Prehell. *Πέργαμος, -ον, -α*
**bhrgh-ú-* > Hitt., Arm. → *-ró-* > Toch.
→ **bhergh-ies-* compar. > Avest.
→ superl. > Ind-Iran.
root subst. actionis f./agentis **bhrgh-* > Avestan, Pers., OIr., Brit., Gmc.; Prehell. *πύργος*

→**bhrǵh-o-* > Iran.
→**bherǵh-o-* deriv. > Pers., Armen., Welsh, Gmc. (→Slav.), (Lith. *biřginti)*
→No. Eur. IE > Gmc.; Balto-Slav. 'bury, hide' and Cimmerian *prokŭ* (in Slavic) 'inventory' < **bhrgho-* are probably from Gmc.

s-stem n. **bhérǵh-es-* > Avest.; → compound Vedic Armen.
nom. actionis **bhorǵh-mó-s* > Gmc. (Germ. *Baum*)
-ti- → **bh(e)rǵh-e-ti-on-* > Gaul. *Βρεγετιων*
**bherǵh-no-* > Bret., Corn. *bern*

We seem to have here scattered stray conservatisms, local innovation and known productive formations; nothing much decisive for subgrouping. The main virtue of our knowledge seems to be broad support for the base as a verb from most branches. For example, North European IE is a known areal (i.e., diffusional) grouping, not a genetic set, or branch. Of the 21 formations registered, 13 are ancient IE and might appear or survive anywhere, while 7 are locally or more recently productive. These last *could* be useful to us for our present task by defining significant tight groups. The singulative in **-(i)on-* is one such since Tocharian seems to share this with Gmc.; but our present collections (perhaps defective) fail here to show it. I would like to find the social-group leader **-no-*, for that defines North and West Europeans. The suffix **-ró-* is ancient IE, but not here; for Tocharian productively replaced all ancient **-ú-*adjectives with **-ró-*. Yet unluckily for us it did this alone, so far as surviving evidence shows, and hence thereby forms no grouping.

Now using our principles and constraints of "buried" innovation by non-loss we proceed to outline a subgrouping of IE by illustrating shared idiosyncratic features in manageable numbers of examples.

1. Brugmann's IE

These branches clearly share a number of features (without entering into the troublesome verb) which are not found in Anatolian (Hittite and congeners). We must now add to what Brugmann knew Tocharian, Nuristani (although he mistakenly knew it), Prehellenic (though Kretschmer suspected something), and probably Cimmerian; and perhaps delete Illyrian. Overwhelmingly important diagnostic features are shared by Brugmann's (adjusted) branches.

Fixed enclitic case inflexions in **+bh/m-* and **+su* (and also gen. pl. **+som*) in the oblique plural and instrumental singular, which I have shown to appear in the relics of complementary distribution between **bh-* and **m-* and between 'sociative' and 'locative' (**su*) or 'genitive' (**som*), a distribution which bridges these substantive ((pro)nominal and adjunct) enclitics and autotonic particle / preposition / preverb / conjunction words; see Hamp 1991a. Thus, to illustrate close to home (though the original synonymy is now lost in the mists of history), in English the truncated ending left in *hi-m* is in origin different in syntax from but

synonymous with *by* and *be-side* and *a-b-ove* and *be-low* and *be-take, be-come, be-lieve, be-wilder.* The attestation of these **bh* and **m* elements may be tabulated as follows:

	Anatol.	I.Ir.	Arm.	Gk.	Ital.	Celt.	Phryg	Toch.
+bh	—	×	×	×	×	×		
+m	—					× (n-)*		
me	—	(-t)	(×)**	×	(×)**		×	
bhi	—	(-*t*)						

	Messap	Alb.	Balt-Slav.	Gmc.
+bh	×	(×)		
+m			×	×
me	×	×		×-t-
bhi			×	×

*see Hamp, *Ériu* 39, 1988, 189-90; 47, 1996, 209.

**If fossilized in Arm. *merj* = Gk. *μέχρι*, Lat. *mox* ≡ Ved. *maksu* : OIr. *moch* 'early'.

Phrygian is simply too fragmentarily known to be significant here, as are the others not shown. Unfortunately the history of Tocharian declension has apparently erased all traces of this process. Hittite had no such endings and simply postposed clarifying particles when required. Brugmann's IE innovated by filling out the paradigm.

Thematic deverbal substantives with base in *o*-grade Ablaut of the type Greek *τομός* (agentive), *τόμος* (action or result). Candidates for this class in Hittite are surprisingly rare; I have identified 80-odd specimens in Slovene (and similarly in Serbo-Croatian and Czech) and 50-odd in Dutch. Only 20-some in Resian, a single isolated valley dialect (1500 persons) of Slovene, but still a significant proportion of this outlier subject to long Friulian and Bavarian contact. In general, the class is far better conserved in branches that conserved traces of the IE word accent longer (including Verner's Law in Germanic and despite the complexities of the Slavic accents and their non-distinctive fate in monosyllables). The incidence of attestation of this class (the handbooks are deficient on this; see Hamp 1988a, b, 1990d) may be summarized:

rich: Indo-Iranian, Greek, Slavic, Germanic

lean: Armenian, Albanian, Baltic (but richer in Old Lithuanian for a specific reason of transfer to *ú*-stems), Tocharian, Celtic, Italic, Cimmerian (a very fragmentary corpus);

fragmentary: Thracian, Prehellenic (less favourable for this than Cimmerian), Messapic, Phrygian (in Paleo-Phrygian only the uncertain names M-07 *tolos* and G-116 *bena-gonos* may furnish examples out of an exiguous corpus).

The Cimmerian evidence is significant; out of a corpus that I accept totalling 31 Balto-Slavic lexemes we find two of this class (*ppto*, SCr. *pũto* 'fetter' < **bhondhó-*; Slavic *gojĭ* 'peace' < **k*^{w}*óio-* > Slav. *po-koj*). Tocharian

furnishes such examples as *keme* (= OCS *zǫbŭ*, Geg Alb. *dhâmb* 'tooth,' Eng. *comb* < **ǵombhó-* 'the biter'), *plewe* (= Gk. *πλόος*), and B *kene* A *kaṃ* 'song' (=Russ. *zvon* 'ringing of bells', Geg Alb. *zâ* 'fame' < **ǵhu̯ónos* : Cz. *zvon*, Pol. *dzwon* 'bell', Geg *zâ* 'voice' < **ǵhu̯onós*), thus clearly manifesting this Brugmannian formation.

It seems likely that the growth in IE productivity of this class is connected with the Anatolian absence of the distinction of morphological aorist and perfect (which latter required *o*-grade: *λέλοιπα*), and with the rarity in Anatolian of the highly productive IE thematic present (*λείπω*).

While **ǵhesr* 'hand' is as old as we can trace in IE ("IH"), with reflexes in Anatolian, Gk, Armenian, Albanian, and Tocharian, the same cannot be said for 'eye, see'. Against Hitt. *šakwā* 'eye' we have the IE base **ς^{w}ek^{w}-* (IEW 775-7, which needs much revising; in this paper I cite Pokorny's IEW simply as a convenient label and *point de repère.* I have written repeatedly about **ς^{w}ek^{w}-*). Formations are attested as follows:

root noun	Armenian, Greek, Baltic, Germanic, Tocharian, Celtic
**-tsH/l-*	Indo-Iranian, Greek, Slavic (> **s*-stem), Italic (*-l-*)
**-i* dual	Armenian, Greek, Albanian, Slavic, Baltic, Tocharian
Verb	Indo-Iranian, Greek, Armenian, Albanian (transformed to *shoh*).

Thus Toch. A *ak*, Toch. B *ek*, pl. *eś(a)ne* reflect this Brugmannian innovation. The highly specific equation

Toch. *yneś* 'really' = Gk. *ἐνωπῇ* 'openly'

confirms the unity of the above set, as well as the regular paradigmatic integrity of *ὠψ* and *ὀπ-/oc-* (Lat.); Arm. *ak-n* is zero-grade **ς^{w}k^{w}-*. The only branches not represented are those of fragmentary attestation.

The augment of IE verbs is repeatedly adduced as a dialectal feature of restricted incidence; it is thought of roughly as an Eastern feature. The facts are briefly as follows:

Indo-Ir.	*a-*
Helleno-Arm.	**e/__* monosyllables > Greek *ἐ-*, Arm. *e-/__*monosyll.*
Balto-Slav. + Alb.	**e-* (reflexive)- > Lith. `#Vb (in certain classes of compound verbs in the pret.) Alb. *u-* < **e-ue-* (in middle voice pret.) *dha* 'gave' *rā* 'beat, fell' (with "lenited" initial < **d, r̄*)
Phrygian	*ε-*
Celtic **nu-*	> OIr. *no* (with "secondary" tenses of simple verbs) OIr. (and Welsh/Breton) *to* became a preverb, and the **sentence-connective took over the accent of the augment and preverbs. *no* also served to cliticize pronouns as in Hittite; Welsh *neu* remained a particle. **su* is frozen in Welsh *hwde.* These adaptations of sentence-connectives became possible by virtue of the development of Insular Celtic VSO order. Latin *e* cliticized a pronoun in the archaic Arval hymn, just as preverbs in tmesis did in the XII Tables.

> **pro+e* > generalized *prō* with verbs in compounds; in IE with multiple preverbs, **pro* always stood next to the verb, but the augment could intervene. (Hamp FS Puhvel)

Germanic and Italic must have lost **e-* (analogous to the reduction of *ge-*) in simplexes just as the preverb **a* was lost in the Germanic compound *come* (Hamp 1987a: 435)

I have no evidence for Tocharian and Messapic, and the other fragments could not show this feature. Nevertheless, the augment seems to be detectable for an early date throughout the whole of Brugmann's IE. Anatolian shows no augment as such; as sentence connectives with well understood syntactic properties Hittite has *nu* and *ta*, and Luwian has *a-* < **e*, we presume.

Brugmann's branches clearly show significant diagnostic innovations not shared by Anatolian. Tocharian participated in these innovations, and therefore is not to be grouped with Anatolian.

2 Non-Asiatic IE

We now proceed to segregate Indo-Iranian and the balance of Brugmann's IE. Frequently one reviews the features that unite Indic (plus Nuristani) with Iranian; this of course identifies Indo-Iranian. But that unity could in principle have seceded from other branches at any time and from any subgrouping. We will now sample the inventory that characterizes the excluded balance. It is difficult to assemble a long list of impressive grand structural grammatical features because, with the early attestation of the socially conservative Vedic and Avestan (and the large corpus of Sanskrit), most of our observations, while valid, fail to be diagnostic by virtue of recording loss or undecideable fragmentation.

It seems likely that many contractions of hiatus left by the loss of intervocalic laryngeal (H) belong to our group, but whether they were coaeval and pandialectal is mostly unanswered. This even leaves the genitive plural in vague chronology, not to mention diphthongal stems.

Note however the relentless progress in N-A IE of the "first" declension towards being a feminine counterpart to the thematics, and note too the flight of the old pronominal declension either into the nouns proper or to isolation as defectives and particles. Our space will not permit justice to those lines of reasoning, but such opportunities must not remain unmentioned.

We turn now briefly to the more tractable lexicon. The lexeme *salt* (IEW 878-9) is believed to be hidden in Indo-Iranian under a marginal marine derivative (the IE homeland seems unconcerned with the sea!), but all the other non-fragmentary branches attest the base clearly. Albanian has *gjollë* for a salt-lick (and trough), and Tocharian evidences A *sāle*, B *salyiye*.

The etymon of *milk* was 'wipe (off), smear (on)' in Indo-Iranian, but all N-A IE branches except (not surprisingly) Messapic and Phrygian attest the meaning '(to) milk'; Toch. B has *malkwer* 'milk', and Toch. A *mālklune*

'milking', *malke* 'milk'. On details and relics of the semantics see Hamp 1979-80.

A different change—replacement by modification of the predecessor—is seen in *tongue*. Here the Indo-Iranian reduplicated noun is replaced by an opaque compound; see Hamp 1989a. The Tocharian form, A *käntu*, B *kantwo*, places it (non-obviously, to be sure), with its initial **d-* and lack of **l*, squarely in Northern IE.

With (*finger*) *nail* we do not know the direction of the innovation, but Indic *nakhá-* and Pers. *nāxun* show the voiceless obstruent against all N-A IE **ς^{w}nog^{w}h-* (IEW 780), even though, sadly, Tocharian cannot instruct us in this, as it can by confirming the **ς^{w}* with its *m-*.

Many more etyma could be proposed as N-A IE innovations that are sparsely attested, on the inferential ground that their incidence is diagnostic in spread. So, Arm. *dašn* 'agreement' < **dh²-ḱ-sn-* (: OPruss. *gim-sen-in*) ~ Lat. *facinus* '(mis(deed' (*faciō, ἔθηκε*, Arm. *dnem edi*, Eng. *do, doom*). But that would be too laborious for our present space and powers. In such matters Insular Celtic can be a useful control for archaism, since it has proved an excellent fossil hoard to match with Indo-Iranian; e.g. Old Irish *nóem* 'saint' = Old Persian *naiba-*.

Clearly, N-A IE is an integral entity.

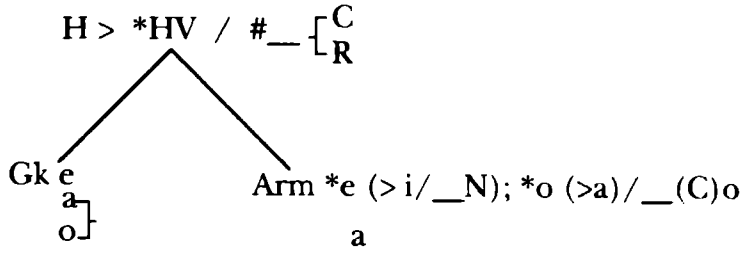
3. Pontic, or Helleno-Armenian

This subgrouping, certainly not so close as Indo-Iranian, where Vedic and Gāθā Avestan are nearly as isomorphous as Toch. A and B, is by no means as convergently reconstructable as Baltic and Slavic. Apart from losses which have deprived us of evidence, the two have simply diverged enormously by gradual displacement of the selfsame phonetic substance (*πεντήκοντα* > *penínda* ~ *yisun*); not to mention life for three millennia before the Roman empire in two or three different areas and Sprachbünde. I will simply place on record my considered conviction that these two indeed form a group, of very ancient date probably east of the Pontus, sharing a society long enough to sort out several features of morphology and at least a couple of dozen N-A IE lexemes (e.g. *āmr/n-* 'day', *γέλως* 'laugh', **ǵmbh-el-* 'jaw', *ἵππος*, **ói̯u+ki* 'not'). Their syntaxes are very different and reflect long independent innovation. They must have together borrowed the name of the tree *πτελέα*. I would expect on these grounds the Greeks to have migrated perhaps along the north Turkish coast (or the south shore of the Pontus) to enter the Aegean from the east, i.e. the west coast of Asia Minor. Thus Greeks could have entered Cyprus from the north (near Pamphylia) and not from the west.

I will now just mention by listing major features of concordance between Greek and Armenian. I have discussed many of these in previous publications. The listing follows the recent erudite, ample and admirably intelligent book of James Clackson (1994), which I refer to as the most recent and complete work on the subject, although I do not agree with the author's overly cautious conclusion. I take matters up mostly in Clackson's

order, thereby making page references dispensable.

I attach importance to the "prothetic" vowels (Hamp 1978, 1991b), and particularly to *ἐννέα* = *inn* 'nine'. Their fates may be summarized:



Clackson has no discussion of the full phonotactics of **s*, a striking concordance.

*s > *[+continuant, -glottal] *s* ___[+obstruent; -continuant]
> Arm. [+velar] > [-continuant] *k'* ___#
> *[+glottal] *h* ___V, R

He sems not to have seen Hamp 1983-4, though he cites a later publication, where the mechanics of the equation *πῶλος* = *ul* < **plH* are explained. This phonological process is too idiosyncratic to be dismissed.

Clackson (42) in an otherwise excellent discussion makes his solitary important mention of Tocharian, reporting claims that in Tocharian and Greek **i/uH* other than **H*$_1$, and this for Armenian as well, gave *i̯/u̯V*. However, even when we accept this formulation (which is important but which Adams 1988: 31-34 does not accept) it is not a diagnostic correspondence, for the structural mechanics are different. In Greek it broadens the behaviour of *RH* to embrace *i/u;* in Tocharian not so.

In the morphology I count the displacement, or copying, of the nasal infix in presents of the verb to the suffix position as too idiosyncratic to be overlooked.

From the lexicon I accept at least the following concordances as significant for our argument: **aiǵ-* 'goat', **H*$_2$*el-*^{2}- 'grind', **H*$_a$*loHpeḱ-* 'fox' (an IE loanword?), **āmr/n-* 'day' (Hamp 1984), *ar-* 'fit' (archaic but idiosyncratic), *au-* 'spend the night' (unique morphology no matter what), *γέφῡρα* (see In memoriam Campanile, in press), *ἵππος* = *ēš* 'donkey', **ḱen-(wo-)* (suffix of polar opposites—no problem), **mēd-* 'plans' (an **-ā* collective), **meǵh(s)r-i* 'near', **ς*^{w}*bhel-* 'sweep; increase/owe', *οὐκι* = *oč'* (there was a word juncture), *πεδα* 'after' (I do not understand C.'s criticism), *πρωκτός* (see also *AAL* 12, 1991, 5), *ψευδ-* **eph-* 'cook', **twH-wo-* 'safe, sound', **wes-nu-* 'clothe' (morphology), **u̯r(ē)n-* 'lamb'.

On these grounds I treat Helleno-Armenian as a unit, and closer to Indo-Iranian than the rest of Brugmann's IE.

While recalling, but without repetitiously rehearsing, our starting principles, let us now make clear the status of Indo-Iranian and Helleno-Armenian—what we mean by closer than to the others of the Brugmann

group. This is not a statement of *grouping* or *subgrouping* such as we make for any of the recognized IE branches. It is a recognition of a certain level of conservatism, aided by their attestation which is early (= less loss of evidence), clear, and abundant. And they will form an exclusion by the combined evidence of NWIE. It is therefore a relation (chronological or stemma priority) which is always subject to revision. For example, it could also prove to embrace Cimmerian.

We now resume positive characterization.

4. Northwest IE (NWIE)

Our set, now arrived at by the principles outlined, has a chequered history of attempts which we will not take the time to trace here; Lejeune 1943 gives a crisp and informed summary of influential work, even-handed, yet judicious, as background to the debate, since 1917 (hinted at in 1916) inaugurated by Walde in his Rektoratschrift, on Italo-Celtic, a key prerequisite to a discussion of Latin. Albanian gets mentioned but once in the monograph only to note its unclear relationship to Illyrian, which itself would be palpably attested only in brief Messapic inscriptions; Messapic otherwise gets mere mention twice, as also Thraco-Phrygian does, the latter for being satem. Meillet's mature views from 1930 on (after Lejeune reviews the disputes of the '20s surrounding Italo-Celtic) emerge as: first, Hittite and Tocharian as most archaic; next the peripheral (therefore archaic) Italo-Celtic and Indo-Iranian; finally the later separation of the "central" group (Germanic, Illyrian, Greek, Thraco-Phrygian, Balto-Slavic). Apart from the appeal to names for dubious corpora (what really was Thraco-Phrygian?), one will easily see the differences between these groupings and those presented in the present paper, both in basis of classification (archaism, and losses) and in membership of groups.

Just as Meillet, Devoto and others, each for differing reasons, thought, we can characterize a similar but different bundle of branches. Of course, one reason for the differences is that progress of scholarship has changed the starting facts; our theory of IE has also been refined, e.g., laryngeals, and their manifestations in Greek, and many details of morphology. Therefore there is no reason to mourn the disagreements.

We can now say that it is still not certain within NWIE whether or when our set of facts is evidence for genetic or areal (diffusional) grouping. Certainly we have here nothing like the clarity and sharpness of Indo-Iranian and Pontic. Big shared features that affect large parts of the grammar are losses, and thus not diagnostic, e.g. the perfect-aorist merger in verb stems.

One common feature, which had further repercussions, was the merger of $*ə$ (= H_2) > $*a$; but this is, in surface phonetics, a loss. A more complex case, which I have discussed in Hamp 1996a, is 'daughter'. The well known IE etymon $*pə_ater$ 'father' yields Toch. *pācer/-ar.*

In the domain of syntax so far as we can tell from languages that have bequeathed us discursive texts, there seems to be a significant increment

in the use of adnominal adpositions showing narrowed constraints in case government; observe that this applies even in Slavic, if less strongly. Though Greek qualifies here, Armenian certainly does not.

We turn now to some lexical items:

**dhelbh-* (IEW 246) 'gouge': found in Gmc., Balt-Slav., Alb.
**dhlgh-* (IEW 271-2) 'debt': Celt., Gmc., Slav.
**dheub-* (IEW 267) '*deep*', Lith. *dubùs*, OCS *dŭbrŭ dŭno*, Alb. *dēt dejt* 'sea' (Arbëresh dialects attest both), "Illyrian" *δύβρις*, Welsh *dwfn*. The Balto-Slavic must have conflated with **dhubh-* 'dark' (IEW 264), since the **u* has not undergone lengthening.

These will give a notion of the overlapping dialect range of attestation. It is, and will be, clear that Tocharian participates in this set. Thus in 'father', as we have seen, Tocharian has *ā* for $*H_a$, which Greek *πατήρ* imposes (in agreement with e.g. *στατός*). This same *ā* occurs in *tās-/tās-* 'put' < $*dhH_e$*-s-* (H_e = ʔ; cf. Greek *θετός*), and in *pāsk-/pās-* 'guard' < $*pH_o$*-* (H_o = ʕʷ; cf. Greek *πῶμα* 'lid' < $*peH_o$*-mn*). Such an equivalence for zero-grade syllabic $*H_a$, H_e, H_o is routine for NWIE; and the *ā* matches the vowel of *āk-/āk-*, Toch. B pres. *āś-* (= Gk. *ἄγω*, Skt. *ájāmi*) < $*H_a eǵ$*-*, in other words not **a*, but an *a*-coloured syllabic. On the other hand, **a* of Greek *δάκρυ*, Skt. *áśru-* appears to give Toch. B *akrūna*/A *ākrunt*. In other words, Toch. B seems to distinguish a true IE **a*, a *rara avis*. Moreover, in the presence of **n* a laryngeal appears to conserve (or better, transfer) a distinction otherwise and elsewhere lost: Thus *ñom* 'name' < $*H_e nomn$ = **ʔnomn* (I realize that I am at variance with other scholars of greater special competence than I; but cf. Hamp 1978); B *ānme* 'soul' < $*H_a onH_e$*-mo-* = **ʕonʔ-mo-* (Gk. *ἄνεμος*; Hamp 1987b); B *mekwa*/A *maku* 'fingernail' < $*H_o nog^wh$*-* = **ʕʷnogʷh-* (= Gk. *ὄνυχ-* : Lat. *unguis*). Here the [-gravity] of [ʔ] is realized as the palatality of *ñ*, and the rounding of [ʕʷ] as the labiality of *m*. Balto-Slavic shows that Tocharian is not alone in NWIE with relics of **H* next to [-grave] sonants (Hamp 1977); but it certainly had richer reflexes.

In sum, NWIE leaves the strong impression of being mainly an areal grouping, but without a pervasive and influential substratum, such as we shall shortly observe. Tocharian might show the fine-grained divergences sampled above by having lived on the margins of NWIE. It is unlikely that the observed result came from a rapid or early termination of the exposure to that conglomerate (= a hurried move East), for that would then cut off the more specific memberships that we are about to consider.

4.1 IE **b*

Our discussion has now led up to an interesting and useful instance of *incremental grading;* decremental grading, by the way, would not be of likely use to us here, since it would be a form of loss, but it is of course fascinating in the observation and study of obscolescences and language death.

Early IE had a blank where **b* should be; at least that is what a simple surface phonemicization and an abstract morphonemic analysis would yield. I have said most of what I think regarding the pre-IE background that led to this notorious problem (Hamp 1989b, esp. 211ff.). The IE obstruents thus were:

*p	t	ḱ	k	k^w	ʔ	and we suppose >	*p	>	*p
	d	ǵ	g	g^w			(b)		b
bh	dh	ǵh	gh	g^{wh}			bh		bh
	s		ç	$ç^w$	h				

Actually when *b was blank *[b] existed; and not merely as a contextual variant, say, of *p before *d or *dh (as κρύβδην <— κρύπτω), or of *bh before *t (—> *dh) by Bartholomae's Law. This certainly arose when *p was followed by $*ç^w$, the third laryngeal. So, with present reduplication Skt. *píbati*, OIr. *ibid* ['iβ´ið´] 'drinks' < *píbçeti] (< *[píbçɔti]?) < *[[píb$ç^w$eti]/pí+p$ç^w$eti/p(í)+ pØ$ç^w$-e-t-i, generated by the paradigm; and OIr. *aub* [aβ^w], gen.sg. *abae* [aβ^{a}é] 'river' < **abū, abens* = *ab-en-s* (and Welsh *afon* 'Avon' < **abonan*) < **abō, abens, abonm* < **çep-ç^{w}Vn-*, by derivation from the base *çep-*, cf. Palaic *ḫa-a-ap-na-as* 'river'.

Until Grassmann's Law Indic had little more than *píbati* to represent **b*. In Pontic besides Arm. *ǝmpem* 'drink' (*pace* Clackson 216-17) and its Greek counterpart *πίνω*, we can cite Arm. *stēp* 'frequent', *stipem* 'press' = Gk. *στείβω* 'stamp', *στειβή* 'plug', *στιβαρός* 'dense, packed'. The number modestly grows. Of course, later dialectally Greek enriches the inventory, e.g. from the labiovelar **g^w*, which can then pass to *m* before *n*. In each language the phonemic rarity gets relieved; the interesting aspect resides in the early phases.

Latin of the Republic and Empire has multiple sources of *b* (even **s* medially before *r*, as in *consobrīnus*), and long accepted it in borrowings from the Mediterranean and neighbouring Europe . But we find a handful of old words such as *trabs, labia* (see below), or with complexities that require *b* for resolution (*barba*, yet *beard*, as if **bh-* yet no *f-*), words that show NWIE cognates. Note too that *b* has become sufficiently naturalized to enable the regularization of the reduplication in *bibō*.

Celtic gives a somewhat analogous picture, with a similar old increment, e.g. *treb-* 'homestead, cultivate' and the etymon 'deep'; however it is more difficult and less productive to search for candidates since at an early date **b*, **bh*, **g^w* and **p* before liquids gave *b* without leaving alternations.

Albanian yields some data, but has its own ways of offering ambiguities. Balto-Slavic with its conservative consonants is much richer in evidence (though **piH-* 'drink' is all that remains of that base in Albanian and Slavic, and has been marginalized in Baltic), and with its word accents permits us to distinguish medial **b*.

Finally, there is a substantial increment in Germanic, and

recognition is generally easy and clear with the frequent Germanic **p*: *deep, thorp, lip, leap, heap, drop/drip, hap(pen), slurp, sip.* Others, such as *open, up,* have different histories.

Even Cimmerian would show an example: Slavic *golǫb-* 'dove', to κόλυμβος < **kolumbo-*.

With the ambiguity of Tocharian obstruents and our growing inference that Tocharian departed before some of the last branches split off, we may well expect from its limited corpus a modest representation. In fact, one good example is rewarding. We have seen that 'deep' is attested in Germanic, Balto-slavic, Celtic, and Albanian (see above). The long vowel and diphthong of Albanian show that the stem was disyllabic and medial consonant (**b(h)*) was reguarly lost. A pre-form **déubeto-* 'depth' would be quite suitable, giving **déet.* The gloss on δύβρις justifies the semantics of *dēt* even though we do not know the language of attribution. One should note also for Lithuanian *daubà* 'ravine', although this too could be **dheubh-* in diphthong and accent. But for this etymon Pokorny IEW makes no provision for the important Tocharian form Toch. B *tapre* 'high', 'top' is however adequately analyzed by Adams (1988, §3.112); this of course is a member of the class of adjectives which has been shifted from *ú-* stem category to *ró-* stem. Toch. B *tapre* is thus an exact equivalent of Lith. *dubùs,* and this NWIE etymon is, on our principle of seeking "buried" correspondences, perfectly at home in Tocharian grammatical structure.

5 Balto-Slavic and Albanian

There is an abundant and well publicized literature on Balto-Slavic. There have been many doubts expressed and long lasting disputes. It is still not clear to what degree the isoglosses diverged at the time of separation, to what degree our reconstructions reach contemporaneity, how deep the divergences were when the two groups parted—whether they formed a sharp dichotomy. They might have formed a pair like Geg and Tosk Albanian of today; yet no one would doubt that Albanian is a single language, though granted that its kin are vastly more distant than were those of parent Balto-Slavic. Clearly, over time there has been a differential smear in the scope of grammatical rules that were once governed by strict contextual constraints.

Just a few phonological correspondences suffice here to characterize a distinct IE unity; they are all marked by complex idiosyncrasy that could not be replicated by simple borrowing:

a) The IE syllabic sonants become vocalized as **iR* and **uR* governed by preceding context (velar, etc.) and redistributed by morphological functions.
b) Internal schwa (H) drops, lengthening a preceding dipthong; all readjusted long syllables become segmentally isochronic, distinguishing two "accents" defined by place of prominence, early or late, in the syllabic. These two accents are then associated with the

two accents (circumflex and acute) of word-final syllables, accents which were inherited from IE.

c) W. Winter's lengthening of syllabics before IE mediae obstruents.

We may add to these some leading morphological correspondences:

d) Consonant stems of nouns, except for *n*- and *r*-stems, shift to *i*-stems. This is generalized from the accusative marker **m̥(-)*, which is subject to (a) above—a vital dependency enhancing our argument.

e) The rich dichotomy in verbs of perfect-imperfective, which is heavily preverb-marked.

I consider the non-obvious (because very ancient) relation of Albanian to Balto-Slavic absolutely clear and certain. It is not generally suggested simply because too few scholars have occupied themselves with Albanian, and as one consequence the raw data is still in the process of harvesting and cleansing. Albanian correspondences are also occluded by the move long ago from the North European culture area to the Danube-Mediterranean. I have written repeatedly on this and will not distract the argument with recapitulation here. Simply to mention some correspondences stronger than those of Helleno-Armenian:

f) Albanian underwent the first clause of (b) above; then, instead of two accents, two different qualities in the liquids resulted, and the position of vocalization correspondingly differed: **L̥ > *Li;* but **LH >* ***L̥ᵊ > *aL* (*i parë* 'first' = SCr. *prȉv,* Lith. *pìrmas; pelë* < **palnī* < **plH-niH$_a$* 'mare' : *πῶλος*).

g) I have broadened (c) above to include Albanian (Arbëresh and Arvanìtika *u* 'I, ego' < **u* < *uo* < ** ō* < **ē* < **ēǵ* < *eǵ* = Slav. *ja*).

h) **io* for the "definite" and concatenator adjuncts in the NP.

i) **(s)ue* + the preterite (for Albanian; generalized in Balto-Slavic) in the function of 'middle voice'.

From my studies of the past year I am reverting (after 40 years) to a strong feeling (on ca. half a dozen features) that Messapic (we say nothing of Illyrian, nor what it is) is related to Albanian. But it is still too early for me to present my evidence.

6 Phrygian + "Italo-Celtic"

Before turning to the classic "Italo-Celtic" question, we must first outline why we are convinced that Phrygian, an eastern migrant, is to be grouped within Western IE with Italo-Celtic.

The Neo-Phrygian *(αδ)δακετ(ορ)* (etymologically Latin *af-ficit*) : *αββερετ(ορ)* (as if Lat. *af-fer(e)t*) mentioned above) : Paleo-Phrygian (W-01b) *daψet* enable us both contextually and morphologically to isolate and identify *ad-* as a preverb. This feature alone (Hamp 1985a: §1) classes Phrygian with Italic, Celtic, Germanic, Prehellenic, (Hamp 1989c), and apparently Tocharian (Adams 1988: V49; Hilmarsson 1996: 1, 9, 52-3).

The zero-grade **dh₁-* and its semantics 'set, put, throw' of Paleo-Phrygian *daψet*, Celtiberian (Botorrita) *Taunei* (Hamp 1990b), and the Old Irish pret. *do'rat* < **to°ro-ad-d(h)₂-* (Hamp 1987a: 433) link with the last to widen the syndrome with Italo-Celtic. Still wider and morphologically richer would be the network of relations with the lexeme *ἄδαμνα* of the *Φρύγες:*

ἀδαμνεῖν • τὸ φιλεῖν καὶ Φρύγες τὸν φίλον ἄδαμνα καλοῦσιν (~ἀδάμνα λέγουσιν) Hesychius

For this form I have proposed the equations (Hamp 1976: 8-9)

Gaul. *Adnamatus ad-nāmat(o)-* < **ad-n-H_amH$_a$-to-* = *ἄδ-αμ-να*

and *Carant-, Namant- nāmant(o)-* < **n-H_amH$_a$-(é)nt-* = Lat. *inimicus* < **enamaiko-* < **n-$H_a$omH$_a$o-iko-*

I have further proposed that this agreement in detail be added to the equation observed by Marsbrander (NTS 2, 1929, 297)

OIr. *eitech* (< **eti-teg-*) 'refusal' (verbal noun of *as°toing*) = Phryg. *eti-t(t)etikmenos*

which by the way is not noticed by Haas 1966: 87-8, a notable omission considering the idiosyncracy of the compound and the presence of *eti-*.

I mention the case of *ἄδ-αμ-να* here, without the purpose of polemicizing against apparent *communis opinio* since Meillet, because I find the agreement in intricate morphology conveying identical lexicon strikingly persuasive. Haas (1966: 136) athetizes *ἄδαμνα* as Phrygian on the grounds that the attribution was used indiscriminately (Haas 9ff.) and it seems that Georgiev (1981a: 129-33) in his silence on *ἄδαμνα* is following Haas. Per contra, Gusmani 1959, after his eminently sensible introduction (836ff.), follows common sense (850) and accepts Meillet and predecessors, but then (851) departs with Vollgraff for Thracian. I prefer to reserve the question as open, and to insist that the evidence is in perfect agreement with other strongly indicative traits.

Another case which is sub judice is that of *βαλ(λ)ήν* (Hesychius *βασιλεύς Φρυγιστί*) (Haas 1966: 159, Frisk GEW 1. 214) 'king'. If this can be read *w-* instead of *b-* it is of interest to our present topic in relation to Toch. B *walo*, A *wäl*, obl. AB *lānt* 'king', whose closest relations are with Italo-Celtic (**ulH-*) and then with Germanic and Balto-Slavic (**uel-dh-/uol-dh-*; generalized from an anit present?), a base that remains unclarified by IEW 1111-2. But, as Gusmani (1959: 853-5) correctly insists, the value of *β* cannot be *F* in the 5th century BCE, as evidenced by (scholiasts to) Aeschylos. Gusmani sees the claim of Phrygian source as justified, but not Asia Minor as the ultimate origin, which rather would be Mediterranean. Georgiev 1981, who cites Gusmani, cannot be right with *F*.

An important correspondence in the demonstrative pronouns is the generalization of *s-* in Neo-Phrygian dative sg. *semo(u)n* and Celtiberian (Botorrita A-7) *somui* (in *iomui... somui*).

A striking set of forms occurs in the attested terminology of divine names in Paleo-Phrygian; I cite from the text edition of Brixhe-Lejeune

1984: *matar kubileya* (W-04; nom. sg. **mātēr*), *materan* : *areiastin* (W-01aII; acc. sg.) *materey* : *eweteksetey*... *awtay* : *materey* (W-01G; dat. sg.). Note the different names or epithets that occur with these instances of *'mother'; this noun is here surely either a title or a common noun, and seems roughly to mean 'goddess'. This terminology reminds us of the Roman (cf. OLD s.v. *māter*, sense 4) and Celtic (Gaulish, Romano-British, and Welsh) *Matres, Matronae, Modron* (e.g., Ross 1967: 204ff and passim; Chadwick 1970: 154; Bauchheuss and Neumann 1987). On the attested morphology of Gaulish *matir* see Hamp 1990e. Besides the name of Cybele we find here a substantive perhaps to be segmented *ewe-tekset-ey*. While *ewe-* is not yet clear to me, *tekse-t(i)-* looks like a verbal noun to **tek*^{w}- 'run, flee' (IEW 1059), with a particularly apposite morphology. The total compound *ewe-tekse-ti-* (*ewe-:* Indic *vi-* 'apart, away'?) reminds us of British *Vo-tepo-rigis* (Latinized) = Ogam VOTECORIGAS (CIIC 358), Welsh *go-deb* 'retreat', *tebet* 'flight' (verbal noun) = OIr. *teched* (verbal noun to *techid* 'flees'); beside these we have Welsh *techaf* 'I flee', Breton *tec'hel* verbal noun (perhaps **tek*^{w}*-s-* desiderative), OIr. subjunctive *°tes* '(that) I flee', with **-s-* forms that are noticeable in Celtic. Therefore Phrygian *-tek-se-ti* looks interesting in the context of *materey*. Furthermore, since **k*^{w}*s* could easily have removed the labiality of **tek*^{w}- we may find in the emerging West European grouping an explanation for Toch. B *cake, ckenta* 'river' < **tekont-* (Adams 1988: §3.42).

The name of *Midas* (M-01d1, M-01a dat. sg.) would go well with Greek, Italic (*meddix*), and Celtic (*med-*) reflexes of **med-* 'control, care for, judge' if we could account for the *i* vocalism. Perhaps a relevant context, between labial and [-grave] is seen in *kubileya* beside *Κυβέλη*. An analogous change, but independent, is observed in Toch. B *mit* 'honey' < **mät* < **médhu* and *piś* 'five' < **pä(ñ)ś* < *pénk*^{w}*e*. We may also consider a perhaps related development that furnishes one more cultural correspondence. We are told that at *Μητρόπολις*, near the "town of Midas," *Μήτηρ* was called *•Ανγδισσις* (var. *•Ανγδιστις*, and other lectiones faciliores; see also the valuable footnote 2 of Gusmani 1959: 850, not neglecting 927.). Now in Hamp 1987/8: 8 I attributed to the noun **abū* (nom. sg.) 'river' Ptolemy's *Ἄβου*, the name of the Humber, **abonan* < **abon-ṃ* (acc. sg.) the Welsh *afon* and the Avon, **aben-i* (loc. sg.) the Breton *aven*, and the derivative *Abisson* < **abinso-* < **aben-so-*. Applying the same reasoning (but with the Phrygian context of [+grave][-grave], we may derive *An-gdissis* < **an( )-gdi(n)si-* < **an( )-dǵhen-si-*, to the base seen in *Gdan ma Γδανμαα* or *Γδανμανα* (Haas 1966: 161; *Γδανμαα* Gusmani 927) : *χθών*, OIr. *dú* (Hamp 1991c), Alb. *dhē* (Hamp 1990f).

The Welsh term for the Otherworld, *Annw(f)n* (in Medieval Welsh written *Annwuyn* [an:uvin], has been debated by scholarship for more than three centuries. In brief, it is an under- (or underseas, or overseas) world, somewhat in mirror-image of this world, with a single high-king dominating petty kingdoms with vassal kings. Therefore the morphology of this blurred word, where the development [uvn] > [un] is purely

phonetic, has been understood both ambiguously and by vague association as *an-* + *dwfn*, that is, 'intensive *-an* ~ not or other- ~ in(ner) ~ under' + 'deep ~ world'; the last two are different Welsh lexemes, Irish *domhain* and *domhan* respectively. Patrick Sims-Williams 1990 (esp. 62-4) has an excellent up-to-date discussion of this and other Celtic 'Otherworld' terms. The result of these hypotheses placed within the most accessible British Celtic lexicon has led to reconstructions of the form **(a)n(dhV) + dhub(h)-n-;* but of course the head of this compound could equally be **dǵhom-n-* (: OIr. *dú, don; duine* 'human being'; Welsh *dyn* 'man, person'), giving a derivative 'in/under-earth'. In this way we may solve an old problem, gain an interesting correspondence, and reach an improved chronology, while relating OIr. *dom(h)-an* to *dú.*

We may also clarify the foregoing by rapidly sketching the development of Phrygian zeta, which is noteworthy for its incidence preceding *ε.* A seemingly obvious pairing is *ζέλκια* ° *λάχανα* (: Lat. *helus* > *(h)olus*, OCS *zelije*, SCr. *zêlje*, to the base **ǵhel-*) and *γλούρεα* ° *χρύσεα* (: *χλωρός*). Note that the latter, like *γελαϝος*, > (scribally miscopied *γέλαρος*)•*ἀδελφοῦ γυνή* (:Gk. *γάλ(ο)ως*, Lat. *glōs*, SCr. *zäova*, Russ. *zolóvka*) with original **1H* and not **e* following, results in *γ*, and not in *ζ*; that is, Phrygian is a centum language. Another obvious derivation is *ζευμάν•τὴν πηγήν* (*χεῦμα* 'stream', both from **gheumn* < **ǵheumn*); less certain, but not troublesome for the present is *ζέτνα* ° *σημαίνει τὴν πύλην* (*πυνήν*?), on which see IEW 423 **ǵhed-*. It seems clear that **g(h)* is palatalized before **e* > *ε.* We may suppose that **g(h)e* > **g(h)i̯e.* Then also *Μαζεύς* ° *ὁ Ζεύς* points to **mag-i-;* far from being a haplology (Gusmani 1959: 865), this Phrygian cluster development follows the same phonetic path that we see in Greek (*ῥέζω* < **Fρέγ-i̯ω* : perfect *ἔοργα* < **Fε-Fοργ-α*). Moreover we find now that Phrygian shares *a* vocalism in this lexeme with Latin *mag-nus, mag-is, maximus*, Oscan *mais, maimas*, Middle Irish *māl* 'prince', Gaul. *maglo-s*, British *Maglo-cune* > *Mael-gwn, Cuno-maglus* > *Cyn-fael*, and Gaul. *Magalos*; in short, Italic, Celtic, and Phrygan agree with Toch. B *māka*, A *māk* 'much' in showing reflexes of **maǵ.*

We may say, then, that **g(h)i̯* gives *ζ.* It would appear, however, from toponyms that the labio-velar **gʷh* in **germos, Γέρμα*, etc., if Phrygian (Gusmani 1959: 927), resisted palatalization before **e.*

With these points settled, we may now deal easily with *ζέμελεν* ° *βάρβαρον ἀνδράποδον* (Gusmani 1959: 862). This must surely be a derivative of the etymon *Γδαν* = *χθών*, therefore **dǵhem-el-;* but the development seems to have been missed by prior scholarship. The centum form **dg(h)emel-* would undergo regular palatalization to **dg(h)i̯emel-*, and then the heavy cluster probably simplified to give **di̯emel-.* Then once again parallel to Greek (**di̯ēus* > *Ζευς* we reach *ζεμελ–.* We are now in a position to explain *ἀζήν*, acc. *ἀζένα* ° *πώγωνα.* Accepting the comparanda Gk. *γένυς*, Lat. *gena* (**ǵenH*), Goth. *kinnus* (**ǵenHu-*), Lith. *žándas* (**ǵonH-dh-*), Gk. *γνάθος* (**ǵnH̥-dh-*), and adding Welsh *gên* 'jaw, chin', *genau* 'mouth' (**ǵenHeu-*), Irish *gion* (**ǵenHu*), gen. sg. and pl. *geana*

'mouth', Toch. A *śanwe-* m f., we may quite mechanically reconstruct for Phrygian **ad-ǵen-*, taking account too of the semantics. Then **adgen-* > **adgien-* > **adien-* > *ἀζεν–*.

Perhaps in *κιμερος* ° *νοῦς* we may see a correspondence to OIr. *ad°cí* 'sees', *ciall*, Welsh *pwyll* < **kuei̯s-lā* (cf. IEW 636, 637). The suffix would be that of Hittite verbal nous such as *a-ar-nu-mar, tar-nu-mar*, which would then be thematised.

The apparent scatter of *φρύγες* in the Balkans and Asia Minor would seem to reflect way-stations on their long trek east rather recently in prehistory. Their vessels and ornaments on view in Ankara are certainly reminiscent of the Celts. The divergent kinship of Celt-iberian, Gaulish (-British), Goidelic, and Lepontic shows that the departure of Celtic and Italic from Central Europe was not a clean and simple break. V. E. Orël's 1993 claim of a close relation between Greek and Phrygian within a South-East IE grouping rests on speculative identification of similarities and risks inclusion of diffusional effects from bilingualism. My claim of Phrygian's eastward move from the "West" makes the journey of the Tocharians not surprising.

7. Italo-Celtic

There is neither time nor space to review this classic topic in extenso here. Besides, the debate over the past 80 years has been conducted by exceptionally well informed scholars: Walde, Devoto, Marstrander, Vendryes, Thurneysen, Pedersen, Meillet, Beeler, D. Greene, Watkins, Cowgill, Kortlandt, K. H. Schmidt, and Jasanoff. Other competent scholars have contributed on important more restricted aspects of the question. For a compact and densely documented review of the issues see K. H. Schmidt 1991. For a sober account of Celtic-Germanic claims it is instructive to read D. Ellis Evans 1981; these two issues are particularly instructive to our present task, since we shall find Italo-Celtic and Germanic relevant to the Tocharian evidence.

Moreover, both our analytic control and our available data have significantly increased in the decades since the 1960s, so that Watkins 1966 and De Coene 1974 (based on a 1970 Gent dissertation), valuable as they were when written, are now dated in their arguments; and in that interval we have two spectacular Celtiberian inscriptions (practically our total corpus), several additional Gaulish inscriptions of unprecedented length and content, excellent fresh modern epigraphic readings of the lion's share of the Gaulish corpus of France and Italy, a monographic treatment (Lejeune 1971) with original autopsy and analysis of the total known Lepontic corpus, a philological summation of the toponyms of Roman Britain, significant accretions in detail to the sectional toponymy of Ireland and Continental Celtic, completion of the basic lexicography of Old and Middle Irish, major continuation of the *Geiriadur Prifysgol Cymru*, a new and augmented dictionary of Old Breton, new tools for the consultation of Medieval Cornish, and a five-volume phonological portion of the Scottish Gaelic Linguistic Atlas. Our tools for the comparison of

Celtic with the vast scholarship which has been amassed for Latin and Italic have been mightily improved in the past third of a century.

Just a few corrective or updating remarks are offered here. On the notorious thematic genitive singular: the debate continues on Celtiberian *-o;* for the present, I would refer for my opinion to Hamp 1994. De Coene (1974: 360-1) is in error that there is no internal Celtic evidence for the length of genitive **ī*; Welsh toponyms such as *Penn Tyrch* (: *twrch* 'boar') and *Car-diff* (: the river *Taff*) show this by their vowel affection, or umlaut; note also that few would agree with De Coene (361) that the genitive case was a late creation. Of course, the facts have meantime changed with the appearance two decades ago of Latin (Satricum) *-osio* to match the known Faliscan (*i*) *euotenosio* and *kaisi-osio* (parallel to gen. sg. *lart-os*); but it is still true that the *-ī* ending was available for the exploitation by Latin, Goidelic, Gaulish-British, and also Lepontic (Lejeune 1971: 73, footnote 254 on gen. sg. -I), and while it may continue an ancient grammatical morpheme, as K. H. Schmidt (1991: 13) perceptively insists, following the reasoning of Wackernagel (but what case ending does not?), the important fact is that it was pressed into service in the very same function by dialects otherwise showing adjacent diffusional effects typical of an intercommunicating society. On the other hand, as I have stated in Hamp 1994a (and references therein), I think the background of **-os+io* and **-os+o* is not at all mysterious.

On superlatives in *-tamo-* I would refer to Hamp 1974a. I have expressed myself on 'son' in Hamp 1971, and 1990c: 297-8; and on 'daughter' in 1971 and 1996a. On **-bh-*, **-m-* and **-su* see above §1 and 1991a. Latin *īmus* and Irish *ísel* are surely not cognate as Meillet would have them, see Hamp 1975: 23-4 (+ 1991 addendum), 1992b. But *pectus* is derived from the ancestor of OIr. *ucht* (Hamp 1983), and *terra* may well equal OIr. *tír*. On *dē* and Oscan *dat* see Hamp (1980: 190-1) for a refinement of the correspondence, which is surely worthy of note. Latin and Celtic *co(m)* is certainly, like *ad*, of wider distribution than just Italic and Celtic. So also is Lat. *re(d)-*: OIr. *fri(th)-*: *uertō*, etc. But absences of items in one or the other of Italic and Celtic will not subtract from the importance of e.g. **dē*.

For phonology we must note that Meillet's statement of **r̥* and **l̥* was not correct for Celtic as the basic facts are now understood, quite apart from Kuryłowicz's theory of *TaR-o-*.

I continue to find the change of **p...kʷ* > **kʷ...kʷ* noteworthy and not at all trivial; the fact that there were no inherited bases with *kʷ...kʷ* could be argued as making the observed change a violation of the phonotactic pattern and therefore unlikely or more difficult. In addition to the examples usually cited I have proposed (Hamp 1973) adding Lat. *cunctus*. It seems to me, furthermore, that there is no problem at all with the set of Lat. *quercus* : Lith. *perkūnas*, Latv. *pẽrkũns*, ON *Fjǫrgyn*, Celt. *Ἑρκυνίων* (*δρυμῶν*) (Watkins 1966: 33, Schmidt 1991: 17). The correct source form must have been **perkúH-(no-)* (Hamp 1995), which gave directly Celtic

**erku(n)-*, and Lith. *Perkūnas* = Germanic **ferhúna-* > **fergŭn-* (> ON *Fjǫrgyn*) —> Slavic *Perûnŭ*, OCS *Pręgynji*. But the simple noun **perkuH-* had an oblique stem **perku(H)-* before a vocalic ending, with the value **perkw-V-* ambiguously between prevocalic laryngeal and a heavy Sievers *rk*. Thus **perkwV-* gave rise regularly to Italic **$k^{w}erk^{w}V$-* Latin *quercus*. Along these same lines the functional genitive of 'ten' in Old Irish, *dëac* < *déec*, instead of reflecting **$duei\text{-}penk^{w}$-*, may well derive from **duei-penk-* > **d(u)ē-egg-*, with the sequence seen in *finger*.

The major points still at issue, aside from **p...k^{w}*, the thematic genitive singular in *-ī* (asymetrically shared with Messapic only for stems in **-io-*), and the replacement of the superlative **is-to-* by **-is-mmo-* (magisterially dealt with by Cowgill), are the **-ā-* subjunctives (on which I do not yet have a formed opinion) and the passive and deponent verbal endings with *-r*. During the past three years the last of these issues has been penetratingly addressed by Jay Jasanoff, with his profound knowledge of the NWIE grouping (if I may be permitted the areal classification sketched above); his impressive result is now available in Jasanoff 1997, on the highly particular characterizing shape of the 3pl. mediopassive.

I continue to consider as an important anomaly, even if it is a conserved archaic idiosyncracy, the gap in *-r* endings in the 2nd plural alone in both Latin and Old Irish. It is also tempting in light of this to see Toch. B *-cer*, the 2nd pl. active, as somehow reflecting an ancient neutralization of voice marking in this solitary personal ending. If so, the agreement in pattern, but divergence in substance, between Tocharian and Italo-Celtic becomes interesting, pace Kraus-Thomas *Tocharisches Elementarbuch* I 259 §466.1.

In addition to these major Italo-Celtic correspondences I believe there are a good score or more (in number somewhat as with Greek and Armenian) agreementsin lexicon and word-formation that are not insignificant for a renewed formulation of Italo-Celtic. Of course, the time-depth and geographic range are great.

8. "North Europe", an ancient Sprachbund

We must now turn our attention to an object quite different, by definition, from those which have engaged us up to this point. Up to now we have been occupied with subgroups which we may call *genetic*. They are defined for the most part, or crucially, by features which result from the shaping or changes undergone by the constituent languages in the material or structure inherited by them from earlier linguistic stages (stages which we detect and describe by *reconstruction*). If some of our identifications or classes of features are less clearly of that character, as in the case of §2 N-AIE or §4 NWIE, it is simply because we have been less successful in isolating sufficient requisite criteria for our task. We now inspect a grouping which we overtly call *areal*, or *diffusional*, i.e. a *Sprachbund*. However in this case we have the traces of an ancient Sprachbund, an area perhaps four millennia distant in time, a set of

reconstructed features resulting from sustained social contact with a *substratum*; it is that substratum (i.e. that population's linguistic habits), I allege, that gave those features a consistent reconstructed pattern. Such patterns are discerned in syndromes of language forms—in principle, not in isolated erratics, as stray boulders in a moraine.

I claim that such features can be observed in, and characterize, the IE branches we call Germanic, Balto-Slavic, Albanian, Prehellenic ("Pélasgique"), less intimately Celtic, marginally Italic. That is why, in an Indo-European sense, "North Europe" is a handy term. Realistically we might place the territory north of the Alps, perhaps between the Schwarzwald and the Vojvodina; a bold guess would be the upper Danube to the Banat. On these matters see Hamp 1990c esp. 292-5, 303-4; 1997.

There are indications that Tocharian did not fully belong to this Sprachbund; it could have been peripheral (or of brief, unstable association) like Celtic and Italic. One clear fact is that in Tocharian IE **o*, **a*, and **ə* did not merge as they did in Germanic, Balto-Slavic, Albanian, Messapic, Thracian, and Prehellenic; nor did medial **ə* syncopate. Consistent with this is Tocharian's conservation of B *ṣe*, A *sas* 'one' (: OLat. *oino*, OIr. *oén*, Welsh Bret. *un*, Goth. *ains*, ON *einn*, Lith. *v-ienas*, Slav. *jed-inŭ*, Geg Alb. *nj-â*). As we see, "North Europe" had a heartland and a periphery.

On the other hand, Polish *łodzia* < **oldi/oldĭji* < **ɔldiiā* or **ɔldiH$_a$*, *łodnia* 'boat, tree trunk" together with Germanic **aldō(n)* is in my opinion a North European etymon (Hamp 1985c: 85§19). Now Toch. AB *olyi* (acc. sg.) has been reconstructed as **oldiHen-* (note the *n*-stems!). Adams (1988: 22) is troubled by the **o*. But with a "North European" source we would have here a treatment just as in Celtic (esp. Irish: *loch, muir* 'sea', etc.), and consequently a source for the rounding. In this way we may seek to solve a troublesome Tocharian lexeme, and to reach a refined relative chronology for the departure of the Tocharians from Central Europe on their long trek east.

There is clearly much more and fruitful work to be done here.

9. Prehellenic and Cimmerian

For a brief statment of the nature of the Prehellenic (Pelasgic) corpus and our mode of recognizing it see Hamp (1994b: 1665-6); for a similar statement on Cimmerian see ibid. 1666. Georgiev (1981a: 96-107) gives a useful compact account of Prehellenic (Pre-Greek, Pelasgian), better than his account of Phrygian, doubtless reflecting his interest where he did so much work. His lists of forms are very informative, but they do not observe a constant standard of quality in the argument. The lists of grammatical argument are not so directly co-exhaustive as we might wish; actually his treatment, like that of other scholars, is rather episodic. But most of all, I differ on certain Lautgesetze, mainly rule (5), p. 100. This rule would make Prehellenic a satem language, and would thus vitiate the etymology of *πύργος*, perhaps the most persuasive starting equation in the whole argument; cf. my remarks *Živa Antika* 29, 1979, 209, footnote 1.

Once I changed the rules I found that many other solutions immediately became obvious or attractive. These resulted in *Živa Antika* 31, 1981, 83-4, 93-6; 32, 1982, 37, 38; 33, 1983, 12, 22, 147-8; 39, 1989, 54, 75-6, 84; and some other writings elsewhere.

For our present purposes the most important points about Prehellenic are the strong relations with the IE languages of northern Europe and the fate of the IE syllabic resonants which vocalized with a *u*-timbre.

10. Thracian (and neighbors)

Our firm data from this group is surprisingly slim, fragile, and opaque, considering the accessibility of the Thracians to the ancient world. In a sense our knowledge, both philological and linguistic, progressed scarcely at all from the time of the ancients until nearly our own lifetimes, the philology (collection of names and glosses) starting mainly at the end of the last century and isolation of discrete language entities only at the middle of this century. A. Fick first used in 1873 only glosses from Thracian and Phrygian, while W. Tomaschek in 1883 exploited Dacian glosses and plant names and in 1893-94 published his renowned and fundamental *Die alten Thraker*, still useful today, which collected together all known linguistic (and other cultural) remains and presented a detailed, systematic, explicit, if now dated and flawed, linguistic and culture-historical analysis of the total material. Then, passing over the giant polymath philologist Kretschmer and his *Einleitung* (1896), we reach, after a half-dozen meritorious philologist-comparativists, the Bulgarian Detschew (Dečev with his crowning life's works in 1952 and 1957.

All during this time the notional grasp of the linguistic composition of the Balkans and its terminology remained remarkably confused by comparison with other areas of Indo-European. It was as if scholars simply accepted names and terms for ethnicities from the ancients and then applied them to areal or generic bundles of data bending their arguments or lines of descent to match the clumps of populations already presumed by the nomenclature. Thus we find, almost without justifying marshalling of linguistic correspondence, such terms as Thraco-Phrygian, Illyrian, Thraco-Illyrian, Thraco-Dacian, Daco-Gete, Geto-Dacian, Thraco-Gete, and such associations as Thracian + Albanian, + Illyrian, + Phrygian, and Phrygian + Armenian. And all of this with mostly exiguous inventories of philologically useful data. Such is the state of affairs still reflected in Russu 1969, despite the commendable and useful erudition typical of this learnèd classicist (author of three or four major works in our field). Scholars who took a more responsible and principled approach also tended to restrict their work to one or more better attested corpora, where less adventurous controls were more easily applied.

In 1961, expanding on one thematic strand of lectures delivered in 1956 at Moscow University, V. I. Georgiev published a new and original identification and geographic assignment of the languages spoken in the

ancient Balkans based on the attested toponyms. In this segmentation Georgiev recognized seven regions: Daco-Moesian, Thracian, Prehellenic, Proto-Hellenic (northwest Greece), Macedonian (southern Macedonia), Proto-Phrygian (northwest Macedonia), Illyrian (north through Dalmatia and southern Pannonia). In his publications he has sketched, sometimes at length, the diagnostic phonological developments characterizing these proposed IE branches. Daco-Moesian features *-dava* ~ *-deva* < **dhē-uā* 'put-, placement', *-upa*, *-sara*; Thracian shows *-para* 'stream' < *'passage', *πόρος*, *-bria* 'city' < **u̯riā*, *-diza* 'fortress' < **dh(e)ĝhā -os* : *τεῖχος*, Osc. *feihúss*, Avest. *-daēza-*. At last we have here linguistic quantities, with characterizing features, which can be placed in relation to other IE groups and which have a rough location in place and time. All these seven groups assume a position in our inventory of IE languages, except for the still elusive and insubstantial "Illyrian." Proto-Phrygian may well represent a way-station on the Phrygian ancient migration east (v. Georgiev 1981a: 185). See further on these groupings Georgiev 1981a: 111-93.

Georgiev has published a third, revised edition his 1956 lectures, where a large section (1981a: 111-29, 132-40, 148-54, 175-8) is devoted to Thracian and Dacian (with Daco-Mysian). Georgiev makes a good case for Daco-Mysian as an earlier stage of Albanian, but Thracian and Dacian are surely two different languages even if they represent two separate chronologies of departure from Balto-Slavic further north. An earlier more ample treatment of Thracian is Georgiev 1977; a later, more accessible one is Georgiev 1983 + 1981b. Further views and documentation are found in Duridanov 1969, 1976, and Poghirc 1983: 3-144, and less centrally the *Actes du IIe Congrès International de Thracologie* III, Bucureşti 1980: 27-197.

Since Thracian and Dacian (and, if separate, Daco-Mysian) have become discrete and computable entities, it now becomes our task to characterize them, to refine the characterization begun by others such as Georgiev, Poghirc, Ariton Vraciu, *et al.*, and to place them in relation to other IE languages.

Georgiev has argued well that in Daco-Mysian we can see plausible beginnings of phonological developments that are known for Albanian. Moreover, the geographical location of Daco-Mysian would fit well with an Albanian presence before the coming of the southern Slavs, when we consider the segment of Romanian autochthonous elements (*elementele autohtone*) that we trace to Albanian of the Roman imperial period (what I have descriminated as the second of three chronological categories of such elements in Romanian; Hamp 1980c: 59). On other grounds (the presence of Latin borrowings in Albanian, but the relative absence of Classical Greek loans) the residence of the Albanians north of the Jireček line (an east-west line roughly through the Shkumbi(ni) river—Skopje (Scupi)—between Niš (Naíssos) and Sofija (Serbica) to the Balkan (Haemus) mountains), which forms the demarcation between Latin and Greek as the language of inscriptions, agrees well with the claim of

relation to Daco-Mysian (Moesian).

In Hamp 1974b and 1980c I have also dwelt on two features which show that Thracian and Proto-Albanian (hence Daco-Mysian) were already differentiated; to summarize simply, Albanian *$g^{w}hermo$- was already on the way to *zjarm* 'fire' as Dac. *Ζερμι-* when Thracian said *Γέρμας*, with no palatalization. And it seems to me (Hamp 1974c) that Dacian and Albanian show more positive connections with Baltic than does Thracian.

Now let us take account as far as we may at present of the state of Thracian back vowels (Hamp 1986). While **e* was preserved, *ē* was the merged continuation of **ē* and **ā*. What was written ou represented *u* < **ū* or *ūH*, and continued as *ü* > *i*; thus *Βρ(ο)ῦτος* 'beer'. What was written ou or u was [U] < **ŭ*. What was written *ω* and later ermerged as *u* may be the result of **ō;* certainly **o* merged with **a* and **ə* (Russu's source of *-a-* in Dac. *-dava*, too) as *a* just as in typical North European IE. Thus we have no destinct reflex of IE **o*. This set of observations led me to attribute vocalizations prevailing in *oR* to an ancestral IE syllabic liquid.

The Thracian vowel system seems to me to have been perhaps as follows:

i < **i (and *ī?)*	u < **ū*
e < **e*	*υ* < **u*
ē < **ē*, ā	o < **Ṛ*
	ω < **ō*

a < **a, ə*, o

Since we know that phonetic asymmetries in vocalic systems normally (i.e., perceptually) favour more distinctions in front vowels than in back vowels perhaps there was a distinct reflex of **ī* even though we have no good eytmological or graphic evidence for this. Perhaps, too, the height of *o* and *ω* should be reversed, since the latter seems to have yielded *u*. We then reach the following system:

ī	ū (or u)
i	u
e	*ω*
ē	o
a	

The macrons or length indications are of course purely to recall the source and perhaps to suggest tenseness.

We may recall here that Thracian is typologically satəm, as is illustrated by *-diza* < **dh(e)iǵhā -os*. Another example seems to be *βρίζα* 'a type of grain, rye (?)'. This is surely wrongly listed in IEW 1183 under **u̯rughio-;* as Georgiev (1958: 27) points out, Germanic (OE *rygen*) shows no evidence for **wr-*. However, his reconstruction with **gh* is incorrect, although his comparison with Skt. *vrīhi* is justified. Turner *CDIAL* 12233 records for the last Pali *vīhi*, Gilgitī Shina *brĩŭ*, Gurēsī Shina *brīm*, Sinhalese

viya 'rice', Kati *wrić*, Prasun *wuzī* 'barley' (but Morgenstierne reports Pashto *vriže*, Ormuri *rezan* 'rice' < **wri ana-*; an Iranian borrowing from Indic?). Georgiev 1977: 172 seems to have silently corrected himself with **ǵh*. Our form therefore is **uriǵhā-*, with comparanda in Indic and Nuristani. Note too the *βρ-* < **ur-* to match *βρία* 'city'.

We have seen that Thracian parted company with Albanian fairly early. Though it appears to share areal traits with North Europe it differs with Balto-Slavic in vocalizing the resonants. On the last feature it shows potential agreement with Germanic and Prehellenic. Yet these last two have parted company with Thracian at an earlier time by undergoing the centum merger in thepalatals. It thus seems that Thracian moved south pretty early.

11. satəm and centum, and middle

At the beginning of this essay the point was made that a dichotomy of satəm-centum, defined in IE terms, could never be diagnostic in the sense we seek because, as an event of common loss, such a fact invoked as an argument would furnish only a special case of the fallacy known as *argumentum ē silentio.* That, of course, is the fundamental point, regardless of the imagined phonetics, which must become more and more uncertain as we recede in time from the immediacy of observation.

Without descending into detail I cannot understand the profit of debating hypothetical phonetics in the fashion of A. Sihler (1997: 189-91). First, he apparently regards Tocharian as not "Western" (188); second, what can be meant by an assertion that no centum language shows an original palatal articulation? Has Sihler never heard Irish, Gāidhlig, Breton, Swedish, Icelandic, Norman, Occitan, Friulian, sundry Slavic, Balkan varieties? Once a variant gets rooted in one context the ability to shift to other contexts can be striking. Before liquids or sonants, of course, a quick route for a palatal to a velar is via a dental (e.g. laterally or nasally exploded). But all this is rather rococo. IE palatals did not universally become sibilants, in fact. And the fate of the "palatals" in Indic (including "retroflexes") is phonetically far too complicated for a few off-the-cuff lines (189).

What is meant by emerging from shadows in the shape of Nuristani (189)? Morgenstierne's Nuristani descriptions are a gem of our literature (of course, and beautifully, old fashioned). As for "palatalized dentals" interpreted from "palatal affricates", just ask a Czech or Slovak (*ť*) to listen to a Magyar or Albanian (*q* [k´]), and then go from Crna Gora to Ohrid to hear [k´] progress from *ć* to *č* and then to [ts] in Greece; by another route one can go from Peć (Pejë) in Kosovë, or Gusî in Crna Gora, to Theth in North Albania (Dukagjin) and *ć* will turn into *ś*. One can consult Hamp 1968: 126-30 and especially 132, 134 if one is curious to see how I envisaged the background of Nuristani (and Kati) when I reconstructed **ć*, **j*, and **jh* as the reflexes of the palatals in Indo-Aryan (which has been my standard practice). As between **s*, **ś*, **ć* it is difficult to settle on the phonetic limits of acceptability for assimilation. I suppose

that ultimately I belong to the school that takes the dosage of medicine that the disease requires, with hope always for a wiser diagnosis.

But rather than speculating on the prehistoric phonetics or the likelihood of directionality in phonetic change, surely the crucial fact requiring an accounting rests on the number of contrastive reflexes observed in a proto-context which is identical for each reflex, a set of facts for which Sihler does not favor us with a solitary Albanian example or derivation. To save space here I would simply refer the reader to Hamp 1989b: 209 and the classic but strangely neglected (even unmentioned!) 1900 paper of Pedersen there cited. In the same place I refer to Melchert's careful and authoritative 1987 study on Luvian.

On the indubitable (for Sihler, poorly attested) triple reflex after nasal in Armenian see Bolognesi 1990: 373, Hamp 1994-5: 7, 1991d. In brief, while IE *nasal + palatal or velar gives the expected Armenian result, IE *nasal + labio-velar (*$*ng^w$*, *$*ng^wh$*) passes the rounding to the nasal (*$*\eta^w g^w$*, *$*\eta^w g^w h$* > *$*wg$*, *$*wgh$*) then regularly merges velar with palatal after *u/w* (*$*w\acute{g}$*, *$*w\acute{g}h$* > *wc*, *wj*). Actually, I now realize that this should not surprise us since the closely related Greek also must early have had distinct reflexes for all three "gutturals": Labio-velar gave Classical Greek (Mycenaean *q*>) *π* or *τ*; palatal + *$*\underline{u}$* gave *ππ* (e.g. *ἵππος*; velar + *$*\underline{u}$* gave *κ* (*καπνός* : Lat. *uapor*), as though simply with loss of *F*.

Finally, we find different satəm/centum results within branches (e.g. Anatolian, Helleno-Armenian) between fellow-languages. As we should expect, this typological distinction is simply not diagnostic. Nor, likewise, is the choice of middle voice marker *-*o(-)/-r* as a simple dichotomy of Indo-European, though it is possible that *-r* in a complex way binds Tocharian at an early date to Italo-Celtic and Phrygian.

12. Individual Tocharian correspondences

In the preceding sections we have managed to define and segregate, using the criteria invoked at the outset, the following groupings (subgroupings, if a superordinate is found): Anatolian, Indo-Iranian, Pontic. These segregated groups define by exclusion Brugmann's IE (including Cimmerian) and Non-Asiatic IE; the latter two groupings are also defined positively by buried shared innovational features (not by loss, preferably idiosyncratic). A Northwest IE areal grouping is loosely defined by features that are not strictly mutually exclusive with others, and this set of branches is also characterized by a growth in the incidence of IE *$*b$* by incremental grading. A North European set is further defined by the traces of a putative substratum; this set additionally includes Prehellenic and possibly Thracian. The last four groupings embrace Tocharian, though North European is less in evidence here.

In addition to these more inclusive groupings some attention has been paid to clarifying as groupings or branches: Pontic, Balto-Slavic with Albanian (and perhaps Messapic), Prehellenic, Phrygian + Italic + Celtic, Italo-Celtic, and Thracian, with mention of Dacian. We must now place Tocharian in relation to these last sets.

First, in seeking closest relation, we may safely segregate, i.e. remove, one set. We must recall that at the methodological outset of our disquisition we observed that we must not commit the fallacy of *argumentum ē silentio* by claiming to demonstrate *non-relation*. That is to say, our demonstration will ultimately rest upon a positive relation with (a) grouping(s) elsewhere which will confirm the indicated exclusion. Nevertheless, two virtues may be claimed for a strong, specific, idiosyncratic exclusion: 1) It is persuasive as being suggestive and on the right track in proportion as it is unlikely that an idiosyncratic feature would be developed and shared in common with other groups and then later independently lost without trace in exactly the same configuration (note even a solitary instance such as Romanes *pakō* 'ripe', a participle not formed with *-t-* exactly matching the anomalous Sanskrit *pakvá-*). 2) A group so (putatively) excluded gains in chronological specificity since whatever it truly shares with the other set (and hence would characterize a more inclusive grouping) presumably antedates the period of formation of the excluded group; thus such a determination gives a strong impetus to search elsewhere for valid positive correspondences to link the other group at issue. We will now seek on these lines to exclude Balto-Slavic + Albanian, within Northwest IE, from probable association with Tocharian.

It will not profit us to inspect in this context the syllabic sonorants. Consider simply the liquids: Balto-Slavic vocalizes **L̥* as **iL* and **uL*, while Albanian vocalizes **L̥* as **Li* (see §5a above). There is no simple way to bring these independent developments into accord. Note however the agreement between Balto-Slavic and Albanian in showing Winter's lengthening before medial (§5c, g). If Tocharian were to form a close grouping with these two we might optimally expect it to share in this development.

Consider the known Tocharian reflexes of IE short and long vowels; to avoid complexity of detail we pass over intermediate stages.

IE quality	Toch. B *V̆	*V̄	(see Adams 1988: 16ff.)
*i	(y)a, ā	i	
*e	(y)a, ā	e	
*a	a, ā	ā	(ă is troublesome)
*o	e, (o)	ā, -u	(Hilmarsson 1996: 41)
*u	a	o, -u-	*-wā- (Hilmarsson 1996: 11)

Examples; chosen by myself, limited to agreement with the specialists and avoiding medial mediae:

*	Toch. A	Toch. B	A	B
i		*wase* 'poison'		*riñ* 'cities'
		yam 'I go'		*sim* 'roof' (Adams 1988: 31)
		kärnā- 'transact' (**k^{w}ri-*)		
e		*yakwe* 'horse' (**-ḱu-*)	*want*	*yente* 'wind' (**-t-*)
		śana 'wife' (**g^{w}-*)		*śeritsi* 'to hunt' (**ǵhu-*)
	ṣälyp	*ṣalype* 'grease' (**s-p*)		

a	*sāle*	*salyiye* 'salt'	*mācer* 'mother' (*-*t*-)
	ākär	*akrūna* 'tear(s)' (*ă, *ḱ*)	
(*ə)	*pācar*	*pācer* 'father' (*-*t*-)	
o	*kam*	*keme* 'tooth' (*ǵ-)	*tāno* 'seed' **dholHn*-
	lake	*leke* 'bed' (*-*gh*-)	
	kaṃ	*kene* 'melody, song' (*ǵhu̯-)	
	**ko*	*erk* 'testicle' (Adams 1997: 592) (*-*ǵh*-)	
		keu 'cow' (*g^{w}-)	
u	*rtär*	*ratre* 'red' (*-*dh*-)	*nō* 'however' *suwo* 'swine' *su*- 'rain' *klup* 'squeeze' < NEurIE **glūb*- or **gluHb*- : ON *klýpa* (Hilmarsson 1996: 153-4)

Now consider the following Tocharian reflexes before IE mediae.

B *tapre*, A *tpär* 'high'	< **dhub-ró*- < **dhub-ú*- (: Eng. *deep*, Go. *diups*, OE *dyppan* (see §4.1 above))
B *lakle* 'suffering'	< **lug-lo*- (**lug-ʔ*), *-ró*- (: λυγρός 'mournful', λυγαλέος 'wretched') (Adams 1988: §3.112; *GEW* 2.(108)
B *kät-nā-, käṃ-t-*, A *k(t)nā-, k(a)t-* 'strew'	< *skʰd*- (**skd*-), **sked*- (*GEW* 2.721) (= σκίδ–να–μαι : σκεδ–άννυ–μαι (Hilmarsson 1996: 108-9))
B, A *läk*- 'see' (B *lyak*-, A *lyäk*- 'thief' (**legh*-ʔ))	< **leǵ*- (: Lat. *lego*, λέγω, Alb. *mb(ë)ledh* 'collect', *zgledh* 'choose')
B *pält*- 'drip'; B *pältakw*- 'drops'	< **plud*- (Adams 1988: IV4)
B *malkwer*, A *malke* 'milk'	< **H$_a$melǵ*- (: ἀμέλγω, Lith. *mélžu*, Russ. *molóz-ivo*, Mid. Ir. *bligim*) (see Hamp 1979-80; the Balto-Slavic accent reflects Winter lengthening, as shown by the Celtic vocalism)
B *palk-/ pälk*- A *pälk*- 'illuminate, burn'	< **bh(e)lg*- (: Lat. *fulgor* (Adams 1988: §4.31; *IEW* 124) Here the Toch. appears to show the "buried" correspondence **l̥* > **ul* > *äl*
B *orkamo*, A *orkäm* 'dark'	< *ʔ*or(g^{w})s*- < *ʔ*org^{w}s*- (ἔρεβος(τὸ)), Go. *riqis*, Arm. *erek* (Adams 1988: §3.113 corrected by Hilmarsson 1996: 56; these cognates would strictly reflect *ʔ*reg^{w}-es-/ os* < *ʔ*rg^{w}-(V) m-ŏn*- (with rounding umlaut to *o* by the labiovelar, hence **r̥* > **ur*- > **or* > **er*- > *or*-). Alb. *err*- 'darker, become dusk'
B *erkent*, A *arkant* 'black'	< *ʔ*rg^{w}-ont*-

Hilmarsson 1996: 56 correctly points to the inconsistency in vocalism between *erkent/ arkant* and *orkamo/ orkäm*, but then improbably reconstructs **H$_2$rǵ*-, seen in the base of 'white', and deriving 'black' from 'shiny, silvery'. The semantics and perhaps the initial laryngeal fail to persuade. Instead, I propose both these from *ʔ*rg^{w}*- (*-ont*-, *-m(o)*-), and at a later time a crossing (contamination) of **erkwont*- 'black' with its polar opposite

**arku-* 'white'; this is confirmed by the stem form of Toch. A *ārkyant-* (obl.), discussed by Hilmarsson (but with needless complexity) 1996: 41. See also my note on Lith. *aršakus* (< **aržu-*) in *Baltistica* (in press).

Observe that these reflexes in position preceding IE mediae all match the foregoing listed reflexes of IE short vowels. In other words, there is no evidence in Tocharian for the systematic lengthening of IE syllabics before mediae observed by W. Winter. This result applies also to the vocalism (**u* and **o-*) developed in Tocharian before syllabic resonants. Therefore, Tocharian, while participating like Celtic in some aspects of North European IE, was not a member of the grouping Balto-Slavic + Albanian (+ perhaps Messapic).

In his excellent article Adams 1984 argues for a significant relation with Germanic. Important is the shared development of **Ṛ* to **uR* (Adams 1984: 397-8). However, such a development and other connexions with North European IE are to be seen in Prehellenic and Thracian. Moreover, Tocharian does not share with Germanic the syncope (a loss when in a paradigm) of medial **ə*. Yet the productivity of nominal *n*-stems remains a notable isogloss of early date. Again, the middle voice marker remains a dividing or negative feature. Clearly these pervasive changes in Tocharian and Germanic are not all decisive and diagnostic.

As has been remarked in §2, A *käntu* pl. *käntwāñ*, B *kantwo* 'tongue' < **dnǵhuōn-* (Adams 1984: 398) by metathesis fits well North European IE with its lack of **l*, and diverges from Lat. *lingua* < **dlnǵhuə$_a$*, *pace* Hilmarsson 1996: 79. As Hilmarsson points out, the metathesis must date from after the merger of voice distinction, otherwise **g(h)ndw-* would lead to loss of **d*. Therefore we have **t(u)nkw-* > **k(u)ntw-;* note that this therefore does not test our thesis of the absence of Winter's lengthening. Thus a prior stage **dl̥n-* > **dn̥-* must have approximated the "North European" period. Then the change **Ṛ* > **uR* would have been likely to have followed **dl̥n-* > **dn̥-*. One sees how important accurate reconstruction can be.

The etymon for 'lip' is specific and peculiar, yet reasonably ancient; its relations require clarifying, which the handbooks systematically neglect. Germanic shows Eng. *lip* < OE *lippa* (= OFrisian), Dutch *lip*, German *Lippe* < West Germanic **lep-ian-;* Norwegian *lepe*, Danish *læbe* < **lep-an;* against Swedish *läpp*. The Germanic guarantees **lep-*, plus a familiar nasal suffix (agentive?). The **p* < IE **b* takes us to a constrained IE time depth (§4.1 above). Our Germanic form gives close agreement with Toch. B *lymine*, A *lymeṃ* (par. f) 'lips'. This has been reconstructed as **lemb(h)iEen-* (Adams 1988: §3.43b), but one may wonder what would happen to **lebn-*. In any event, **leb-* seems assured.

Now some time ago I argued that the outcome of IE **uo-* was *ua-* in Latin (*uacca, ualuae, uas uadis, quaerō quaesō*). I now argue elsewhere that in Latin *l-* had the same phonetic effect as *u̯-;* therefore IE **lo-* > Latin *la-*. Thus we no longer need tolerate the deviant vocalism shown by Pokorny (*IEW* 656) and accepted by Watkins (*AHD IE Roots* 1985: 35b); Latin

labium, labra are simply **lob-*, in an unsurprising relation to Germanic and Tocharian **leb-*. This shared late IE etymon is beyond doubt.

Tocharian *lip-* 'übrigbleiben', *lyipär* 'Rest' seems to be a peculiarity shared with Germanic 'leave' (*eleven*, *twelve*, etc.), against Latin *linquo*, Lithuanian *liekù*, etc. However, Toch. B *walkwe* 'wolf' refutes the generality of this observation, although ON *ylgr* shows that conditions are not of the simplest order.

We find clear, if fragile, traces of early ties with Germanic.

On the other hand, the development of IE **ō* to *-u* in final position (Adams 1988: §3.123) but *ā* elsewhere is reminiscent of Celtic.

In Hamp 1985b: 224 I have observed that in Proto-Italic the nom. sg. of *-nt-*participials levelled to the old neuter in participles (Umbr. restef), but to exclude the neuter in animate nouns (Lat. *fōns*) and personal adjectives (Lat. *īnsōns*). Now in Hilmarsson 1996: 85 we read that "The nom. sg. final of IE *nt*-stems has... been largely reshuffled": B *walo*, A *wäl* 'king' would be "either a secondary **-ōn* or possibly a remade **-ōnt-s* for IE **-ont-s.*" "In the adjectival stems... or agent nouns of the type B *käryorttau* 'merchant' the nom. sg. final reflects a zero grade **-ṇt-s.*" Perhaps agent nouns here were generalized from inanimate nomina instrumentī of this stem class. We see then that we have a precise equivalence in selective merger based on original gender (= *o* vs. zero grade) between Italic and Tocharian.

In Hamp 1991 I have pointed to the suppletion of B *kartse* and *krent* 'good' (**-tó-* and **-(o)nt-*) and the parallel with Celtic (Hamp 1976 and §6 above); it is seen that this suppletion belongs to a morphological complex that extends also to Latin.[2] Cf. now Hilmarsson 1996: 84-5 s.v. B *kare* A *kär* 'good', 97 B *kartse* 'goodness'. Tocharian would agree with Latin in changing at a very early time IE initial **dr-* to **tr-* (Adams 1988: III 39); but then how do we explain *or* 'wood'? Whether this was early enough to have been done incommon is not clear; even the Latin evidence is sparse enough to have been overlooked until twenty years ago.

There is a semantic development that joins Tocharian strikingly with Celtic and Italic. The IE base **dheg^{w}h-* (IEW 240-1) is attested in Indic (RV) *dáhati*, Avestan *dažaiti* 'burns', Waigali *dēž* 'fire; burning' (CDI-AL #6247 **dahya-*, from Morgenstierne), Alb. *djeg* 'burns', *dhez* (**V-dhog^{w}éiet*), *ndez* (**en-dhog^{w}éiet*) 'kindles, ignites', *nxit* < **ndëzit* (**en-dhog^{w}itīt*) 'incites', *xixë* 'spark' (**dizë* < **dhe+dhg^{w}h-ia*) (Hamp 1987c), Lith. *degù, dègti* 'burn' (Latv. *degt*), *dâgas* '(summer) heat' (OPrussian *dagis* Voc. 13 'summer' : Indic *nidāghá-, dāha-* 'heat'), *dagà, dagỹs* 'thistle', *dagùs* 'inflammable', OCS *žegǫ žešti*, Russ. *žgu* (2sg. *žžëš'*, 3pl. *žgut*) *žečĭ* 'burn', *žgut* 'torch' (see Hamp 1996b for **dh(e)gh-* > **ggh-* —> **g(h)eg(h)-*), Gk. *τέφρα* 'ashes', Latin *fouēre* 'heat up' (**dhog^{w}héie-si*), Welsh *de* 'burning', *cyn-ne* (**deg(w)-*), *goddaith* (**u(p)o-deg^{w}-to-*) 'bonfire', OIrish *daig* (fem.) gen. sg. *dego* > *dega*

[2]Perhaps the active diathesis of *-tó-* in Tocharian also matches the retreat of *-tó-* and overlap with *-tio-* in Celtic.

(**d(h)eg^{w}(h)-i-s* (*d(h)eg^{w}(h)ói-s*)) 'fire, flame', (Vendryes-P. Y. Lambert LEIA 1996: D8-9), and Tocharian AB *täk-* 'burn'. The basic meaning and core semantic range of this IE root leaves no doubt whatever. It is with a degree of interest, then, that we find Latin *febris* (fem.) 'fever' < **dheg^{w}h-ri-s* (Walde-Hofmann *LEW*3 1.471-2); OIr. *daig* 'pain, pang' > Mod. Ir. *daigh* (fem.) 'flame (literary); stabbing pain', 'twinge' (~ *bhoilg* 'stomach ache', ~ *chroí* 'heartburn', pl. ~ *fiacaile* 'toothache'); pl. *daítheacha* 'neuralgia, rheumatism'; Toch. B *teki,* pl. *tekanma* 'illness' (ambigène) < **dhog^{w}h-mn,* pl. **dhog^{w}h-mnā* (with a rebuilt singular; see Adams 1988: 118 §5.311) neuter. We appear here to have a common departure in the shape of **dheg^{w}h(-r-)-i-* (fem.) and **dhog^{w}h-mn* (neuter) in the sense of 'bodily malaise', perhaps induced by painful disease, typically manifested by fever, which would be an extension of the notion 'burn'. The common extension of the semantic field would therefore be a function of pragmatics.

It is worth noting here for the base **seik-* (Hamp 1982: 70-2) that Tocharian seems not on this feature to classify itself with Northern Europe, i.e. with Baltic and Germanic.

An interesting detail of buried morphology has been pointed out by Hilmarsson (1996: 120-1): B *kaut-* A *kot-* 'split, cleave' has been equated (though with debate on uncertain ground) for its base with Lat. *cūdō* 'hammer, beat'; they are only two branches to show this dental **d* on this base.

Tocharian B *klokaśce,* Toch. A *klyokäśśäñ* 'pore' are compared by Hilmarsson (1996: 151) with Latin *cloāca* (*clouāca, cluāca*) 'sewer, drain' (: *cluō* 'purify'), Lith. *šliaukti* 'to brush' < **kleu(e)H$_{a}$k-.* Latin *cloāca clouāca* is ambiguous in the vocalism but the Toch. A and Lith. *šliaukti* show **kleu-.* Lith. *šlaukýti,* Latv. *slaũcît* confirm *klouHk-.*

Toch. B *kāw-/käp-,* Toch. A *käp-* 'crave, want' has been reconstructed to **kH$_2$p-V-*/pres. *kH$_2$p-n-, kH$_2$p-ie/o-* : Lat. *capiō* 'take'; see Hilmarsson 1996: 121-3. See also 146-7 s.v. AB *klāw-* on the alternation *w/p* where *w* seems clearly to be primary. Now if we observe A *yow-* B *yäp-* ~ *yop-* 'enter' < **iebh-* (IEW 298 **eibh-* > Indic *yábhati,* Russ. *jebú jetí,* SCr. *jèbêm jèbati,* κοίφω, with narrowed sense); A *wäp-* B *wāp-* 'weave', *wapāttsa wawāttsa* 'weaver' < **uebh-* (IEW 1184); A *ṣtop ṣtow,* B *śakātai* (oblique) 'Stock' (cf. B *ṣukt* : A *ṣpät* 'seven') < **stebh-* (IEW 1011-13), and if we hypothesize A *wip-* < **uibh-* and B *waiw-* < **uoibh-* (Adams 1988: 3.15) 'be wet', and A *wärp-* B *wärw-* 'spur on' as formed on the base **ϛ^{w}er-* (ὄρνυμαι, Indic *ṛnóti,* Avest. *ar-* 'move', Arm. *yaṙnem* 'rise', Lat. *orior,* IEW 326-9) extended by **-bh-,* we may be justified in viewing Toch. *-w-* and *-p-* as contextual medial outputs of **-bh-.*

IEW 527-8 lists for **kap-* 'fassen' only three branches (Albanian, Italic, and Germanic) with clear reflexes for verbs: Alb. *kap* 'seize, reach, include', *kam* 'have'; Latin *capiō, auceps* 'catcher'; Germanic *haft-* 'slave, fetter, occupied (with)'; Gothic *hafjan* 'heben', OE *hebban hóf hafen hæfen* > Eng. *heave,* Irish *cuan* stands far off from the verb paradigm, and κάπτω

'gulp' is, as Frisk remarks, semantically of dubious relevance. Similarly, *IEW* 407-9 shows for **ghabh-* only three branches: Latin *habeō*, Osc. *hafi-*, Umbr. *habe*, OIr. *gaib-*, verbal noun *gabál* 'take' (with a curious aside on Welsh *cael* ~ *caffael* 'get'); Goth. *giban*, ON *gefa*, OE *giefan* 'give'. Indic *gábhasti-* 'lower arm' is marginal at best.

I added to this deficient account (Hamp 1954) in order to show how these two bases (plus **kagh-*) might have led to the observed verbs. In the intervening time I have seen how some refinements and corrections can be made: p. 229, ¶ 2—I am not sure now that Pokorny's alternative is equally attractive; certainly Welsh *cae* is **kagh-*. Thus the final paragraph, p. 229, may be overly hopeful.

p. 230—The Albanian forms are more exactly *kē, kā, jē*, and hence an exact example, instead, would be 'saw': *pashë, pae, pā*.

p. 231—top line: for 'hold' read 'grasp'; line 5 for perfective read stative. Delete the last sentence of the paragraph on Hittite. Instead of **kaglā* I now see as a more plausible development **kap-elV-* ~ **kapp-elV-* (see below) > Welsh *ca-el* ~ *caff-el*. Thus (p. 232) we really need no **kav-h-*, and the crossing with defective **ghabh-* gave **kab-* > *cav-*.

Now notice the defective, or complementary, behavior of these two bases in Celtic: **kab-* appears in the preterite in British, and **gab-* in the verbal noun. In Old Irish *gaibid* has a newly productive *ā*-subjunctive, *ē*-future (cf. the defective *berid*), and *s*-preterite. Note in particular that the compound *fo°gaib* 'finds, gets; induces, causes; undergoes; is able, gets to; experiences; devises' has a suppletive perfect *(fo)°fuar* (3 sg. *fo-nd°uair* Sg 144^{b}3), while *fo°ácaib* (= *fo-ad+gaib-*) 'leaves' matches the productively regular paradigm of *gaibid*. In other words OIr. *gab-i-* was a defective presential, and it seems that **ghabh-* and **kap-* suppleted one another. This then explains some peculiar noun situations. *IEW* 529 **kapro-* 'Bock' gave Lat. *caper* 'goat', Umbr. *kaprum*, ON *hafr*, OE *hæfer* (plus OIr. *cáera* 'sheep' < **kaper-*, not listed by Pokorny); yet Welsh *gafr*, Breton *gavr*, OIr. *gabor* (masc.) 'goat' < **ghabhro-* also occurs. And OIr. *gabor* (fem.) < **ghabhro-* means 'a (white) mare'. Ovicaprids and certain other animals were apparently 'penned up'. The horse in Welsh is *ceffyl* < **kappilo-*, but the late Latin *caballus* presumably came from a Gaulish **kaballos*. These must be agentive participle-adjectives related to our verbs above, **kapp-* ~ *kab-* < **g(h)ab(h)-* (and to OIr. *gabul* 'fork', Germ. *Gabel*); the horse was 'the reacher, the attainer, the winner'. And we now know why king Arthur's dog was called *Cafal* < **kabalos*, yet was not a horse.

We see then in Celtic the suppletive remains of two defective paradigms built on the bases **ghabh-* and **kap-*. As such, they could form the basis of different verbal derivations, yet conflate to fill out a full paradigm mostly from **kap-* > *ca-* ~ *caff-*; but in Goidelic mostly from **g(h)ab(h)-*. The paradigm of **gab-* was aoristic or perfect (preterital), and formed a presential **gab-i-*. Thus the rest of the paradigm was neologistic. A relic remnant was left in OIr. *ro-n-d+gab* (perfect *ro*, nasalizing relative neuter pronominal object + preterite/perfect *gab*) 'is', suppletively used

for the substantive verb *tá* in certain nasalizing relative clauses; this relic was formally perfect. Thus too the presential *fo°gaib* 'finds, gets' in conservative fashion had a suppletive perfect *(fo)°fuair* (3 sg.).

When we turn to Latin we find *habeō habēre* 'have' (**ghabh-*), an old *ē* stative, without an old perfectum. Oscan *hafiest* provides an *-io-* formation, with a perfectum *hipid* (the vocalism conflated with Latin *cēpi*). Latin *capiō capere* had only a presential (infectum) paradigm, the stem of *cēpi* being a new creation, probably modelled on *fēcī*. In Germanic the semantics of Goth. *giban gaf gebum*, ON *gefa gaf*, OE *giefan* 'give' are factitive or causative, and beside this we find a strong preterite, itself being simply the old base **ghabh-*. The present Goth. *hafjan*, ON *hefja*, OE *hebban* = OS *hebbian* 'lift' is identical with Lat. *capiō*, and to this has been supplied, like *cēpi*, a strong preterite ON *hōf* etc. Parallel to Lat. *habeō*, we find the stative Goth. *haban*, ON *hafa*, OHG *habēn* (**kap-ē-*), and OS *hebbian* 'have'. To these we have a new weak preterite Goth. *habaida*, ON *hafða*, etc. The Albanian *-mi* verb is presential in its suppletion.

Thus we find in Celtic, Italic, and Germanic for these two bases functionally similar and formally related suppletions. Turning to the Tocharian pair *kāw-/kāp-* 'crave, desire' (but leaving to the Tocharianists decisions on the development and allocation of the detailed morphology), we read in Hilmarsson 1996: 122: "One has two choices then: first, there might be two verbs involved, one denominative yielding the present stem XII *kāwāññä/e-*, and the other a primary verb providing the non-present stems; these two verbs could then be seen as forming a suppletive paradigm. Or second, a deverbative present XII *kāwāññä/e-*, formed to an unattested... present VI **kāw(ä)nā-*... The second alternative seems simpler...". Hilmarsson (Toch. and IE Studies 5, 1991: 81, where this passage originally appeared) therefore classes this present XII as a primary deverbative formation; but that does not remove the possibility of suppletive origin. In his ensuing discussion Hilmarsson 1996 mentions the unresolved alternation of *w* and *p*. I would propose that in this complex paradigm we have the remnants not only of **kap-* in the *p* but also of **ghabh-* in the *w* ~ *p*. In any event, it seems that Tocharian shared to some extent with Italo-Celtic and Germanic in possessing this intrinsically related pair of verbal bases which show no evidence of such survival and development elsewhere in Indo-European. The following table shows in broad terms the semantic allocation of the descendant forms.

	Albanian	Celtic	Italic	Germanic	Tocharian
'get, reach'	kap	W. cael Ir. fo°gaib			kāw- ~ kāp- [desiderative]
'take'		Ir. gaibid	capiō	hafjan	
'(have) taken/ got = have'	kam		habeō	habēn	
'cause to have = give'	(jap- *də-	(to°a-ber- to ad-də-)	(dā-)	giban	

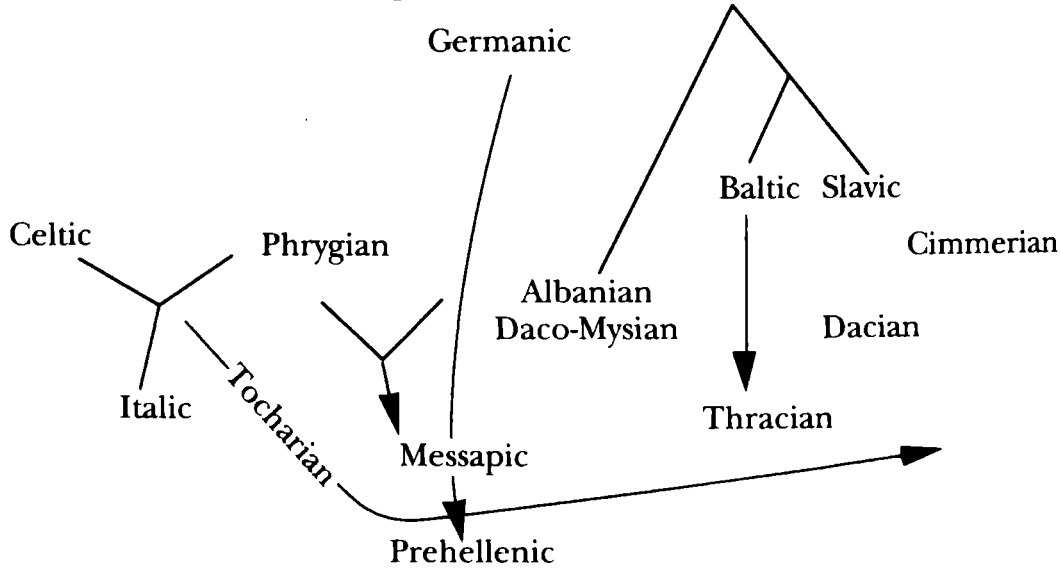
There are persistent indications on points of detail that at an early date Tocharian was associated with Italo-Celtic and Germanic.

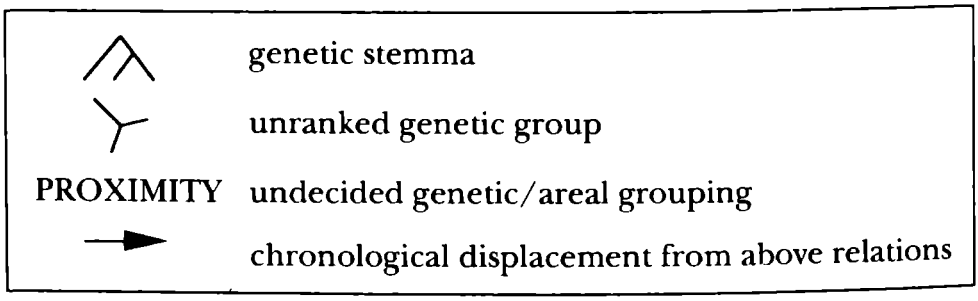
If B *kerciyi* (pl. tantum) 'palace' could have been **ghordhi(i)o-* sufficiently early (see Hilmarsson 1996: 132) then we might look for a reasonable correspondence in Phrygian *Γόρδιον*, as Benveniste suggested in *Festschrift Hirt* II 236 (Haas 1966: 162). If, however, the *c* betrays a later layer then we could have to do with a passing loan along the Tocharians' journey from the west—but from which source?

Finally, we cannot ignore the striking correspondence of B *riye* A *ri*, AB acc. *ri*, nom. pl. *riñ* 'city' < **u̯ri<<ʔ>>ēn u̯riʔen-* (Adams 1988: 119-20) with Thracian *βρια*) presumably < ** b̄ria* or **vria* < **u̯riʔā*. From the rest of our exiguous evidence it seems likely that the Tocharians would have picked up this item of economic/social acculturation in the course of a prolonged contact with IE speakers on their passage through eastern Europe. Further evidence and discussion on this question must await another occasion.

The above formulations are intended as the start and continuation of a conversation, not as a conclusion. It is hoped that they may lead to the marshalling of more and firmer evidence, as well as productive and principled analysis.

We summarize with a space-time schema:





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Lexical Archaisms in the Tocharian Languages

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1. In the present paper I propose to evaluate, and add to, the arguments of Klaus T. Schmidt (1992). That author's claim is that there are a number of archaisms in Tocharian A and B which set these two idioms apart from most of the other members of the Indo-European group of languages. The phenomena he includes are (a) a possible consonantal reflex of a Proto-Indo-European laryngeal, (b) the preservation of the original complex onset of the Proto-Indo-European word for 'earth' in Tocharian A, (c) the survival of a nasal present with apophony in the root, (d) archaic features preserved in forms of the preterit and subjunctive stems, (e) a special use of the mediopassive, (f) the absence of a reflex of PIE *-*tro*- in the word for 'plow' (Toch. B A *āre*), (g) two alleged lexical archaisms, Toch. B A *yäp*- 'enter' and Toch. B *kwīpe*, A *kip* 'shame'.

The individual points differ greatly in weight. Regarding (a) it can be stated that in light of the data discussed in Winter 1965:207-210, the possibility cannot be excluded that in a sequence *R$X (resonant—syllable boundary—laryngeal) a consonant developed which in both Tocharian B and Tocharian A was rendered by <k>. The interpretation offered by Schmidt therefore seems a reasonable suggestion.

As far as (b) is concerned, the fact that in various Indo-European languages, including Indo-Iranian, Greek, and Balto-Slavic, the reflex of *$\acute{g}h$ (that is, C_2 of the original cluster *$dh\acute{g}h$) survives after cluster reduction makes it likely that prior to reduction the original sequence *TK* was retained in these languages. The metathesis *TK* > *KT*, found in languages without cluster reduction, therefore was an innovation of only limited distribution. The Anatolian-Tocharian isogloss of retained *TK* thus appears to have included what seems to be the major part of the Indo-European group.

The reconstruction, under (c), of a present-tense form Toch. B *$\acute{s}$anmäṃ is not justified: Form pairs such as Toch. B *śarsäṣṣäm* 'teaches': *kärsanaṃ* 'knows' or Toch. B *śatkäṣṣeñca* 'causing to transcend': *kätkanaṃ* 'transcends' clearly show that a likely noncausative match for *śanmäṣṣeñca* would be a present **stanmaṃ* (if not **kanmaṃ*; cf. Krause 1952: 99). The Tocharian evidence therefore does not permit reconstruction of nasal presents with full grade of the root.

Schmidt's argument (d) will be discussed elsewhere; and his

argument (e) can also be disregarded in the present context.

In regard to (f) it seems appropriate to state the following: Toch. B *āre*[1] can be taken to be a form comparable to items such as Toch. B *plewe* 'raft, boat', a designation of an instrument with *-*o*-*o*-vocalism,[2] or with words of the type Toch. B *cake* 'river', an old *-*s*-stem with *-*e*-vocalism of the root, whose original meaning *'runner' also would provide a functional parallel to the noun 'plow' based on the verb 'to plow'. Under the circumstances it cannot be demonstrated that a *-*tro*-less word for 'plow' in Tocharian B is particularly archaic.

In the remainder of the paper I discuss and supplement Schmidt's observations concerning argument (g).

2. An etymological connection of Toch. B *kwīpe*, A *kip* 'shame' with Gmc. **wiβa*- as reflected by OE *wīf, wīfman*, etc., presupposes a semantic development 'shame' > 'place to be ashamed of' > 'genitals' > 'female genitals' > 'woman'.

In our Tocharian texts, use of the word for 'shame' with reference to the private parts is indeed attested: In B 334, a leaf on which an enumeration of masturbation techniques deemed sinful in the case of monks has survived, 'penis' is expressed by Toch. B *kwīpe-ike* 'shame place'; and in A 152 b 3 the ablative of Toch. A *kip-kapśañi** 'shame body' is found in the phrase Toch. A *cami mācri kip-kapśiññäṣ pre läntsamāntāp* 'of (one) who is leaving his mother's shame body'.

Even the second passage, however, does not imply that Toch. A *kip* as such had reached stage four in the semantic development chain posited above: Without the explicit reference to Toch. A *mācar* 'mother' there would have been no indication that a female body part was meant by the collocation *kip kapśañi** 'shame body'. Moreover, in neither of the two cases is there a need to assume that even stage three had been attained: The basic meaning 'shame' fully suffices to explain the use of the collocations 'shame place' and 'shame body' for genitals in a Buddhist religious context where the avoidance of a "direct" term such as Toch. B *tso* 'penis' (cf. Winter 1984: 215) makes immediate sense.

If thus for Tocharian nothing beyond step one of the assumed semantic development needs to be posited, the entire sequence of the semantic changes would have to be placed within the prehistory of Germanic. While this may not be impossible, the fact cannot be overlooked that the Tocharian forms point to an earlier *-*s*-stem (note the adjective Toch. B *kwipassu*) rather than to an *-*o*- stem as found in Germanic. Moreover, Toch. B *kw-*, A *k-* may reflect PIE **w* preceded by any one of the dorsals, and Toch. *-p-* may derive from PIE *-*p*-, *-*b*-, or

[1]Tocharian A *āre* is a borrowing from Tocharian B.

[2]This, of course, presupposes the assumption that with *-*a*-vocalism of the root no *-*o*- ablaut occurred.

*-*bh*-. The best one can do, therefore, is to acknowledge that the etymological connection proposed by Schmidt (and Schmidt & Strunk 1989) presents a possible way of breaking down the isolation of the Germanic word for 'woman'.

3. The high degree of ambiguity of the Tocharian reflexes of Proto-Indo-European stops of course also causes problems as regards the other etymology proposed by Schmidt. He considers the verb stem Toch. B A *yäp-* 'enter' to be related to Skt. *yabh-*, Gk. *oíphō*, Russ. *ebu*, all three denoting 'have intercourse (said of the male)' and derived from PIE **yebh-*. The Tocharian form can be derived from the same source: The *-o-*vocalism in the active preterit forms Toch. B *yopsa, yopar* can be accounted for by viewing them as reflecting not PIE *-*o-* but PIE *-*ē-* as in Toch. B *lyautwa* 'I removed' or Toch B *plyeṅksa* 'he put up for sale'.[3] The singular of the subjunctive active (Toch. B *yopu, yopäṃ*) shows the same transfer of the vocalism of the preterit active as found in Toch. B *plyewäṃ* : *plyewsa* : *plu-* 'float'.

Semantically, the use of a term for 'enter' for a male's sexual intercourse is not very surprising (cf. Engl. *penetrate*). What is really remarkable, though, is that one lone subfamily, the Tocharian languages, should not show this semantic change whereas Sanskrit, Greek, and Slavic do. If the etymology proposed should be correct, Schmidt is quite justified in stating, 'Dieser Befund läßt sich am ungezwungensten dadurch erklären, daß das Tocharische bereits vor Eintritt dieser Bedeutungsentwicklung aus der indogermanischen Grundsprache ausgeschieden war [This finding can be most naturally explained if Tocharian had left the Indo-European parent language before the beginning of this semantic development]' (1992:113). If indeed the meaning 'have sexual intercourse' should be later than 'enter', then the non-Tocharian languages must be the innovating subgroup of Indo-European; the reverse, which would have to posit a development from 'copulate' to 'enter', is unthinkable. It remains to be seen whether other cases of lexical retention in Tocharian can be adduced that would serve to support Schmidt's contention.

4. The first item to be discussed at this point is a very well-known word. As far back as Schrader & Nehring (1929: 2), Toch. B *laks* 'fish' was compared with the word for 'salmon' in Germanic and Balto-Slavic. To these items from Northern Europe, Ossetic *læsæg* 'salmon' (cf. Abaev 1973: 32-33 with references) as well as Arm. *losdi*, a name of a fish species found in dictionaries, are to be added from a different part of the Indo-European territory.

In principle, two interpretations of the difference in meaning

[3]Forms of preterit III in Tocharian A contain palatalizing *-a-* < *-*ē-* throughout the entire active paradigm.

'fish' vs. 'salmon' may be proposed: Either Tocharian 'fish' results from generalization of a term once applied only to a specific kind of fish, or a general term for 'fish' was used for a prototypical fish in a particular region such as the northern part of Europe. The first alternative has generally been preferred (cf. e.g. Kluge & Mitzka 1960: 416-417, Pfeifer et al. 1989: 960-961). Even if the specific meaning originally was that of 'salmon trout, salmon' (Mallory 1989: 116), the explanation of the meaning discrepancy between Tocharian and the other Indo-European languages would remain essentially unaffected.

There are, however, some features of the Tocharian word which should give pause. The Germanic and Slavic forms admit of a derivation from PIE **lokso-* (cf. e.g. Fraenkel 1962: 341-342) or from PIE **lakso-* (Polome 1994). The Ossetic form is similarly ambiguous. The *los-* of Arm. *losdi*, if indeed it belongs here (I cannot account for its *-di*), tips the scales in favor of **lo-*.

Now, neither **lokso-* nor **lakso-* can be the source of Toch. B *laks*. The former would have resulted in Toch. B *lekse**, the latter in Toch. B *lākse**. The actually attested forms of Tocharian B show a vocalism /i/ in the base, which cannot be derived from either PIE **-o-* or PIE **-a-*.

Van Windekens (1976: 254) strangely enough lists forms with Toch. B *-ä-*, such as the nominative plural Toch. B *läkṣi*, but fails to draw the proper conclusions about forms with Toch. B *-a-* in the first syllable. Such forms owe their *-a-* to the (retracted) accent on the first syllable of morphophonemically disyllabic forms rather than to borrowing of an alleged Toch. A *laks**. Further, Van Windekens, like others beside him, fails to pay attention to the fact that the Tocharian word, in contradistinction to its counterparts in several other Indo-European languages, shows no trace of an old **-o-*stem but rather follows the rare recessive pattern of the consonant stems (cf. Krause & Thomas 1960: 131-132). We thus have side-by-side continuations of a PIE **lokso-* and of a PIE **l$_o$ks-*, with the latter surviving only in Tocharian.

As regards the form, Tocharian clearly is more conservative than the other Indo-European languages in question: It appears not to have participated in the development of the **-o-*stem found in the other languages, as either a free or a bound form. If now we assume that innovation in form went along with innovation in meaning—and this assumption does not seem to be illegitimate—then the Tocharian meaning 'fish' has a good claim to being the older one. And if this conclusion is warranted, then the case of 'fish' > 'salmon-like fish' would not be too different from that of 'enter' > 'have intercourse' discussed in § 3.

To further strengthen this point, it would of course be desirable to find additional evidence for lexical archaisms in the Tocharian languages.

5. Van Windekens (1960: 39-40, 1976: 209) aligns Toch. B *kärweñe* 'stone, rock' with Skt. *grāvan-* 'stone for pressing out some', Welsh *breuan* 'handmill', to which Goth. *asiluqairnus* 'donkey-driven mill', OCS *žrŭny* 'mill', Lith. *gìrnos* 'handmill', Arm. *erkan* 'millstone' are to be added. The Tocharian B form seems to have its counterpart in Toch. A *kärwañi** attested in the locative plural form in A 12 a 5 (*pkänt pkä*) *nt lokalok ṣulaṃ kāklos kärwaṃsaṃ* 'having fallen asunder on the rocks on Mount Lokalok'.

What is remarkable again is that, as in §§ 3 and 4, we have a discrepancy in meaning between Tocharian and the other Indo-European languages that have the lexeme in question, with Tocharian showing a very general meaning and the other languages a much more specific one. As was the case in § 3, for Toch. B *kärweñe*, A *kärwañi**: Skt. *grāvan-*, etc., it is only the general meaning that can have a claim to being the original one: Just as 'have intercourse' could fairly easily develop from 'enter', so 'rock, stone' > 'millstone' makes immediate sense while 'grinding tool made of stone' > 'stone, rock' does not. If the etymology proposed by Van Windekens is correct, the Tocharian languages again differ from Indo-Iranian, Armenian, Celtic, Germanic, and Balto-Slavic by being alone in preserving the older state of affairs.

6. The preterit of the Tocharian B verb 'give' is derived from a stem /wisa-/, sg. 1 *wsāwa*, 2 *wsāsta*, 3 *wasa*/*wsā-*, plural 1 *wäsām** (attested as *wasam* in B 490, a manuscript in which schwa dots are not used with *wa-*), 3 *wsare*. In Tocharian A, the same stem is found in sg. 1 *wsā*, 3 *wsā-*.

The unbound form of the third person singular, Toch. A *wäs*, apparently was open to reanalysis to the effect that *-(ä)s* was interpreted as the marker *-s* of the third person singular of the preterit III paradigm, and a base /wi-/ was extracted which gave rise to the past participle Toch. A *wawu*, a form otherwise irregular on several counts.

The third person plural, Toch. A *wsr-* is likewise an unexpected form. If it were derived from Toch. A /wisa-/, one should find *wasar**; if from /wi-/, the outcome should be *war**. Even the forms based on the stem /wisa-/ in the two languages are peculiar: In the case of a transitive verb, the active preterit of Tocharian B (and the singular of the active preterit in Tocharian A) should contain a reflex of original **-e-*vocalism in terms of palatalization of the initial consonant of the stem. If /wis-/ were derived from PIE **wes-*, the B paradigm should have been singular 1 *ysāwa**, 2 *ysāsta**, 3 *yasa**, etc.[4]

Part of these difficulties can be avoided by positing a source form PIE **wis-*, since **wi* is reflected by /wi/ in both languages. Even so, the

[4]Tocharian A does not preserve an immediate indication of palatalization.

fact remains that in the active preterit of Tocharian B one would expect to find a reflex of **wey-* (e.g. 3 sg. **yisa*) and not of **wi-*. The best that can be done, then, is to state that the Tocharian preterit of 'give' shows an irregular vocalism, but that it is probable that it reflects an earlier **wis-V-*. The attempts at an etymology listed in Van Windekens 1976: 563-564, including his own, are to be rejected.

Krause (1952: 185) prefers a different analysis of the data. He assumes that Toch. B *wasa*, based on a root **we-*, contained the normal ending of the third person singular of preterit III and was subsequently reinterpreted as *was-a*, i.e. as a form of preterit I. The *-s-* was then generalized throughout the paradigm and even extended to Toch. B. *wase* 'poison' (for whose semantic development cf. Germ. *Gift* 'poison'). He points out, however, that such a **we-* lacks acceptable support in other Indo-European languages.

The connection of the Tocharian words for 'poison' with the verb stem under discussion here was first proposed by Duchesne-Guillemin (1941: 167) and endorsed by Van Windekens (1976: 563) who argues against a correspondence between Toch. B *wase*, A *wäs* and Skt. *viṣa-*, Avest. *viš–*, Gk. *ἰός*, Lat. *vīrus*, OIr. *fí*, all with a meaning 'poison', since he believes that the sequence PIE **wi-* yielded Toch. B *i-*, A *wi-* in Toch. B *ikäṃ*, A *wiki* 'twenty'. This argument is ill-founded, since Toch. /wi/ is proved to reflect PIE **wi* (as in Toch. B *wate*, A *wat* 'second' from PIE **dwito-*, cf. Winter 1992: 133). Moreover, the short vowels required for this derivation are attested in Indo-Iranian (Skt. *viṣa-*, Avest. *viš–*). There can therefore be no objection to a derivation of Toch. B *wase*, A *wās* 'poison' from PIE **wiso-*.

We should now return to the implications of the proposals made by Duchesne-Guillemin and Krause. If Toch. B /wise-/ is from PIE **wiso-* and Toch. B /wisa-/ from PIE ** wis-V-*, it is of course possible that both are based on the same Indo-European root. We have, however, to take cognizance of the fact that in all Indo-European languages that have the term, the continuation of **wiso-* (**wīso-*) always means 'poison'; a form **wis-* (i.e. **weys-*) 'give', on the other hand, has no match outside Tocharian.

If the Tocharian words for 'poison' and 'give' are indeed related there is only one possible explanation for this fact: As the path from *geben* 'give' to *Gift* 'poison' is necessarily unidirectional, the pair of terms found in Tocharian must reflect a very old state of affairs, and the meaning 'give' cannot be a Tocharian innovation. Moreover, if the use of a noun related to 'give' in the meaning 'poison' was a secondary development, it must have occurred early enough to be shared by Tocharian, Indo-Iranian, Greek, Latin, Celtic.

By contrast, the corresponding verb **weys-/*wis-* 'give', while preserved in the Tocharian languages, was lost elsewhere. It seems more reasonable to view this loss as a shared innovation of the non-Tocharian idioms rather than as a development that took place

independently in at least four subgroups of Indo-European.

7. It is generally agreed that the ancestor of the Anatolian languages must have been the first to become separated from the remainder of the Indo-European group. The lexical evidence discussed in the present paper suggests that the speakers of the ancestral language of the Tocharian subgroup also severed their ties with the rest of the Indo-European community at an early point in history. There is no indication that the Tocharian departure preceded the Anatolian one. Only a date later than the departure of Anatolian seems to make sense. In this context, the few apparently exclusive Tocharian-Anatolian isoglosses deserve some comment.

Of the five equations listed by Van Windekens (1976: 618), that connecting Toch. A *wät-* 'set up(?)', Toch. B *aittaṅka* 'towards', and Hitt. *weda-* 'build' is beset with too many difficulties to deserve serious attention. Moreover, even if one were to accept the argumentation of Van Windekens (1976: 566-567), the isogloss would be shared with Germanic and hence not be of immediate interest here.

Toch. B *ṣärkäsk-*, A *ṣärkäs-* 'surpass' presuppose the existence of a "Grundverb" Toch. B A *särkā-** (or, less likely, *ṣärkā-**), the meaning of which cannot be determined. Hence a connection with Hitt. *sarku-* 'hervorragend, erhaben, mächtig; Held' cannot be demonstrated.

Equating Toch. B A *tärkā-* 'let go' with Hitt. *tarna-*, as first proposed by Benveniste (1932: 142), makes good sense in view of the semantic near-identity of the two verbs and the fact that the argumentation by Schmidt (1992: 104-105) provides an explanation for the absence of *-k-* in Hittite and in the present stem of Tocharian A. This isogloss connecting Hittite and Tocharian appears to be an exclusive one, as does one of the remaining two in the short list given by Van Windekens.

The agreement of Hitt. *kast-s* 'hunger, famine' with Toch. A *kaṣt* (B *kest*) 'hunger, famine' was first noted by Friedrich (1924-1925: 122). The nouns are consonant stems in their respective languages. The only possible attachment to a verb stem would require a semantic change possibly found in both Hittite and Tocharian. Hittite has a verb stem *kist-* 'erlöschen; vergehen'. If *-i-* were to be interpreted as *-e-*, a relationship parallel to that between Engl. *starve* and German *sterben* could be assumed. 'Fading away' could also underly Toch. B *kästuwer* 'at night', an absolutive derived from the past participle of an unattested verb Toch. B *käst-**. A connection of Hitt. *kist-* with PIE **g^{w}es-* 'become extinguished' (cf. Van Windekens 1976: 210 with references) is unlikely. Here, as in Toch. B *kästwer*, one would expect to find a reflex of the labial component of the initial consonant. Even if the connection were correct, Hittite and Tocharian alone would share the feature of a dental extension of the root.

One of the stems used in the suppletive paradigm of 'make, do'

in Tocharian A, *ya-*, has long been connected with Hitt. *ya-* 'make, do' (cf., e.g., Van Windekens 1976: 586). Puhvel (1984: 345-347) discusses at length the merits and demerits of this claim. He makes a good case for deriving the Anatolian forms from **ey-* followed by a thematic vowel. If this derivation is correct, the similarity with the forms of Tocharian A is reduced to a single sound, *-y-*: Forms with a stem Toch. A *ya-* occur only in places where, if the paradigm were thematic, palatalizing /i̯/ should be found as the reflex of PIE **-e-*; or, if the paradigm were semithematic like that of Toch. B *nes-*, nonpalatalizing /i̯/ or zero. Thus, the time-honored Tocharian-Hittite equation does not seem to survive closer scrutiny. (Moreover, the other stems found in the suppletive paradigm of 'make, do' in Tocharian A, thematic *yp-* and athematic *yām-*, which is also found in Tocharian B, furnish no support for the assumption of a connection with Hitt. *iya-*, Luw. *aya-*, Hieroglyphic Luw. *aya-*, etc.)

8. We are thus left with two fairly convincing isoglosses limited to Anatolian and Tocharian. If correctly identified, they would represent elements of the Proto-Indo-European lexicon that survived beyond the time of the separation of Anatolian from the rest of the Indo-European group, but were lost in the other Indo-European languages after their ties with the Tocharian subgroup had been severed.

If this view is correct, Schmidt's tentatively stated assumption that the ancestors of the speakers of the Tocharian languages left the Indo-European community at a fairly early date would stand confirmed not only by the Tocharian forms discussed here in §§ 3-6, but also by the evidence of Anatolian-Tocharian isoglosses mentioned in § 7. (Note that one or the other of the items included in §§ 3-6 might require shifting to § 7 if appropriate data from Anatolian should become available.)

9. The assessment arrived at here on the basis of lexical evidence agrees very well with two recent proposals based on completely different arguments.

Mallory (1989) reaches his conclusions on the basis of a combination of an interpretation of archeological evidence, of common-sense reasoning, and of some considerations derived from a 'linguistica areale'. He thinks (note pp. 56-63, 226) that the ancestors of the speakers of Tocharian arrived in the heart of Asia before the expansion of Indo-Iranian. A date 'as early as the fourth or early third millennium BC' (p. 226) for their arrival in the new territory of necessity implies a separation from the remainder of the Indo-European group at an even more remote time. Hence the pre-Tocharians must be among the candidates for extremely early separation from the rest of the Indo-Europeans.

The conclusions of Gamkrelidze & Ivanov (1984) are based on

the analysis of morphological innovations; cf. their stemma on p. 399. Tocharian is assumed here to have participated in the second split that affected the Indo-European group as a whole. Consideration of phonological developments contributes to drafting a refined schema (p. 415), with the place of the individual subgroups in the stemma conditioned by lexical isoglosses whose scope is assumed to have been due to transfer in adjacency between sometimes only distantly related subgroups. As concerns Tocharian, it is the authors' contention that it was a Tocharo-Celto-Italic group that became separated from the rest of the Indo-European community. This claim is not confirmed by the data analyzed in the present paper: The Germanic innovation in § 4 is shared with Balto-Slavic, Indo-Iranian, and possibly Armenian; and that in § 5 with Balto-Slavic, Celtic, Indo-Iranian, and Armenian. Geographical adjacency does not suffice to explain the extent of these groupings. If the facts are properly interpreted, they imply that the community of Celtic and Germanic with Indo-Iranian continued to exist after the separation of pre-Tocharian.

10. Regardless of the modification proposed, the lexical evidence discussed in the present paper offers independent support for a central point in Gamkrelidze & Ivanov's analysis: The ancestors of the speakers of the Tocharian languages appear to have been the second group, after the pre-Anatolians, to become separated from the remainder of the Indo-Europeans. If this was the case, Tocharian evidence takes on major importance for the reconstruction of Proto-Indo-European whenever this evidence is found to agree with that from other Indo-European languages, for such an agreement can be taken to point to a very early period in the prehistory of the language family. However, as I tried to show in this paper, disagreements may, under favorable conditions, be equally revealing.

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Tocharian Languages and Pre-Buddhist Culture

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The literature written in the two Tocharian (A/B) languages is mostly of Buddhist inspiration; even the profane texts (account books, letters) deal with the economic and social life of the Buddhist monasteries which were so prosperous in the oases of the Northern route of the Tarim basin. Only the caravan-passes (dating to the first half of the 7th c. CE) are devoid of any religious purpose: they were written by the officers of the Kuchean kingdom, not by monks. The bulk of the Tocharian literature that can be dated from the 6th to the 8th c. CE (not excluding the composition or transcription of texts up to the 9th and 10th c.), depends on models that were previously written in Buddhist Sanskrit. Nevertheless, behind the level impregnated by Buddhist culture and rhetoric, one can discover bits and pieces of the culture of the Tocharians before their conversion to Buddhism. The key resides in the vocabulary for some basic notions, but also in some formulas that are not imitated from Sanskrit. How deeply can we reconstruct the culture of people from documents written in dead languages? The question remains open. But etymology is one way of explaining older meanings of some words and to catch a glimpse of the world where those words have been coined.

I. Religion and aristocratic ideology.

1. Names of pre-Buddhist deities that are common with Turkish speaking peoples: - "Sun" B *kauṃ-ñäkte* A *koṃ-ñkät* "sun-god", cf. T. *kün-täṅgri.*
- "Moon" B *meñ-ñäkte* A *mañ-ñkät* "moon-god", cf. T. *ay-täṅgri.*
- "Earth" B *keṃ-ñäkte* A *tkaṃ-ñkät* "earth-god", but T. *yir täṅgri* "earth and heaven".

2. Cf. also "God Karman", maybe Indian reshaping of an indigenous god of destiny: B *yāmor-ñäkte*, A *lyalypu-ñkät.*

3. On this model is made the term for "Lord Buddha": B *pañäkte* < **pät-ñäkte* (**pät* < **putt-* < **putta-* < Skt. *Buddha-*), verse form *pud-ñäkte*, A *ptāñkät* (< **pät-ā-ñäkt(a)*, cf. Winter, 1987).

4. Tocharian languages have a role in the discussion of IE poetics and stylistics (cf. Pinault 1989: 165 and 192-3; Watkins 1995: 65). There is,

for example, the importance of the concept of glory, and of hearing the name and the deeds of somebody. The formula B *ñem-kälywe* A *ñom-klyu* "renown, fame" = "name+glory" is a binomial phrase that was probably inherited, cf. connections with the cognate terms Ved. *nâman-* and *śrávas-*, *nâma śrútyam*, Gk. *ὄνομα* and *κλέϝος*, *ὄνομα κλυτός*, *ὀνομάκλυτος* (cf. R. Schmitt 1967: 90-93).- Toch. B *-kälywe* A *klyu* < **kälywæ* < **klyäwæ* < IE **klew-os* "hearing, what is heard". To mention only in passing, this etymon has nothing to do with the one of Lat. *caelum* "heaven" < **kaid-lo-* or **kait-slo-*, cf. Gm. *heiter*, Lith. *skaidrùs*.

5. This binomial expression (hendiadys) has been imitated by the Ancient Turks, by the Uighurs: U. *at kü* (*küü*) "renown, glory" corresponds to Chin. *ming* "name, fame", Chin. *cheng* "renown, glory" (cf. Röhrborn, 1988, 250-251). This fixed phrase is made with T. *at* "name" plus a word which is probably borrowed from Toch. A *klyu*, in the phrase A *ñom-klyu*. The noun *kü* (*küü*) means "hearsay", "rumor", and "renown", "reputation", either alone or in the binomial phrase *at kü* (cf. also *DTS*, 322; Tekin 1968: 353; Clauson 1972: 686).

6. Already in the Orkhon inscriptions I and II (731 and 735 CE): I.East, 12 *tašra yorïyur teyin kü ešidip* "having heard the rumor that he was marching off" ; I. East, 25 and II.East, 21 *türk bodun atï küsi yok bolmazun* "may the renown of the Turkish people not be destroyed !" ; II.East, 36 *tabgačda atï küsi yok boltï* "his renown was destroyed among the Chinese", etc. Some years before, the same value of *kü* alone is very clear in the inscription of Ixe-Xūšōtu (between 720 and 725 CE), 12: *alpïn ärdämin üčün kü bunča tutdï* "such was the fame that he obtained by his courage and his merit". For the translation and interpretation of these passages, see Orkun (1936: 34, 40, 66, 137) and Tekin (1968: 265, 267, 277).

7. Traditionally, T. *kü* is identified with another word, OT. *küg*, transcribed also *kög* "Lied" (A. v. Gabain 1974: 343): "song, melody", which became *küi* or *kü* in several Turkish dialects (cf. Clauson 1972: 686). This word is a borrowing of Chinese *ch'ü* (EFEO *k'ü*, pinyin *qǔ;* Mathews n° 1623a) < **khyog* "song, melody" (Clauson 1972: 709). In fact, the two words, which became homonymous, have entirely merged in some Turkish dialects (Kirgiz) ; only *küg* "song, melody" is kept, whereas *kü* itself survives simply in the derivative *kü-lüg* "famous", of a very common type.

8. T. *kü* is very isolated in the Turkish languages, and is probably a borrowing, as Prof. Louis Bazin (Paris) has suggested to me. The phrase *at kü* is used already at an early date, and is obviously a calque of Toch. A *ñom-klyu*, which goes back to Common Tocharian, and

even to IE phraseology. Phonetically, *klyu* > T. *kü* is correct, since only one initial consonant is allowed in Turkish ; diphthongal *-yu* > *-ü*. In that case, we can challenge the current assumption according to which the Tocharian word-pairs are due predominantly to foreign influence (cf. Aalto 1964), mostly from the Altaic side. In the process, we may suspect that Tocharian was sometimes the giver, not only the receiver of such binomial expressions.

9. This is a new example of borrowing from Tocharian into Turkish, but already in a pre-Buddhist context, before some of the oldest Turkish documents. It proves close contact between Tocharian (A) speaking people and Turkish tribes of the northern steppes.

10. There were Tocharian kings and princes, who appear as pious donors of the Buddhist community, marching in processions on the frescoes of the caves around Kucha. We know generic terms such as "lord", Toch. B *saswe*, A *nätäk*; the word for "god", quoted above (§§ 1-3), Toch. B *ñakte* (A *ñkät*), originally meant "lord", and was still used as a respectful term of address (vocative *ñakta*). Besides occurrences in the Buddhist narratives, the word for "king" is known from official documents of the Kuchean kingdom: Toch. B *walo*/oblique sg. *lānt*, to which matches Toch. A *wäl*/obl. sg. *lānt* ; "queen" is derived from the stem **lānt-* by means of the IE feminine suffix **-iH$_2$-/*-yeH$_2$-*: B *lāntsa* A *lānts*, analogous to OIr. *rigain* and Ved. *rājñī-* "queen", vis-à-vis, respectively, OIr. *rí* and Ved. *rājan-* "king". The Tocharian title does not reflect the well-known IE etymon for "king", **H$_3$rēĝ-*, as reflected by Ved. *rāj-* (more primitive than *rājan-*) Gall. *-rīx*, OIr. *rí*, etc. (Buck 1949: 1321). But several IE languages have different designations which go back as well to a remote antiquity (cf. Watkins 1995: 8 sq.). Although the details are open to discussion (Pinault 1989: 81 sq.), the best etymology proposed so far connects Toch. B *walo* A *wäl* (allomorph **(w)lānt-*) with the root of Lat. *ualēre* "to be strong", and to words that belong elsewhere to the sphere of kingship: Celtic **wlati-* in OIr. *flaith* "sovereignty", W. *glawd* "land" etc. The Tocharian lexicon is not as isolated or bizarre as it appears at first sight; Tocharian can be placed in the IE mainstream.

II. Names of the year and of the seasons.

11. "Year" is used for stating the "age" of somebody: Toch. A *p$_u$käl* B *pikul*, plural A *puklā* B *pikwala*. Adjectival derivatives from this word are commonly used in compounds, e.g., B *ikäṃ-pikwalañ̈e* "twenty years old" (*"having twenty years"), A *taryāk-päñpi-puklyi* "thirty-five years old", *tmāṃ-ṣäk-wälts-p$_u$kul śolune* "a life lasting 16,000 years", etc.

12. The reconstruction in C(ommon) Toch(arian) leads to **p'äkwäl*,

plural **p'äkwälā*, therefore an old neuter, which became feminine. Traditional etymology (E. Sieg apud Schrader-Nehring. I, 526 sq.; Van Windekens 1976: 395): **pek^{w}-ḷ* an abstract (action noun) based on the root **pek^{w}-* "to cook, to ripen"; neuter, plural **pek^{w}-ḷ(l)-H_2*, giving the attested forms. Toch. AB have a verbal root *päk-* "to cook, to ripen" without synchronic connection with the noun for "year".

13. This etymology has recently been challenged by J. Katz (1994), who assumes a transferred epithet of "year": "the turning one" **pi-k^{w}ḷ-*, prefixed form of the root **k^{w}el-* "to turn, to revolve", cf. Hom. *ἐπιπλόμενον ἔτος* "the revolving year", epic formula *ἐπιπλομένων ἐνιαυτῶν* "as the years turned". This is semantically correct, of course, but there are objections: 1) It is not sure at all that **pi-* > **p'ä-* with a palatalized bilabial occlusive. Short **i* does not palatalize **w-* (cf. A *wäs* B *wase* "poison" < **wiso-*, A *wät* B *wate* "second" < **dwi-to-*), **k^{w}-* (cf. interrogative-relative A *kus* B *k$_u$se* < **k^{w}äsæ* < **k^{w}is-so*), etc. 2) One would expect **pi-k^{w}l-o-* for an adjective epithet of the IE neuter **wétos* "year" in an ancient formula. 3) According to his structure, the root-noun **pi-k^{w}ḷ-* should be an *animate* agent noun, cf. Lat. *prīnceps* "taking the first part", Hom. *ὑπόδρα* < **upo-dṛ̥k̑* "von unten her blickend". Points 2) and 3) are contradictory with the form of the CToch. word, both athematic and neuter.

14. According to the former etymology, the "year" is not the "cooked one"; the abstract verbal noun means "ripening", as a resultative noun "ripeness", "maturity". This concept fits perfectly with the life of pastoral nomads who are attentive to the growing of plants. A semantic parallel is offered by the Turkish term for the "age-giving year" ("année d'âge"); OT. *yāš* is cognate with other words expressing "greenness, freshness": adjective *yāš* "humid", substantive "tear", *yāš ot* "new grass", derivative *yaš-il* "green". So to speak, the new year is "the green" of plants. The Turkish people did not use the astronomical calendar for counting the years, but used instead the criterion of botanic phenomena (cf. Bazin, 1959; 1991, 55-65). The *Book of the Chou dynasty* (*Chou shu*, EFEO *Tcheou chou*, pinyin *Zhōushū*) describes the Turks of Mongolia (Tūjué, EFEO T'ou-kiue, Mathews n° 6540b) for the period between 557 and 581 CE with such words: "They don't know the succession of the years, and they count only by the grass turning green." This practice could probably also fit for the ancestors of the Tocharians.

15. In that case, the limit of each new year would have coincided with springtime, when the plants began to ripen. The analogy with the Altaic designation is possible with a slight modification. The Tocharian word refers rather to the "maturing", also to the acme of the growing process, not to the beginning; one can presume that the

Tocharians also considered the growth of fruits and cereals, and not exclusively the green of the grass on the surface of the steppe.

16. We do not know the Tocharian terms for all the four seasons, but simply two seasons: "summer" (good season) and "fall" (bad season), corresponding to the halves of the complete year ("spring"+ "summer")+("fall"+"winter"). Both words are combined in Toch. A *ṣme śärme* "summer [and] fall", this binomial phrase covering the totality of the seasons of the year (cf. Pinault, 1993, 144-157). The Tocharian terminology is similar to the system of the Turkish peoples (Bazin, 1991, 49-55), and is very different from the Indian system of six seasons (*vasanta-, grīṣma-, varṣa-, śarad-, hemanta-, śiśira-*), reflecting instead the continental climate of Central Asia.

17. A *ṣme* < **ṣäme* < **ṣämäyæ* < **semēn*, cf. Av. *ham-*, Ved. *sámā-*, OHG *sumar*, Arm. *am* (instr. sg. *amaw*), Gaul. *Samonios*, OIr. *samain* (end of the nice season, and beginning of winter). A *śärme* < **śärmäyæ* < **ḱerd-mēn*, cf. Ved. *śarád-* "fall", Av. *sarəd-*, OP. *θard-* "year".

18. "season": A *yusār*, dual *yusāri*, < **yäusār* < **H_2yeus-ōr* "moment", "division of time", based on the postpositional locative **H_2yeus-er* "inside time", from **H_2oy-u-s-/*H_2y-eu-s-*, cf. Ved. *áyuṣ-* "(long) life", *yáḥ* "growth, increase, prosperity", **H_2ey-w-o-* > Lat. *aevum* "eternity, life-time, age", etc.

III. Names of the four cardinal points.

Tocharian A.

19. 1) A *koṃ-pärkānt* "east", adj. *koṃpärkāñci* "easterly", compound *koṃpärkānt-kälymey(äṣṣ aci)* "from an easterly direction" (A 462 b 2), phrase with *kälyme* "direction", *koṃpärkāñcāṃ kälyme* (A 66 b 4) "towards the easterly direction", *koṃpärkāñcāṃ kälymyaṃ* (A 379 b 3) "in the easterly direction". The designation has an exact counterpart in B *kauṃ-pirko* (eastern dialect: *kompirko*) "East", adj. *kauṃpirkoṣṣe*, compound B *kauṃpirko-kälymi* (PK AS 13 D b 4) "easterly direction".

20. 2) A *ṣuliñc* "north". This identification is proven by the correspondence between a Tocharian fragmentary passage (the reading of which I established from the original manuscript kept in Berlin) and an Uighur text.

A 286 + 260 a 1 *(sup)[uspit]is ṣuliñc^{ä}/// ///tāśśeṃsyo (worpu waiśravaṃ wäl) ptāñkät käṣyāp pāccrac^{ä} träṅkäṣ päṣtam pä(ṣtam puro)h(i)t*, cf. MaitrHami XVI, 12 a 26-b 1 *antaran tägzinip supuspit* [27] *yimislikning taγdïn qapïγïnga yaqïn* [28] *barïr .. anta ymä waysirawani maxarač yäklär ur(u)ngutlarï birlä tägrik-*[20] *läp tngri tngrisi burxan*

qangïn tïda inčä [b 1] *tip tiyür .. tur tur purohit* "(Dann) wandte sich (der Purohita Brahmāyu) ... (von jenem Ort) um und ging nahe *zum nördlichen Tor des Supuṣpita-Gartens.* Dann aber hinderte Vaiśravaṇa, der Mahārāja, umgeben von Dämonen-Kriegern, den Vater des Göttergottes Buddha und sprach folgendermaßen: «Halt, halt, Purohita!» (...)" (edition and translation Geng Shimin and H.-J. Klimkeit, 1985, 87 and 108).

21. 3) A *koṃ-wmānt* (A 259 a 2) "west", cf. YQ 1.28 b 2 (ed. Ji Xianlin) *säs koṃ-ñkät wmāluneyaṃ yäṣ* "the sun is going down" ; abstract of a verb **wäm-*, subjunctive stem **wämā-*, cf. *pärkānt*, derived from the subjunctive stem *pärkā-* of *pärk-*. Maybe cognate with Toch. B *yäm-* "to enter", present stem *yänmask-* < **yäm-näsk-*, derivative *yenme* "door", cf. B PK NS 49 b 3 *kauṃ-yänmälle* "sundown".

22. In the episode of chap. XVI of *Maitrisimit nom bitig* quoted above (§ 20) the Brahmin goes successively to the four gates of the Supuṣpita garden, where the entrance is forbidden by one of the four Celestial Guardians: Dhṛtarāṣṭra (East) / Virūḍhaka (South) / Virūpākṣa (West) / Vaiśravaṇa (North).

MaitrHami XVI, 11 a 9-13 "In dieser Zeit erreichte der Hauspriester Brahmāyu, von zahllosen Myriaden von Menschen umgeben, das *östliche* Tor des Supuṣpita-Gartens" (l. 12 *öngtün qapïγïnga*).

MaitrHami XVI, 11 b 10-12 "Dann wandte sich der Hauspriester Brahmāyu von dort ab und erreichte das *südliche* Tor des Supuṣpita-Gartens" (l. 12 *kün ortudïnqï qapïγïnga*).

MaitrHami XVI, 12 a 18-23 "Ich bin der Virūpākṣa genannte Götterkönig, der Macht hat über die Drachen die vom Untergang der Sonne (l. 18 *kün batsïqtïnqï*) an die Städte und Länder behüten. Ich behüte das Tor des Göttergottes Buddha."

Cf. Geng Shimin and H.-J. Klimkeit, 1985, 86-87 and 106-108.

In Old Turkic texts, the most common sequences of the four main directions are: East-West-South-North, or East-South-West-North (cf. R. Arat, 1963, especially 193). The second sequence is used in this narrative.

23. A 259 a 2 *yäṣ koṃpärkāntac yäṣ ṣkārā koṃwmānt yäṣ ṣul(iñcäṃ kälymeyac?)* "he goes to the east, he goes back to the west, he goes to the north". Sequence: East - backwards West - North - (South).

Cf. Old Turkic *öngdün* [East =] "forwards" - *kidin* [West =] "backwards" - *yirdin* [North] - *birtin* [South] (*Türkische Turfantexte*, VI, 291).

24. A 379 b 4 *///koṃpärkāñcāṃ kälymyaṃ cami mäcriṃ koṃ[ṇṣ]ānt kälymentwaṃ ṣul(iñc-kälymyaṃ)*. The form *koṃ[ṇṣ]ānt* is corrected as

koṃ[tp]ānt by W. Winter and identified as "South" (1988, 780 sq.), so that *mäcriṃ* refers to "Southeast".

Sequence: East - South - West - North. A sequence: East - South - North - West is not documented in the Old Turkic documents, therefore *mäcriṃ koṃ[tp]ānt kälymentwaṃ*, refers to two directions, namely South and West. The problem resides in the presence of a second term for West besides *koṃ-wmānt*; if one reads *koṃ[-yp]ānt*, one gets a plausible designation with a derivative of the root *yäp-* "to enter", cf. PK AS 18 Ba 3 *kauṃ-yaptsi tänṫsi* "until sundown".

25. Toch. A *mäcriṃ* "South", cf. Old Turkic *kün-ortu* "mid-day", *ortu* "middle" ; derivative with suffix *-iṃ* (< CToch. **-äññæ*), cf. *oṅkriṃ*, *toriṃ*, *waṣtiṃ*, etc. **mäcär* < **m'äcäræ* < **medhi-ro-*, cf. **medh-y-o-* "middle" > Ved. *mádhya-*, Av. *maidiia-*, Gk. *μέσος*, *μέσσος*, Lat. *medius*, OHG *mitti*, etc.; superlative "middlemost" **medh-ṃ(m)o-* > IIr. **madhama-* > Av. *maδəma-*, transformed in Ved. *madhyamá-* "being or placed in the middle".

Tocharian B.

26. The decisive document is a wooden tablet from the Tokyo National Museum, Shiryokan (Archives), N° 174, known previously as "Otani 19.1" [photograph published in *Seiiki kōko zufu* (Tōkyō, 1915), vol. II, pl. 19]. The information of the *Catalogue* (Tokyo, 1971), on page 157, is scanty: «Inscribed tablet (Tokhala characters). / Ink on wood. 12.0 x 19.5 cm., thickness O,7 cm. / Perhaps Kucha.» This beautiful, albeit difficult, text (which probably goes back to the 7th or 8th c. CE) has remained until now in the dark.

Broad transcription:

1. mitrawarddhane ♦ wiryaśānti ♦ aryarakṣite ♦ kalyanamokṣe ♦ aryakoṣe ♦ satyarakṣite ♦ mi-
2. trasome ♦ śāntisene ♦ moko puttawarme ♦ ynaimyāṣṣi ketasa cāneṃ kamānte yältse
3. piś känte ♦ tāy[ä] saṅk<r>āmiññai ketāntse kom pirko[meṃ] ar[m]okiññe cake sim o-
4. motruññaiṣṣe yateññe ckeṣṣe ārte sim kom klāskomeṃ orotsa newiya sim
5. oṣṣa[X]lemeṃ armokiññe ckeṣṣe ārte sim orotsai newiyai tänṫsi ♦
6. kāyne ṣotri ṣecaki aṣkār lākāskemane

End of the document; the beginning, which should contain the necessary date, was written on another tablet. The document is obviously a contract for the sale of a piece of land. Tentative translation:

[1] "Mitravardhana, Vīryaśānti, Āryarakṣita, Kalyāṇamokṣa, Āryakoṣa, Satyarakṣita, Mi[2]trasoma, Śāntisena, Buddhavarman the Elder, [inhabitants] of Ynaimyā have received one thousand five hundred *cāne* (of money) for the estate. [3] Of this estate pertaining to the domain of the monastery (Saṅghārāma), on the east the boundary is the river Armoki; of [4] the south, the boundary is the arm of the river Yāte; on the west the boundary is the great canal; [5] on the north, the boundary is the arm of the river Armoki up to the great canal inclusively. [6] On the receipt the sign of a lion [is] seen on the reverse."

27. According to an usual procedure, the contract states explicitely the boundaries (Toch. B *sim*, borrowed from Skt. *sīmā-*) of the land in the four directions ; there are numerous examples in the Uighur contracts, cf. Nobuo Yamada, *Sammlung Uigurischer Kontrakte*, hrsg. von Juten Oda, Peter Zieme, Hiroshi Umemura, Takao Moriyasu (Osaka: Osaka University Press, 1993). The order of the description of the boundaries with reference to the four directions was usually: east/south/west/north; sometimes, east/south/north/west or north/east/south/west. In describing the boundaries, references are made to natural objects (road, watercourse, canal) and to others' estates.

28. - "east": B *kom-pirko* for *kauṃ-pirko* (see above, § 19) "sunrise".
- "west": B *kom-kläsko* for *kauṃ-kälsko* "sunset", final member from the verb *kälsk-* "to set, to go down", cf. abstract *kälskālyñe* "setting" of the stars.

29. - "south": adjective B *omotruññai-ṣṣe* "southerly, southern, of the south", based on the oblique sing. of **omotruñño* or **omotruñña*. Hilmarsson (1991, 132) proposes **æn+motruññai* (prepositional phrase), which I interpret as "to the right point, at ripeness, on the median" of the solar cycle, between rising and going down. For the derivation of **omotruñño/a*, compare B *kotruññe*, abstract derivative of B *kottär* "family" (Skt. *gotra-*). The basis for this would be an adverb **motär* < **mā-tṛ*, on the IE root **mā-* (**meH$_2$-*), cf. Lat. *mānus* "good", *mātūrus* "arriving in due time, ripe", OIr. *maith*, W. *mad* "good", etc.

30. - "north": B *oṣṣale*, prose form attested elsewhere, verse form *oṣle*, adjectival *oṣṣaleṣṣe*. The alleged meaning was given as "west, evening; westerly", cf. *TEB.* II, 177 ("abends"), but the meaning "north", and "northern" for the adj. *oṣṣaleṣṣe*, fits perfectly in all the contexts. The basic meaning seems to be "in the darkness", as shown by B 69 a 2 *oṣle pākre klainämpa kca treṅsate* "in secret and in public he clung to a certain woman" (Hilmarsson 1991: 147).

31. The parallelism between A *ṣuliñc* (cf. § 20) and B *oṣṣale* "north, northern" is obvious. Both are independently formed from the word for "mountain": A *ṣul*, B *ṣale*, provided that the basic meaning is "darkness", "dark side of the mountain"; also, "direction of the darkness" > "north". According to a previous suggestion of W. Winter (1988, 786 and 787), Toch B *oṣṣale/oṣle* is to be connected with B *ṣale* as Toch A *ṣuliñc* with A *ṣul*, and the approximative meaning would be "(pertaining to the direction) by the mountain". I agree with Hilmarsson's etymology (1991, 153 sq.), connecting A *ṣul*, B *ṣale* "mountain" < CToch. **ṣwälæ*, with the IE root **skew(H)* "to cover", which is reflected among others in Lat. *obscūrus* "dark", OIcel. *ský* "cloud", *skuggi* "shadow". But I would not insist on this point in the present context.

32. This connection between "darkness", "mountain" and "north" is akin to the facts of the Altaic languages: 1) peculiar to Uighur: *taγdïn* "on, or to the north" (lit. "the mountain"), derivative from *taγ* "Berg, Gebirge ; Norden" (A. v. Gabain 1974: 366), cf. Clauson 1972: 463 and 467. 2) more widespread *yïr* (*ïr*) 'the north' ; "it may originally have had some concrete meaning like *kuz* 'the shady side of a mountain', hence 'north', but if so it is lost." (Clauson 1972: 954). 3) *kuz* "the northern side of a mountain seldom reached by the sun" ; base of the word Az. *ğuzey*, Osm. *kuzay/kuzey*, Tkm. *ğuzay* "north, northern" (Clauson 1972: 680).

33. The ancestors of the Tocharians did not use the terminology known from Indo-Iranian and from other Indo-European languages (cf. Schrader-Nehring, t. I, 500 sq. ; Buck, 1949, 870-873). Apart from the reference to the position of the sun, the terms reflect directly the orientation of the speaker facing the sunrise. "East" = "before, in front" ; "West" = "behind" ; "North" = "upper region", or "left" ; "South" = "sunny region" or "right". But the lexical connection of "north" with "mountain" does not give evidence of the Common Tocharian homeland. The concept is not objective, reflecting local and natural conditions, but rather cultural or mythical, as in the Altaic domain. As Prof. Denis Sinor puts it, the semantic link between "mountain" and "north" is "the reflection of a very old concept which places a high mountain range in the extreme north of the world" (1990: 296). This conception of the Altaic cosmology was also known to the Tocharian speaking peoples. For the moment, we should be content with such a limited assertion.

IV. "Land" as "pasture".

34. B *yapoy* A *ype* "land" , plural B *ypauna* ; the plural A *ypeyäntu* is

secondary, with a productive plural suffix.

B *yapoy* nominative = oblique sg., *yäpoy* MQ (B 123 a 6), B genitive sg. *ypoyntse, ypoytse* < **yäpóy-ntse* ablative sg. *ypoymeṃ* (*yipoymeṃ*) < **yäpóy-meṃ* locative sg. *yápoy-ne* or *ypóy-ne*. B *yápoy* < **yäpāy*, plural **yäpā* contracted from **yäpāyā*, whence **yäpā+unā* (extracted from the *u*-stems) > *ypauna* (Hilmarsson 1988: 39 sq.). In search of an analysis, one can take into consideration the possibility of mutual substitution *p/w* (*TEB.* I, 69).

35. Previous etymologies: 1) From the root *yäp- /yäw-* "to enter" (Van Windekens, 1976, 606). 2) Connected with Toch. B *yap* "barley" (Watkins, 1978, 165), but IE **yewo-* > CToch. **yäpæ* > B **yape*, therefore *yap* is preferably borrowed from Skt. *yava-* idem, or from Middle Iranian. Cf. Hom. φυσίζοος αἶα (Katz 1974: 165): another case of transferred epithet. Objection: this cereal is only one among others in the Kuchean economical documents, and does not have any special pre-eminence. If the term was borrowed, the derivation proposed seems impossible. The generic term for "grain, cereal" is B *śātre* "means of life" (root *śāy-/śāw-* "to live"). 3) Locative phrase **en-bhuH-i* "dwelling place" > "land" (Hilmarsson 1988 and revised 1991: 183 sq.). 4) **ep-ouden*, plural **ep—oudneH₂* "on the earth", cf. Gk. οὖδας, Hitt. *utnē*, etc. (Adams 1990: 74 sq.).

36. None of those proposals meets the requirements of semantics and morphology. I propose a connection with the root **HyewH-* "weiden", well-known in Indo-Iranian: Ved. *yūthá-* nt. "Herde" (RV +), *gáv-yūti-* fem. "Weideland, Rinderweide" (RV +) = Av. *gaoiiaioiti-*; adj. *áyavasa-* "ohne Weide", *sūyávasa-* "mit guter Weide" (both RV +), pointing to the initial laryngeal in the neuter **(H)yavas-* "Weide". IE **HyuH-ti-* > IIr. **yūti-*, IE **HyewH-e/os-* > IIr. **(H)yawas-* (cf. Mayrhofer, *EWAia.* I [Lief. 7, 1990], 481).

37. We may reconstruct a proterokinetic *i*-stem **(H)yewH-i-/*(H)ywH-ey-* "pasture"; first allomorph gives directly **yäwāy*; second allomorph would also give **yäwāy-* provided that the second laryngeal was **-H₂-*, by an intermediary stage **(H)ywHay-*. Plural **yäpāyā* < collective **Hyäway-a* < **HyewH-y-H₂*, with analogical preservation of laryngeal before yod at IE stage.

38. Imagine a possessive adjective of a very common type in Tocharian: **y(ä)wāy-tstsæ* "having a land", plural **y(ä)wāy-cci*, cf. B *kokale-tstse* "provided with a chariot"; this would be close enough to Tocharian **Ywati*, presupposed by E. G. Pulleyblank as the source of Yuèzhī < Early Middle Chinese *ŋuat-tɕiă* (1962: 93-94; 1995: 425), cf. also *Ἰάτιοι* (Ptolemy). There were probably Tocharian speakers among the Yuezhi tribes who later became Iranized. This etymology

provides the best link so far between the Tocharians and the Yuezhi (Yüeh-chih: Mathews n° 7696a). Victor Mair has pertinently asked me about any evidence for the word *yabgu* "chief, ruler, leader" in Tocharian texts. Since Josef Marquart, *yabgu* has been considered as one of the few Yuezhi words that have survived; it is reflected by several loanwords in different languages of Central Asia: Bactrian *zaooo*, Gk. *ζαοου*, Prakrit *yavuga-*, *yaüa-* (cf. Humbach 1966: 24-28; Davary, 1982, 297), OT. *yabgu* "hoher türkischer Titel" (cf. Clauson, 1972, 873 ; Doerfer, 1975, 124-136). In Tocharian, the only trace of this word that I am aware of is Toch. A *yāppäk* in a fragment which is kept in the Musée Guimet (Paris), but this is not a genuine Tocharian word since Toch.*yāppäk* is in the context of the fragment the title of a Uighur donor ; therefore, Toch. A *yāppäk* is borrowed regularly from T. *yabγu*; as we have seen before (§ 10), the common terms for "chief, ruler" in Tocharian are totally different. Returning to our last point, the designation of the "land" as "pasture" would be quite expected in the mouth of people whose ancestors were pastoral nomads.

Conclusion. Several items of the Tocharian lexicon point to the closeness of the ancestors of the Tocharians to other peoples of the steppes, nomadizing on the ranges to the north and west of China. The Tocharian speakers were members of a cultural continuum that included the Altaic peoples. One can add further examples of mutual influence between Tocharian and Altaic, and of common influence from the Chinese side (the cycle of Twelve Animals, for instance, used as a popular calendar). This cultural dimension fits well with the isolation of the Proto-Tocharians from the other Indo-European-speaking peoples.

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On the History and Significance of Some Tocharian B Agricultural Terms

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0. In his contribution to this volume, Georges Pinault has published for the first time an important, short Tocharian B text[1]. The document would appear to be a contract whereby a group of men, presumably monks, inhabitants of Ynaimya (a monastery?), are engaged in selling a tract of land, either as owners or trustees. The relevant portion of the document is given below (with Pinault's translation altered in a few places so as to more nearly match the Tocharian B word-order):

> *[NAMES] ynaimyāṣṣi ketasa cāneṃ kamānte yältse-*
> *piś-känte tāy sank<r>āmiññai ketāntse kom-pirkomeṃ armokiññe cake sim o-*
> *motruññaiṣṣe yateññe ckeṣṣe ārte sim kom-kläskomeṃ orotsa newiya sim*
> *oṣṣalemeṃ armokiññe ckeṣṣe ārte sim orotsai newiyai tänṭsi*
>
> "[NAMES] [inhabitants of] Ynaimya for the estate have received one thousand
> five hundred *cānes*. Of this estate [pertaining] to the monastery, on the east the boundary [is] the Armoki river;
> of the south the boundary [is] the arm of the Yāte River; on the west the great canal [is] the boundary;
> on the north, the Armoki River are [is] the boundary, up to the great canal"

The document is of particular interest to Pinault because, in describing the boundaries of the parcel of land, it makes very clear reference to the cardinal directions, removing any ambiguity there may have been in our knowledge of them. However, the document also presents us with three, heretofore unknown, words dealing with agriculture: *keta*, *newiya*, and *ārte*. The first word refers to the parcel being sold and Pinault translates 'estate'. The second word, in the phrase *orotsa newiya*, is pretty obviously 'canal' (and the phrase '± great canal'). The Great Canal and the Armoki River form the western and eastern boundaries of the parcel respectively. The northern and southern boundaries of the parcel are the Armoki River *ārte* and the Yāte River *ārte* respectively. Pinault suggests a translation of 'branch' (thus the 'branch of the Armoki River') for *ārte*. Let's look at all three of these words for what they might tell us about Tocharian B's

[1]Tokyo National Museum, Archives, No. 174.

agricultural terminology and its history.

1. *Keta* (whose underlying shape is *ketā*, cf. the genitive *ketāntse*) obviously refers to a type of land. Pinault's 'estate' would do, as would translations on the order of 'farm' or 'field'. Since the parcel's price is measured in *cānes* (a word borrowed from an Old Chinese word whose modern Mandarin form is *qián*, a monetary unit that at least in recent centuries has not been exceptionally valuable), it may be that a smaller unit of land rather than a larger one is intended here. I would suggest that we might have here a derivative of *kät-* 'scatter (to some purpose), sow' and a meaning of '± seed-land, grain-field', much as Greek *spórima* (pl.) 'grain-fields' derives from *speírō* 'sow'. Morphologically it would be a derivative like Greek *tomḗ* 'place where something is cut off, stump of a tree'. Since the word does not show the effects of *ā*-umlaut (whereby it would have been */kātā-/), a process which was active about the end of the Proto-Tocharian period (Adams, 1988:24- 25), this word must be a creation of Tocharian B itself, but one created by an inherited morphological process. More interesting for their possible external connections are the other two words.

2. *Newiya* is obviously 'canal' and almost as obviously is originally a borrowing from Eastern Iranian. Throughout Indo-Iranian we have reflexes of a Proto-Indo-Iranian **naHwíya-* '± boatable' (that is, 'deep enough to allow a boat or require one [i.e. too deep to wade])', a regular derivative of Proto-Indo-Iranian **naHu-* (PIE **neh$_a$u-*) 'boat' (earlier probably 'hollowed out log'). By unexceptional semantic development it came to mean 'navigable' (Old Persian, Avestan, Sanskrit) or 'deep' (Avestan in *āfš nāvayā*[2] 'water channel', Sogdian *n'ywk* 'deep'[3]). It was nominalized as 'deep river/water' in Sogdian (unattested there but almost certainly reflected by borrowing in TochA *new-* (m.) '[deep] running water, flood'), and in Sanskrit *nāvyā-* (f.) 'navigable river'. The Avestan phrase *āfš nāvayā* 'water channel' may show the route whereby it could also be nominalized as 'channel, canal', a development seen in Sarikoli *wanɛw* 'irrigation ditch' (from a Proto-Iranian **wi-nāwiyā*, cf. *wanɛw čɛygow* 'to irrigate').

Another possibility is that the meaning 'irrigation canal' derives from an even earlier meaning of **naHwíya-*, namely 'pertaining to a hollowed out log'. That meaning is seen in the Nuristani languages, e.g. Ashkun *nō* ~ *nāwa* 'mill-race', Kati *nũ* 'mill-race, aqueduct

[2]The expected shape of the Avestan word would be *nāv(i)ya-*, a form actually found in some manuscripts.

[3]K. T. Schmidt (1987:164ff). The Sogdian, not unexpectedly given its propensity for metathesis, reflects **naiwa-* rather than **nawya-*.

consisting of hollow logs', or in the Dardic Khowar *nā* 'mill-race, aqueduct consisting of hollow logs'. This second possibility is strengthened perhaps by the repetition of the development *'something hollowed out' > 'irrigation canal' seen in the relationship of New Persian *xan* 'hold of a ship' and Yagnobi (the descendant of Sogdian) *xan* 'irrigation canal'.[4]

The form of TochB *newiya* does offer some difficulty. A Proto-Iranian **nāwíyā* should have given TochB **nāwíyā* (written **nawiya*). TochB *newiya* suggests a pre-form **nawíyā*. However, various east Iranian languages show variable shortening of **ā* before a resonant followed in turn by a vowel (Gershevitch, 1961, pp. 16-17, § 121-124) and it may be that Tocharian made the borrowing from a variety of East Iranian where this shortening had taken place in this word. It may be worth noting that another derivative of this root, the word for 'sailor', is Avestan *navāza-* and Sogdian *nw"z-* (compare Parthian *nāwāza-* 'sailor' without shortening).

3. The third new word, *ārte*, clearly would seem to denote some sort of watercourse, one that is subsidiary in some sense to both the river and the Great Canal. As we have seen, Pinault suggests 'branch (of a river)'. Such a translation would make perfect sense here but it is not the only one possible. *Ārte* cannot be derived from any known Tocharian root[5] and thus we gain no semantic or etymological insight from that source. However, if we think of the possibility of an Iranian source it is difficult to separate *ārte* from the three Khufi words, *wurδ/wūrδ* 'irrigation canal carried across the unevenness of the country on top of a stone causeway'[6], *arδān* 'embankment between irrigation canal and field', *arδo^{a}n* 'opening in this embankment for letting water flow into the field' [7], which reflect putative Proto-Iranian **árda-*, **ardánā-*, and **ardána-* respectively.[8] Tocharian B *ārte* is probably what one would expect of an early borrowing from an Iranian **arda-* and thus it is extremely tempting to equate the two

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[4]The Sogdian-Yagnobi word has been borrowed by Uzbek as *xan* 'irrigation canal'. Iranian *xan*, of whatever meaning, reflects a derivative of Proto-Iranian **xan-* ~ **kan-* 'dig, hollow out' (cf. Sanskrit *khan-* 'dig'). One might also compare Sarikoli *čenāk* 'irrigation canal', a derivative of Proto-Iranian **kan-*.

[5]The only phonologically possible roots would be *ār-* 'cease' or *ārtt-* 'love'.

[6]The *-u-* is the regular development of a Proto-Iranian **-a-* in Khufi when in a stressed but closed syllable and followed by a (lost) **-a-*. The Khufi *w-* is prothetic as in the phonetically similar *wūvd* 'seven' from Proto-Iranian **hapta.*

[7]The initial *a-* in the latter two Khufi words is the regular development of PIE **-a-* when pretonic and in a closed syllable.

[8]That these Khufi words might be more widely distributed in the Pamir Iranian languages is quite possible. Our knowledge of the technical vocabularies of these languages is quite spotty.

words and translate the Tocharian B *ārte* as '(raised) aqueduct', '(raised) feeder canal' or the like. Given the meaning of the Iranian **arda-* it is hard to resist relating it to the PIE **h₂erd-* 'high, lofty' that otherwise appears in Latin *arduus* 'steep, towering, lofty', Old Irish *ard* 'high, great', Hittite *harduppi-* '± high' (Puhvel, 1991:203), and considering the Tocharian B word a borrowing from Iranian. Relating Tocharian B *ārte* to **h₂erd-* directly is less likely since, in that case, we might expect a Tocharian B ***ār(r)e*. In any case, the triad of morphologically connected words in Iranian looks to be more original than the apparently isolated Tocharian B word.

4. It seems significant that both of the two words we know in Tocharian B that deal with irrigation technology have probable (*ārte*) or certain (*newiya*) Iranian etymologies. The most reasonable explanation for that state of affairs is that Tocharian borrowed the words along with the technology from Iranian speakers. Since agriculture in the Tarim Basin is utterly dependent on irrigation, this is an important piece of "technology transfer" and might be presumed to bear on the relationship of the prehistoric Iranians and Tocharians. In the absence of any firm data, a number of possible scenarios concerning this relationship might be imagined. I think the following are the most likely. As a first possibility we may envision Eastern Iranians practicing irrigation agriculture as resident throughout the Tarim Basin. At some point in prehistory the (largely pastoral?) pre-Tocharians[9] entered the basin from the north, adopted irrigation technology and its attendant vocabulary from the Eastern Iranians, and linguistically assimilated them in the northern and eastern parts of the basin (much as in the same fashion the Uighurs linguistically replaced both Tocharians and Eastern Iranians at the end of the first Christian millennium), but not in the southern parts of the basin. Secondly, it is possible that the Tocharians entered the Tarim Basin from the north at about the time the Eastern Iranians were entering from the southwest and that they met more or less along the line where we find the historically attested division and that the Tocharians borrowed irrigation and vocabulary from the Eastern

[9]The pre-Tocharians were certainly not ignorant of agriculture. Due to the nature of the preserved texts we do not know many details of Tocharian agricultural terminology; however, we have TochAB *āre* 'plow' from PIE **h₂érh₃os* (a *nomen agentis*, 'the plower', from **h₃erh₃-*, Anatolian **h₃er(h₃)-s-*, rather than the more usual *nomen instrumenti*, **h₂érh₃trom*, cf. Greek *árotron* 'plow'), TochA *turs-ko* 'draft ox' where the first part of the compound is related to Hittite *tūriya-* 'harness' and Sanskrit *dhúra-* 'yoke, pole' from PIE **dhurh$_x$-* 'harnessing', TochA *wsār* 'grain', TochB *ysāre* 'grain; wheat' from PIE **we(r)sōr-o-*, a derivative of **wers-* 'harvest' as also in Hit *warsi* 'harvests' or OCS *vrěsti* 'to thresh', or TochAB *räp-* 'dig, plow' from PIE **drep-* as also in Hittite *teripp-* 'plow'. The agreements with Anatolian are remarkable.

Iranians at this line of contact. Thirdly, it is possible that the Eastern Iranians entered the basin from the southwest at about the same time the Tocharians were entering from the northwest, the latter having had a previous (brief?) contact with other Eastern Iranians in what is now eastern Kazakhstan where they borrowed irrigation and its terminology. The other presumptive possibility, that the intrusive Iranians found the Tarim Basin inhabited by Tocharians and introduced irrigation agriculture to them, would seem to be ruled out by the virtual impossibility of agriculture without irrigation in the basin.

For the same reason that we can rule out this last possibility, the second hypothesis, that the pre-Tocharians and the Eastern Iranians entered the Tarim Basin at approximately the same time, is rendered most unlikely: we have no way of explaining how the pre-Tocharians "made their living" in the basin before they met the Iranians and adopted irrigation. Neither the first nor third hypothesis suffers from this particular problem. Nevertheless, the first hypothesis (that the pre-Tocharians found Eastern Iranians already throughout the Tarim Basin) does not offer a good explanation as to why we find two archeologically distinct populations in the Tarim Basin, a 'Proto-European' one in the north and an 'Indo-Afghan' (= 'East Mediterranean') one in the south.[10] Nor does it fit well with Hiebert's observation (1996) that irrigation agriculture is known from 2200 BCE in western Central Asia and is found in Xinjiang from 2000 BCE onward, but in conjunction with an archeological culture distinct from that found in western Central Asia.[11] However, both the skeletal material and Hiebert's acheological data do match the third of our hypotheses whereby the pre-Tocharians enter the Tarim Basin from the northwest after a brief period of contact with Eastern Iranians in western Central Asia.

Thus the historical scenario suggested by this evidence is one where the pre-Tocharians enter the Tarim Basin about 2000 BC from the northwest, bringing with them a knowledge of irrigation learned from some, presumably peripheral, group of Eastern Iranians in Western Central Asia. The most likely location for this interaction is perhaps the lower Ili Valley, in the contemporary Kazakhstan regions of Alma Ata and Taldyqorghan. From their starting point in the Ili

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[10]Mair (1995:290) provides an excellent map (after Han, 1994) that shows very clearly the presence of a Proto-European population along the northern edge of the Tarim Basin, ending at Lop Nor, and a Mediterranean one along the southwest margin of the basin, also ending at Lop Nor, where both populations are found.

[11]I am indebted to James Mallory for providing me (p.c.) with a summary of an earlier article by Hiebert on this topic, published in Russian and unavailable to me, that outlines the same hypothesis concerning the origin of (irrigation) agriculture in Xinjiang.

Valley, the (pre-) Tocharians then spread to the Turfan Depression (and beyond, all the way to Hami, if the skeletal evidence for a Proto-European population can be equated with Tocharian speakers) and throughout the land adjacent to the Tarim River, all the way to Lop Nor where they ultimately met and mingled with Eastern Iranians who had settled along the southern margin of the Tarim Basin.[12]

Trying to trace the location of the pre-Tocharians before 2000 BCE is of course most speculative at this point, even if one agrees with the scenario outlined above. However, a location for the pre-Tocharians in eastern Kazakhstan in the closing years of the third millennium BCE would at least increase the likelihood that they were descendants of the bearers of the Afanasievo Culture on the upper Yenisey earlier in the third millennium or descendants of the bearers of what we might call the "wider Afanasievo culture area" witnessed by Afanasievo-like finds in the Tobol drainage of southwestern Siberia or on Karaganda in north central Kazakhstan (Mallory, 1989:225-226).

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[12]The scenario outlined here was independently suggested by James Mallory (p.c.). It should be pointed out that in conjunction with discussions concerning the Xinjiang mummies, it has often been noted of late that the Karoshthi Prakrit which provided the official language of Kroraina (= Loulan) to the west of Lop Nor contains evidence of a Tocharian substratum (i.e. 'Tocharian C'). So it does. There are a number of obviously Iranian words in the Karoshthi Prakrit as well. Thus we have both linguistic and skeletal evidence for an originally ethnically mixed population in Kroraina. Rarely do the two kinds of evidence lead so obviously to the same conclusion.

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Tocharian Loan Words in Old Chinese: Chariots, Chariot Gear, and Town Building

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In this paper I am going to present the first results of a long-term project, which started a few years ago, when my colleague George van Driem, a specialist in the field of Sino-Tibetan linguistics, asked me to look for possible Indo-European (*in casu*, Tocharian) loan words in Old Chinese. We have known for 80 years (since Polivanov 1916) that the Chinese word for honey is likely to be of Indo-European, probably Tocharian, origin:

Chin. *mì* 蜜 'honey' < EC *mjit* < OC **mjit*/**mit*
Toch. B *mit* 'honey' < PToch. **m'ət-* < PIE **med*^{h}*u-*.

The question is whether there are more Tocharian loan words that can be discovered in the Old Chinese vocabulary.[1]

As a starting point, I have used the magnificent book on Old Chinese phonology by William H. Baxter (1992). On the one hand, this book gives an account of the ways in which Old Chinese phonology can be reconstructed and presents the newest insights on the matter, being a synthesis of important studies by Pulleyblank, Jaxontov, Li, Bodman, and Starostin, who have pursued the pioneering efforts of Karlgren. On the other hand, Baxter has proposed several important improvements for the reconstruction of Old Chinese and presented a coherent phonological system.[2] Most important for our purpose, however, is the fact that this book contains a corpus of more than 2,000 reconstructed Old Chinese words. In Appendix C of his book, Baxter presents the reconstruction of the rhyme words of the *Shījīng* "Book of Odes", a collection of Old Chinese poetry, the oldest portions of which are considered to date to the beginning of the first millennium BCE, although the collection as

[1]Other possible Chinese loan words from Tocharian, discussed by Pulleyblank on several occasions (e.g. Chin. *shīzǐ* 獅子 'lion'—Toch. B *ṣecake*, Pulleyblank 1962: 109, 226, 1995: 427f.; Chin. *yāngkuì* 央匱 'asafoetida'—Toch. *aṅkwaṣ*, Pulleyblank 1962: 99 with ref.), concern *Wanderworte*, of unknown etymology, so that their Tocharian provenance cannot be ascertained.

[2]I would like to stress that, in spite of the ongoing debate concerning particular points, there is a great deal of consensus about the principles and the results of the reconstruction of Old Chinese. To my knowledge, the disagreement among scholars does not affect my study in any significant way.

a whole was reedited toward the end of that millennium. In the case of the *Shījīng*, we have a corpus limited to a certain degree in time and space, which has clear methodological advantages. In addition to the rhyme words of the *Shījīng*, I have made use of the Old Chinese reconstructions mentioned by Baxter in the main text of his book. All in all, the Old Chinese corpus in which I have been searching for Tocharian loan words consists of some 2,400 words.[3]

Meanwhile, work on Old Chinese reconstruction has continued, and as Professor Baxter told his audience during a mini-course in Leiden (summer 1995), the reconstruction can now be refined in some respects.[4] I have given his new reconstructions after a slash.

Tocharian, the easternmost representative of the Indo-European family, is attested in two dialects or languages, known as Tocharian A and Tocharian B. The bulk of the texts composed in Tocharian is religious literature, almost entirely of Buddhist origin. This fact greatly influenced the attested Tocharian vocabulary, only a small portion of which consists of terms pertaining to everyday life. Even a quick look at the Tocharian vocabulary reveals that we are dealing with literally hundreds of loan words from Sanskrit, Prakrit, and Iranian, so that the inherited lexicon is rather limited. On the contrary, the poems of the *Shījīng* are of a non-religious nature, abounding in descriptions of nature and everyday life. It is therefore *a priori* to be expected that the amount of demonstrable loan words will be small.

Another point which hampers the comparison is that of chronology. The Tocharian texts were probably written in the period between the 6th and 8th century CE. Even by reconstructing Proto-Tocharian, we presumably cannot reach beyond the 4th century BCE. This means that there still is a considerable gap between the period of possible contacts of Tocharians with the Chinese and the reconstructed Proto-Tocharian. Here, some help can be obtained from the Indo-European comparison, since we generally know what the original form must have looked like.

Looking at the Old Chinese vocabulary through the glasses of an Indo-Europeanist involves various methodological dangers. A very large proportion of Old Chinese words is monosyllabic. There are limitations on possible syllable onsets and, especially, codas. This means that the number of possible syllable structures is not very high, the more so as voicedness, aspiration, and nasalization of the initial

[3]If the Old Chinese reconstruction is given below without any reference, it means that the word can be found in Appendix C (The rhyme words of the *Shījīng*) of Baxter's book. Otherwise, I give the number of the example in the body of the book. Baxter's *Handbook of Old Chinese Phonology* is simply referred to as "Baxter".

[4]The changes are largely notational: in particular, Baxter writes *i* as *ə* and interprets the contrast of *CjV* vs. *CV* as *Cṽ* vs. *CṼ*.

consonants can be due to original prefixes. If we then tolerate rather loose phonetic and semantic correspondences, we might find an Indo-European parallel for practically every Chinese word. The large amount of look-alikes makes a very strict methodology indispensable. I have used three criteria in order to distinguish between probable loan words and simple look-alikes:

A. The Old Chinese and Tocharian words must match both semantically and phonetically. This rather obvious criterion makes me reject, for instance, the often proposed borrowing of Chin. *niú* 牛 'ox, cow, cattle' < EC *ngjuw* < OC **ng^{w}ji/*ng^{w}i from PIE *g^{w}ou- / g^{w}eH$_3$u-* (Toch. B *kau**, A *ko* 'cow'). These words have only one phoneme *g^{w} in common, which seems insufficient to me.

B1. The Old Chinese word must be isolated in the sense that it has no other cognates than Tibetan. This criterion is based on new insights concerning the dialectal position of Chinese (cf. van Driem 1995). For instance, the connection of Chin. *quǎn* 犬 'dog' < EC *khwenX* < OC **k^{w}hi/ en?/*k^{w}hi/ ēn?* with Toch. AB nom.sg. *ku*, obl. B *kweṃ*, A *koṃ* 'dog' < PToch. nom.sg. **ku*, obl. **k^{w}en* is improbable, in spite of a pretty good phonetic resemblance, because the Chinese word has a Tibeto-Burman etymology (cf. Benedict 1972: 44, who reconstructs **kwiy*).

B2. As a corollary, the Tocharian word must have a good Indo-European etymology. For instance, I am reluctant to assume a Tocharian loan word in the case of Chin. *yíng* 營 < EC *ywieng* < OC **wjeng/ weng* 'to lay out, plan' (cf. Toch. B *wärik-* 'to prepare'), since the latter lacks an Indo-European etymology.

C. The OC word must belong to a semantic field which is liable to borrowing, e.g. artifacts, social institutions, etc. Consider, for instance, the following OC word family:

Chin. 兌 *duì* 'to open a passage through, clear' < EC *dwajH* < OC **lots/ lōts*
Chin. 奪 *duó* 'take away, deprive' < EC *dwat* < OC **lot/ lōt*
Chin. 閱 *yuè* 'opening, hole' < EC *ywet* < OC **ljot/ lot*[5]

[5]Chin. 脫 *tuō* 'to take off, let loose' < EC *thwat* < OC **hlot/*hlōt* (Baxter, no. 957),

Chin. 脫 *tuì* 'easy, leisurely' < EC *thwajH* < OC **hlots/*hlōts* (Baxter, no. 958), etc. probably also belong here. Pulleyblank 1962: 116, 1973: 116-7, Bodman 1980: 103f. compare Tib. *glod* 'loosen, relax, comfort, cheer up', *lhod, glod, lod* 'loose, relaxed, easy, unconcerned', WB *hlwat* 'free, release', *klwat* 'taken off', *khlwat* 'to take off', *hlwat* 'free', L *flyát, flyót* 'relax, loosen'.

It may appear tempting to connect Toch. AB *lut-* 'to remove, drive away', B *lyauto* 'opening', A *lot* 'hole', cf. also A *lyutaṃ* 'ravine, chasm', B *laute* 'moment, period' (= German 'Abschnitt'), but, in my opinion, at the present stage of our knowledge about Sino-Indo-European contacts, this connection does not deserve serious consideration. This is not to say that words of this semantic category cannot be borrowed—for instance, German *Bresche*, Dutch *bres*, Russian *breš'* 'breach' are all borrowed from French *brèche*, which, in its turn, has been borrowed from Germanic (cf. German *brechen* 'to break')—, but in view of the situation sketched above, when an Indo-European etymology can easily be found for practically every Old Chinese word, we must first refrain from comparing words from the basic vocabulary.[6]

In my paper I shall concentrate on two semantic fields, viz. 'chariots, chariot gear' and 'town building'. There is ample archeological and historical evidence that chariots and fortified towns came to China from the West (see various archeological contributions to this volume and the bibliographies attached to them), so that it is conceivable that the Chinese terminology for chariotry and fortification has been borrowed from an Indo-European language.

Chariots and chariot gear

(1) Chin. 乘 *shèng* 'chariot (with four horses)' < EC *zyingH* < OC **Ljings/*Ləngs*
Toch. B *kleṅke*, *A klaṅk* 'vehicle, Skt. *yāna-*, *vāhana-*', Toch. AB *klāṅk-* 'to ride, travel (by vehicle)', PIE **kleng-* (cf. Modern German *lenken* 'to guide, conduct', *Wagenlenker* 'charioteer').

The Chinese word is clearly a derivative of *chéng* (same character) 'to mount, ride (in a chariot)' < EC *zying*, which may be reconstructed as OC **Ljing/*Ləng* (as this word is not attested among the rhymes of the *Shījīng*, it is not discussed in Baxter's book). The symbol of the notation **L* in Baxter's reconstruction refers to an unclear initial **l-* cluster which yielded EC *zy-*. It has been pointed out to me by several participants of the conference, however, that this cluster can hardly be OC **kl-*. The reconstruction of the Old Chinese initial **l-*clusters is not easy. Baxter (232ff.) essentially follows Bodman (1980: 108-13, 143-145, 168-171), who assumes **l-*clusters of two types for Proto-Chinese (a stage intermediate between Proto-Sino-Tibetan and Old Chinese). In one type, written ***Kl-*, medial ***l* behaves like medial **r*, so that **l-*

[6]Note, incidentally, that this Chinese word family has cognates in Burmese (see note 5) and in the Kiranti languages, e.g. Limbu <*lɔtt*> 'to take away, remove', which means that this comparison does not stand the test of criterion B either.

clusters of this type had presumably already merged with **r*-clusters by the Old Chinese period. In the other type, written with a hyphen as ***K-l*, the vocalism appears to be unaffected by the medial **l*, but the cluster shows a dental reflex (**k-l-* > *t-*, **kh-l-* > *th-*, **g-l-* > *d-*). The phonetic difference between the two types is unknown. What is more important for our purpose is that the phonetic realization of the second type of the **l*-clusters in Old Chinese is also unclear. At any rate, it does not seem unreasonable to assume that, at the time of borrowing, Old Chinese no longer had initial **kl-*, so that the Tocharian initial cluster was replaced by the phonetically closest equivalent.

(2) Chin. *gǔ* 轂 'nave of a wheel' < EC *kuwk* < OC **kok/*kōk*
Toch. B *kokale*, A *kukäl* 'chariot', PIE **k^{w}ek^{w}lo-* 'turning point, wheel' (Skt. *cakrá-*, OE *hweohl* 'wheel', Gr. κύκλος 'ring, circle, wheel', Lith. *kāklas* 'neck', etc.).

The original meaning of the Tocharian word is undoubtedly 'turning point, wheel'. The semantic correspondence with the Chinese word may seem rather loose, but in the Indo-European languages 'wheel', 'nave of the wheel', 'navel', and 'wagon' are often expressed by the same word, cf. Toch. B *kele* 'navel < turning point' (PIE **k^{w}ol(H)o-*) next to Gr. πόλος 'turning point, axis', OIr. *cul* 'chariot', and, probably, OCS *kolo*, gen.sg. *kolese* 'wheel'.

If this comparison is meaningful, the *o* in OC **kok/*kōk* clearly points to the Tocharian provenance.

(3) Chin. *fú* 輻 'spokes of a wheel' < EC *pjuwk* < OC **pjik/*pək*
Toch. B *pwenta* (pl.) < PToch. **pəw- < *puH-* 'spokes of a wheel', cf. Skt. *paví-* 'felloe' < **peu̯(H)-i-*.

According to Bodman (1980: 125ff), OC **-k* may reflect both **-k* and **-ʔ*: "by the time of the Odes, glottal stop had already merged with OC -k as we can tell by poetic rhyming". It is therefore conceivable that **-ʔ* reflects an Indo-European laryngeal.

(4) Chin. *guǐ* 軌 'wheel-axle ends' < EC *kuwjX* < OC **k^{w}rjuʔ/*k^{w}ruʔ*
Chin. *kuí* 逵 'thoroughfare' < EC *gwij* < OC **g^{w}rju/*g^{w}ru*
Toch. B *kwarsär*, A *kursär* 'league, mile; vehicle, means of salvation', translating Skt. *yojana-* and *prayojana-* < PToch. **k^{w}ärsär*.

The Tocharian word is likely to be related to Lat. *currus* 'chariot', *cursus* 'course', etc. (for a discussion of the Indo-European reconstruction see Hilmarsson 1996, s.v. *kwarsär*). The position of *-r-* of the Chinese words is unexpected, but it must be borne in mind that the Old Chinese syllable probably had no final *-r*.

(5) Chin. *zhōu* 輖 'carriage pole' < EC *trjuw* < OC **trju*/**tru*
Toch. A *tursko* 'draft-ox' (?), Skt. *dhúr-* 'carriage pole', Hitt. *tu-u-ri-ia°* 'to yoke' < PIE **d*^{h}*ur*(H_1)-.

Toch. A *turs-ko* was interpreted as 'draft-ox' by Schmidt (1987: 294f.), but this word is only attested in a fragment without sufficient context, and various details of the reconstruction remain unclear. Note again the metathesis of *-r-* in the Old Chinese word.

(6) Chin. *kuò* 鞹 'leather' < EC *khwak* < OC **k*^{w}*hak*/**k*^{w}*hāk*
Toch. A *kāc* 'skin, hide' < PToch. **k*^{w}*ac-* < PIE **kuH-ti-* (Lat. *cutis*, Olc. *húð*, OE *hýd* 'skin, hide'). For the etymology see Hilmarsson 1985.

Although the Chinese word is glossed as 'leather' in the dictionaries, its oldest attestations always refer to chariot vocabulary (Schuessler 1987: 359): leather harness, front-rail casing for a carriage, screen. Therefore, the connection with Tib. *kog-pa*/*skog-pa* 'rind, shell', Burm. *ə-khok* 'tree bark' (Coblin 1986: 134) seems less probable.

It is important to point out that the development of PIE **uH* to **wa* is only attested in Tocharian.

(7) Chin. *è* 厄 'part of a yoke' < EC *ʔæk* < OC **ʔrek*/**ʔrēk*

According to Schuessler (1987: 145), the Chinese word refers to a metal yoke-ring. The purpose of this ring is not quite clear, but a reasonable guess is that the reins went through it to the horse bits. It is therefore tempting to connect OC **ʔrek*/**ʔrēk* with the Indo-European root **H*$_3$*reg-* 'to make straight, to steer' (Gr. *ὀρέγω*, Lat. *regō*, etc.). In Tocharian, this root is reflected in AB *räk-* 'to stretch, spread', and in the personal name B *Kleṅkarako*, for which see Pinault (1987: 81ff) and Isebaert (1993[1994]: 295f). It is of course a hazardous business to etymologize personal names, but considering the fact that B *kleṅke* means 'chariot', it seems safe to assume that the second part of the compound also refers to chariotry, being either an action noun 'chariot-driving', which is advocated by the mentioned authors, who translate the compound 'ayant la direction du char (ou du cheval attelé)', or a part of the chariot gear. In both cases, the semantics is close enough for a comparison with the Old Chinese word.[7]

Note that the initial **ʔ-* of OC **ʔrek*/**ʔrēk* matches the initial laryngeal of the Indo-European word.

It may be worthwhile to compare words (1)-(7) with other terms for a chariot and its parts in our Old Chinese corpus. First of all, we

[7]In Middle Chinese, this word has developed the meaning 'strategic point; to yoke' (Pulleyblank 1991, s.v.).

find two words for a 'wagon, vehicle', viz.

Chin. *jū* 車 'vehicle' < EC *kjo* < OC **k(r)ja/*k(r)a*
Chin. *chē* 車 'vehicle' < EC *tsyhæ* < OC **KHja/*KHa*

Both words are likely to be etymologically related to the verbs for 'to abide, dwell, stay':

Chin. *jū* 居 'to stay at, remain, dwell' < EC *kjo* < OC **k(r)ja/*k(r)a*
Chin. *chǔ* 處 'to stay, keep still, dwell' < EC *tsyhoX* < OC **KHja?/*KHa?*,
chù 處 'id.' < EC *tsyhoH* < OC **KHjas/*KHas*

This fact seems to indicate that Chin. *jū* and *chē* originally referred to a cart where the nomads put all their belongings and where they lived. From the etymological point of view, it would seem not to have been a battle chariot.

Further terms are Chin. *héng* 衡 'yoke of a carriage' < EC *hæng* < OC **grang/*grāng* and Chin. *jià* 駕 'to yoke' < EC *kæH* < OC **krajs/*krājs*, for which I could find no Indo-European equivalents. Chin. *héng* also means 'beam, crosspiece, steelyard, weights' (Schuessler 1987: 233), which shows that 'yoke of a carriage' is a derived meaning. As to Chin. *jià* < OC **krajs/*krājs*, its final *-s* is most probably a suffix, so that we may connect Chin. *jiā* 加 'to add, attach, hit' < EC *kæ* < OC **kraj/*krāj*. In this case, too, we may be fairly confident that the verb for 'to yoke' is an indigenous word.

The elaborate nomenclature of horse colors in Chinese does not look Indo-European either. In our corpus there are as many as nine terms for horse colors, but hardly any of them has an obvious Indo-European equivalent. Also the generic word for a horse, Chin. *mǎ* 馬 < EC *mæX* < OC **mra /*mrā?* is likely to be indigenous or, at least, non-Indo-European. I strongly doubt the correctness of the assumption, frequently found in the literature, that this word is somehow connected with the Celto-Germanic word for 'horse' (OIr. *marc*, OE *mearh*, etc.). The limited distribution of this Indo-European term does not inspire confidence in the proposed borrowing by the Chinese or, for that matter, a borrowing in the other direction (cf. for this word Janhunen's article elsewhere in this volume).

We may conclude that the Chinese knew how to yoke an ox, but were unfamiliar with the more elaborate gear of the battle chariot and spoked wheels (cf. Shaughnessy 1988: 189-237 with further references).

Town building

(8) Chin. *jí* 堲 'masonry' < EC *tsit* < OC **tsjit* < **tsjik/*tsik* (Baxter, no. 670)

Toch. AB *tsik-* 'to build, form'[8] < PToch. **ts'əik-* < PIE **d^heig^h-* 'to knead clay, make walls' (cf. Gr. *τεῖχος* 'wall', Skt. *saṃ-dih-* 'wall', Av. *pairi-daēza-* 'circumvallation', *uz-daēza-* 'wall, dam', OP *didā-* 'wall, fort', etc.).

Bodman (1980: 158, cf. also Coblin 1986: 108, Baxter: 301) adduces a clear Tibetan cognate *rtsig* 'to build, wall up; wall, masonry', so that this word has been borrowed not only in Chinese, but also in Tibetan.

Tocharian is the only Indo-European language where PIE **d^h* > *ts*. As Winter (1962) has shown, PIE **d^h* > PToch. *ts* in the position before another aspirate.

(9) Chin. *lǐ* 里 'village, hamlet' < EC *liX* < OC **C-rjɨʔ/*C-rəʔ*[9]

Toch. B *riye*, A *ri* 'town', PIE **u̯riH-eH$_2$*, cf. Thracian *βρία*, probably */u̯ria/*, mentioned by Strabo 7,6,1 as a Thracian word for *πόλις*, *τεῖχος* and glossed by Hesych as *κώμη* (the etymology originally Smith 1910-11: 43, see further van Windekens 1976: 405). Note that the final *-ʔ* of the Old Chinese word may match the Indo-European laryngeal.

(10) Chin. *yuán* 垣 'wall'; 園 'garden, park' < EC *hjwon* < OC **wjan/wan*
Toch. AB *wänt-* 'to envelop, surround' < IE **uend^h-* (cf. Goth. *bi-windan* 'to wrap', Goth. *wands*, OHG *want*, etc. 'wall').

There is yet the third character for the same word, viz. *yuán* 圓 'circle, circumference; recur' (Schuessler 1987: 791), which most probably conveys the original meaning. The loss of the final dental in the Chinese word is not surprising.

Pulleyblank (1973: 121) has pointed out that there exists a whole series of Old Chinese words beginning with **w-*, all meaning 'round, revolve' (cf., for instance, Chin. *yíng* 縈 'to entwine' < EC *yweng* < OC **wjeng/*weng*). He further conjectured that these words may all be somehow related. At our present state of knowledge about Chinese word families, however, we cannot account for the alternations of the type **wan/*weng*, so that borrowing of OC **wan* from Tocharian remains a distinct possibility.

(11) Chin. [*zhēn*] 楨 'post in a wall, support' < EC *trjeng* < OC **trjeng/*treng*

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[8]The fact that I cite the Tocharian verbal root should not be interpreted in the sense that it was the verb that was borrowed into Chinese. Most probably, the source was a Tocharian word for 'wall, masonry' derived from this root, but by chance this word is not attested. The same applies, *mutatis mutandis*, to examples (10), (11) and (13).

[9]**C-* = "an arbitrary (but probably voiced) consonant" (Baxter: 200).

Toch. B *treṅk-*, A *träṅk-* 'to be fixed to', PIE *d^herg^h- (Av. *drənjaiti* 'to reinforce', Skt. *dṛhyati* 'to be firm', etc.).

The original meaning of the word seems to be 'post in framework used in rearing earth walls' (Karlgren 1957: s.v. 834l).

(12) Chin. *bì* 壁 'wall' < EC *pek* < OC **pek/*pēk* (Baxter 159)
Toch. B *pkante*, Toch. A *pkänt* 'hindering, obstacle' < PToch. **pəkənte*, PIE **b^heg-* 'to break' (van Windekens 1976: 376).

If the Chinese word is a borrowing from an Indo-European language, its voiceless stops point to probable Tocharian origin.

(13) Chin. *chéng* 城 'city wall, fortified wall' < EC *dzyeng* < OC **djeng/*deng*
Toch. AB *täṅk-* 'to hinder, impede' < PIE **teng^h-*.

Although the semantic side of the equation is quite attractive (cf. the preceding equation) and words for 'city wall' are frequently borrowed (cf. Lat. *vallum*, borrowed to OE *weall*, English *wall*, MHG *wal*, whence it was borrowed as Polish *wał*, Russ. *val*, etc.), this example is not without problems. First of all, if the Chinese word for 'wall' is connected with the verb *chéng* 成 'to achieve, complete' (which is far from evident from a semantic point of view), the borrowing from Tocharian is of course out of the question. Further, EC *dzyeng* is ambiguous, as it can reflect both OC **djeng/*deng* and OC **gjeng/ *geng* (cf. Baxter: 211f.). Bodman (1980: 160) opted for the second reconstruction and connected the Chinese word with Tib. *ḥgengs* 'to fill, fulfill', *gyang, gyeng* 'pisé, rammed earth'. This etymology is not very probable, however. In answer to my query, Professor Baxter writes to me (May 8, 1996): "As for *chéng* < **deng* 'complete', according to the Shuowen it is composed of *wǔ* < **m(r)us* 'cyclical sign' (Karlgren 1957: s.v. 1231a), plus *dīng* < **tēng* '4th heavenly stem' as phonetic; this would presumably support the reconstruction **deng*. But this is not confirmed by older paleographical evidence. Also, there seem to be several cases where 'complete' interchanges with *píng* < **breng* 'level, even'; I don't know what's going on there. But although **geng* would be a theoretical possibility, I don't know of any positive evidence for a velar. The connection with **breng* (if there's anything to it at all) would not necessarily extend to 'wall', though; that character might have been created after *chéng* 'complete' already had some kind of dental or even affricate."

Conclusions

We may formulate the following tentative conclusions:

1. Apart from the word for 'honey', there are several other Old Chinese words which are likely to be borrowings from an Indo-

European language. We may indicate at least two semantic fields where borrowing took place: chariots/chariot gear and town building.

2. Some of these loan words can be positively identified as borrowings from Tocharian: this is the case with words (1), (2), (5), (6), (8), (12) and, possibly, (9). There are various reasons for this identification: for (1) and (9) it is the limited distribution of the particular word in Indo-European languages; for (2) it is the specific development of $*k^wek^w$ to Toch. B *kok*; for (5) and (12) it is the Tocharian merger of voiced and voiceless stops; for (6) it is the unique Tocharian development of $*uH$ to $*ua$ between consonants; and, finally, for (8) it is the unique Tocharian development $*d^h > ts$ in the position before another aspirate.

Abbreviations

Av.	Avestan
Burm.	Burmese
Chin.	(Modern) Chinese
EC	Early Chinese
Hitt.	Hittite
MHG	Middle High German
OC	Old Chinese
OCS	Old Church Slavonic
OE	Old English
OHG	Old High German
OIc.	Old Icelandic
OIr.	Old Irish
OP	Old Persian
Goth.	Gothic
Gr.	Greek
L	Lepcha
Lat.	Latin
PIE	Proto-Indo-European
PToch.	Proto-Tocharian
Skt.	Sanskrit
Tib.	Tibetan
Toch.	Tocharian
WB	Written Burmese

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Computational Cladistics and the Position of Tocharian

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This paper reflects joint work, under the auspices of the Institute for Research in Cognitive Science at the University of Pennsylvania, which we have been pursuing since the beginning of 1994. Our work has been supported in part by National Science Foundation grant SBR-9512092 to the first three authors and an REU supplement (Research Experience for Undergraduates), as well as by National Young Investigator award CCR94-57800 and a Penn Research Foundation grant to Tandy Warnow.[1] On the most technical level, Warnow has been responsible for the algorithmic work, Michailov has implemented the algorithms, Taylor and Ringe have handled the data, and Levison has been responsible for the user interface of our implementation software and for data analysis using that software. However, as our investigation has progressed we have found ourselves contributing to the development of our methodology in no discernible pattern, so that the methodology as a whole is uniquely the product of an extraordinarily fruitful collaboration.

Considerations of space preclude a full explanation of our methodology here; we attempt only to clarify the relevance of our work to the problem of reconstructing the evolutionary tree of the Indo-European (IE) family. We expect to publish a monograph-length report on our work in the near future; in the meantime, interested readers should consult our papers listed in the bibliography for further information.

1. The problem.

The traditional criteria for subgrouping the languages of a family are well known. Each internal node of the tree represents the end of a period of common development followed by a period of divergence; therefore, if we are to justify grouping a subset of the languages together under a single internal node, we must show that they and only they share a set of distinctive innovations, unusual enough so that

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they could not have occurred twice independently, dating to the period of common development before they began to diverge. Retentions of ancestral characteristics are not significant, since any member of the family might happen to have retained particular inherited features, and innovations which might have occurred independently more than once must be ruthlessly excluded.

These criteria are both realistic and sufficiently rigorous; nevertheless, the attempt to determine evolutionary trees by these criteria alone runs into serious difficulties. Sound change innovations are easy to identify, because phonemic mergers are irreversible; but most sound changes are "natural" changes that can easily occur more than once independently, so that we often cannot be sure that shared innovations necessarily point to shared history (a problem too often ignored by historical linguists). For example, the naturalness of a sound change *ti > *si* seems far from obvious,[2] yet it can be shown that such a change has occurred independently on at least four occasions widely separated in time and space: in the South Greek dialects sometime between the Proto-Greek period (perhaps ca. 2000 B.C.E.) and the date of the Linear B documents (ca. 1200 B.C.E.; Risch 1955:66, 75); in the prehistory of Tocharian well after its separation from the other IE languages (Jasanoff 1987:108-12, Ringe 1996:47-8, 80, 88); in the prehistory of the Baltic Finnic subgroup of the Finno-Ugric family, perhaps in the last few centuries B.C.E. (cf. e.g. Fromm and Sadeniemi 1956:26-7, 39-40, Laanest 1982:22-3, 102-3); and in the Tongic subgroup of the Polynesian family, where it seems to have reached the final stage only within the last two centuries (Biggs 1978:703). It would therefore be inadvisable to treat this change as a "significant shared innovation" for purposes of subgrouping in any language family. The use of morphological changes for subgrouping runs into the opposite problem: most morphological changes are much too peculiar to have occurred repeatedly, but all too often we cannot say with any confidence which languages have innovated. Lexical data are beset by both problems and various others, as every practicing historical linguist knows. It is therefore often difficult to assemble enough significant shared innovations to validate a subgroup by traditional methods.

Beginning in the 1950's, linguists tried to get around this paucity of evidence by using "distance-based" lexicostatistics (see Embleton 1986 for extensive and excellent discussion), which involves comparing basic vocabularies of the languages to be subgrouped and noting, for each pair of languages, how many items the two languages *fail* to share. That number is taken as a measure of the evolutionary

[2]In at least some cases, and probably in all, this formula expresses the result of a series of sound changes (cf. Biggs 1978:703); it is interesting and instructive that (probably somewhat different) series of changes with the same outcome have recurred so often.

distance between them, and a tree is constructed from the pairwise distances by one of several pair-joining methods. Various shortcomings of this methodology have caused linguists to distrust it.[3] For one thing, it is based on lexical evidence alone—the most complex and "messiest" type of evidence; for another, the tree-construction heuristics are not mathematically reliable, since they return a tree which is *locally* optimal but not necessarily the tree which is *globally* optimal. (That is, the output is a tree better than any other tree which could be constructed by changing only one point in its structure, but there might be a better tree which could be found by changing several points at once, and the heuristics cannot reliably find it. See further below for a discussion of what "better" means in this context.) But the greatest shortcoming of distance-based methods is that in converting a complex pattern of data to a single measure of distance one loses all information about the distribution of peculiarities over the whole set of languages being studied—and a method that discards so much relevant information is necessarily less likely to give reliably correct results.

2. The methodology.

What we need instead is a method as rigorous as the traditional one, but without its limitations, and it seems clear that any such method must be based conceptually on the known facts of language change. Of these the most important is the fact that complete "backmutation"—the reversal of a linguistic change in such a way that precisely the *status quo ante* reemerges—does not occur, except on the trivial level of phonetic detail (which is not accessible to the comparative method anyway; see Hoenigswald 1960 for discussion). In the case of sound change the prohibition is absolute: phonemic mergers are never "undone" in such a way that the original phonemic contrast reappears in its original distribution (Garde 1961:38-9). In theory it might be possible for complete backmutation to occur in other areas of a language's structure; but the complexity of morphological systems, meanings of words, etc. is normally great enough that the chances of any *precise* reversal of a specific change are virtually nil.

It follows that, if parallel or convergent evolution can be eliminated from the data set (see above), the true evolutionary tree will exhibit the following topological pattern. Each identifiable peculiarity (such as a particular word in a particular meaning, or the presence or absence of a sound change) will occupy a coherent

[3]Not all this skepticism is justified, of course; note especially that the refinements of Embleton 1986 substantially increase the reliability of distance-based methods. But in our opinion the mathematical and conceptual shortcomings discussed below cannot be overcome within a distance-based methodology.

subtree, such that all the languages which exhibit that peculiarity—not only the attested ones at the ends of the branches, but also the ancestral ones occupying internal nodes of the tree—can be connected in a subtree which is not crossed or interrupted by any other such subtree representing a competing peculiarity. Consider the following pair of trees, which are *unrooted* (i.e., the position of the protolanguage in the tree is not marked). Each tree represents a hypothesis about the relationships between four languages, represented by the letters at the terminal nodes ("leaves") of the tree. Languages A and B exhibit cognates for a particular basic word—say, "hand"—and that is indicated by assigning them both the numeral 1; languages C and D show a different cognate set, labelled 2, for the same meaning.

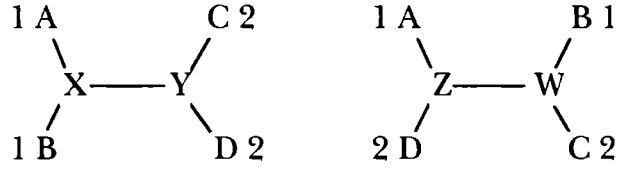

Fig. 1. Alternative trees for four hypothetical languages.

In the tree on the left, internal node X can be assigned cognate set 1, while internal node Y can be labelled 2; all the nodes labelled 1 can then be connected in a coherent subtree which does not involve any nodes labelled 2, and vice versa. In the tree on the right this is not possible; no matter how internal nodes Z and W are labelled, the subtrees for the two cognate sets must overlap or be discontinuous. The right-hand tree is not compatible with the observation that complete backmutation does not occur in linguistic evolution; but the left-hand tree is compatible with that general principle of linguistic change *no matter where the root of the tree belongs*. In fact there are seven topologically different ways of rooting the tree; here are three of them:

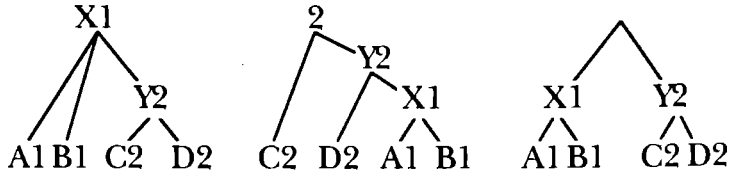

Fig. 2. Alternative rootings of the left-hand tree of fig. 1.

Note that every cognate set occupies a coherent subtree no matter which set is ancestral, or even if (as in the last example) we cannot determine which is ancestral.

In technical terminology, a tree in which this pattern holds for all characteristics investigated is called a *perfect phylogeny* (PP—see further below); for the reasons just outlined, the true evolutionary tree of any group of related languages is a PP. This is the fundamental

insight on which our work is based.[4]

Of course we may not be able to recognize and eliminate all parallel innovations, nor even all borrowings between languages in the sample. If that proves to be the case, we should seek the tree which approximates a PP most closely, according to an appropriate measure of "closeness". In other words, we seek the *optimal* evolutionary tree for our data, and in order to recognize it when we find it we need to specify an *optimization criterion.* Our ultimate criterion is necessarily linguistic: we must be able to give a linguistically plausible explanation, not contradicted by any data at our disposal, for every point in which the optimal tree departs from a PP. But it is most efficient to narrow down the field of candidates for the optimal tree by a more mechanical procedure, and for that it makes sense to use a mathematical optimization criterion. The criterion that comes first to mind is *parsimony,* which has been used in evolutionary biology; but it seems to us that *character compatibility* is a more appropriate optimization criterion for work in evolutionary linguistics.[5] To explain the difference and justify our choice, we must first define some technical terms.

Our data are organized as *characters,* each character representing a parameter along which languages can differ (as first proposed for linguistic data by Gleason 1959).[6] The different ways that the languages express each character are referred to as *states* of the character. For example, the basic word-meaning 'give' is a character, which each language in our sample expresses by a member of the cognate set reflecting Proto-Indo-European (PIE) *ay- (state 1), or of the set reflecting PIE *deh$_3$- (state 2), or by a word without cognates in any of the other languages (each such word being assigned a unique state); the formation of the genitive singular of o-stem nouns is a character, which each language instantiates with an ending reconstructable as *-os (state 1), or *-osyo (state 2), or *-ī (state 3),

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[4]The above holds only for changes which have "gone to completion" throughout a speech community; otherwise there results a topological pattern of *character polymorphism,* in which some characters exhibit more than one state for some languages (see below for informal definitions of "character" and "state"). However, this pattern is not significantly different from patterns produced by at least some types of parallel evolution. A methodology for tree construction in the presence of polymorphic characters has recently been devised (see Bonet et al., forthcoming, in the bibliography), but considerations of space preclude full discussion here. See further below.

[5]There are other optimization criteria as well. At least one, *maximum likelihood,* is not feasible: it presupposes a stochastic model of evolution, and for linguistic evolution no realistic stochastic model has been devised.

[6]To some extent Kroeber and Chrétien 1937 adumbrate the use of characters, though their actual methodology is distance-based. We are grateful to Sheila Embleton for these and other references.

etc.; the regular sound change called the "ruki rule" is a character with only two states, since it has either occurred in the history of a language (state 2) or not (state 1). We can now define the important concept of *character convexity:* a particular character is *convex on,* or *compatible with,* a particular tree if every state of that character occupies a coherent subtree of the tree—precisely the pattern we expect to find in real linguistic data if there is no parallel evolution, given that there cannot be any backmutation (see above).

The difference between the two available optimization criteria is easy to explain in terms of the concepts just introduced. The *parsimony criterion* evaluates trees in terms of how much evolution has occurred overall; the tree exhibiting the smallest amount of evolution is optimal. As might be expected, a perfect phylogeny is as parsimonious as possible: because every state of every character occupies a coherent subtree, the number of evolutionary transitions from state to state is as small as it can possibly be. But if the optimal tree is not a perfect phylogeny, the parsimony criterion does not care how the "extra" evolution is distributed; a single character with two extra transitions is just as "bad" as two characters each with a single extra transition. By contrast, the *compatibility criterion* evaluates trees in terms of how many characters fail to be convex; the tree on which the fewest characters are nonconvex is optimal (a perfect phylogeny being, of course, a tree on which all characters are convex). There are thus numerous cases which will be judged differently by the two criteria, the compatibility criterion preferring the fewest possible characters with *any* extra state-to-state transitions, while the parsimony criterion prefers the fewest possible extra transitions (no matter how they are distributed among the characters).

How are we to choose between these criteria? Recall the inherent limitations of linguistic evidence alluded to in the preceding section. The suitability of a particular sound change for subgrouping is an all-or-nothing matter. Most sound changes are natural and repeatable, so that if we accepted them as potential markers for valid subgroups we would fail to eliminate potential parallel development, which could easily occur in *more than two* lines of descent; those sound changes are simply unusable. Other sound changes are odd enough to be virtually unrepeatable, and they can safely be used. Items on basic wordlists tend to show a similar pattern: some are notoriously susceptible to parallel development—for example, words meaning 'human being' often shift to 'man', and words meaning 'man' often become the usual words for 'husband'—while others show no such tendency. In these cases, too, if parallel development can occur at all, it can occur in multiple lines of descent. In other words, there are "good" and "bad" characters, and in attempting to exclude parallel development from our data we must try to eliminate the latter. It follows that the compatibility criterion, which evaluates trees in terms of characters

rather than in terms of state-to-state transitions, offers a more realistic approach to the true optimization criterion for linguistic evolutionary trees.

This is fortunate because of the inherent limitations of morphological characters, for which we often cannot specify which states are innovative. Of course we do need information about the direction of at least some language changes (such as sound changes) in order to determine where in the tree the node representing the parent language lies; but we also need to use inflectional morphology and lexical evidence for subgrouping whether or not we can tell which languages have innovated. That is precisely what the compatibility criterion enables us to do, since it works with the *topology* of the distribution of character states without reference to information about *directionality*—that is, about which languages have innovated and, ultimately, where the "root" of the tree (the node representing the protolanguage) lies. Consider the following unrooted tree:

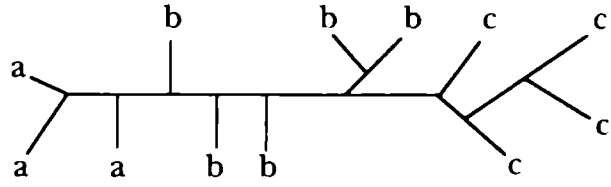

Fig. 3. An unrooted tree with states of a single character.

Each of the leaves of this tree represents an actually attested language; the way they are connected represents a working hypothesis about the nearness of their relationships to one another (which, for the purposes of this demonstration, will be taken for granted). Each different letter represents a different state of a single character, and it is clear that the tree is a PP (a minimal one, since we are only considering a single character). Though we do not know where the root of the tree belongs, we can say something interesting about the subgrouping of the languages. In the first place, either group (a) or group (c) *must* be a valid subgroup, sharing an innovation. To see why this is so, think about where the root node could be placed. If it is anywhere in (a) or (b), then the state of the root node for this character will be (a) or (b) respectively; and in that case (c) will be a coherent subtree exclusively sharing an innovative state of this character—that is, a valid subgroup. On the other hand, if the root is in (c), or if it is between the (b) and (c) subtrees but we assign it state (c), then (c) will not be a valid subgroup sharing an innovative state, but (a) will be. A mirror-image argument gives the same result for (a). In *no* case can (b) be a valid subgroup (though (b+a) could be, or (b+c) could be); yet (b) does occupy a coherent subtree of its own. It should be clear that treating several such characters simultaneously, each one partitioning the tree into coherent subtrees, can tell us even more about the subgrouping of the family (unless, of course, all the

partitions coincide).

However, finding the tree with which the greatest number of characters is compatible is far too complex a problem to solve by hand; if it cannot be done using automated means, it cannot be done at all. And until a few years ago the prospects for an automated solution were not promising, for a very simple reason. Computational problems are posed in very stringent terms; if we cannot achieve the correct solution for *all* inputs, then we haven't solved the problem at all. This is so for an obvious practical reason: we cannot know in advance what sort of case we will have to tackle next, and if there are types of cases our program can't handle, it isn't reliable. Solving for the compatibility criterion is a problem that is *NP-hard*. In practice that means that there is no reasonable hope of constructing an algorithm that will solve the problem for all inputs *and* can be implemented to run in polynomial time (so that as the size of the input increases, the time required to run the program grows polynomially rather than exponentially).[7] Of course we can always devise algorithms that will solve a problem in exponential time—exhaustive search of all the logical possibilities is perhaps the most obvious example—but algorithms that run in exponential time are prohibitively expensive, because as the size of the input increases the amount of time required to run the algorithm explodes.

But in the last five years an important advance has been made in this area. A well-defined part of the compatibility problem involves finding perfect phylogenies, if any exist; this is called the *perfect phylogeny problem*. The perfect phylogeny problem can be solved in polynomial time provided that one of the input parameters can be bounded; algorithms now exist to solve it if r, the maximum number of states per character, is bounded (Agarwala and Fernandez-Baca 1994, Kannan and Warnow 1995). Still, if we try to use a perfect phylogeny algorithm to construct an evolutionary tree from linguistic data, we are taking a large gamble. If the best tree is a PP, with all the characters convex, the program that implements the algorithm will find it and we've hit the jackpot. But what if the program tells us that there is no PP for our data?

In that case we ought to inspect the distributions of states of our characters. What we would hope to find is that the distributions fit one another well, only a few characters being nonconvex. We can then remove those few suspect characters from the matrix and run the program again. Suppose that this time we obtain a PP. Do we now have the best tree that can be constructed from the data? Not necessarily, but it is now feasible to find the best tree, for the following reason. Of the total of k characters we eliminated only a small number

[7]On the technical definition of NP-hardness see Garey and Johnson 1979, chapter 2.

t to obtain a PP; thus we have a PP on $k - t$ characters, and we know that at least $k - t$ characters are compatible with a PP. We can now search all subsets of k that include at least $k - t$ characters, but only if t is small, since the number of those subsets is

$$\binom{k}{t} + \binom{k}{t-1} + \ldots + \binom{k}{0}$$

and that sum increases exponentially as t increases. When we have found the tree(s) with the highest compatibility score by this search, we have the best tree(s). Our current software is able to perform these operations so as to find the optimal tree according to the compatibility criterion in a reasonable amount of time.

3. The Indo-European experiment.

We have evolved the methodology described in the preceding section in the context of an attempt to recover the first-order subgrouping of the Indo-European (IE) family, a problem for which there is still no definitive solution after much more than a century of exceptionally well-informed work. Both the methodology and the experiment continue to evolve; this is therefore an interim report of partial results.

We have chosen as a representative of each major subgroup of the IE family the most archaic language in the group that is well attested, so as to make relatively full use of the most ancient available data while minimizing the occurrence of gaps. The languages are the following:

subgroup	language	dialect	earliest date well attested
Anatolian	Hittite	—	ca. 1400 B.C.E.
Indic	Sanskrit	Early Vedic	ca. 1000 B.C.E.
Iranian	Avestan	"younger"	ca. 500 B.C.E.?
Greek	(Greek)	Classical Attic	ca. 400 B.C.E.
Italic	Latin	Classical	ca. 100 B.C.E.
Armenian	(Armenian)	Classical	ca. 500 C.E.
Celtic	Old Irish	—	ca. 800 C.E.
Tocharian	Tocharian B	—	ca. 800 C.E.
Germanic	Old English	Late West Saxon	ca. 1000 C.E.
Slavic	Old Church Slavonic	—	ca. 1000 C.E.
Baltic	Lithuanian	modern standard	
Albanian	(Albanian)	modern standard	

Fig. 4. IE languages providing input data.

The only detail that requires comment is the choice of Old English rather than Gothic to represent Germanic. We found by experiment that using OE does not bias the results in any particular direction (say, in favor of a closer connection of Germanic to Latin); once

recognizable borrowed words have been ruthlessly eliminated (as they must be), the disagreements between the older Germanic languages become too insigificant to affect the results of our methodology.

We have employed the following set of characters: four regular sound changes; two unexplained phonological pecularities; eleven morphological characters; and the 207-word Swadesh list of Tischler 1973, with the item 'day' split into two characters (namely 'period of daylight' and 'period of 24 hours') and each of the non-third-person pronouns likewise split (one character for the nominative, the other for the oblique stem). We re-collected the lexical data, both in the hope of improving on Tischler's data and because Tischler includes no lists for Avestan, Tocharian B, or Old English. The phonological and morphological characters and the distribution of their states are given in the Appendix.

Of course we eliminated most sound changes because they are natural and repeatable; however, those that we have retained, as well as some of the morphological characters, are extremely important, both because they are more reliable than lexical characters and because they provide our only evidence for rooting the tree.[8] Considering those facts, it might seem surprising that so few morphological characters were used. We would have been glad to use more, but the structure of the data defeated us. Most morphological characters in the IE family show one of three distributions of states: either each subfamily exhibits a unique state, which is obviously *uninformative* (i.e., unhelpful in constructing the tree); or all the languages preserve the PIE state, which is equally uninformative; or there is one set of subgroups that share a state, while each of the remaining subgroups goes its own way. This last configuration could be informative if any of the languages used were the direct ancestor of any other and therefore occupied an internal node of the true tree; but since it can easily be demonstrated that each of our twelve languages must occupy a leaf of the true tree (because each exhibits clear innovations not shared by any other, and complete backmutation does not occur—see above!), the configuration of states in which only one state is "large" (i.e., shared) is also uninformative. It is very important to understand why this is so; therefore it seems best to devote a paragraph to explaining the matter at this point.

Consider the following two unrooted trees:

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[8]It is only for the phonological characters and some of the morphological characters that we can determine which states are innovative *on internal grounds alone*, without adopting any larger hypothesis about the true evolutionary tree; thus only these characters can provide evidence for rooting the tree. For those phonological and morphological characters we can assign nonunique states to PIE; for all other characters, including all lexical characters, unique states must be assigned to PIE to avoid making our arguments circular.

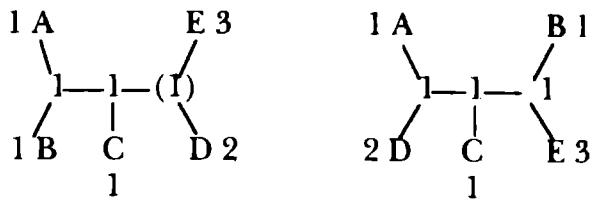

Fig. 5. A character with one large state compatible with two very different trees.

Again, each tree represents a hypothesis about the relationships between five languages (represented by the letters) which between them show three states of a single character (represented by the numerals). Note that each of the states is convex on both trees—and that will be true for any tree you can draw for these five languages, simply because it will *always* be possible to restrict the unique states, 2 and 3, to the leaves of the tree, assigning the only large state, 1, to *all* the internal nodes. Of course the linguist may find the tree on the right quite incredible as a hypothesis of the true tree, but the algorithm doesn't care what the linguist believes (which is one of the best reasons for employing it); the algorithm considers all the mathematical possibilities. Given that all the languages in our data occupy leaves of the true tree, it follows that the only informative characters are those that partition the tree into *two or more* large states.

In fact there are a few uninformative morphological characters even among those we did use; we include them both because they reflect important aspects of IE verb inflection (so that their distribution in the optimal tree, when the latter has been found, is more than usually interesting) and to illustrate the point made in the preceding paragraph. We also included many uninformative characters in the wordlist, because the point of using a standard wordlist is to provide us with an impartially chosen set of comparanda.

A further fact complicates the use of our data. 25 of the lexical characters show overt *polymorphism;* that is, for each of those characters at least one of the attested languages exhibits two or more states. (This is not an uncommon situation in languages generally; for example, in modern American English *little* and *small* are equally good representatives of one meaning on a basic wordlist, even though they are not interchangeable in every context.) A completely different algorithm is needed to construct an evolutionary tree in the presence of polymorphic characters (see fn. 4 above); in practice we have found it preferable to construct trees on the basis of monomorphic characters alone and test them against the polymorphic characters. In addition, a further 22 lexical characters can be shown by uncontroversial traditional work to have undergone parallel development, and these, too, must be excluded in a first pass through the data.

Thus of the 229 characters we have assembled, only about 60 are

both informative and immediately usable as input to our program—and the number of such characters for these twelve ancient IE languages will never be much greater than that no matter how much additional data we gather.[9] This is disappointing, but it does reflect the reality of the situation with which we must deal. Of course there are two corresponding advantages: one is that the method is maximally rigorous; the other is that it is extraordinarily difficult to cheat, since in order to "fix" the input for a single character one must make not one but *two* positive statements about cognations, and of course they are subject to the same scrutiny from one's qualified colleagues as any other assertions.

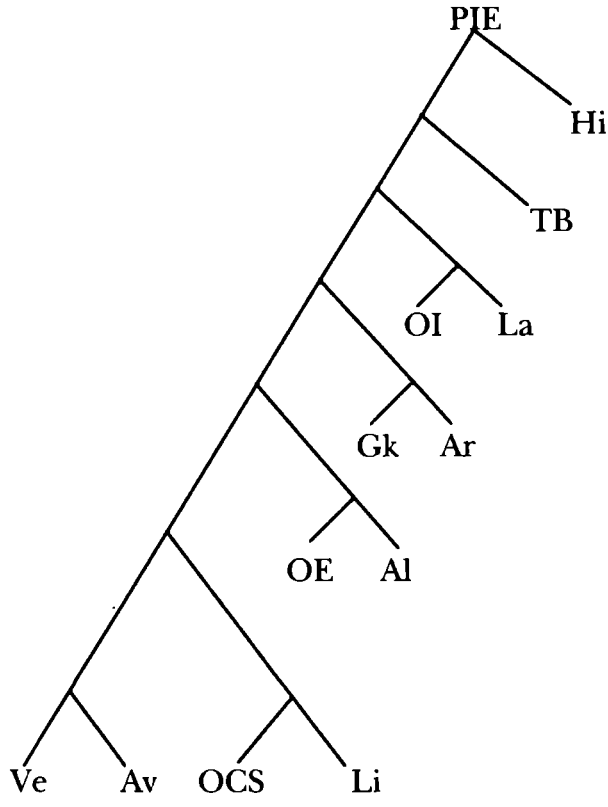

Fig. 6. A relatively good tree for the whole data set (14 characters nonconvex).[10]

[9]Strictly speaking, the use of additional languages will greatly increase the number of informative characters, since many states are restricted to one or another of the well-defined subgroups that each of our twelve initial languages represents; for example, a character in which all the Germanic languages agree against all the Italic languages will become informative if two or more languages of each of those subgroups are included. However, that will not help in recovering the first-order subgrouping of the family.

[10]Because we have assigned a unique state of each lexical character to PIE, for the reasons given in fn. 8 above, the algorithm actually produces the following configuration:

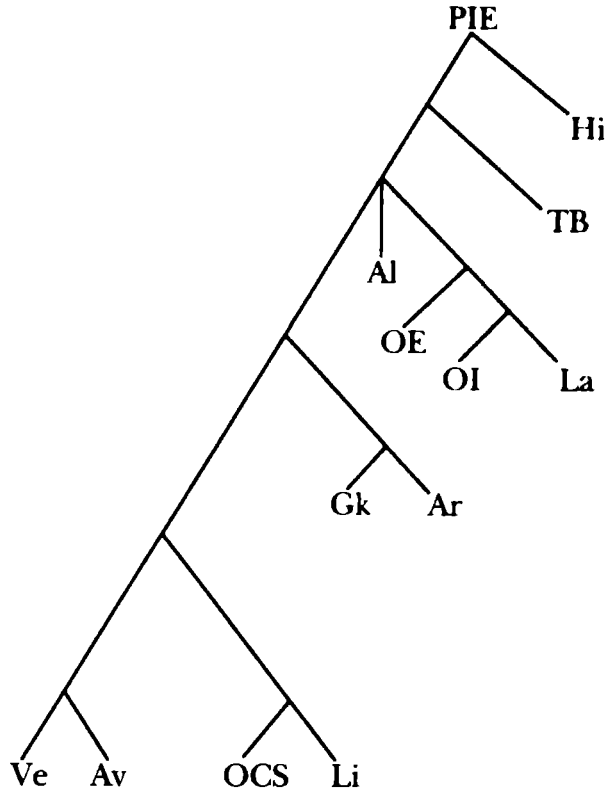

Fig. 7. A quantitatively better tree for the whole data set (11 characters nonconvex).

Naturally the coding judgments of colleagues will occasionally differ from ours. Experimentation suggests that that seldom affects the results; but to the extent that it does affect them, that simply reflects the state of knowledge in the field. Of course this shows that our methodology is most useful for the rigorous testing of hypotheses—*which is all that we claim for it.* We trust that no one will be naive enough to expect that, because the method is automated, it

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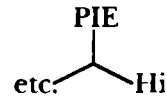

On linguistic grounds this collapses uncontroversially to the configuration given in fig. 6, since the last common ancestor of all the attested languages is, by definition, PIE; and collapsing the topmost edge in that fashion establishes the PIE states for a large number of lexical characters. (In traditional terms, once we have established that the first-order subgroups of the IE family are (1) Anatolian and (2) all the non-Anatolian subgroups together, we can reconstruct for PIE all and only those lexemes shared by Anatolian and at least one other subgroup; but until we have established the rooted tree—on the basis of the phonological characters and of those morphological characters which show internal directionality—we cannot determine which lexemes are reconstructable for PIE and which are reconstructable merely for one of the intermediate protolanguages, such as the last common ancestor of Greek and Indo-Iranian.)

should allow us to circumvent the necessity of specialist judgments about particular cognations. It does not.

There is no PP for our data. Moreover, the best trees we have been able to find for the whole set are quite poor. For example, there are 14 characters nonconvex on the tree in Figure 6.

In purely quantitative terms we can improve on this tree by shifting the position of Old English (OE) and Albanian; the tree, with only (!) 11 characters nonconvex, results in Figure 7. In fact this tree represents a small family of binary-branching trees, since the ternary branching from which Albanian depends can be resolved by attaching it to any of the three edges adjacent to that node without changing the number of nonconvex characters. But though the compatibility score of this family of trees is not quite as bad, one of the nonconvex characters is morphological character 6, the shape of the nonpast mediopassive endings,[11] which we are convinced must be convex on the true tree; thus we have not really gained anything by this attempt to improve the compatibility score. Moreover, so far as we can tell, a tree on which significantly fewer than 11 characters are nonconvex cannot be constructed for this data set.

It is immediately obvious that removing individual characters from the matrix, on the hypothesis that they are inherently "bad" (see above), would not lead to plausible results; too many would have to be removed to improve the score of the optimal tree. We therefore removed *languages* from the matrix one by one, running the algorithm on each remaining set of eleven input languages (plus PIE; see fn. 8 above and the Appendix). We obtained the best results by removing OE, which suggests that there is something peculiar about the development of Germanic (the subgroup of IE which OE represents). The optimal tree is represented in Figure 8. Again this represents a family of binary-branching trees. The position of Albanian is highly indeterminate; it could be fitted to the tree anywhere outside the "satem core" (the large subgroup including Vedic, Avestan, Old Church Slavonic, and Lithuanian), the Greco-Armenian subgroup, and the Italo-Celtic subgroup (including Old Irish and Latin), but below the node at which Tocharian B diverges from the rest of the family, without changing the compatibility score. This is not surprising, considering how much of the PIE morphology and lexicon Albanian (attested only from the 15th c. C.E.) has lost.

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[11]See the appendix for the states of this character. We accept the hypothesis that the PIE markers of primary endings were *-i in the active and *-r in the mediopassive (e.g. 3sg. active *-t-i, mediopassive *-to-r), that the appearance of *-y (= *-i) in the mediopassive (e.g. 3sg. *-to-y) is an innovation, and that precisely that innovation (as opposed to, say, the creation of a compound mediopassive marker *-r-i, to give a 3sg. *-to-ri) is not very likely to have occurred more than once. That is not the only possible interpretation of the pattern of data, but it is the majority opinion among informed specialists.

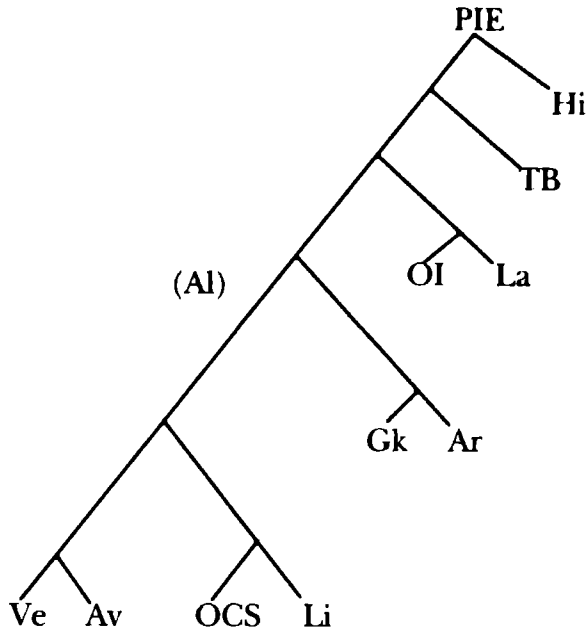

Fig. 8. The best tree with OE removed (3 characters nonconvex); see the text on the (indeterminate) position of Albanian.

The compatibility score of this family of trees is quite good; moreover, we are able to advance a plausible explanation for each nonconvex character. Lexical character 1 'all (pl.)' is nonconvex because (according to our coding) it groups Latin and Armenian together and Greek and Tocharian B together. But while TB *poñc* and Gk. *πάντες* are unquestionably cognate (reflecting a preform *pántes), it is merely possible, not necessary, that Latin *omnēs* and Armenian *amenekʰean* reflect *$h_3$ém- ~ *h_3m- (for an alternative proposal see Hübschmann 1897:416). Moreover, even if the Latin and Armenian words are cognate, PIE or its immediate daughters might have exhibited polymorphism in this character, since it is not rare for languages to have two words for 'all' (typically one that can be paraphrased as 'each' and another that can be paraphrased as 'whole'). Lexical character 96 'liver' groups Hittite and Armenian together against a number of other languages (including Greek and Latin); but while Hittite *lissi* and Armenian *leard* do seem to reflect a preform *lis- (Jochem Schindler, p.c.), it is possible that the word was borrowed from some Anatolian language into Armenian at a very early date. Finally, phonological character 14, the presence of *d- in the noun 'tear(s)', shows a pattern so completely at variance with all other evidence—grouping Tocharian with the satem core—that we are forced to suggest that the form of this word without *d- was borrowed into Tocharian, probably from Indo-Iranian, at a very early date. (Readers should note that this amounts to a rejection of the only positive conclusion of Ringe 1991!) If we eliminate these three characters on the hypothesis that they are simply "bad" (see above), the tree of fig. 8 is in fact a PP.

The important features of this tree can be summarized as follows. The Indo-Hittite hypothesis, according to which Anatolian is one first-order subgroup of the IE family and *all other branches together* are the other first-order subgroup, is supported—but by only one character, the presence of a thematic aorist in the verb system (morphological character 3).[12] The satem core emerges as an extremely robust subgroup, always with the traditional internal structure (which is not at all surprising). More interestingly, there is always a subgroup including Greek and Armenian, as has been suspected in the past (cf. e.g. Porzig 1954:155-7, Clackson 1994—and note that the latter finds no clear evidence for a Greco-Armenian subgroup by traditional means). Most interestingly of all, Italo-Celtic emerges as a robust subgroup, as suggested also by Jasanoff 1994.[13]

But it is the position of Tocharian that is most relevant in the context of this volume. Successive refinements of our data and methodology have consistently shifted the point at which Tocharian diverges from the rest of the family up the tree; our current optimal tree, in which its divergence is next after that of Anatolian, conforms strikingly in that point to the recent findings of Werner Winter (this volume) and to the best judgment of the late Jochem Schindler as of 1991 (Jay Jasanoff *per litteras*). Still, we should admit that only one character—lexical 63 'give', for which Hittite and TB share one state while Latin, Greek, Armenian, and the whole satem core share another—forces us to posit so early a divergence of Tocharian. Any binary resolution of the following tree would not be much less optimal

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[12]The "aorist" is one of the stems of the verb in many conservative IE languages; it originally expressed perfective aspect. "Thematic" stems are those that end in a vowel which appears as *-e- in some forms and *-o- in others. Cardona 1960 established that no thematic aorists can certainly be reconstructed for PIE. We hypothesize that PIE in fact had no thematic aorists, and that the Anatolian languages also had none at any stage of their development; that is, we judge that the absence even of any relics of thematic aorists in Hittite and its nearest sisters (Luvian, Palaic, etc.) argues that they were primitively absent in that subfamily. On the other hand, there are clear relics of thematic aorists in Tocharian and Celtic; in particular, the preterites TB *lac* '(s)he went out' and OIr. *luid* '(s)he went' are perfectly cognate, reflecting a thematic aorist preform *$h_1lud^hét$ which also appears in Greek (*é h_1lud^het > Homeric Gk. ἤλυθε '(s)he came'). Of course there are other ways of interpreting this pattern of evidence; if different judgments are made, a different rooting of the tree will result. This is a good example of how our methodology enables us to test hypotheses *and their consequences* in considerable detail.

[13]The evidence which Jasanoff considers naturally overlaps with ours, but of course some of our judgments differ; the agreement in our conclusions is therefore especially suggestive. Whether or not Italo-Celtic is a valid subgroup has been a matter of ongoing debate among Indo-Europeanists; see e.g. Watkins 1966, Cowgill 1970.

than the resolution represented in fig. 8 above:

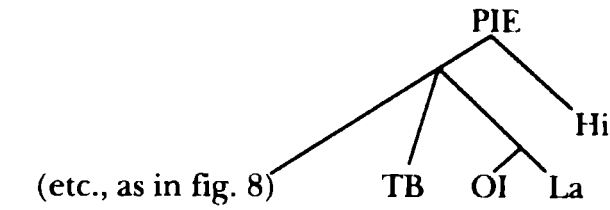

Fig. 9. A family of alternative near-optimal trees.

What is very clear is that Tocharian, like Anatolian and Italo-Celtic, is a peripheral member of the IE family that began its independent history earlier than most other surviving branches of the family.

The position of Germanic is of course the biggest puzzle of all. The best explanation that we have been able to devise so far is that Germanic began its independent life as one end of a dialect continuum that also included Balto-Slavic (BS) and, at the other end, Indo-Iranian (II). At least one significant phonological quirk, the replacement of inherited *-b^{h}- by *-m- in the oblique dual and plural endings of nominals (phonological character 13), is shared by Germanic and BS but not by II; on the other hand, the well-known satem sound changes (phonological characters 11 and 12) and the innovative future in *-sye/o- (morphological character 8) are shared by II and BS but not by Germanic. However, that is not the whole story. Germanic also shares quite a number of states of lexical characters exclusively with Italic, Celtic, or both; in addition, it shares a state of phonological character 17 (*tst > *ts) exclusively with both those branches. For the lexical characters the most likely explanation is borrowing between Pre-Proto-Germanic, Pre-Proto-Celtic, and Pre-Proto-Italic; but the borrowing must have taken place *before* any diagnostic sound changes had occurred in any of those daughters of PIE, since the loans are indistinguishable from inherited cognates. The shared sound change is a more complicated case. Though Old Irish and the other Insular Celtic languages exhibit reflexes of a full sequence of changes *tst > *ts > *ss, just like all the Germanic and Italic languages, certain forms in Gaulish inscriptions show that only the first stage of this sequence (at most) can have occurred by the Proto-Celtic stage.[14] Thus the entire sequence cannot be a significant innovation shared by Pre-Proto-Germanic, Pre-Proto-Celtic, and Pre-Proto-Italic in a period when all three were still more or less identical. The first stage—that is, the relatively simple change *tst > *ts—might be such a shared innovation, but it could conceivably have occurred more than once independently; in that case our coding must be revised so as to assign OE, Old Irish, and Latin unique states for this

[14]In Gaulish inscriptions written in the Greek alphabet this cluster is variously noted as $\theta(\theta)$, $\tau(\tau)$, or $\sigma(\sigma)$; in those written in the Latin alphabet it typically appears as Đ(Đ). See Lejeune 1985:444-5, 1988:59.

character, which thereby becomes uninformative. However, there is a third alternative: given the inherent instability of complex consonant clusters and the propensity of low-level phonological rules to spread in close contact situations, it seems possible that the first stage of this sound change spread into Pre-Proto-Germanic from one or both of the other relevant branches in the same contact situation that led to the borrowing of so much basic vocabulary. That is what we tentatively propose.

We can represent these hypotheses by a "quasi-tree", an evolutionary tree to which we have added edges indicating early contact and its effects:

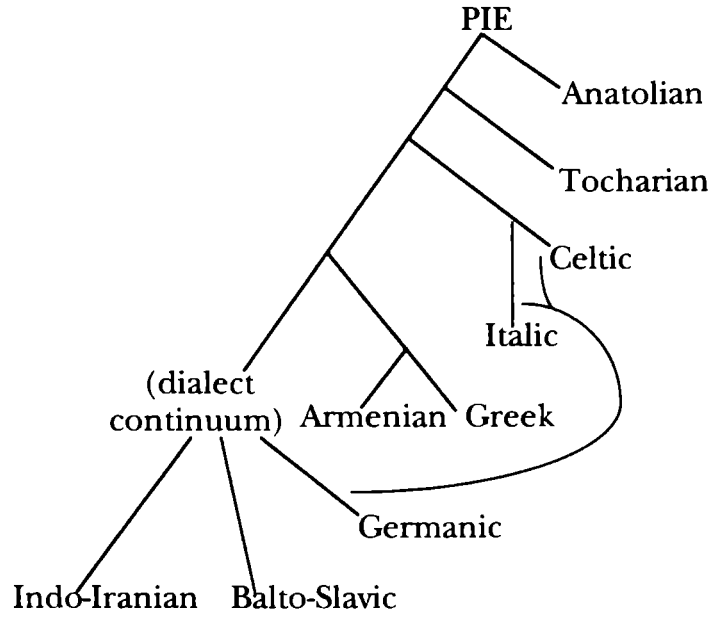

Fig. 10. The "quasi-tree" that best reflects the development of Germanic.

Aside from the complexities at the node labelled "dialect continuum" (on which see above), this quasi-tree is nearly as compatible as the tree of fig. 8. Even the polymorphic characters can be fitted to it without difficulty, and the only remaining problem is that lexical character 74 'heavy' is nonconvex; but that character will be nonconvex on any of the better trees, since OE and Hittite (!) share one of its states, while Latin, Greek, Vedic, and Avestan share another. We leave that problem for future research.

4. Conclusion.

This line of work is still in its infancy. Even when it is fully developed, our methodology will never be more than an exceptionally rigorous means of testing the hypotheses of qualified experts; indeed, no methodology can do better than that, since cognation judgments are *necessarily* the basis for all linguistic evolutionary hypotheses. But it seems reasonable to suggest that the trees given above represent some

of the likeliest hypotheses about the diversification of the IE family in the current state of our knowledge.

Appendix: the phonological and morphological characters.

ch.	Hi	Ar	Gk	Al	TB	Ve	Av	OCS	Li	OE	OI	La	PIE
1)	1	2	2	2	3	2	2	2	4	5	6	2	7[15]
2)	2	1	1	3	4	1	1	5	6	7	8	9	10
3)	1	2	2	3	2	2	2	2	4	5	2	2	1
4)	1	4	1	5	3	6	7	8	9	10	11	2	1
5)	2	1	1	3	1	1	1	4	5	6	7	8	9
6)	1	3	2	4	1	2	2	5	6	2	1	1	1
7)	4	5	1	6	3	1	1	1	1	1	2	2	7
8)	1	7	4	8	9	6	6	6	6	2	5	3	1
9)	1	2	2	5	6	2	2	4	4	2	3	3	7
10)	3	4	1	5	6	1	1	7	8	1	2	2	9
11)	1	1	1	1	1	2	2	2	2	1	1	1	1
12)	1	1	1	1	1	2	2	2	2	1	1	1	1
13)	3	1	1	4	5	1	1	2	2	2	1	1	6
14)	3	1	1	4	2	2	2	5	2	1	1	1	6
15)	3	1	1	1	1	1	1	1	1	1	2	2	4
16)	1	1	1	3	1	1	1	1	1	1	2	2	1
17)	1	9	4	10	5	2	6	7	8	3	3	3	1

The states of each character are as follows.[16]

1. organization of the verb system
   1. one stem per lexeme, lexical classification by conjugation (hi- vs. mi-conj.)
   2. two or more stems per lexeme, contrast between present and aorist stems clearly attested
   3. &c. two or more stems per lexeme, system not based on present/aorist contrast
2. augment
   1. present
   2. &c. absent
3. thematized aorist
   1. absent, apparently primitively
   2. present or immediately reconstructable
   3. &c. aorist lost, or unclear
4. productive function of *-sḱé/ó-
   1. iterative
   2. inchoative
   3. causative

[15]PIE is assigned a unique state for each character for which the situation in the protolanguage cannot be reliably determined.

[16]Note that, for each character state that could have developed more than once independently, each language must be assigned a unique state. Judgments about which states could have arisen repeatedly will of course differ.

4. &c. other, or unproductive or lost
5. function of *-d^{h}í
   1. imperative (only)
   2. past (with imperative relics)
   3. &c. lost or unclear
6. mediopassive 1ary marker (sg., 3pl.)
   1. *-r
   2. *-y (= */-i/)
   3. &c. lost
7. thematic optative
   1. *-oy-
   2. *-ā-
   3. &c. absent, or preform obscure
8. (most) archaic future stem[17]
   1. identical with present
   2. identical with present, but some press. reflect PIE subjunctives
   3. ← PIE subjunctive
   4. ← desiderative in *-(h_1)se/o-
   5. ← reduplicated desiderative
   6. *-sye/o-
   7. &c. history unclear
9. gen. sg. of o-stem nouns and adjs.
   1. *-os
   2. *-osyo
   3. *-ī
   4. *-ead
   5. &c. history unclear
10. superlative suffix
    1. *-isto-
    2. *-isṃo-
    3. &c. other or none
11. full satem development (*k^{w}, *k > k; *ḱ > affricate)[18]

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[17]We regard the Lithuanian stem in *-si-* as a sound-change development of *-sye-, and the 3sg. in *-s* as a development of *-si by early apocope of short *-i.

[18]Armenian does not seem to show the full satem merger, since *k^{w} is palatalized (in *č^{h}ork^{h}* 'four') while *k is not (in *k^{h}erê* '(s)he scratches, (s)he peels'). As Jay Jasanoff (p.c.) points out, the nonpalatalized initial consonant of the latter could have been introduced analogically from the derivationally related verb *k^{h}orê* '(s)he scratches him/herself' if the latter is inherited (or was created early enough in the prehistory of the language). But while Hübschmann 1897:503 does list both verbs, only the former is listed in Jungmann and Weitenberg 1993; and though the latter work is not a full concordance of all Classical Armenian texts, it does cover the oldest texts reasonably well. — Note that it is the *full* satem merger that is at issue here; it is clear that delabialization of the labiovelars and affrication of the PIE "palatals" are individually repeatable changes. There is some evidence that

1. absent
2. present

12. "ruki"-retraction[19]
    1. absent
    2. present
13. obl. du./pl. case endings
    1. *-b^h-
    2. *-m-
    3. &c. no similar endings
14. initial *d- in *(d)ákru 'tear'
    1. present
    2. absent
    3. &c. different word
15. *k^w ... k^w in place of majority *p ... k^w
    1. absent
    2. present
    3, 4. evidence unclear[20]
16. primary derivational noun suffix(es) including *-ti-[21]
    1. *-ti- only
    2. also *-ti-$h_1$en-
    3. evidence unclear
17. outcome of *-tst-
    1. no change
    2. -tt-
    3. *-ts- (> -ss-)
    4. – 8. -st-[22]
    9, 10. no clear examples

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the satem merger spread from Indo-Iranian into Balto-Slavic; see Hock 1986:442-4 with bibliography p. 667.

[19]See Andersen 1968 on the development of this change in Balto-Slavic.

[20]None of the relevant words occurs in Hittite. Since the PIE node falls between Anatolian and the rest of the family, that raises the (admittedly not very likely) possibility that the traditional statement of this sound change should be reversed (there are no counterexamples); for that reason we have also assigned a unique state to PIE.

[21]It seems clear that Hitt. *-uzzi-* (e.g. in *ispantuzzi-* 'libation') reflects *-ti- with resegmentation; relic *-zi-* also occurs sporadically, e.g. in *ēlzi-* 'scales' (cf. Melchert 1994:136). We judge it unlikely that the innovative state 2 arose also in non-Italo-Celtic languages but was later lost without a trace; one would expect to find at least a few relic forms.

[22]It seems likely that this development could have occurred independently more than once (hence our coding). The same might conceivably be true of the development to *-ts- (and ultimately *-ss-*); if so, the Germanic pattern of shared states discussed toward the end of section 2 becomes even easier to explain.

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The Horse in East Asia: Reviewing the Linguistic Evidence

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In Central Asia, the terms used to denote the horse are basically different in each genetic group of languages: Indo-European (*equus* etc.), Ugric (**lox*), Yeniseic (**kuqs*) and Turkic (*at*). By contrast, the major languages and language families of East Asia share what appear to be reflexes of a single primary name for the horse: Mongolic (*morin*), Tungusic (*murin*), Korean (*mar*), Japanese (*uma*) and Chinese (*ma*). This situation suggests that the horse was introduced to East Asia from a single source, possibly by a single wave of cultural impact. These as well as other equine and equestrian terms give concrete indications as to how, when, and by what routes the innovations of horse breeding and horse riding arrived in and diffused over East Asia. The present paper is a state-of-the-art survey of the relevant linguistic data and their ethnohistorical implications.

Introduction. In the expansion and distribution of both cultural and linguistic elements, it is a well-known regularity that the primary center of any given innovation tends to exhibit a greater degree of internal diversity than the peripheries, only secondarily encompassed by the innovation concerned. If we did not know from archeological evidence that the horse was domesticated somewhere in Central Asia, we could surmise that this was so in view of the diversity of the terms denoting the horse in the languages and language families today distributed in and around this region. Thus, each genetic group typically has a word of its own for the horse: Indo-European **ek´w-os* > Latin *equus* etc. (IEW 1.301–302), Ugric **lox* > Hungarian *ló*: *lova-* etc. (UEW 863), Yeniseic **kuqs* > Kott *xuç* etc. (Starostin 1982: 156), and Turkic *(*x*)*at* > Turkish *at* etc. (EST 1.197–198). It is reasonable to assume that each of these genetic groups was since ancient times familiar with the horse, and that the words for the horse existed already at the time when the animal was being domesticated.

It has, however, to be noted that the protolanguages listed above belong to very different chronological levels, rendering the absolute chronology of the domestication of the horse difficult to assess on the basis of linguistic criteria alone. The most ancient level, corresponding to the Neolithic period of cultural evolution (apparently some 5,000 to 7,000 BP) is represented by Proto-Indo-European, while Proto-Ugric, Proto-Yeniseic and Proto-Turkic are all entities roughly datable to the early Iron Age (not much earlier than

2,000 BP). This suggests that it may, indeed, have been the very Proto-Indo-Europeans who first domesticated the horse, though we cannot rule out that the animal was at the same time already known to the linguistic ancestors of the Ugrians, Yeniseians and Turks. The single region that could have formed the primary source of horse culture for all these groups would have been located in the steppe belt between the Southern Urals in the west and Western Altai in the east. The important thing is that none of the groups concerned can be shown to have borrowed the basic term for the horse from any other identifiable ethnolinguistic entity.

However, borrowing of equine terminology must also have taken place in the peripheries of Central Asia, and any look-alikes should be examined from this point of view. It has, for instance, been noted that the Ugric word **lox* is reminiscent of Turkic *ulag* 'relay horse' (EST 588–590) and its Mongolic pendant *ulaxa/n* (Sinor 1965). Alternatively, the Ugric item has been compared with a Tocharic word of Indo-European origin for 'game, beast' (Napol'skikh forthcoming). Unfortunately, neither of these identifications is linguistically without problems, and the external likeness of the words concerned may well be accidental. A much more concrete case of lexical similarity is observed between Proto-Samoyedic **yunta* 'horse' (SW 49) and Ancient Turkic *yunt* (id.). A borrowing from Turkic into Samoyedic is normally assumed in this case (Róna-Tas 1980), but it has also been suggested that the word might originally derive from an otherwise unknown and subsequently extinct Central Asian language family (Sinor l.c.), an assumption corroborated by the dominance of **(x)at* as the basic term for the horse in Turkic.

It may be noted that Ugric and Samoyedic, though both genetically related and areally adjacent to each other in the context of the Uralic language family, do not share a common word for the horse. This probably means that the Proto-Uralians, a Neolithic or Mesolithic ethnic entity preceding the Proto-Indo-Europeans by at least a couple of millennia, were not yet familiar with the domesticated horse. This is also evident from the variety of words used for the horse in the European branches of Uralic, such as Permic (*)*völ* (UEW 2.563–564), Mordvinic *lishme* (UEW 689), and Finnic (*)*hepo* (SSA 1.156, borrowed from Indo-European). However, it should not be forgotten that even Indo-European, in spite of **ek'wos*, shows an internal diversity whose origins are not always easy to explain. Among the Indo-European branches and languages of Europe, such as Germanic, we find a number of completely different words for the horse even in closely related languages, as is well exemplified by English *horse* (ODEE 488), German *Pferd* (EWD 540), and Swedish *häst* (SEO 1.390), not to mention the other branches of Indo-European.

Against this diversity and variation in both Central Asia and, as it

seems, also Europe, it is surprising to observe how uniform East Asia is with regard to the terms for the horse. In the following, the etymological material is dealt with separately for each major language family in the region, after which some conclusions are drawn from the possible historical background of the situation.

1. Mongolic. The Mongolic word for the horse is **mori/n*, ending in an unstable stem-final nasal (alternating morphophonologically with zero). The word is attested in all the modern Mongolic languages in a more or less identical shape (MCD 487, Poppe 1955: 28). The Proto-Mongolic shape is preserved as such in Khamnigan and Moghol *mori/n*, while secondary processes have transformed the basic form (absolutive/nominative singular) of the word into *mory* in Khalkha (with non-initial-syllable vowel reduction and loss of the unstable stem-final nasal), *mör* in most of the Inner Mongolian dialects (with additional Umlaut and final vowel loss), and *mör/n* in Oirat (with the stem-final nasal preserved).

The only aberrant feature is observed in the language of the Eastern Yellow Uyghur, where the vowel of the initial syllable is recorded as long, *moore* (also with non-initial-syllable vowel reduction and loss of the unstable stem-final nasal). Our understanding of the areal and genetic position of Eastern Yellow Uyghur (Shira Yughur) is still too limited to allow the long vowel to be explained as being due to a specific diachronic process (cf. Bao & Jia 1992). However, there is no reason not to assume that the length of the vowel is secondary in some way or another. Either it is a question of a sporadic case of irregular lengthening, or we are dealing with a combinatory development whose background remains to be specified.

Assuming that vowel harmony was originally a feature covering also the vowel **i* (< **i/*ï*), the original Pre-Proto-Mongolic shape of **mori/n* may be reconstructed as **morï/n*. Assuming further that the unstable stem-final nasal (secondarily lost in many modern Mongolic idioms) is an element (class, gender, number, or case suffix) secondarily added to the simple stem, the original shape of the item must have been **morï*. This is also the stem on which the corresponding collective derivative (nominative plural) form **morï-d* > *mori-d*, still preserved by most of the modern Mongolic languages, is based (Poppe 1955: 178–179). Since Proto-Mongolic is located at a very shallow chronological level (11th to 13th centuries CE), the shape **morï* may be assumed to have existed in the language during some unspecifiable earlier period, possibly just a few centuries before the rapid expansion of the historical Mongols.

2. Tungusic. The Mongolic word **mori/n* has been borrowed into several Tungusic idioms: Manchu *morin*, Solon Ewenki *morin*, Orochen Ewenki *morin*, Khamnigan Ewenki (Urulyungui dialect) *morin* (SSTM

1.558–559). The Tungusic idioms in question belong to those whose contacts with Mongolic have continued up to the present day, and in each case we may assume that the word was borrowed separately from a different Mongolic language: from General Eastern Mongol into Manchu, from Dagur (if not Manchu) into Solon Ewenki and Orochen Ewenki, and from Khamnigan Mongol into Khamnigan Ewenki. The date of all these instances of borrowing is late, in any case not earlier than the Ming period of Chinese history. It is particularly noteworthy that even the Manchu, a nation often pictured as horseriding conquerors (though apparently more correctly to be understood as settled agriculturalists), borrowed their current word for the horse so late from a neighboring ethnic group. The reason is obvious, in that the Mongols had during the Yuan dynasty become *the* Horseriders in East Asia, and their cultural impact on the Jurchen ancestors of the pre-Qing Manchu is hard to exaggerate.

The Tungusic term for the horse has, however, also another shape: **murin*, as attested (with regular phonological variants) in Siberian Ewenki *murin*, Khamnigan Ewenki (Borzya dialect) *murin*, Ewen *muran*, Ulcha and Orok *muri(n)*, Oroch *muri(n)*, Udeghe *muyi(n)* (cf. Cincius 1966). Importantly, this shape is also attested as †*mulin* = *murin** in Jin-period Jurchen, the medieval ancestor of the Manchu language. The segment (*) *u* in this item has been affected by the regular areal process of vowel rotation, variously manifested in all the Tungusic languages (Janhunen 1981). In its extreme form, vowel rotation has led to the lowering of **u* into **o*, as in Nanai *mori(n)* and Neghidal *moyin* (with an additional areal development of the vibrant into a palatal glide, cf. Pevnov 1994). Although we have in these cases a complete merger of **u* and **o*, the general framework of Tungusic lexical distribution allows the original shape to be reconstructed unambiguously as **murin* < **murïn*. There is, consequently, a clear material difference in Tungusic between those items of the *morin* type which are recent borrowings from various Mongolic languages, and those which represent a secondary rotational transformation of the *murin* type.

When we eliminate the late borrowings going back directly to Mongolic (*) *mori/n*, we are left with **murin* as the only original Proto-Tungusic shape of the word for the horse. This situation is further confirmed by the fact that Tungusic **murin* has also been borrowed by the non-Tungusic (Palaeo-Asiatic) Ghilyak language. The borrowing must have taken place a rather long time ago (apparently either from early Jurchen or from the mediaeval ancestor of Nanai-Ulcha into Pre-Proto-Ghilyak), since the word has been affected by several specifically Ghilyak phonological developments: **murin* > Proto-Ghilyak **murng* (with non-initial vowel loss and velarization of the final nasal) > modern Sakhalin Ghilyak *murng* vs. Amur Ghilyak *mur* (with additional loss of the final nasal).

It is generally assumed that Tungusic **murin*, though vocalically different from Mongolic **mori/n*, is also ultimately a borrowing from Mongolic (Doerfer 1985: 25 No. 51). In view of the wide distribution of the word in Tungusic (all branches, all languages), the borrowing could be technically dated as Pre-Proto-Tungusic, corresponding to a time possibly as early as the last centuries BCE. The word might, however, also have initially been present only in early Jurchen, from where it could well have been borrowed on a secondary areal basis into the other branches of Tungusic.

The big problem with **murin* is that no shape of this kind is known to occur in any living Mongolic language. Since, on the other hand, there is no evidence suggesting that a development **morin* > **murin* would ever have taken place on the Tungusic side, the shape **murin* or **muri/n* must be identified as primarily Mongolic. There are two possibilities:

(a) Either the original Mongolic shape was **murï/n* > **muri/n*, which, after having been transmitted into Pre-Proto-Tungusic, was replaced by the actually attested shape **mori/n;*
(b) or the original Mongolic shape was **morï/n* > **mori/n*, which was replaced by **muri/n* only in a special branch of Mongolic, from which the Tungusic items reconstructable as **murin* would immediately derive.

The first possibility (a) can be eliminated in the light of a parallel case offered by the word for the sheep, Mongolic (*)*koni/n* (MCD 364, Poppe 1955: 131). In the modern Mongolic languages this word shows exactly the same phonological developments as **mori/n*, including, interestingly, the lengthening of the vowel in Eastern Yellow Uyghur, where the recorded shape is *xoone*. Again, Tungusic shows two layers of borrowing: one going back to **kunin* and today apparently preserved only in Khamnigan Ewenki (Borzya dialect) *kunin* (according to the personal field materials of the author), and the other representing the shape **konin* and recorded from the rest of the Tungusic idioms. In this case, the shape **konin* is also attested in Ghilyak as *xoñ*. Now, Mongolic (*)*koni/n* < **koñï/n* is itself a well-known loanword, borrowed from Turkic (Pre-Proto-Bulgharic) **koñï* (TMEN 3.563–565 No. 1590). Since the Turkic source item contains the vowel **o*, it may be concluded that the shapes **kuni/n* and **muri/n* in Mongolic are both secondary.

The second possibility (b) is therefore the only plausible explanation of the seeming incompatibility between Mongolic **mori/n* and Tungusic **murin*. The Mongolic language from which both **murin* and **kunin* were borrowed into Tungusic may be tentatively identified as one of the Para-Mongolic idioms once spoken in the western half of Southern Manchuria, the territory of the

medieval Khitan (Janhunen 1995). We do not know what the exact conditions of the development **mori/n* > **muri/n** were in this branch of Mongolic, but, in view of the parallel case **koni/n* > **kuni/n**, it may well have been a question of a regular combinatory process affecting the vowel combination **o–*ï*.

It has, incidentally, been suggested that the shape **muri/n* was once peculiar to a specific 17th century dialectal variety of Dagur (Doerfer 1985: 167–168), a language often considered the direct descendant of Khitan. However, the factual basis of this line of reasoning is defective. Even if there may have been a secondary combinatory development **o* > *u* in this idiom (better classified as a variety of Khamnigan Mongol), Tungusic **murin* represents a much more ancient chronological level. There is no specific reason to assume that the Para-Mongolic language from which **murin* and **kunin* were borrowed was in any direct relationship with Dagur, nor with any other Mongolic language preserved today.

The conclusion is that the Tungusic shape **murin* derives from a subsequently extinct Para-Mongolic language, presumably once spoken in the neighbourhood of Jurchen in Southern Manchuria. Paradoxically, in the Mongolic context the shape **muri/n* is innovative, but in Tungusic it represents the more archaic state, since it was in this very shape that the word for the horse was initially borrowed into Tungusic. Ultimately all the Tungusic and Mongolic items concerned derive from the uniform Pre-Proto-Mongolic shape **morï*.

3. Koreanic. The modern Korean word for the horse is *mar* (*mal*), but we know that the premodern shape was *mår*, containing the low rounded central vowel (*)*å*, which has later merged with (*)*a* (Lee 1977: 240–242). In the framework of vowel rotation, the segment (*)*å* represents the rounded middle vowel **o* of the original Pre-Proto-Koreanic paradigm (Janhunen 1981). If we further recognize the factor of vowel elision in non-initial syllables, well documented for Koreanic from other kinds of evidence, the original shape of the word for the horse in Pre-Proto-Koreanic may be reconstructed as **morV*.

Although Korean is a single-liquid language of the East Asian type with no possibility of distinguishing between **r* and **l*, and although the quality of the stem-final vowel in **morV* also seems impossible to verify, the relationship of the Koreanic word with Mongolic **morï* is transparent enough to suggest an etymological connection. Of course, we do not not know whether there was a direct linguistic contact between Pre-Proto-Mongolic and Pre-Proto-Koreanic. Perhaps more probably, there was a chain of borrowings involving an unknown number of unidentifiable intervening languages. It is, however, important to note that Mongolic **morï* and Koreanic **morV* clearly represent a single original word shape, from

which Tungusic **murin* and its presumable Para-Mongolic source are separated by a secondary vowel development.

4. Sinitic. Compared with the Mongolic and Tungusic items, the Chinese word for the horse, represented in Mandarin as ^{3}ma, shows the important difference of being monosyllabic. There is, however, a consensus that the monosyllabic roots of the modern Sinitic languages go back to considerably more complex bisyllabic or polysyllabic structures of Pre-Proto-Sinitic (cf. e.g. Shafer 1974: 11). Also, it seems reasonable to accept the idea that words of the type ^{3}ma (and a number of other types) originally involve a medial vibrant (Baxter 1992: 258–269, 775), yielding the reconstruction **mraq* for Old or Ancient Chinese (with **-q* standing for the tonal structure, possibly once represented by a segmental glottal stop). The vibrant may have been present in the actual phonological structure of this and other similar words as late as the Eastern Han period (1st to 3rd centuries CE, Starostin 1989: 687). The written character for the horse (馬) is, however, recorded in Chinese much earlier, and an ancestral shape of the modern ^{3}ma may well be assumed to have been present in the language already during and before the Shang period.

The phonological similarity of **mraq* with Pre-Proto-Mongolic **morï* is obvious, especially if we think that the tonal structure of this word type might be connected with the loss of an original initial-syllable vowel, i.e. **mraq* < **mVra*. The conclusion lies close at hand that this similarity is due to borrowing between some early forms of the two protolanguages. Since there are historical reasons to assume that the Chinese were not the original domesticators of the horse, but received this innovation from the Northern Barbarians (cf. e.g. Creel 1965), it is natural to assume that the word for the horse was also borrowed, possibly directly from Pre-Proto-Mongolic into Pre-Proto-Sinitic. The word has also been further transmitted from Sinitic into a number of Southeast Asian languages, notably those of the Burmic group, where shapes of the types (*) *mrang-h* > *myin-h* (Burmese) and *gù-mrà* (Kachin) are attested (Starostin 1989: 147). In view of the phonological relationships, the borrowing may be assumed to have taken place from Ancient (Old) Chinese or Pre-Proto-Sinitic into Pre-Proto-Burmic, perhaps during the Han period.

The only linguistic argument against the assumption of a borrowed origin for Sinitic **mraq* could be offered by data showing that the word derives from Proto-Sino-Tibetan. If this were the case, the modern Southeast Asian data containing the root (-) *mra*(-) could simply be viewed as genetic cognates of the Sinitic item. Chronologically, this would place the Sino-Tibetan horse term to a level comparable with Proto-Indo-European, if not earlier, an assumption that would be poorly compatible with the archeological material. Nevertheless, in support of this speculation, and in reference

to the Sino-Tibetan prefix system (cf. Shafer 1974: 20–35), it has been suggested that the Sinitic word should be analyzed as **m-raq**, allegedly composed of the prefix **m-* plus the primary root **-raq* < **-rang*. The same root is supposed to be present in **s-rang* 'horse', a parallel derivative involving the prefix **s-* (Baxter 1994: 27). At the current stage of Sino-Tibetan comparative studies it appears technically rather difficult either to prove or to disprove this argumentation, but it is clear that Sinitic **mraq* would not be an item to be included in any critically selected list of Sino-Tibetan lexical cognates (cf. Coblin 1986).

Without going into the other terms used for the horse in the modern and ancient languages of Southeast Asia, it may be noted here that, unlike the Burmic branch, the Bodic (Tibetan) branch of Sino-Tibetan uses a word of its own for the horse: (*)*rta* (Róna-Tas 1966: 90 No. 610). This would certainly be an interesting object for further etymological research, separate as it seems to be both from Sinitic **mraq* and from the known Central Asian terms for the horse. Possibly, it should be explained as being itself part of the original diversity of the Central Asian equine terminology.

5. Japanic. Like modern Chinese ^{3}*ma*, modern Japanese $^{2.3}$*uma* 'horse' is also separated from the Mongolic, Tungusic and Koreanic words for the horse by the absence of a vibrant segment. Additionally, the Japanese item contains an initial vowel whose origin and relationship with the rest of the word remain unclear: *$^{2.3}$*u-ma*. Nevertheless, it is common to view this vowel as a secondary element, perhaps connected with a phonological development (sporadic vowel prothesis before an initial labial nasal), or, alternatively, as a separate morpheme (the first element of a bisyllabic compound word). Whichever alternative is adopted, the basic root of the word for the horse in Japanic may be restored as **ma*. This, on the other hand, is conspicuously similar to both Chinese ^{3}*ma* and Korean *mar* (Martin 1987: 561), leaving only the question as to what the exact route was through which the word arrived on the Japanese Islands.

Certain potentially diagnostic Ryukyu cognates of Japanese $^{2.3}$*uma* show shapes of the type *nman* resp. *qman*, suggesting that the word in Proto-Japanic originally ended in a nasal, i.e. **u-man* (Martin 1987: 74). The nature of this nasal (primary or secondary, combinatory or non-combinatory, radical or suffixal) remains, however, unclarified, and no unambiguous diachronic conclusions can be drawn from it. At least for the time being, the nasal segment can hardly be regarded as a concrete trace of any previous consonant, such as the vibrant **-r-*, which could be assumed to have been present in the word on the basis of both Sinitic and Koreanic. In view of both internal and external information, the Pre-Proto-Japanic shape of $^{2.3}$*uma* can therefore be reconstructed as *(*u-*)*ma*(*-n*), a complex form

apparently built around the simple core **ma*.

Since Pre-Proto-Japanic **ma* is clearly more ancient than the known layers of direct Chinese loanwords in Japanese, among which we, of course, also find Sino-Japanese *ma* or *ba* 'horse', there is no specific reason to assume that the word came from the Sinitic side. Moreover, any horses and horseriders arriving in Japan in protohistorical times would have come from the Korean Peninsula, where one of the early speech communities spoke Pre-Proto-Koreanic. On the other hand, the phonological relationship between Pre-Proto-Japanic **ma* and Pre-Proto-Koreanic **morV* is not immediately clear, making the assumption of a direct borrowing from Koreanic into Japanic rather unlikely. As I have argued elsewhere (Janhunen 1996: 196–210), parts of the Korean Peninsula were once inhabited by populations speaking ancestral and parallel forms of Japanic (Pre-Proto-Japanic and Para-Japanic), later assimilated by Koreanic. Most of the non-Sinitic lexical parallels between Koreanic and Japanic are therefore to be explained as being due to a Japanic substrate in Koreanic. It is, however, questionable whether the word for the horse would at all have been transmitted *between* the two languages, for it may as well have reached both of them from some third non-Sinitic language, spoken in the more continental parts of Manchuria.

Assuming that Japanic **(u-)ma(-n)* and Koreanic **morV* derive from a single source language, perhaps Pre-Proto-Mongolic, we still have to explain the shape of the Japanic word. Compared with both Koreanic **morV* and Mongolic **morï*, Japanic **(u-) ma(-n)*, like modern Chinese ^{3}*ma*, has the important peculiary of containing no segment corresponding to the original intervocalic liquid **-r-*. It is therefore interesting to learn that a process of **-r-* loss has actually been postulated for Pre-Proto-Japanic on the basis of a number of other Japano-Koreanic lexical parallels (Whitman 1990). If this process could be documented with generally acceptable material evidence, we could obviously trace Japanic **(u-)ma(-n)* back to an earlier **mVrV*, though we would still be unable to explain the development of the vowel qualities. Unfortunately, the verification of the hypothesis concerning **-r-* loss is still incomplete, and it remains to be seen whether it can be accepted as a fact upon which other conclusions of Japanic linguistic history can be built.

In this situation, although definitely connected with the areal complex formed by Mongolic **morï*, Koreanic **morV*, and Sinitic **mraq*, Japanic **(u-)ma(-n)* presents technical problems which do not yet allow an unambiguous phonological and chronological interpretation. Most probably, the word was transmitted separately into both Pre-Proto-Japanic and Pre-Proto-Koreanic on the Korean Peninsula from the north during the protohistorical period, when horses begin to be documented in the archeological material. The difference in the material shapes of Japanic **-ma-* and Koreanic **morV*

suggests that the phonology of Japanic, as a whole, has undergone prehistorical reduction processes much more destructive than those observed in Korean. In this respect, Japanic is reminiscent of Sinitic.

7. Conclusion. Among the major language families distributed in East Asia, Japanic, Koreanic and Tungusic (with Ghilyak) have clearly received their word for the horse from an external source. The ultimate source of borrowing in all of these cases seems to have been Mongolic, the main intermediator of Central Asian influences to Northeast Asia. The same word in Sinitic (with Burmic) could, from the chronological and phonological points of view, also well derive from Mongolic, though it cannot be ruled out that both Sinitic and Mongolic received the item from a common third source.

Although the *areal* background underlying the distribution of the word for the horse in East Asia is today, with the possible exception of the Sino-Tibetan data, a generally recognized fact, it has to be mentioned that in the past many proponents of the so-called Altaic Hypothesis have preferred to explain the situation in a *genetic* framework, claiming that the Mongolic, Tungusic, Koreanic as well as, possibly, Japanic data all derive from a uniform Proto-Altaic root of the type **mVrV* (cf. e.g. Ramstedt 1949: 138; Novikova 1975: 41–51). However, even without going into the question concerning the overall validity or invalidity of the Altaic Hypothesis (now increasingly often rejected), we may confidently dismiss this particular Proto-Altaic "etymology" for three reasons:

(a) It is generally recognized that, if there ever existed such an entity as Proto-Altaic, it would have to be dated back to a chronological level preceding Proto-Indo-European and even Proto-Uralic. From the point of view of cultural history, it is extremely unlikely that any equine or equestrian terms could have survived from this remote period (dated, say, 8,000 to 10,000 BP). It is true that Altaic genetic comparisons have always been characterized by a curious anachronism, due to which the names of even very late equestrian innovations, such as the saddle and the stirrup, have occasionally been thought to derive from the Proto-Altaic period (Poppe 1960: 68, 82).

(b) As demonstrated above, the phonological relationship between Mongolic **morï/n* and Tungusic **murïn* can only be explained by assuming an areal contact involving a subsequently extinct aberrant branch of Mongolic (Para-Mongolic). There is simply no way to force the two different material shapes into an internally consistent system of Altaic comparative phonology. Analogous problems are encountered with other equine and equestrian terms, such as the words for the stirrup (Róna-Tas 1973).

(c) The root **mVrV* is not attested in Turkic, one of the principal entities within "Altaic". In fact, almost all of the equine terms in Turkic and Mongolic are different (Clauson 1965: 166; Doerfer 1995: 211), suggesting that the innovations connected with the domestication of the horse reached the linguistic ancestors of the Turks and the Mongols from different directions and at different times. When viewed in the Central Asian context, Mongolic would seem to be the easternmost linguistic entity that is characterized by an overwhelmingly autochtonous equine and equestrian terminology.

In this context, it is, however, important to note that the original homeland of Mongolic (with Para-Mongolic) was apparently not located in Central Asia in the strict sense, but, rather, somewhere on its northeastern periphery, most probably in the western half of Southern Manchuria. In spite of the historical significance of the Mongolian horseriders and the Mongolian pony (Alekseev 1990), the linguistic ancestors of the Mongols would seem to have lived rather far away from the site where the horse was first domesticated. It is therefore possible that the Mongols received their basic horse terminology from some non-Mongolic ethnic group which inhabited the Mongolian steppes during the early protohistorical period.

It must be further noted that, since Mongolic **morï(-/n)* has no etymological counterpart in Turkic, the word may be assumed to have existed in the ancestral form of Mongolic already before any major contacts with Turkic. Such contacts (which, incidentally, are responsible for the illusion of Altaic genetic unity) seem to have been initiated only during the so-called Hunnish period (ca. 300 BCE to 300 CE) between the protohistorical entities known in Chinese historiography as the Xiongnu (the "Eastern Huns") and Xianbei (Janhunen 1996: 185–189). In this framework, the Mongolic (Pre-Proto-Mongolic) Xianbei did, in fact, borrow a few equine and equestrian terms from the Turkic (more exactly, Para-Turkic or Pre-Proto-Bulgharic) Xiongnu, the most notable example being offered by Mongolic **adïrga* 'stallion', deriving from an early form of Turkic **adgïr* id. (Doerfer 1995 passim; cf. Poppe 1960: 4–5)

Assuming that Mongolic **morï* as well as Sinitic **mraq* (possibly received through Mongolic) are pre-Hunnish borrowings from some non-Turkic Central Asian language, there are very few chances for a concrete identification of the actual source. It would, of course, be tempting to draw the early eastern Indo-Europeans into the speculations, and it happens that a word occasionally mentioned in this context is Indo-European **mar(-)ko-* 'horse' (IEW 1.700). However, the latter word is only attested in two far-away branches of Indo-European, Celtic and Germanic (English *mare*), and there is no reason to regard it as anything but a secondary regional innovation in

the European sphere. The historically documented eastern branches of Indo-European show regular reflexes of **ek´w-os* as the normal appellation of the horse, as is exemplified by Tocharic A *yuk* and B *yakwe* (Van Windekens 1976: 611). If the East Asian words for the horse derive from Indo-European, it is difficult to explain why they are based on a root other than **ek´w-os*.

To cope with some of these problems, it has been suggested that it is, in fact, not the Mongolic and East Asian word that was borrowed from Indo-European but vice versa (e.g. Gamkrelidze 1994: 41). This is, unfortunately, an equally unlikely possibility both for geographical and linguistic reasons. Phonologically, the East Asian and Indo-European data have conventionally been bridged by hypothetical (? Pre-Proto-Mongolic) reconstructions of the types **mor-ka** or **mor-kin**, but it has to be said that no single one of the relevant East Asian languages shows any evidence of such shapes. Both the vocalism (in Mongolic originally **o*) and the internal consonantism (all over East Asia **-r-*, not **-r-k-*) remain incompatible. A further problem is that, if the word is supposed to have been transferred between Mongolic and some early form of Indo-European, the external circumstances of such a contact would have to be explained. The earliest documentable (though still controversial) zones of linguistic contact involving Indo-European in Central and East Asia are those between Tocharic and Sinitic, on the one hand (cf. Pulleyblank 1966), and between Tocharic and Turkic, on the other (Róna-Tas 1974). It is possible, and even likely, that some items of cultural lexicon connected with cattle breeding were transmitted from Tocharic (and Iranic) through Turkic into Mongolic (and further into Tungusic), and the possibility of an opposite flow of cultural lexicon cannot be ruled out. However, there seems never to have been a direct contact between Indo-European and Mongolic (Pre-Proto-Mongolic). Therefore, the similarity between **mar(-)ko-* and East Asian **morï* is most probably simply accidental.

What is important in the East Asian data for the 'horse' is, in other words, not the presence of occasional look-alikes elsewhere in the world, but the overwhelming dominance of the root **morï* in all the major languages of the region. The linguistic evidence clearly shows that the horse was introduced to East Asia in a rather rapid wave of cultural influence, originally radiating from a single horse-breeding population in Eastern Central Asia. We do not know the linguistic identity of this population. They may have been related to the later Mongols, but more probably they just represented one of the prehistorical ethnic groups once living in the western neighborhood of the Mongols, in the region of Southern Mongolia and Eastern Turkestan. Their linguistic and cultural relationship with the Bronze and Iron Age Europoid Mummies of Xinjiang remains a tantalizing but scientifically unverifiable possibility.

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EWD Friedrich Kluge. *Etymologisches Wörterbuch der deutschen Sprache.* 22. Auflage, neu bearbeitet von Elmar Seebold. Berlin & New York: Walter de Gruyter, 1989.
IEW Julius Pokorny. *Indogermanisches etymologisches Wörterbuch* 1–2. Bern & München: Francke Verlag 1959.
MCD Sun Zhuzhu 孫竹主 ed. *Menggu yuzu yuyan cidian* 蒙古語族語言詞典. Xining 西寧: Qinghai Renmin Chubanshe 青海人民出版社, 1990.
ODEE *The Oxford dictionary of English etymology.* C. T. Onions, ed. Oxford: Clarendon Press, 1966.
SEO Elof Hellqvist. *Svensk etymologisk ordbok* 1–2. Tredje upplagan. Lund: Liber Läromedel, 1980.
SSA *Suomen sanojen alkuperä. Etymologinen sanakirja* 1–3. Helsinki: Suomalaisen Kirjallisuuden Seura, 1992–.

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Languages of the Dead

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The question of the languages of the mummies of western China is important because language is a critical component of cultural identity. In fact, by recovering words from a lost language one can recover, virtually re-experience, the lost thought of a people, albeit in a skeletal, fossilized form. There are four sources for delimiting the possible languages of a vanished population. First, the etymology of ethnonyms can determine the cultural roots of their dead bearers. Second, non-native vocabulary in attested languages can reveal hitherto unknown languages. Third, oronymy and hydronymy are the most conservative toponymy and can reveal ancient origins. Fourth, surviving or attested languages from an area are the obvious, "default," form of what was spoken earlier and frame the history of a region within well-defined limits.

As a case of the first category, I examine onomastic evidence from the enigmatic Hephthalites. The findings are mixed, suggesting Iranian-like and non-Indo-European admixture. The second category awaits more extensive research. For the third category, I give common toponyms and hydronyms from the three indigenous Caucasian families, using proto-forms where possible. If the mummies spoke a far-flung Caucasian language, then the topography should bear witness to this. The findings suggest no Caucasian links. This leaves the fourth category.

Allowing for admixture with earlier populations, and linguistic relics therefrom, the mummies of western China are most likely the newly arrived Indo-Europeans themselves in a variety of forms which are outlined, and one of which is examined.

1. Introduction The ancient mummies of European aspect discovered in the deserts of western China by Dolkun Kamberi and others immediately suggest that they have found the bodies of Indo-Europeans from the first wave of expansion (Mallory and Mair forthcoming; Mair 1995b; numerous articles in Mair, ed., 1995a; Kamberi 1994; Hadingham 1994). Yet, some have suggested that this conclusion is hasty and that these peoples may have spoken other types of languages. As an alternative, Caucasian languages have even been proposed, presumably using the argument that since many of the present peoples of this mountain area are relicts of once more widely spread peoples, many of the others might also have once

enjoyed much wider cultural dominions perhaps stretching even to China. Clearly the area of early Indo-European expansion to the east was vast and must have been home to a host of peoples who were either simply non-Indo-European speaking or perhaps speakers of languages which, though in strict terms were non-Indo-European, were distant cognates with Indo-European itself. The question is important because language constitutes one of the central pillars, if not the central pillar, of ethnic identity. At first glance the problem seems hopelessly difficult.

Few items of culture seem more evanescent than language, and yet to a linguist few things are more enduring than the languages of vanished peoples, which can echo for millennia after their passing, being preserved as words in a variety of milieus. To recognize such ancient relic words, a thorough understanding of the phonological and morphological patterns of attested languages is needed, along with the etymological significance of these patterns. Once such non-native vocabulary has been sifted out, it can be subjected to an analysis in its own grammatical terms to determine its origins. These may be from a cognate dialect, from a cognate language, or from some wholly new language. In the last case alien patterns of phonology and morphology can be conjectured which then serve as a base for further reconstruction of a lost language or even an entire lost family.

As an onomastic example, permit me to take my surname, for it exemplifies all three possibilities: well known, partially known, and enigmatic, see (1). The *-russo,* Italian for 'red,' is cognate with both English *red* and *ruddy,* and other Indo-European forms such as Old Norse *rauthr,* Lithuanian *rùdas,* Greek *eruthrós,* Sanskrit *rudhiráḥ,* and yet clearly can not derive from either of the Latin cognates, *ruber* (from Sabellian ?) or *rufus* (from Oscan, cf., Umbrian *rofu, rufru*). Its source appears to be more southern within Italic, pointing to languages where original Indo-European **-dh-y-* yielded *-s-*, as with the ethnonym *Messapian,* from the heel of Italy, which seems to reflect its location by being from *medhyu-ap- '(in the) middle-(of) water,' a designation for a peninsula, or with Greek *mesos,* note Sanskrit *madhyah,* Armenian *mej,* Latin *medius.* Gothic *midjis.* Note too that *russo* even shows Greek gemination of a consonant glide combination, for example Greek *allos* 'other,' Latin *alius,* but outdoes Greek in that **-dh-y-* in Greek was an exception to this pattern, as *mesos* shows. *Russo* therefore appears to reflect Indo-European **ərudh-yó-* seen in English *ruddy* and Old Church Slavonic *ružda.* Despite its obscure and marginal pedigree the color term has spread throughout the Latin-based linguistic fabric of modern Italian. This is an example of a "partially" known form.

The *cola-* portion is a medieval nickname for *Nicola,* much as *Klaus* is the nickname for *Nikolaus.* The *-la* is "well" known and comes

from earlier *-laus*, which is from Homeric Greek *lāós* 'people, host,' *eleútheros* 'free,' an Indo-European root, with an odd split in meaning (two homophones ?), which appears in a wide range of languages.

While also from Greek, the *Nico-*, however, is non-Indo-European *níkē* 'victory', which shows no obvious cognates anywhere in the family. It is the name of a winged female deity that was autochthonous to Greece and vicinity. It is "enigmatic."

(1) The etymology of *Colarusso*
(Gk = Greek, OHG = Old High German, ModG= Modern German, OCS = Old Church Slavonic, Lat = Latin, Skt = Sanskrit)

a. Known: *-la-* < earlier *-lao* < earlier *-laus* < Gk *lāós* 'people, host,' *eléutheros* 'free,' OHG *liut*, ModG *Leute*, OCS *liudije*, Albanian *llauz-i* 'people,' Lat *liber* 'free,' in the plural 'children,' and Venetic *louzero-phos* 'having children.'
b. Partially Known: *-russo* < IE *ərudh-yó-, from a southern Italic language with Greek-like features, cf., Gk *eruthrós*, Skt *rudhiráḥ*, Lat *ruber* (from Sabellian ?), *rufus* (from Oscan), Umbrian *rofu*, *rufru*), OCS *ružda*, English *red*, *ruddy*.
c. Enigmatic: *Co-* < earlier *Nico-* < Gk *níkē* an autochthonous goddess of Samothrace, a non-Indo-European theonym.

2. Onomastics As examples of a persistent ethnonym one may take the Armenian self-designation, *hay*, which continues Hittite *ḫattili*, which itself is the non-Indo-European (Northwest Caucasian?) self-designation of the *Hatti*. A later example is the Croatian *hrvat*, which shows a Slavic metathesis of an Iranian **hvrat*, which comes from older **xvarāta* from IE **swol-eə-to* 'sun-suffix-collective,' "those from the east," also seen in Iranian *Khorassan* and *Khwarezmia*. Non-Indo-European ethnonyms first occur in abundance with the advent of the Altaic-speaking peoples, of which the Huns and the earlier Xiongnu of the Chinese annals are considered to be the first example, even though many of their names are clearly non-Altaic (*Attila* is Gothic for 'little father,' *Bleda* looks strongly Circassian, while the Bulgar khan *Asparukh* has a transparently Iranian name, *aspa-* 'horse,' *rukh-* 'white'). The White Huns or Hephthalites are worthy of examination since they seem to have combined a number of odd features which suggest that they may have represented an archaic pre-Indo-European population that survived several millennia of Indo-European domination to re-emerge late in the historical period.

Kazuo Enoki (1955) and R. Ghirshman (1948) have devoted whole studies to these enigmatic peoples, who were classified by their contemporaries as Huns but were nevertheless considered as distinct from all other members of that "race." Apart from their white skins and "regular" features, they exhibited the highly unusual trait of

polyandry, which Enoki plausibly takes to mean that they were near Tibet (p. 236), the only known region where this practice had any real frequency. This accords with references to their origin in *Himatala*, which he takes to be the Hindu Kush region, and ultimately to be of Kaffiri origin, though he notes that several Chinese chroniclers link them with the Greater Yuezhi and consider them therefore descended from the people of Turfan (p. 232). From our perspective, their white, "regular" appearance points to a Europoid population while their polyandry points to non-Indo-European origins. They have left us a few names that may reveal something of the non-Indo-European linguistic landscape of Central Asia as well.

The name *Hun* itself shows a range of other forms, Xiongnu (earlier romanized as *Hsiung-nu*) in Chinese, *Chionite*, (*Var-*)*chonite*, *Xyaona* in Avestan (Sinor 1990b: 179), the later *Xyon*(*o*) (Sinor 1990c: 300-1) in Pahlavi, and Soghdhian *xwn* (Sinor 1990b: 179).[1] The Hephthalites were said to have been earlier called (*A*)*var*, a term occurring both separately, the *Avars*, and paired with *Hun* in *Varchonite*, taking on their later name in the fifth century (Sinor 1990: 298). The Chinese reading of the name is now pronounced *Wuhuan* and this suggests an original **xwar* with a separable **a-* prefix or a dialect variant **axwar*, both of which look vaguely Iranian[2] and tie in with one Chinese claim that the rulers of the Hephthalites were Sakas (Enoki 1955: 226). Ghirshman felt that they probably spoke an Iranian language and this gains support from the transparent etymology of their later dynastic or political designation, *Hephthalites*, which is transparently *hephtha-li-te*, with an Iranian-looking 'seven-instrumental-collective,' "the group (organized) by seven," a typical horde denotation as seen in Hunnic *Bulgar*, Turkic *Bashkir* both from proto-Altaic **baλ-*(*o*)*ĝyz* five-hordes, or in Turkic *Toquz-oghuz* nine-hordes. The root *hephtha-* is too close to an Iranian **hafθa-* to be doubted (Avestan *hapta*, Soghdhian *'βt*(*'*), Khwarezmian *aβd*, Khotanese Saka *hauda*, Ossetic *avd* (Bielmeier 1977: 105)). The form looks old because the intervocalic fricatives remain unvoiced. The first vowel, however, means the word cannot be Iranian, nor even Indo-Iranian, for it would then be *a*. It is conceivable that this *-e-* is due to

[1]Victor Mair (personal communication) has noted that the first form actually reflects a much later, modern Mandarin pronunciation of two characters used to transcribe a non-Sinitic name and is thereby misleading. The Han period pronunciation of Xiongnu (Wade-Giles romanization *Hsiung-nu*) would have been something like **huang-nâ*. Mair further notes that the Uyghur form for Xiongnu is simply *Hun*.

[2]Edwin Pulleyblank (personal communication) notes, however, that the characters for this name were probably pronounced **ʔá-ɣʷán* in Old Sinitic and seem to refer to a people who were originally Tungusic speaking from ancient Manchuria.

some mishearing via the transmitting language (Greek), but then one would have expected the same for the second vowel as well, yielding **Hephthelite*. One should note too the faithful Greek rendering of the Skythian form of the name 'Septimius,' *Aphthaímakos* (Bielmeier 1977: 105). Therefore, the form is best seen as coming from an Iranian-like language, but one of distinct pedigree, some lost branch of Indo-European that must have been adjacent to the Iranian center of origin and shared with Iranian a host of isoglosses as well as developments for a substantial period of its history. This is just what one would expect to find on the eastern margins of the Iranian world. On the western margins similar 'hybrid' words are found, such as Greek *eu-gíēs* 'well-living,' with an Iranian-like second element, instead of the expected **eu-bíēs* (but with Greek-like first element and vowels), or the toponym taken from the warm springs of southern Germany, *Germania*, with Iranian treatment of consonants and Greek treatment of vowels (cf., IE **gh*^{w}*ərm-*, **gh*^{w}*orm-* 'warm,' Avestan *garəma-*, Modern Persian *gārm*, Sanskrit *gharmá-ḥ*, Greek *th ermós*, Latin *formus*, Irish *gorim* 'I warm,' Armenian *jerm*, Old English *wearm*, Ligurian *bormo*). We might call this marginal source language for *Hephthalite* "Saka Hephthalite."

We know of three Hephthalite personal names and these are far more enigmatic (W. M. McGovern 1939: 404 ff) (cf. Khazar *Itil?*). *Ye-ti-i-li-duo*, by Chinese accounts, is beyond my capacity to interpret. *Toramana* and his son *Mihirakula* (by Sanskrit accounts) look almost Japanese. The earlier Yuezhi may have been the hypothetical **ywati* who are taken to be the Tokharians, and surely the Kushans, from their own name and that of their great founder *Kanishka*, have a strong Iranian appearance, but the Hephthalite names look distinctly non-Indo-European. To force them into an IE mold requires pure speculation that itself shows disturbingly odd mixtures of IE sub-group sound patterns. For example, one might guess that behind *Toramana* was some sort of Iranian form **tākhar-a-mān-nām* 'warrior-vowel-keeper-genitive plural,' "Keeper of the warriors" (?), with unique loss of *-kh-, and that behind *Mihirakula* was a **megh-ə-rog-ulo* consisting of the root for 'great' with an Indic-like shift of **gh* to *h*, a Hittite-like or Germanic-like shift of **e* to *-i-* in the first syllable, Sanskrit-like *-i-* vowel from a laryngeal in the second, the root for 'king', *reg-* in a unique *o*-grade (since by the current speculation the *e*-grade would have yielded **-rik-*), followed by the sort of IE diminutive one sees in *Caligula* or *Dracula*. While superficially plausible, these two etymologies suggest an Iranian-like name and an Indic-like name, the latter with a slight Tokharian flavor in the form of **-g-* to *-k-*. This seems implausible in one language, but just might work if we assumed the Hephthalites to be a composite, and the name itself scrambled. The sources suggest such a composite make-up not only by mentioning a Saka ruling class, but also by pointing out that a distinct people, the *Gujaras*, formed

part of their horde. The last name, if it has a Central Asian pedigree, is also enigmatic. The only non-procrustean interpretation of these names, however, one that makes them accord also with the Chinese attestation *Ye-ti-i-li-duo*, is to take them as evidence for a non-Indo-European language spoken by a Europoid population that was native to some portion of western China or Central Asia and which had a link to an Iranian-like ruling class or family. If one is seeking a relict population from this part of the world that is classically European in appearance but non-Indo-European in customs and language, then the Hephthalite general horde is the best candidate available and its language might be called "Horde Hephthalite."

3. Relict Vocabulary This topic deserves a depth of study which I am unable at the present to devote to it. Nevertheless, students of both Tokharian and Iranian (as well as Indo-Aryan, Dardic, and Kaffiri) recognize vocabulary items that are peculiar to these branches or sub-branches. A few of these may be of Indo-European pedigree, but are words that have been lost in all other branches. Others, however, are undoubtedly terms that have been taken from non-Indo-European languages that were spoken by populations encountered by the earliest Iranians, Tokharians, etc., as they expanded into their attested realms. The Indo-European languages from western China and Central Asia (and from India since Indo-Aryan speakers passed through Central Asia) must be sifted for such distinctive words, and these words then examined for internal patterns of distinctive form, either Indo-European but of a form external to the branch at hand, or non-Indo-European.

To my knowledge this effort has been made for Indo-European languages in Europe, but not for those in Asia. Forms from Uralic (Finno-Ugric and Samoyedic), Yeneseyan (Kett, Kott, etc.), Sino-Tibetan, and Altaic (Hunnic, Turkic, Tungusic, and Mongolic) may well be found, as well as forms from language families that have been wholly lost. Many of those features that are now considered as diagnostic of Indo-Iranian, of Iranian proper, or of Tokharian, are likely to be characteristics of these lost languages. For example the Indo-Iranian loss of vowel contrasts may well reflect the phonology of some language of Central Asia. The later Iranian proclivity for spirantization and palatalization may reflect the habits of yet another language or family. The Iranian word *don* may be of Caucasic origin, cf., West Circassian *t^{h}ane*, name for the Don (as in the Classical Greek name for this river, *Tanais*) which reflects some old Circassian **t^{h}ane-ya-* 'Don-the one of,' "the one of the Don"), or *tokhar-* 'warrior' (*twɣry* from a Uighur colophon [Lockwood 1972, 254]) which has no

obvious cognates outside the branch,[3] would seem to be a borrowing. Similarly, the Iranian toponymic suffix, *-qand(a)* 'walled town, fort,' as in *Samarqand, Kokand, Yarkand,* and perhaps too *Karaganda,* does not have any obvious Indo-European pedigree and probably reflects a borrowing from a language spoken in some of the sedentary centers of Central Asia which the nomads encountered in their expansion. The Tokharian collapse of the Indo-European stop system down to one voiceless series, as well as its strong tendency to palatalization, are strongly reminiscent of Uralic. Further, its unusual clusters with initial *y-* such as *yw-* or *yn-*, and its unusual contrasts between initial *yn-*, *ñ-* and *ñy-* (as in B *ynāñmñe-* 'respect,' *ñem* 'name' (of IE pedigree), *ñyâtse* 'danger') are also a hallmark suggesting a foreign sub-stratum. Words such as *walo* 'king' or *wñānes* 'spoke, said' seem non-Indo-European at the same time that they show a phonological pattern of *w* followed by a sonorant, strongly suggesting the sound habits of a lost language or family.

4. Hydronymy and Oronymy Toponyms and hydronyms can be very old. As an example, note that *Ur* of the Chaldees is clearly Elamo-Dravidian, cf. Dravidian *urra* 'village,' or one may note *Manhattan* (Algonkian). The most conservative of place names are those associated with rivers, lakes, and other bodies of water. Mountain names are also persistent. Witness the Delaware river (Algonkian), the Susquehanna river (Iroquoian), Lake Ontario (Iroquoian), the Appalachians (Muskoghean). The noted Indo-Europeanist, Hans Krahe, examined the "old European" hydronymy (Krahe 1954: 48-63) and uncovered an inventory of roots and suffixes (2) that reflect a language that is virtually identical with Proto-Indo-European itself (2) but without overt laryngeals (with reference to Watkins [1980]).

(2) Krahe's Old European Hydronymy
(Gk = Greek, OHG = Old High German, ModG= Modern German, OCS = Old Church Slavonic, Lat = Latin, Skt = Sanskrit, Eng = English, Hitt = Hittite)

a. *Roots* (for IE **o* < older **a*, see Colarusso [1992, pp. 22-3])

(a)is- >	later **yes-* 'to boil, foam, bubble', Eng *yeast*, Gk *zéein* 'to boil.'
al(a)-	Lat (*amb*)*ulāre* < **ambi-al-āre*, *éxul* 'exile.'
albh-	Lat *albus* 'white,' Gk *alphós* 'dull white,' OHG *Alberich* 'elf-ruler,' Old Norse *alfr* 'elf,' (= "ghostly white one").

[3]One might see a metaphor along the same lines as Hittite *tarḫ-* 'to conquer,' Latin *trāre* 'to conquer,' *trāns* 'to cross,' (whence *tyrant*, Greek *túrannos*, Latin *Tarquinius*), with the same root found in Latin *teg-*, *toga* with the sense of 'to cover,' so that the Iranian would be a 'conqueror,' with the sense of 'one who covers, goes upon his enemies.'

am(a)-> later only with suffixes **am-bhi* 'spread out, swampy-instrumental', Lat *ambi* 'around, about,' Gk *amphí* 'id.,' "shortened" Germanic form Eng *by, be(holden)*, etc., but note what may be the bare root in ModG *um-* as in *Umwelt* and *herum*, though Old Norse *um(b)* may show the suffix; and**am-bhō* (old dual of the preceding), Lat *ambō* 'both,' Gk *ámphō* 'id.,' Eng *both.*

ar(a)-> *ʔor-, *ʔer- > OHG *Ermin* 'whole, universal,' *ʔr-əy-, *ʔr-i-l- > Eng *rill*, *ʔr-əy-wo- > Lat *rīvus* 'stream,' *ʔr-əy-no- > Gaulish *rēnos* 'river,' the Rhine.

arĝ- Lat *argentum*, Hitt *ḫarkiš*, Arm *arcat^h*, all 'silver,' Gk *argḗs* 'shining (of lightning).'

av(a)-> **aw-es* 'to shine, reflect' > Eng *east, Easter*, **aws-os* > Lat *Aurōra* 'Dawn,' Gk *ēōs, héōs* 'id,' Skt *Úṣas* 'id,' in IE myth Dawn reflects upon the water of the ocean, see next item.

var(a)- variant of the preceding, < * *ʔew-r-* 'water,' Lat *ūrīna* 'urine,' *ʔow-r-* Gk *ouron* 'id.'

sal(a)- English *salt*, Lat *sal*, Gk *háls* 'salt,' *hálus* name of a river near Troy, OCS *soli*, Arm *att.*

b. *Suffixes* (forms with -o- are later, see Colarusso [1992, pp. 22-3])

-na-/-no-s secondary noun suffix

-ma/-mo-s < **m(e)n-* nominal action suffix, or Germanic/Slavic instrumental (?)

-re/-ro-s agentive suffix

Old hydronymic terms abound in western China and Central Asia. For example, *Ordos*, from western China and *Oxus*, from Central Asia, are both quite early. The former is a Greek rendering of an Indo-Aryan form, **harda-*, itself showing characteristic *h-* from IE **gh-*, and cognate with Latin *hortus* 'garden,' English *yard, garden*, Russian *gorod* 'city,' Phrygian *Gordium*, and perhaps pre-Hellenic (Pelasgian?) *kórinthos* 'Corinth.' The original word seems to have referred either to a social unit such as a horde (ultimately an Indo-Aryan form from which this English word also comes, via Turkic *ordū*) or its territory, either a city or an enclosed area (perhaps for livestock). *Oxus* is cognate with Iranian *axšaəna* 'black,' English *ashen, ash.* The *Ob'* is clearly the Iranian for 'water,' and *Don* is 'river.' A careful examination of hydronymic and oronymic terms will surely reveal pre-Indo-European or archaic Indo-European words, in the latter case even attesting to old migration routes. I shall confine the rest of the

paper, however, to a critical examination of the possible existence of some form of Caucasian language in Central Asia and Western China.

The Caucasus has roughly fifty ethnic groups, many of whom are relicts of earlier, more far-flung peoples. The Ossetians are relict Sarmatians, with *sārmā-tæ* even meaning 'free-collective', "the free (men)" in Ossetian. The Karachay may be relict Kipchaks and the Balkars even relict Bulgars. There is a habit among some scholars of assuming that many of the other peoples of the Caucasus may also be relics of once more widely spread nations. There is very little evidence to support this hypothesis.

Vague resemblances between the Northeast Caucasian family and the language isolate, Burushaski in the Gilgit-Hunza area, have been long noted: both share grammatical class systems of masculine, feminine, and a range of arbitrary neuter classifications. Linguistic or genetic links across southern Eurasia between the Caucasus and Hindu Kush may be possible (see Tuite, this volume). Most of the Caucasian languages, however, seem never to have been spoken anywhere except in or around the Caucasus, with the exception that Proto-Indo-European itself may have been a northern outlier of Northwest Caucasian (Colarusso 1992). There is some vague onomastic evidence linking the Ukrainian /-nko/ name suffix with proto-Circassian */-n-q^{w}a/, which has the same function and originally meant 'genitive case-son' to form patronymics, and there is the vague folk tradition, reflected by three arrows emblazoned on the Circassian flag, that in ancient times the Circassians migrated north, west and east.

For present purposes, however, I shall content myself with the issue of the hydronymy and oronymy of western China. If Caucasian or Caucasian-like languages were ever spoken in this region, then careful linguistic work should reveal this fact in the toponymy. To assist in this effort I have compiled hydronyms and oronyms in the three Caucasian families, South (3), Northwest (4), and Northeast (5).

(3) South Caucasian hydronyms and oronyms
(Georgian unmarked, FS = Fähnrich and Sarjbeladze 1990)[4]

lake	*t'ba-i* ← **t'ab-* (p. 290)
river	*mdinare-i*, Old Georgian (*c'ar*)*-din-*(*ebai*), ← *-din-*
water	*c'q'al-i* 'spring,' *rc'q'va* 'irrigation,' ← **c'q'-* (p. 455)
mountain	*mta-i*, diàl. *mti-* < **mət-* ?

[4]I wish to thank the kind assistance of Kevin Tuite for the South Caucasian forms. In this table and the following two C' = glottal ejective, C^{w} = rounded consonant, c̄ = pharyngealized consonant, C^{y} = palatalized consonant, C^{ː} = prolonged, tensed consonant, v̄ = long vowel, aa = coda-filling, open vowel in Circassian, vI = a pharyngealized vowel in Daghestani languages.

hill	*bor(cvi)*, *bor(ak'i)* < **bor-* (cf., IE **bher-gh-* 'mountain' ?)
valley	*xev-i*, Svan *q^{h}ev-i* (p. 455)
lowland	*dabloba*
land	*qan-* ← **q'an-* 'arable land' (p. 363)
plain	*vél-i*
town/city	*kalak-i* < Armenian *kałak*
house	(*sa-*) *x*(*-li*)
fort	*cixe* ← **ʒixe* (p. 435)

(4) Northwest Caucasian hydronyms, oronyms, toponyms (Proto-Northwest Caucasian unmarked, C = Circassian, U = Ubykh, Abx = Abkhaz, Abz = Abaza)

lake	**x̂e*, **x̂o* (**w-x̂a*), C *x̂ə*, U *šʷá*
river	**pə-ʒə-x̌o*, C *psəx̌ʷa*, U *bzá*, Abz *ʒəʕʷ*
water	*(*pə-*)*ʒə*, C *psə*, U *bzə*, Abx *ʒə*
mountain	**ƛaḥa*, C (*qʷə-*)*śḥa*, U *ƛax̂á* (forested), (but *səpqʸə* [without forest]), Abx *x̌ʷa*, Abz *šʸqa*,
land	*(*w-*)*x̂a* C *x̂a-*(*kʰʷ*), (*kʸa-*)*x̂*, (*-x̂* , suffix in regional names), U *šʷablá*, (Abz *q'raƛ*)
plain	**du*, C *də*, U *dʷə́*, *dʷə*(*sʷáx̂*), (Abz *rqa*)
town/city	**qaλa*, C *qaaλa*, U *q̄aś* < **qəλa-ś* (The U form suggests that the root is old and not a borrowing from Turkic)
house	**ĝuna*, C *wəna*, Abx *yʷna*, Abx *ʕʷna*

(5) Northeast Caucasian hydronyms, oronyms, toponyms (proto-forms are tentative, attested forms from Kibrik and Kodzasov 1990)
(R = rising tone, H = high tone, F = falling tone, L = low tone)

lake	**ʕ 'ōr*, **ʕ 'ūr* (R), Avar *ḥor*, Akhvakh *iḥʷara* (RRL), Aghul *ʕur*, Lezgin *ür*, Rutul *ʕ 'uʕ '*, Kryz *nahur*, Khinalug *novūr*
sea (1)	**xʳul-* (H), Lak *xʳiri*, Dargin *urxʳú*, Tabasaran *hül* (H), Aghul *Hul*
sea (2)	**réto-*, Avar *ratad*, Andi *reto* (H), Chamalal *yeta* (H), Tsez *ratad*
water (1)	**tʲem-*, (oblique stem) **tʲu-* (F), Avar *tim*, *tu-dū-l*, Andi *tʲen* (F), Lak *šin*, Archi *tʲan*,
water (2)	**šʳor-* (L), Tabasaran *šay*, *šitʲ-í*, (L), Aghul *šer* , Richa Aghul *xed*, Lezgin *yad*, Tsakhur *xʷan*, Kryz *xäd*, Budukh *xəd*, Khinalug *xu*, Udi *x̌e*
river	**ƛʳenc'o-* (RL), Andi *tʲensʳo* (H), Akhvakh *ƛesʳa* (RL)

	Chamalal *ƛ'es'a* (L), Tindi *ƛesa* , Richa Aghul *lec*^{w}, Burkikhan Aghul *nec*^{w}, Lezgin *wac'*, Rutul *lac'*
mountain	**mɣĕrŏ-* (oblique stem) **muɣrŏ-*, Avar *meʕer*, *miʕr-úl*, Akhvakh *muɣu* (R), Budukh *buduɣ*, Khinalug *m(ɪ)dă*, Udi *buruχ̌*,
hill	**q̄'unt'u-*, (oblique stem) **q̄'ont'o-* (F), Avar *ɣuní*, *ɣon-ŏ-l*, Inkhokvari *hun* (F) (also 'mountain'), Tsez *ḥon* ('mountain'), Ginukh *χ̌*^{w}*in* ('mountain'), Hunzib *gondu*, Archi *q̄*^{w}*éni*, Tabasaran *gunt'*, Lezgin *k'unt'*, Tsakhur *got'*^{w}, Budukh *hundur*
land (1)	**ʕarč'i* (HL), Andi *onš'i* (HL), Lak *alrš'i*, Dargin *ʕanč'íya*
land (2)	**naq'o-*, Archi *naq'*^{w} , Lezgin *naq'*^{w}, Tsakhur *n*^{w}*aq*^{w}

Clearly the three Caucasian families abound in "guttural" consonants, with the two northern ones showing numerous laterals as well. The Northeastern family further adds a set of prolonged, tensed consonants, some of which can occur geminated to produce "hyper-long" segments. The South Caucasian family has a notable series of "harmonic" clusters, actually velarized and uvularized consonants, *c'k'*, *c'q'*, *ǯg*, *ǯɣ*, etc. All three families show a three-way source feature contrast of voiceless aspirates, voiced, and voiceless ejective stops (much like revised Indo-European), and sometimes fricatives as well. The Northwest family had a four-way contrast, adding to this three-way pattern a voiceless unaspirated series, something reminiscent of Indo-Iranian within Indo-European. Northeast Caucasian had tone and Northwest shows some evidence of this as well, both therefore being reminiscent of Proto-Indo-European tone accent. Subsequent efforts to represent similar contrasts among presumed cognate words in Central Asia or western China would be difficult, and yet the overall consonantism should leave distinctive traces, for example 'tl,' 'dl,' and 'hl' for the lateral affricates and fricatives, numerous examples of 'h' or 'kh' for the guttural fricatives.

A quick perusal of available toponymy does not seem promising. I would draw the preliminary conclusion, which further research may of course alter, that no Caucasian cogeners were found in Central Asia or western China, at least north of the Iranian plateau and the Burushaski highlands of Gilgit and Hunza (if there should prove to be a genetic link between the Caucasus and Burushaski).

5. The Indo-European hypothesis In such efforts, however, one can ill afford to ignore the obvious. The mummies present sun symbol tattoos, a particular Europoid physiognomy, riding gear clothing, and a dramatic appearance in the archeological record. Taking these features with the attestation of Iranian and Tokharian in this region, one can reasonably conclude that the mummies spoke early forms of

these branches of Indo-European (Adams 1995: 403), and in the oldest cases perhaps even Indo-European itself or some late, slightly differentiated set of Indo-European dialects. Either Indo-European pattern, as is true of later forms, would have exhibited a large admixture of non-Indo-European speech acquired somewhere along the vast migration routes or in western China itself from autochthonous Europoid or Mongoloid populations. For such matters of physical appearance, however, linguistics best defers to physical anthropology and its powerful tool of DNA analysis. Perhaps even older mummies of the autochthonous population will yet be found.

In all this the investigator must be careful not to project the present into the past nor history into prehistory. Specifically, an archeological industry must not be seen as the result of a linguistic differentiation, but rather as the precondition for one. For example, the Afanasievo culture of southern Siberian is often linked with Tokharian, but at best it must be seen as a cultural drift and a geographic isolation which could have set the stage for language innovations that after several centuries might have given rise to Tokharian.

A careful analysis leads to a set of stages which may be ranked regressively as a set of filters for the linguistic material leading us successively to older strata, each with its own hallmarks,(6).

(6) Regressively ancient language possibilities

a. Iranians: words of IE pedigree and Iranian characteristics
b. Indo-Aryans, Dards, Kaffiris: relict forms of IE pedigree with sub-branch characteristics similar to Iranian, engulfed by expanding Iranians
c. Tokharians: relict forms of IE pedigree with branch characteristics divergent from the preceding, older than the Indo-Iranian expansion
d. lost branches: relict forms embedded in the preceding, with IE patterns that are unidentifiable, from languages that have been engulfed without historical attestation,
e. transitional IE branches (Saka Hephthalite): forms with IE patterns that show mixed characteristics of known groups, descendants of the early "continuum" period of dialect differentiation before later centers of expansion could engulf other dialects,
f. Proto-Indo-Iranians : relic forms characteristic of the branch at its period of unity, but of IE pedigree
g. Late ("second wave") Indo-Europeans: Indo-European forms of near pristine quality with minor deviation or a sub-set of branch features; source features would be of the "classical" form, e.g., *t,

*d, *d^h, or their reflexes,

h. Proto-Tokharians: like the preceding, but with Tokharian hallmarks,(a "first wave" language, as in [i] following),

i. Early ("first wave") Indo-Europeans: Indo-European forms of pristine quality, similar to Krahe's hydronymy of Old Europe,(2); with source features tending more toward voiceless forms, e.g., *t^h, *t', *d, or even *t^h, *t', *t,

j. phyletically linked pre-Indo-Europeans ("indigenes"): Indo-European-like forms with extreme archaisms and unusual deviations, likely to show numerous "laryngeals," in the form of fricatives such as 'h,' 'kh,' 'gh,' or other orthographic approximations,

k. non-Indo-Europeans (autochthons) (Horde Hephthalite): relics without Indo-European pedigree or pattern, appearing as isolated words at first examination, but revealing phonotactic and morphological patterns upon further investigation; such words are in abundance as the characteristic Iranian or Tokharian vocabulary which lacks IE pedigree.

6. A Lost First Wave Indo-European People A "first wave" form, category (i), may already be evident in Vedic Sanskrit in the name *Tvaṣṭṛ*, an enigmatic figure killed by the hero *Indra* and who may have been Indra's father. As *Totraz*, *Totyradz* (Ossetic), *Tawtaresh* (Circassian), *Tutaresh* (Abaza), and *Totrash* (Abkhaz), this name is continued, with suffixes *-(d)z* or *-esh*, from an Iranian source in the Nart sagas of the North Caucasus, a body of myth which has many parallels with the Vedic corpus (Colarusso 1981). The immediate source cannot be Ossetic, because the expected Ossetic development of a Proto-Indo-Iranian (henceforth PII) **twastr* would be **Tosra(dz)*, cf., for the development of *-*st*- in auslaut PII **wasti* 'woman', Iron Ossetic *us*, Digoron Ossetic *uosæ*, (Bielmeier 1977: 41). The first syllable *to*- shows the expected Iranian development of **twa*-, cf., PII **hwahā* 'sister', Iron Ossetic *xo*, while the Circassian form *Tawtaresh* is automatically from **twataresh* and shows a more conservative development, as with Proto-Indo-Iranian **hwahar* 'id.', Digoron Ossetic x^{w}*æræ* (ibid., 40). The compound nature of the name is evident from the Abaza variant *Sotrash*, with *so*- from Proto-Indo-Iranian **šwas*- 'breath, life', as in English *wheeze*, and seen in Ossetic *Soslan* < **šwas-alānām*- 'breath-(of the) Alans'. Thus, the North Caucasian evidence appears to suggest that the name was *Tva-str* and that this form was continued down to the present from an Ossetic-like language of the western steppes.[5]

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[5]This assumes, of course, that the traditional etymology of this name within Sanskrit, *tvakṣ*- 'to make' + *-tṛ* 'agent' > *tvakṣ-tṛ* > *tvaṣṭṛ* 'maker' (Lloyd Anderson, p.c.), is a folk etymology that has leaked back into the mythic

Furthermore, two Abaza Nart myths give striking suggestions as to the meaning of the name. In the first (Salakaja 1975: 103-6) the eyes of this figure, *Tutaresh*, are seen as two stars, shining like the morning star:

> "His eyes shine, as I see" said Sosruquo, "like stars. His eyes in size also resemble the sunrise star," said Sosruquo.

In the second myth (ibid., 106-109), this figure, here called *Sotrash*, has an inchoate dark form, like the night:

> Something black saw I in front of me.
> I called that black, whom I had seen,
> But he did not heed my voice or me.

The interpretation of this figure is now as startling as it is simple. The original name is to be read as two zero grades, **Tw-astr* 'two-star', with a form for 'two' which is classically peripheral Indo-European in that it shows **t*, cf., Germanic **two*, Armenian *erku* < **tku* < **tgō* < **twō*, and the form for 'star' with the original *a*-coloring laryngeal in vocalic position. The numeral cannot be Tokharian because 'two' in that language is *wu* (Mallory 1989, p. 13), though it might be Proto-Tokharian. The Tokharian (B) form for 'star', however, is *ścirye* < **ster-yo-* and this stands apart from the simple **astr*, making it unlikely that the source language was Proto-Tokharian. One should note that where more central or familiar Indo-European languages have voicing or voiced aspiration, other peripheral ones, attested in often meager but early forms, show voicelessness, cf. Sicelian *rutilos* and Ausonian (eastern Italy, cf., **aws-os* in [2] above) *Rutulos* both based on the root for 'red', or Illyrian *metu* 'middle', Messapian *mess-(ap-)* < **metya-(ap-)* 'between-waters' (at the heel of Italy), both from < **medh-yo-*, or Pelasgian (?) *Kórinthos* < **ghor-ent-os*, based on the root for 'city, enclosed area for the horde,' not to mention the voicelessness characteristic of both Anatolian and Tokharian, even if the last probably shows substratal influence, or that already noted within Germanic and Armenian. **Twastr* thus falls naturally into this set of forms from peripheral, and therefore, old languages.

The form **Twastr*, therefore, may be from a lost "first wave" Indo-European language. It may have been the name of a syncretistic stellar god (the morning and evening stars), combining the iconography of the Divine Twins, Castor and Pollux and their cogeners. In the Nart

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corpus, just as Greek *amadzón* 'Amazon' is taken from *a-madzós* non-breast, with its corresponding fable, when it is transparently Circassian *a-mez-án* the-forest-mother, a warrior woman who has been borrowed into Greek (Colarusso 1989).

sagas this figure is supremely ferocious and mighty, and can only be defeated by the guile of a hero who is a generation younger than he. He may have been an earlier hypostasis of the Divine Twins, perhaps even their father. If so, then outside Indo-Iranian his role was usurped by **Dyews* (Greek *Zeus*, Latin *Iu(piter)*, Old Norse *Týr*, Hittite *šiuš*, etc.), who may have been opposed to him as day to night. Alternatively, he may even hearken back to an ancient version of the first battle between the Storm God and the Serpent, preserved in Hittite (Güterbock 1961: 152), in which the latter is victorious and takes the Storm God's heart and eyes as trophies. The Storm God regains his organs by a ruse and is successful in the second battle. Sosruquo also suffers a defeat in the first battle with Tutaresh, only to triumph by a ruse in the second.

The name **Tw-astr* may have been borrowed into Indo-Iranian lore along with the overthrow of this earlier god by his successor, the storm god Indra, this being the mythic representation of a cultic struggle. This one name would then be direct testimony to the existence in ancient Central Asia of an otherwise unknown Indo-European people of great antiquity and archaic linguistic form who were nonetheless distinct from the Tokharians, and who occupied a geographical position somewhere between the latter in the east and the ancestors of the Indo-Iranians in the west. Quite possibly they were contiguous with the Tokharians and may even have occupied the western portion of the Tarim Basin. Some of the mummies may therefore have spoken "Twastrian."

With luck and continued effort, more linguistic forms and mummies may yet be found which will provide both cultural and biological correlates to the hypothetical stages in (6).

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Evidence for Prehistoric Links between the Caucasus and Central Asia: The Case of the Burushos[1]

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The Tarim Basin, site of the desiccated human remains which are the principal focus of this volume, is surrounded by mountains on three sides: the Tian Shan range to the north, the Kunlun Shan to the southwest, and the Altun Shan to the southeast. Just beyond the western rim of the basin are the Pamir, Hindu-Kush and Karakorum mountains, a region noted for both its rugged terrain and the diversity of ethnic groups which have settled its valleys. One such group in particular has fascinated linguists and historians for nearly a century: the Burushos of northern Pakistan. While I know of no strong evidence that the ancestors of the Burushos ever inhabited the vast depression 200 km northeast of their current homeland, I believe the study of Burusho prehistory to be of relevance for understanding the cultural and linguistic context of the western Tarim region in the 2nd millenium BCE, the period to which the oldest mummies have provisionally been dated [Mair 1995].

The Burushos speak a language, Burushaski, that has not been convincingly grouped into any known linguistic family. Its three dialects—Hunza, Nager, and the Yasin Valley (or Werchikwar) dialect—are at present surrounded by Indo-Iranian and Tibetan languages, though it seems a safe assumption that the ancestors of the Burushos were already present in northwestern South Asia when the

[1]In preparing this article I have profited greatly from discussions with Drs. Karl Jettmar and Hermann Berger (Heidelberg), Johanna Nichols (Berkeley), John Bengtson (Minneapolis), P'aat'a Buxrashvili and Ap'olon Tsanava (Tbilisi), John Colarusso (McMaster), Victor Friedman (Chicago) and Étienne Tiffou, Yves-Charles Morin, Richard Patry and John Leavitt (Université de Montréal), to all of whom I express my gratitude, while absolving them of blame for the use I make of their contributions. Some of the ideas contained in this paper were presented at the American Anthropological Association (December 3, 1994), the Symposium on Language and Prehistory in South Asia, Univ. of Hawai'i at Manoa (March 20, 1995), the 7th Conference on the Cultures of Caucasia, Univ. of Chicago (May 6, 1995), and at the Georgian Academy of Sciences in Tbilisi (July 7 and 12, 1995). The research presented here has been supported by grants from the Social Sciences and Humanities Research Council of Canada, and les Fonds pour la Formation de Chercheurs et l'Aide à la Recherche du Québec.

first speakers of Indo-European languages appeared in the area.[2] Two related questions have been frequently asked regarding the Burushos: (1) What territory or territories were occupied by prehistoric Burushaski speakers? (2) Is Burushaski genetically related to any other language(s)? In this paper I will present my thoughts on these two questions. With regard to the first, I will argue in favor of the assertion that the Proto-Burushos were historically linked to the Caucasus region, and very likely migrated to their present homeland from there.[3] As for the second, I will content myself with a preliminary examination of the linguistic evidence for Burushaski-Caucasian links, without forcing it to yield a response to a simple yes-no question regarding phyletic relationship. The belief that the peoples of the Caucasus and Hindu-Kush/Karakorum region are somehow connected is of course far from new: the hypothesis has been discussed from time to time in the German- and Russian-language anthropological literature,[4] and even some Greek geographers of antiquity saw links between Colchis and India.[5] In addition to bringing new data and new arguments to bear on this hypothesis, I will discuss the methodology of historical study, in particular, the coordination of data from linguistics and comparative mythology to establish prehistoric contacts.

1. The Burushos in northwestern South Asia. Scholars have noted numerous features of Indo-Iranian languages which point to intensive contact with speakers of non-Indo-European languages [e.g. Èdel'man 1980], presumably after Indo-Iranian-speaking peoples migrated eastward and came into contact with populations speaking Dravidian, Munda and other languages. Burushaski loan-words and grammatical features in Shina, an Indic language of the Dardic subgroup, indicate

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[2]See Tikkanen [1988] for arguments in favor of a "pre-Aryan convergence area" in northern South Asia, including (Proto)-Burushaski, Dravidian, and Tibeto-Burman, but not Indo-Iranian. Note also the presence of early Tibetan loanwords in Burushaski, e.g. the words for 'rice' [Klimov/Èdel'man 1970: 13] and 'salt' [Fussman 1972: 333; though H. Berger prefers a Shina origin for the latter (personal communication)].

[3]I employ the term "historically linked" as an umbrella designation for the sharing of cultural/linguistic features between communities due to common origin (genetic/phyletic relation), occupation of adjoining territories, or other factors contributing to diffusion (e.g. migration or trade). More detailed study of historically-linked cultures may lead to a clearer picture of the type of relation between them, but for any given case there is no guarantee that enough of the signal can be detected against an often very noisy background.

[4]Dirr [1925: 146]; Jettmar 1957; Klimov/Èdel'man [1970: 12]; Gamkrelidze/Ivanov [1984: 956]; etc.

[5]Arrian *Anabasis* 5.3.1-4, Strabo 15.1.8; see also the brief discussion in Braund [1994: 18].

that Burushaski or one or more now-extinct languages related to it were once more widely spoken in the Gilgit region [Jettmar 1975: 190]. Other languages of the immediate vicinity—Khowar (Dardic), Wakhi (Iranian) and Balti (West Tibetan)—also show signs of a Burushaski substratum [Fussman 1972; Tikkanen 1988], as do toponyms. The search for linguistic or archeological traces of Burusho occupation farther afield in the Subcontinent, though, has yet to yield convincing positive results, leading Parpola [1994: 142] to the conclusion that "the earliest speakers of Burushaski entered their present homeland from the north after the inception of the Late Neolithic [late 3rd millenium BCE—KT], and have never gone much farther". There is, furthermore, evidence in the Gilgit area of a linguistic substratum of unknown affiliation, evidently distinct from Burushaski, Indo-European, Dravidian and Tibetan. Berger noted many toponyms and anthroponyms of unknown origin [1960: 662],[6] and the attested fragments of the language referred to as *Bru-zha* in late-1st millenium CE Tibetan sources, despite its promising resemblance to the ethnonym *Burusho,* might be unrelated to any known language of the area [Jettmar 1975: 299; Tikkanen 1988: 317; but see Berger 1995 for a Burushaski reading of some Bru-zha words]. These facts are compatible with a scenario in which the Proto-Burushos arrive in the Hindu-Kush / Karakorum region several centuries or a millenium before the Indo-Iranian-speaking peoples. As to their previous whereabouts, the evidence is less direct, and primarily derives from comparative linguistics and ethnology.

2. The Macro-Caucasian hypothesis and Eurasian mountain pastoralists. Many efforts have been made to find a place for Burushaski in one of the Eurasian language families, most often one of the North Caucasian groups or the tiny Yenisean family of Central Siberia. The paleolinguist John Bengtson has recently proposed a linguistic grouping which he has named the "Macro-Caucasian" phylum [Bengtson 1991a, 1991b, 1992b]. This phylum, which is claimed to be itself one component of a much larger genetic grouping termed "Sino-Caucasian" or "Dene-Caucasian",[7] comprises the Northwest Caucasian (Abkhaz-Adyghean) and Northeast Caucasian (Nakh-Daghestanian) languages,[8] and the isolates Basque and

[6]According to Èdel´man [1968: 58], the greater part of the toponyms in the mountainous regions of the Hindu-Kush and Pamir regions are of unknown provenance.

[7]Bengtson [1991a] includes Sino-Tibetan, Yeniseian, Sumerian and Na-Dene in this macrophylum; it corresponds closely to Starostin's «Paleo-Eurasian» grouping [1982: 197].

[8]Northwest and Northeast Caucasian are grouped into a single 'North Caucasian' family, although such a grouping has yet to be demonstrated to the satisfaction of many linguists who work on these languages.

Burushaski. The Macro-Caucasian hypothesis is of particular interest to us because it encompasses languages spoken in several widely-separated Eurasian mountain ranges (viz. the Pyrenees, Caucasus and Hindu-Kush/Karakorum) which are home to cultures sharing numerous features. The indigenous populations of these regions practice (or practiced until recently) a mixed economy based on agriculture, transhumant pastoralism and hunting. The participation of the two genders in these economic activities is strictly regulated by tradition, and symbolic associations and valuations linked to women and men are projected onto the different forms of food production and their associated animals. Comparing his observations among the Kalash people of the Hindu-Kush with those collected in the Pamirs, Pyrenees and elsewhere, the ethnologist Peter Parkes observed that "... an extensive permutational set of variously juxtaposed livestock values can ... be traced among Eurasian mountain pastoralists from the Pyrenees to the western Himalayas" [Parkes 1987: 655-6]. In structural terms, the individual valuations of animals and food-producing activities, and their associations with male or female spheres of activity, may vary from one region to another, even among neighboring ethnic groups, but their organization into a binary system of opposed terms—the "dual symbolic livestock codes of mountain pastoralists [according to which—KT] ... animals are primarily associated with male and female values of 'purity' and 'impurity'"—seems to be a constant in these societies [loc. cit]. Considering these facts diachronically, one naturally asks to what degree the topography and climate favor a particular type of pastoralism (goats and sheep being led to alpine pastures in the summer while bovines stay near the village year-round) and a particular emphasis on altitudinal zonality (high = pure but dangerous; low = corrupt, polluted) in the symbolic system? A careful examination of the ethnographic materials, hand-in-hand with comparison of the relevant languages, can be of assistance in determining whether populations inhabiting similar ecological zones, despite the likelihood of independent convergence in many aspects of their cultures, are in fact historically linked. In this paper I will concentrate on the two easternmost 'Macro-Caucasian' language families and their associated cultures, since the case for historical links between them is particularly strong. Evidence of possible connections with the Alps and Pyrenees will be mentioned here and there in the footnotes, though its relevance for the Macro-Caucasian hypothesis remains to be assessed.

3. The comparative method in ethnology and linguistics. In his work on Indo-European social ideology, Dumézil noted that a comparison of material derived from the myths, epics or folklore of widely-separated peoples is convincing to the extent that similarities are found at both the substantive and structural levels. As in historical

linguistics, where genetic groupings proposed on the basis of apparent cognates are rendered considerably more probable by striking, functionally unmotivated similarities in grammatical features, so hypotheses concerning ancient cultural contact are strengthened by such correspondences in both the form and structural contextualization of symbols:

> «Au fond, il en est de la méthode comparative en matière religieuse comme en matière linguistique: elle seule permet de remonter avec assurance, avec objectivité, dans la préhistoire par l'utilisation simultanée des archaïsmes, des bizarreries (des "irrégularités", disent les grammariens), de toutes les traces qui, ici et là, au sein de chaque équilibre particulier substitué à l'équilibre préhistorique commun, témoignent bien de ce lointain passé ...» [Dumézil 1992: 236].[9]

Despite the large proportion of its vocabulary for which no Indo-European etymology has been established, the retention in Hittite of such typologically-unmotivated features as the *r/n-* heteroclitic declension (e.g. nominative *wata-r*, genitive *wete-n-as* "water") makes its Indo-European affiliation readily recognizable [Gamkrelidze/Ivanov 1984: 188; cp Greenberg, Turner and Zegura 1986: 493]. A comparable example from Dumézil's work is the discovery of paired one-eyed and one-handed gods or heroes, associated with magic and justice, respectively, in several Indo-European traditions. This mythemic "bizarrerie" is linked to two complementary aspects of sovereignty well-established elsewhere in early Indo-European social ideology [Dumézil 1992: 261-6; Puhvel 1987; Littleton 1982: 99, 247-8], which makes its interpretation as an archaism dating back to Proto-Indo-European society all the more likely.

Dumézil developed his method in the context of the study of symbolic systems of peoples speaking languages already shown to be related by the comparative method. What I propose here is the application of a similar procedure of substantive and structural comparison of symbols to two speech communities for which historical linguistics has not yet conclusively proven a relationship. The two bodies of comparative data—ethnological and linguistic—taken together provide a stronger case for historical linkage than either would on its own.

4. The Caucasian "prosthesis motif" and its Hindu-Kush parallels. Many peoples of the Caucasus region (the Abkhazians, Georgians, Ossetes, Chechens, etc.) have variants of the following myth: Supernatural beings (gods or demons) capture, kill and eat an ibex. They then gather up the bones and wrap them in the skin, but

[9]On Dumézil's methodology, see also Littleton 1982, Dubuisson 1993.

discover that one bone has been lost; in some versions it was stolen by a hunter who happened across the feast. They replace the missing bone with a piece of wood, and set it with the others. The gods/demons strike the skin with a stick, or pronounce an invocation, and the animal returns to life. The next day a hunter kills the revived ibex, and discovers a wooden bone in its corpse. Nearly identical tales of resuscitation and prosthesis have been recorded among the Burushos and nearby Dardic-speaking peoples (the Shinas and Kalashas) in the Hindu-Kush: A hunter is invited by fairy-like supernaturals, or the demon-like Pfûts, to share a meal of ibex or goat meat. The hunter hides a rib-bone. After the meal the fairies gather up the bones, and fashion a replacement from juniper wood for the one that is missing. They revive the animal. The human who observed the feast later kills the revived animal and discovers the wooden bone. By way of illustration, two prosthesis texts, one from the province of Xevsureti in northeast Georgia [Shanidze 1931: 637-638], the other from the Burushos of northwest Pakistan [Lorimer 1981: XX], are presented in Table 1.[10]

Table 1: The prosthesis motif.
Elements of the prosthesis story (Caucasus, Hindu-Kush/Karakorum)

(*a*)	*Human (hunter or herdsman) observes supernatural beings dining on meat of ibex or goat.*
(*b*)	*He steals and hides one of the bones.*
(*c*)	*The bones are gathered and placed on (or wrapped in) the skin.*
(*d*)	*A replacement for the missing bone is fashioned out of wood by the supernaturals.*
(*e*)	*They resuscitate the animal, which runs off.*
(*f*)	*The animal is later caught and killed by the human, who discovers the wooden bone.*

Comparison of Georgian (Xevsurian) and Burushaski versions:
GEORGIAN: Shanidze *Xevsurian folk poetry* (1931), translated by KT. [*A hunter went hunting and came to a cave at the foot of a cliff. He recounts this story*]: "I lit a fire. At midnight someone called out "Come to our wedding party!" "I can't", another demon called out, "I have a guest, I cannot come." The first demon says "Come and bring your guest with you!" It was very dark. ... I could not see anyone. "Come with me," a voice called to me, "follow the sound of my voice." ... We arrived, the place was full of demons.... They brought three ibexes, slaughtered them and boiled the meat. They ate and drank vodka ... I too drank

[10]For the Caucasian variants see: Dirr 1925; Shanidze 1931: 637-638; Dzidziguri 1970, 1971; Virsaladze 1976; Salakaia 1975, 1987; Mak'alatia 1985; Tsanava 1990, 1992: 42-46. The variants from the Hindu-Kush/Karakorum region known to me are cited in: Lièvre/Loude 1990: 65-6; D. Lorimer 1981: xx; Jettmar 1975: 247; Tiffou & Pesot 1989: 105-106; Tiffou 1995: 161-166.

and ate. They gathered up the bones stripped of meat, wrapped them in the skin, struck it with a whip. The very ibex that we had eaten rose up and ran off! Now they gathered the bones of the second one, wrapped them in the skin, and pronounced a blessing. It too got up and ran away. My host demon said to me: "Hide one bone." I did so. They began searching. I held on to the shoulderblade. They made one of wood, set it with the others, wrapped them in the skin, and prayed: "Get up, get up, *xech'ech'ao,* you have a shoulderblade of wood." It rose up and ran away. Then I went to sleep. Next morning at sunrise I got up and caught sight of some ibexes. I killed three ... including the one in which they had set the wooden shoulder blade the night before!

BURUSHASKI: Lorimer *Folk tales from Hunza,* XX: "The man who supped with the Pfûts."

One day a goat belonging to a man got lost. (As he went on) looking for it night came down on him. He was returning to his home without having seen it, and as he came along there was a light in the Bûri Bûn and there were Pfûts dancing. He also went in, they say, and mixed with them, and then sat down among them. After dancing the Pfûts brought food for a wedding party and at the end when they had eaten they brought a skin. Then they demanded from all the bones of their shares of the meat, and collected them. There was one rib short. That rib the man, to whom they had given it as his share, had hidden from them. Then they made a rib of wood and threw the bones into the skin, and on shaking it up the goat came to life. When the man looked he saw that it was his own goat. The Pfûts drove it out and then they went off as a wedding party to the house of the Sughûralo Pfût. When the man, having departed thence, came to his house that goat of his was there at the door. On the morrow, when he slaughtered it, one rib was missing and in its place was a wooden rib.

It is important to note that the prosthesis motif, far from being an isolated mythemic curiosity, is in both regions embedded in remarkably similar complexes of beliefs and symbols associated with hunting, hunting deities and game animals. The Caucasian and Hindu-Kush variants resemble each other not only at the surface level (e.g. game animals watched over by female supernaturals with reversed feet, toes pointing backward), but also appear to derive from similar sets of symbolic oppositions (e.g. beautiful female supernaturals with inverted features opposed to monstrous male gods/ogres with missing or defective features [one-eyed, blind or deaf]).

The principal features of these complexes are the following:

(a) *Divine patrons of game animals—female and male.*

Caucasus: The female deities/demons who watch over the ibex and other horned game animals of the high mountains (e.g. the goddess

Dæl of the Svans of northwest Georgia) are said to be extraordinarily beautiful, with golden hair and radiant white skin (literally radiant: they glow in the dark). They often seduce human hunters, who thereupon enjoy great success as long as they observe a series of taboos imposed by the goddess. Should they violate a taboo, or incite the jealousy of their divine lover, they risk falling to their death from a cliff [Virsaladze 1976]. One such animal-resuscitating female supernatural, the *č'ink'a* of northwest Georgia, can be identified by a curious feature of her anatomy: her feet are reversed, "the heels pointing forward and the toes backward" [Nadaraia 1980: 192].[11] As for the male patrons, many traditions specify that they are handicapped in some fashion (one-eyed [e.g. the Chechen *Elta*, whose eye was knocked out by his own father] or blind, sometimes deaf or mute; the Abkhazian *Až°eipšaa*, is aged, deaf *and* blind [Dirr 1925; Dumézil 1965: 55-59; Chikovani 1971; Mal'sagov 1991; Salakaia 1991; Xalilov 1991]).[12]

Hindu-Kush/Karakorum: The so-called 'fairies' (*parí*, also known as *rāṣhi* "protectors") are represented as beautiful young women and seducers of hunters. Hunters who offend them may pay with their lives, pushed by the deities off the mountain.[13] A man can tell them apart from human women by their feet: their toes point backward [Jettmar 1975: 247-8; Snoy 1975: 176; Tiffou & Pesot 1989: 114-115].[14] Some Burushos attribute the feature of reversed feet to the fairies [*parí-gus*]), others to the harmful female *bilás* [Patry 1994]. Their male

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[11]At least two other mythical beings from western Georgia are said to have reversed feet: the Mingrelian *očok'oči*, a Pan-like forest-dwelling creature [Danelia & Tsanava 1991: 385]; and the shape-changing *kaji*, which can take the form of a beautiful woman, save for feet with the heels forward [Tsanava 1992: 66].

[12]In the religious thought of the Svans and Abkhazians, the patrons of game animals (Dæl and Až°eipšaa) stand in opposition to the patrons of hunters, warriors, woodcutters, thieves and in general all men who go into the wild in search of its riches. The latter function is attributed to *Jgëræg* ("St. George") among the Svans, and *Aerg* in Abkhazia (Charachidzé 1986; Inal-ipa 1965: 517-519; Tuite 1996, ms.). Also inhabiting the wild spaces are seductive long-haired sprites with reversed feet (e.g. the Abkhazian *Dzydzlan-dzaɦk'uaže* [Inal-ipa 1965: 524]) and fearsome ogres, often represented as cyclopses. Insofar as their corporal structure is concerned, the sprites and ogres appear at first glance to be symbolic doubles of the *Dæl-Jgëræg* couple, but the matter needs to be investigated further.

[13]I owe this information to Mr. Dada Khan, a Burusho from Yasin, Pakistan, who was invited to Montréal by my colleague Prof. Etienne Tiffou in May 1994.

[14]Manchmal nehmen sie [die Rāṣhi—KT] gar die Gestalt des Eheweibs an, um sich an den Erwählten [Jäger—KT] heranzumachen. ... An den nach rückwärts gerichteten Zehen erkennt er die unheimliche Besucherin [Jettmar 1975: 247-8].

counterparts (the Shina *yaṣh* and the Burusho *hír-bilas* ["man-*bilás*"]) are one-eyed giants [Jettmar 1975: 222; Berger 1983:31].

In both cases the sexual dichotomy between divine patronesses and patrons of game animals appears to be paralleled in other features of their representation: beauty vs. monstrosity; *inversion* of body parts (reversed feet; also vertically-set eyes in some descriptions of the *rāṣhi*) vs. *lack* of body parts or other defect.[15]

(b) *Transformations of the deity.*

Caucasus: Many divine patrons of ibex and deer can take the form of the beasts they watch over. The transformed deity bears a special mark: golden horns, unusual coloration or beauty, etc. [Virsaladze 1976: 33].

Hindu-Kush/Karakorum: The 'fairies' can disguise themselves as ibex, mountain goats, or crows [Jettmar 1975: 223].

(c) *Purity and taboos.*

Caucasus: The peoples of the Caucasus considered the high mountain peaks to be the habitations of the gods. The deities, in particular the goddesses of game animals, are extremely sensitive to any kind of "impurity." A man must, therefore, be absolutely certain that he—and everyone in his household—is "pure" before he goes into the mountains to hunt. The most serious occasions of impurity are death, adultery, and women's blood flow (i.e. menstruation and childbirth).

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[15]These cases of corporal inversion and handicap are to be distinguished from the Indo-European paired one-eyed and one-handed gods (see above), which have a very different distribution and symbolic function. Another curious resemblance, awaiting further study, is the figure of the bird-footed goddess or demon (an inversion of humanness rather than of direction?), noted in Western Europe [Hoffmann-Krayer/Bächtold-Stäubli 1929-1941: «Perhta»; Grange 1983], Azerbaijan [Basilov 1987] and perhaps in Central Asia [Bleichsteiner 1953: 64-68]. The Basque mythological figure Mari shares many features of the Caucasian and Hindu-Kush patronesses of game animals, although the prosthesis motif has not yet been noted in the Basque country, to my knowledge. Mari is the «jefe o reina de todos los genios», and is described as having the foot of a goat («Esta dama era muy hermosa y muy bien hecha en todo su cuerpo, salvo que tenía un pie como de cabra»). She is associated with animals, and can appear in the form of a male goat. She is frequently said to control weather phenomena, especially rain and hail. There is also mention of a cave-dwelling male cyclops (Torto, Anxo or Alarabi), associated with a Polyphemus-like story of anthropophagy, blinding and escape [Barandiarán 1960]. In much of Central Asia, notably among the Turkic-speaking populations, one hears accounts of a female demon, variously named *Albasty, Almasty, Halanasy, (H)al*, etc., who is said to have breasts so long they hang over her shoulders and down her back [Johansen 1959; Benveniste 1960]. Some Kazakh myths attribute reversed feet to this demon, while a Tuvin myth portrays her with a single eye in her forehead [Basilov 1987]. Could these represent reworkings of symbolic material—the female with inverted features and the male with a missing feature—more faithfully conserved in the Caucasus and Hindu-Kush?

The slightest violation, even if unintentional, of a taboo is thought to have fatal consequences for a hunter [Gabliani 1925: 36, 140]. Animals, their meat and other foodstuffs are also ranked according to purity, with game animals of the high mountains considered more pure than domestic animals restricted to lower altitudes. At the top end of the scale is the meat of ibexes and deers, which, according to Svan hunters, cannot be touched by menstruating women, pigs, sheep or chickens [Nizharadze 1964: II, 36]. A male shaman [*kadag*] in the northeast Georgian province of Xevsureti guards the state of ritual purity necessary for the exercise of his powers by avoiding contact with women, and abstaining from onions, garlic, eggs and poultry [Charachidzé 1968: 146-147].[16]

Hindu-Kush/ Karakorum: In order not to offend the fairies, a Shina hunter must avoid all occasions of impurity, that is, any contact with women (especially during menstruation and childbirth), or with cows and their milk [Jettmar 1975: 228-229, 248].[17] According to Parkes, "the symbolic values of Kalasha animals may ... be seen to be ordered along a basic gradient of altitude: markhor [a type of ibex—KT] > goats > sheep > cattle > hens." The products considered especially polluting are domestic fowls, onions, garlic and the scarlet dyestuff *rhoŋ*, which is "associated with evil spirits (*balâ*) that derive from the lower ends of the valleys" [Parkes 1987: 648-650].

(d) *The patrons of game animals and the weather.*

Caucasus: In addition to their role as caretakers of game, the divine patrons influence the weather. The hunting goddesses in particular are associated with snowfall and rain [Charachidzé 1979: 100 on Dæl; Oniani 1917: 13-5 on the *č'ink'a*; Tsanava 1990: 55]. There is a mountain lake in Svanetia (NW Georgia) consecrated to the hunting god *Jgëræg* ("St. George"). If a drop of blood falls into the lake, or an "unclean" (menstruating) woman approaches it, it will rain [Chartolani 1977: 136].

Hindu-Kush/ Karakorum: The fairies can control the weather and cause storms. In the mountains are lakes where they are said to bathe. Throwing rocks into one of these lakes will cause rain or hail

[16]Charachidzé motivates the ban on onions and garlic by the supposed necessity for those who speak to the gods to avoid an offensive breath odor [Detienne/Harmonic 1995: 67]; while I do not doubt that some of Charachidzé's informants may have offered this sort of explanation, I suspect that the original motivation was the association of these foods with the lower altitudes and women's sphere of activity.

[17]Fragmentary evidence indicates that some sort of cow-milk taboo may have existed in the Caucasus also. The power of the Mingrelian *t'q'ašmapa* ("queen of the forest"), a beautiful and potentially dangerous goddess of wild animals, can be neutralized by bathing her hair in milk [Danelia & Tsanava 1991: 361-366].

[Hussam-ul-Mulk 1974: 97].[18]

(e) *Animals «pre-eaten» by the gods.*

Caucasus: The divine patrons of the ibex and deer are believed to exploit them for food in a manner parallel to the animal husbandry practiced by Caucasian villagers: The deities lead their herds of wild caprids to high mountain pastures, watch over them like shepherds, milk them, and kill them for meat. This latter activity is not only for the benefit of the gods. The Abkhazian and Mingrelian sources indicate specifically that hunters can kill *only* those animals which have been previously eaten, then resuscitated, by their divine patrons [Salakaia 1991: 49-50; Tsanava 1990: 55-6; Danelia & Tsanava 1991: 345-347].

Hindu-Kush/Karakorum: The peoples of Dardistan believe that the exploitation of domestic animals (specifically goats) is merely the terrestrial parallel to the herding of ibexes and mountain goats by the fairies in their high mountain domain [Jettmar 1975: 221]. Furthermore, according to hunters "one can only kill animals which have already been eaten by the fairies". The latter are thought to "rob the essence" from game animals by eating them, thus leaving them vulnerable to the hunters' arrows or bullets [Jettmar 1975: 224, 246; Snoy 1976: 115].[19]

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[18]There are likewise similar beliefs concerning the meteorological impact of unburied human remains. Among the Chitralis of the Hindu-Kush, «If a dead body is left unburied in open ground, it will rain for a long time» [Hussain-ul-Mulk 1974: 113]. More specifically: «Wird die Leiche eines Ertrunkenen, vor allem die Leiche eines Mädchens, nicht aus dem Fluß geborgen, so kann das Regen auslösen. Es genügt aber auch schon, daß ein Toter unbeerdigt in den Bergen liegen bleibt. Offensichtlich wird damit die von den Peri gehütete Reinheit befleckt» [Jettmar 1975: 429]. Earlier this century, among the Georgians it was believed that «... si un ossement demeurait à la surface de la terre, sans être beurré et recouvert de terre, l'on disait alors qu'une grande pluie allait venir, qu'elle inonderait la terre et que le beau temps disparaîtrait. Les gens disaient: "Les nuages du ciel pleurent, c'est donc qu'il y a un os hors de terre." S'il pleuvait trop, on partait à la recherche d'un os déterré ... on le beurrait et l'enterrait ... » [Charachidzé 1968: 583]. The curious practice of buttering unearthed human bones may also have a faint echo in the Hindu-Kush: The 'Kafirs' of Waima in the Ashkun valley would, on certain occasions, open the coffins of their ancestors and rub the bones with fat. [Jettmar 1986: 128].

[19]One of the principal functions of Siberian shamans is to assure the success of hunters by "capturing" the souls of game animals: "En outre, les Samoyèdes attribuent aux animaux des âmes ou «ombres» (donc des «âmes libres»), censées protéger l'animal et que le chaman devait «prendre» avant que la chasse puisse commencer. Les Iouraks croyaient fermement qu'un chasseur ne pouvait prendre un animal avant que le sorcier (chaman) se soit emparé de l'«ombre» de l'animal en question." [Paulson 1965: 91]. It remains to be determined what light these Siberian facts can shed on the Caucasian and Hindu-Kush beliefs that animals must be pre-eaten by the deities before a

One can speculate that in the context of this cluster of beliefs, the implantation of a wooden bone by a supernatural being that has eaten and revived a game animal reflects some notion of possession or in-dwelling: the insertion of a portion of the divine essence or power into the animal. For the historical study being undertaken here, the prosthesis motif is at the heart of the argument, since, among the hunting-related symbolic elements presented here, it has the most restricted distribution.[20] The motif of female supernaturals with

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hunter can capture them. Is the eating of a creature a means of seizing its soul? Does the implantation of a prosthesis signal supernatural control or possession of an animal or person? [cp Charachidzé 1968: 320-23; Jettmar 1957: 129; Tuite, in press]. On parallels between Caucasian motifs of consumption and resuscitation, and beliefs associated with shamanism, see, among others, Eliade [1968: 68-69] and Pócs [1989: 41-42].

[20] Besides the Caucasus and Hindu-Kush/Karakorum regions, the prosthesis motif has been recorded in Turkey [Boratav 1976, 1992], Greece and the Alpine region. Here as well most of the variants are found in the proximity of mountains, leading one to wonder if there is a connection to be sought with Eurasian mountain pastoralist societies which speak (or once spoke?) "Macro-Caucasian" languages. In almost all of the variants attested to the west of the Bosporus, it should be noted, a human is eaten and resuscitated, rather than an animal (see map; could the transposition "en clé de sorcière" of a game-animal resuscitation myth have been correlated with the crossing of a major linguistic and/or cultural frontier? [Lévi-Strauss 1973: 223; 1991: 129-130]). The three principal European prosthesis variants are:

(a) *Pelops and the ivory shoulderblade.* Pelops, the legendary ancestor of the House of Atreus, was killed by his father, cooked and served to the gods at a banquet. None of them tasted the meal, except for Demeter, who took a piece from the shoulder. The gods gathered up the fragments of Pelops' body, threw them into a cauldron, and added a shoulderblade of ivory to replace the one chewed on by Demeter. Pelops emerged hale and hearty from the cauldron, with the addition of the ivory shoulderblade which was subsequently to be a mark of his lineage. Some scholiasts recorded a more extreme version in which all of the gods partake of the meal, leaving only the head, hands and feet of Pelops untouched [Heyne 1807; Drachmann 1969: *Olymp.* I, 79-80; Lorimer 1936: 32; Tuite, in press].

(b) *The "Hazel-witch" in Central Europe.* Ethnographers have described a "Pelops motif" in the folklore of Austria, the Italian Tyrol, Slovenia, Hungary, etc. [Mannhardt 1858: 66; von Sydow 1910; Schmidt 1963; Matičetov 1959]. of which the following is a typical outline: A village girl attends a witches' banquet. The witches kill her, cut up her body, cook it and eat it. A young man watching the scene grabs a rib bone and hides it. The witches gather up the bones, replacing the missing rib with a hazel branch, and reanimate the girl, who returns to the village. Shortly afterwards the boy announces that "there is a hazel-witch *(Haselhexe)* among us." The girl falls dead on hearing these words [Schmidt 1963: 147]. Schmidt has indeed proposed, based on a comparison of these legends with the fragmentary accounts of the Caucasian prosthesis myths in Dirr 1925, that the two traditions are somehow related, and even sketches possible routes of transmission. As for linguistic evidence of

reversed feet is attested farther to the east, in the Himalayas,[21] and perhaps as far west as the Basque country (see note 15), thus overlapping the range of the prosthesis motif. Whether the latter represents an innovation, introduced within a group of hunting cultures in contact, or an archaism remains to be determined.

5. Burushaski and Northeast Caucasian: evidence for early contact. In this section I will explore linguistic evidence of historical links between the Burushaski and Northeast Caucasian (Nakh-Daghestanian) speech communities.[22] Certain morphosyntactic systems reconstructed for earlier stages of Burushaski and Northeast Caucasian (NEC) resemble each other both in overall structure and in specific details: the category of gender, and its association with the genitive case; a single absolutive/ergative form for the 1st and 2nd person pronouns; and stem suppletion for the 2sg pronoun.[23] These

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historical links between the Alpine region and the Caucasus, Orel and Starostin [1990] recently published 59 etymologies associating Etruscan words, the meaning of which is rarely very clear, with Northeast Caucasian roots, in an attempt to demonstrate that Etruscan descended from a branch of the Northeast Caucasian family. This would be an astonishing parallel to the mythological evidence presented here if it were true; unfortunately the etymologies offered by Orel and Starostin do not inspire much confidence in their proposed genetic grouping.

(c) *Animal-reviving witches and saints.* The only Western European example I have encountered thus far of the resuscitation of an animal with an inserted wooden bone is likewise associated with witchcraft. A woman tried by the Milanese Inquisition in 1390 was accused, among other things, of reviving animals. Should a bone be missing, an elder-wood prosthesis was substituted ("et si quod ex ossibus defficet ponunt loco eius de ligno sambuci" [Bertolotti 1979: 486]). There are as well numerous accounts of medieval saints, mostly of Celtic or Gallic origin, bringing animals back to life. One version of the life of the 7th-century Saint Opportune of Normandy relates how she resuscitated dead geese from their bones. Because one bone was missing, however, the revived geese limped [Grange 1983: 146]. The theme of a revived animal which limps because of a missing bone (i.e. the prosthesis motif without the prosthesis) is also attested in Scandinavian mythology (Thor's goats) and elsewhere in medieval Europe [von Sydow 1910; Schmidt 1963].

[21]The Kumaonis, an Indic-speaking people of the Himalayas, speak of fairies with reversed feet, accompanying a monstrous sylvan deity called Airi, which, rather than lacking an eye, has a third one atop his head which kills anyone who meets its gaze [Oakley 1905/1990 §9; Atkinson 1981: 825-6].

[22]The Northeast Caucasian family consists of two primary branches: Nakh (Chechen-Ingush and Bats) and Daghestanian. The latter is further subdivided into the Avar-Andic, Tsezic, Lak-Dargwa and Lezgian groups [Schulze-Fürhoff 1992b].

[23]The Burushaski data presented here come principally from the Werchikwar dialect of the Yasin Valley, which appears to be more conservative in important respects than the better-known Hunza dialect [Berger 1974: 5].

structural similarities, in conjunction with possible lexical cognates, indicate some kind of prehistoric contact, either direct or mediated, between the ancestors of Burushaski and the Northeast Caucasian languages.[24] My purpose at this point in the research program is to explore linguistic data which corroborate the ethnological findings reported in the first part of the paper, and leave any evaluation of a possible Burushaski-Caucasian phyletic grouping for later consideration.

(a) *Gender marking.* A grammatical category of gender—by which is meant a categorization of nouns into two or more groups, each with distinct morphosyntactic properties—is far from rare [Corbett 1991]. The Burushaski and NEC gender systems (often designated as "class" systems) have several features in common. In the gender system reconstructed for Proto-NEC by Schulze-Fürhoff [1992a, b], there are four genders ranked according to "control" and "social relevance", following a cascading hierarchy of the binary features [± animate; ± human; ± masculine].[25] The category of gender in Burushaski is structured along somewhat similar lines.[26] In both cases, there are two gender classes for nouns referring to male and female humans, a third gender including names of animals and other nouns, and a residual class. Agreement markers in Burushaski and most NEC languages crossreference the gender and number of the absolutive-case NP in the clause. In both Burushaski [Tiffou/Patry 1995] and Proto-NEC there is no distinct plural agreement for the lowest-ranked of the four genders, as shown in the following table:

The primary sources are Berger 1974 and Tiffou/Pesot 1989.

[24]The similarities proposed here resemble those shared by Proto-Kartvelian and Proto-Indo-European (ablaut, shared lexemes), which are believed to reflect early contacts between these two language families [Gamkrelidze/Ivanov 1984], or possibly common origin [Bomhard 1996]. Burushaski of course shows signs of convergence with the languages of northwest South Asia, especially those spoken in its immediate neighborhood. Most of the characteristics Burushaski shares with Indo-Iranian and Tibetan languages are phonological (retroflex consonants) and syntactic (quotative and subordinate constructions) [Tikkanen 1988]. The features shared with NEC are of a different order, pertaining to the structure of the morphology.

[25]Nichols [1989] argues that gender marking arose in later Proto-NEC, through the reanalysis of pre-Proto-NEC systems of nominal and verbal prefixation as agreement. If the Burushaski gender system indeed reflects convergence with NEC, the time of contact would correspond to late Proto-NEC or even after the break-up of the protolanguage (see the discussion of loanwords in subsection (c) below).

[26]"[La classe] *hm* représente exclusivement les humains masculins et *hf* exclusivement les humains féminins.... À la classe *x* appartiennent les noms désignant les animaux, des entités dénombrables; à la classe *y* appartiennent les entités non dénombrables, les éléments fluides, les grains, les éléments immatériels etc." [Tiffou/Pesot 1989: 15-16]. See also Berger 1992.

Table 2. Gender in Burushaski and Proto-Northeast-Caucasian.

***Burushaski* [Klimov/Èdel'man 1970; Berger 1974; Tiffou/Pesot 1989]**

Gender	core membership	Verb agreement with abs. NP	
		singular	*plural*
hm	human males	i/e-	u/o-
hf	human females	mu/mo-	u/o-
x	animals; count nouns	i/e-	u/o-
y	mass nouns; substances, grains, abstract nouns	**i/e-**	**i/e-**

***Proto-NEC* [Schulze-Fürhoff 1992]**

Gender	core membership	Verb agreement with abs. NP	
		singular	*plural*
I	[+ masc; + hum; + control] (human males)	*w-	*b-
II	[- masc; + hum; ± control] (human females); [- hum; ± anim; + relevant [+ fem; + hum]] (objects associated with women's work sphere)	*r/y-	*b-
III	[+ hum; - control] (human children); [- hum; ± anim; + socially relevant [+ hum]] (non-human animates and some inanimates)	*b-	*d-
IV	[- hum; - control; ± anim; - socially relevant [+ hum]] (all other nouns)	***d-**	***d-**

In Burushaski and many NEC languages, the genitive case of certain nominals is identical to, or includes, a gender-agreement marker. In most languages of the Avar-Andic subgroup of NEC the genitive case of Class I (human masculine) nouns, personal pronouns, and other types of pronouns referring specifically to people consists in a gender marker, agreeing with the modified NP, attached to the oblique stem: e.g. Andi *imu-**v** vocci* [father-**gender.I** brother] "father's brother", *imu-**b** k'otu* [father-**gender.III** horse] "father's horse" [Tsertsvadze 1967: 281]. In the Lezgian language Archi, the genitive and dative forms of the 1st person pronouns take gender prefixes, e.g. *w-is ušdu* [**gender.I**-my brother] "my brother" [Xajdakov 1967: 618; Kibrik 1979:68]; frozen gender prefixes are retained in the genitive-case forms of the personal pronouns of other Lezgian languages, and perhaps in the ergative-case forms (derived from ancient genitives?) of the Nakh personal pronouns. The evidence suggests that gender agreement within the NP, between the head noun and its genitive-case modifier, is an ancient feature of NEC. As for Burushaski, the genitive-

case suffixes for most classes of nominals are identical to the agreement markers in the verb for nouns of the corresponding gender, as listed in Table 2 above: [hm/x/y] **-e**, e.g. *hir-e ha* "the man's house", [hf] **-mo**, e.g. *gus-mo ha* "the woman's house" [Tiffou/Pesot 1989: 20-23]. To be sure, this is not an agreement phenomenon of the sort observed in Andi or Archi, since the genitive suffix reflects the gender of the noun to which it is attached, rather than that of the noun heading the NP. The formal similarity between the two declensional patterns is nonetheless sufficiently strong, and the patterns themselves sufficiently rare, to warrant notice.

It seems likely that the Burushaski genitives—and indeed the declensional system as a whole—are of relatively recent origin [Tiffou/Pesot 1989: 56]. In most respects Burushaski morphosyntax corresponds to the head-marking type described by Nichols 1986: the transitive verb agrees with both the subject and the direct (sometimes indirect) object, and 'inalienably-possessed' nouns (mostly kin-terms and body-part nouns) take prefixes indexing their possessors [cp Nichols 1988]. The latter construction, on the assumption it continues the manner of marking possession for all nominals in Proto-Burushaski, may be the direct source of the gender markers used as genitive suffixes. The prefixes marking the gender, person and number of the possessor NP (e.g. **á**-s "my-heart"; **go**-s "thy-heart"; **mo**-s "her-heart") could have been resegmented as suffixes attached to the preceding word, i.e. the possessor in a consistently SOV language such as Burushaski:

hmxy:	*[*hir* [*e-ha*]]$_{NP}$ 'man his-house'	⇒	[*hir-e* [*ha*]]$_{NP}$ 'man's-house'
hf:	*[*gus* [*mo-ha*]]$_{NP}$ 'woman her-house'	⇒	[*gus-mo* [*ha*]]$_{NP}$ 'woman's-house'

Although the Burushaski genitive arose from materials already existing in the language, close contact with the early NEC languages, characterized by a formally-similar exploitation of gender-agreement markers as genitive-case desinences, could well have played a catalyzing role.

(b) *Case neutralization for 1st and 2nd person pronouns; stem suppletion in the 2sg.* Internal evidence from Burushaski and NEC morphology indicates that at an earlier stage, the 1st and 2nd person pronouns did not have distinct absolutive and ergative forms. The best evidence for the older pattern comes from the Yasin dialect of Burushaski [Berger 1974: 20; Tiffou/Morin 1982; Tiffou, personal communication], and the Avar-Andic, Tsezic and Lezgian branches of NEC. Elsewhere, the ergative has been extended to the personal pronouns, but stem-formation evidence indicates that this was a relatively recent innovation. The Burushaski and NEC declensional pattern is one variant of the split-ergative phenomenon first described by Silverstein [1976], and may have originated in an earlier Sprachbund including

the Kartvelian languages spoken to the southwest of NEC.[27] The neutralization of the absolutive, ergative and dative for 1st and 2nd person pronouns is clearly ancient in Kartvelian, and furthermore it is correlated with a split between head-marking and dependant-marking grammar. The grammatical roles of 1st and 2nd person core arguments are indicated exclusively by crossreferencing markers in the Kartvelian verb, i.e. the syntax is head-marking [Nichols 1986]. On the other hand, 3rd person NPs (except proper nouns and the pronoun meaning "who") are fully case-marked, while verb agreement is less prominent or even absent—hence a basically dependent-marking morphosyntax for NPs lower on Silverstein's hierarchy [Tuite 1995]. At present it is uncertain whether a head-/dependant-marking split of this kind can be reconstructed for earlier stages of NEC or Burushaski.

One particularly striking structural parallel between Burushaski and several branches of NEC is the use of a completely different stem for the absolutive/ergative form of the 2nd singular pronoun:

Table 3. 2nd-singular pronouns in Yasin Burushaski & some NEC languages.

	['-B' = gender marker (Avar-Andic genitive)]							
	Burushaski	*Avar-Andic branch*		*Tsezic branch*		*Lezgian branch*		
	Yasin	*Botlix*	*Godoberi*	*Tsez*	*Hinux*	*Archi*	*Aghul*	*Udi*
ABS/ERG	**un**	**min**	**min**	**mi**	**me**	**un**	**vun**	**un**
GENITIVE	go	du-B	du-B	debi	debe	vit	vi	vi
DATIVE	go-ɣa	du-j	du-ɬi	deber	debez	vas	va-s	va(x)

In this instance as well, NEC is likely to have played the role of catalyst for a change in Burushaski. The 2sg genitive *go* is identical to the 2sg agreement marker in the verb. When gender-agreement markers were reanalyzed as genitive suffixes for 3rd-person nominals in Burushaski, the already-existing pattern of stem suppletion in early NEC may have encouraged the extension of the change to the 2nd singular declension in particular, while the 1st singular retained its stem (with lengthening of the vowel: abs. *je/ja,* genitive *jáa*) [cp Tiffou/Morin 1982].[28]

(c) *Lexical look-alikes.* Bengtson has published several dozen Macro-

[27]The declensional pattern described here is to be distinguished from a superficially similar neutralization of case oppositions in the declension of personal pronouns in the Pamir, Dardic and Nuristani languages (Èdel'man 1983, Paxalina 1989). Neutralization of the direct/oblique case opposition is limited to the 1st and 2nd person **plural** pronouns, and therefore is likely to reflect the general tendency toward reduction of paradigmatic distinctions for the marked member of a grammatical category (Croft 1990: 77-79).

[28]The phonological similarity between the absolutive/ergative 2sg pronouns in Burushaski and in the Lezghian branch of NEC is probably fortuitous; only two phonemes, both of high frequency, are involved.

Caucasian etymologies, consisting of what he considers to be cognate words deriving from at least two of the three member families, viz. 'North Caucasian', Basque and Burushaski [1991b, 1992b; Blažek/Bengtson 1995]. While I remain sceptical of his claim of a phyletic relationship between Northwest Caucasian and NEC, and the inclusion of these latter within a language phylum stretching from the Pyrenees to New Mexico, Bengtson's lexical spadework has uncovered some compelling evidence of early links between Burushaski and the *Northeast* Caucasian family (more precisely, its Daghestanian branch). Of sixty-three Burushaski lexemes cited as having 'North Caucasian' cognates, forty-seven, including the more convincing ones, have their best or only match in NEC, versus five in Northwest Caucasian and eleven undecidable. Of particular interest are instances of what might very well be ancient loanwords from individual branches of NEC into (Proto)-Burushaski.

All seven Burushaski lexemes shown in Table 4 (below) are semantically plausible as loanwords, and show close formal and semantic resemblances to at least one candidate source in NEC. The Lak and Burushaski lexemes in ex. 1) have very similar meanings, and the fact that the former appears to be an isolated semantic innovation within NEC implies that the Proto-Burushos borrowed the word from (Proto)-Lak after the break-up of Proto-NEC. In 2) the proto-NEC root has undergone metathesis of its initial and final consonants (not a rare occurrence in prehistoric NEC, to judge by the entries in Nikolayev and Starostin's dictionary), with variant [ii] preserved in the Lezgian language Tabasaran, whereas the other branches of NEC only employ variant [i]. The use of the NEC lexeme in 3) to denote a unit of measurement rather than a body part is evidently an innovation within the Tsezic branch. The compound root in 5) **ǯu-χlera* "pear" (?< **ǯum* "quince" + **χlera* "pear" [N/S 893]) is limited to the Lezgian branch of NEC. In these cases the Burushaski lexeme was borrowed after particular formal or semantic changes took place within individual branches of NEC, indicating once again that the time of borrowing postdated the period of Proto-NEC unity.[29]

[29]If we take as a ball-park estimate that NEC is "comparable to I[ndo-]E[uropean in age", the break-up of Proto-NEC would date to roughly the 4th millenium BCE [Nichols 1994].

Table 4. Possible Northeast Caucasian loanwords in Burushaski.[30]

Burushaski	*Possible Daghestanian sources*
1). phīnč / pfīnč / [Yasin] phínju "stick for games such as polo"	*Lak* paInc' "a small stick for playing, sharpened at one end (Russ. чижик)"
2). ṣoq "sole, track"	*Proto-Lezgian* [i] *q'I^{w}aš / [ii] *šaq'I^{w} "heel" (variant [ii] preserved in Tabasaran) < *Proto-NEC* *q'HwošwV "heel, ankle"
3). qΛṣ "cubit"; [Yasin] qaṣ "Elle mit Hand, als Maß"	*Proto-Tsezic* *k'c(n)č'u 1. "leg, shin"; 2. "distance between thumb and forefinger" [*Gunzib* k'cč'u] < *Proto-NEC* *kwănVč'ĕ "paw, knee"[31]
4). quš "elbow of a garment" [Yasin]	*Proto-Lezgian* [i] *q'I^{w}a(m)č'V- 1. "to bend"; 2. "elbow" [*Udi* (*Nij dialect*) q:ačI "elbow"]; 3. "tip, point" < *Proto-NEC* *q'Hwemč'V "hook, curved"
5). šuɣuri/šoɣori "kind of pear"; [Yasin] šuɣurí "Art harte Birne"[32]	*Proto-Lezgian* *ǯu-χIera "pear" [e.g. *Lzg.* č:üχ^{w}er, *Agul* ǯeχer / č:iχIar, *Tbs.* žiχir "pear"]
6). tilí-eŋ "saddle"; -ltul- "to saddle (a horse)"	*Avar* λ':ilí (кьИли «седло»); *Lak* k'ili "saddle" < *Proto-NEC* * λ'wilē "saddle"
7). pholɣó "feather" [Yasin]	*Lak* p'iḥulli *Dargwa* (*Akushi dialect*) palḥalla "feather" < *Proto-NEC* *p'VḥVlV "feather, mane"

The question of a genetic linguistic grouping paralleling the

[30]Sources: 1) MCE (Bengtson 1991b) 47, N(ikolayev)/S(tarostin) 870-1, Victor Friedman (pers. comm.); 2) MCP (Bengtson 1992b) 63, N/S 926, Xaj(dakov) 38; 3) Berger 1974, MCP 52, N/S 704, Murk(elinskij) 119; 4) MCE 53, N/S 925; 5) Berger 1974, MCE 30, N/S 893, Xaj 56, Murk 162; 6) Blažek/Bengtson 160, Xaj 88, N/S 783; 7) Bengtson 1996, N/S 879, Tiffou (pers. comm.). The reconstructed NEC forms come from Nikolayev and Starostin [1994]. In their system of transcription /I/ indicates pharygealization; /H/ stands for a laryngeal consonant, and /V/ a vowel, of uncertain quality.

[31]The irregular correspondances between Burushaski /q/ and various Daghestanian velars and uvulars might pose difficulty for a proposed phyletic relation between Burushaski and NEC, but such inconsistencies do crop up in cases of borrowing. In Georgian words borrowed from Arabic, for example, Arabic /q/ can be replaced by /q'/, /k'/ or /χ/; conversely, in Georgian place-names recorded by Arabic chroniclers, Arabic /q/ can represent Georgian /q'/ or /k'/ [Zereteli 1990].

[32]Tiffou suspects that *šuɣurí* might be a loan from Khowar or Shina; Bengtson responds that "this may be one of the Burushic words retained by Burushos who assimilated to Indic languages (Khowar, Shina)" [pers. comm.].

correspondences proposed here, on the basis of evidence from comparative mythology, must for the time being remain unresolved. Much more work needs to be done, on the basis of the most recent and most reliable language data, before one can associate the prosthesis motif with an ancient population which spoke Macro-Caucasian. What I believe I have demonstrated, though, is that Burushaski and the NEC languages share what Nichols has termed *quasi-genetic resemblances*: "resemblances of structure and vocabulary that do not prove genetic relatedness in the standard sense but certainly suggest a possible connection at a level slightly deeper than the comparative method can reach" [1993: 73].

The archeological evidence indicates that the Northeast Caucasian peoples have been in roughly their present location for several millenia at least [Džaparidze 1989: 376ff; Nichols 1994]. Does this therefore imply that sometime in the 3rd millenium BCE the ancestors of the Burushos migrated eastward from an Urheimat in the vicinity of the North Caucasus region, across the steppes north of the Caspian Sea and through what is now Kazakhstan? There is another possibility that should be considered. The common features discussed in this paper could have as well diffused more slowly across a chain of highland communities to the south of the Caspian, across Iran and Afghanistan. Long-distance displacement of communities is not required by this model, and it has the added bonus of being consistent with the retention of symbolic clusters associated with highland topography and economic activities. Perhaps some of the influx into the Bronze Age Tarim Basin came from this second, less-studied southern route.

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Qilian and Kunlun* — The Earliest Tokharian Loan-words in Ancient Chinese

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> The Yuezhi[1] originally lived in the area between the Qilian (Mountains) and Dunhuang, but after they were defeated by the Xiongnu (Huns) they moved far away to the West, beyond Dawan, where they attacked and conquered the people of Daxia and set up the court of their king on the northern bank of the Kui river.
>
> — Chapter 123, *Shiji* (*Records of the Grand Historian*) by Sima Qian[2]

This record comes from a report of the Han envoy Zhang Qian who, after having visited Daxia (viz. Bactria) ruled by the Yuezhi, returned to China in 126 BCE and reported to the Han emperor Wu on the above event.

The Yuezhi people who came from Dunhuang were called

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*A Chinese edition of my article was published with the same title on pp. 113-116 of *Dunhuang Research* 敦煌研究, 4 (Lanzhou: Dunhuang Academy, 1994). There I had to leave out some linguistic analyses on the two Tokharian loan-words in Ancient Chinese discussed herein because many linguistic symbols could not be printed by that Chinese periodical. Thus, a further discussion of the two words will be made in this article.

[1]This proper name is read "Rouzhi" by Chinese scholars because it was written with the graphs 月(=肉)支 *rouzhi* in classical Chinese texts. One of the sources of modern Chinese /y/ is classical Chinese /ng/. For instance, the first syllable 鄴 (*ye*) of the place-name 鄴城 (Ye City) was transcribed as "nkp-" in the Sogdian ancient letters of the third or fourth century CE found in Dunhuang. Cf. W. B. Henning, "The Date of the Sogdian Ancient Letters," *BSOAS*, 12 (1964), 609.

[2]For the English, see B. Watson, *Record of the Grand Historian of China*, vol. 2 (New York: Columbia University Press, 2nd ed., 1962), p. 268. But here and hereafter, all Chinese proper names are to be changed into the modern standard Pinyin when cited.

Tókharoi in classical Greek works and *Tukhāra* in ancient Indian texts.[3] As revealed by archeological and linguistic data, the language spoken by Tokharians is probably one of the earliest Indo-European languages because of its close relationship to the Hittite language of Indo-European which appeared in Asia Minor between 1900 and 1450 BCE.[4] Both share a set of medio-passive *r*-endings comparable to those of Italic and Celtic.[5] The Tokharian language is found where only satem languages such as Sanskrit and Iranian would be expected, but its surprising linguistic position is proven to be among the centum languages, especially between Italo-Celtic on the one hand and Armenian on the other.[6]

Three dialects spoken by the Tokharians have been well attested in manuscripts and inscriptions found in various ancient sites around the Täklimakan desert, Xinjiang (Chinese Turkestan), i.e., Tokharian A which prevailed between the Argi and Gaochang kingdoms (between Qarashähär and Turfan), Tokharian B in the kingdom of Kucha and Krorainic in the Kroraina/Shanshan kingdom (between Loulan and Niyä).[7] The Yuezhi people did not leave any written materials in West China, but many Yuezhi terms were noted by Chinese historians and are well preserved in classical Chinese texts.

As recorded in the *Shiji*, the Yuezhi people, before they left for Bactria, lived mainly in the area between Dunhuang and the Qilian Mountains, lying west of the Hexi corridor in Gansu. However, the Yuezhi people belonged to a nomadic tribe seasonally on the move in search of water and pasture. The range of their activities extended widely from the Tarim Basin to the Ordos steppe. As early as in Shang China (c. 13th-11th BCE) the Yuezhi people had already begun their commercial and cultural contact with the ancient inhabitants of the Yellow River Valley,[8] so that some Tokharian words were borrowed into Chinese. One typical example is Chin. 蜜 *mi* < **myit* "honey". This Chinese word has been taken to be a loanword from Tokharian as it is

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[3]For the word for "Tokharian" in various languages, see H. W. Bailey, "Ttaugara," *BSOS*, 8 (1936), 883-921.

[4]Cf. E. Sturtevant, *A Comparative Grammar of the Hittite Languages*, vol. 1 (New Haven: Yale University Press, 1951), p. 10.

[5]H. Pederson, "Hittite and Tokharian," *Language*, 9 (1933), 13-34.

[6]A. Meillet, "Le Tokharien," *Indogermanisches Jahrbuch*, 1 (1914), 1-19; for various other arguments on this problem, see D. Q. Adams, "The Position of Tokharian among the Other Indo-European Languages," *JAOS*, 104 (1984), 395-402.

[7]For Tokharian A and B, see E. Sieg, W. Siegling, and W. Schulze, *Tocharisches Grammatik* (Göttingen: Vandenhoeck und Ruprecht, 1931); for the Krorainic dialect of Tokharian, see T. Burrow, "Tokharian Elements in the Kharoṣṭhī Documents from Chinese Turkestan," *JRAS*, (1935), 667-675.

[8]Lin Meicun, "Tocharian People: Silk Road Pioneers," *Senri Ethnological Studies*, 32 (Osaka: National Museum of Ethnology, 1992), 91-96.

closest to Tokh. B *mit*$^{\theta}$ and Kror. *meta* < *PIE *medhu* "honey", cf. Greek *methu* and Skt. *madhu*.[10]

The Yuezhi people were the strongest of the nomadic tribes in the northwestern steppe of China during the pre-Qin period, thus Sima Qian wrote in his *Shiji*, "At that time the Eastern Hu were powerful and the Yuezhi strong. The Chief of the Huns, Touman 頭曼, could not withstand Qin China (c. 255-205 BCE) and migrated to the north."[11] This being the case, the Huns, Proto-Turks, Proto-Uyghurs, and other nomadic tribes scattered over the northwestern steppes of China seem to have been under the suzerainty of the Yuezhi during the pre-Qin period. This may help us to understand how some Tokharian words would have come into Proto-Turkic in the pre-Qin period. For instance, the king of the Huns Touman's name is merely an Old Turkic title *tuman*, which probably derived from a Proto-Tokharian form of Tokharian B *tumane* (=A *tmāne*) "ten thousand".[12] Old Turkic *mïr* "honey" also derived from a Proto-Tokharian form of Kror. *meta* and Tokh. B *mit*, but British Turkologist G. Clauson suggests that this Tokharian loanword in Old Turkic may have come indirectly from Chinese.[13] Another Tokharian loanword in Old Turkic is *kün* "sun"; as German linguist W. Winter has pointed out, it must have been the equivalent of Tokh. A *kom* and B *kaum* "sun".[14] In all likelihood, most of the Tokharian loanwords in Proto-Turkic and Old Turkic derived from the Yuezhi dialect of Tokharian.

As for the Yuezhi vocabulary which survived in Ancient Chinese, many instances remain unidentified in Tokharian. One of them is the word *qilian* 祁連 to be discussed in this article. As introduced above, this word was used for the name of a mountain in the Yuezhi people's homeland. Unfortunately, it used to be regarded as having derived from the language of the Huns because the famous Chinese scholar, Yan Shigu, of the Tang period noted in his work that the Huns called the sky "Qilian". Yan's note on *qilian* has exercised a great influence upon the scholarly world of China and has been cited recently in the newly published *Great Chinese Dictionary*.[15] However, from the

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[9]J. Pokorny, *Indogermanisches Etymologisches Wörterbuch*, vol. 1 (Bern: A. Franke, 1959), p. 707.

[10]Cf. E. J. Rapson and P. S. Noble, *Kharoṣṭhī Inscriptions Discovered by Sir Aurel Stein in Chinese Turkestan*, pt. 3 (Oxford: Clarendon Press, 1929), p. 363.

[11]Sima Qian 司馬遷, *Shiji Xiongnu liezhuan* 史記匈奴列傳 ["Biography of the Huns", *Records of the Grand Historian*] (Beijing: Zhonghua, 1956), p. 2887.

[12]W. Krause und W. Thomas, *Tocharisches Elementarbuch*, Band. II (Heidelberg: Carl Winter's Universitätsverlag, 1960), p. 200.

[13]G. Clauson, "The Foreign Elements in Early Turkish," in *Researches in Altaic Languages*, ed. by L. Ligeti, (Budapest: Akadémiai Kiado, 1975), p. 44.

[14]W. Winter, "Tokharian and Turks," in *Aspects of Altaic Civilizations* (Bloomington: Indiana University, 1963), pp. 239-251.

[15]Luo Zhufeng 羅竹風 et al., ed., *Hanyu da cidian* 漢語大詞典 [*The Great*

"Biography of the Huns" in the *Hanshu*, we know that the Huns actually called the sky *chengli* 撐犁 (read as *tsengli*). So far as we can tell, the Huns must have belonged to a tribe speaking some form of Old Turkic, thus the so-called *chengli*, as French Sinologist P. Pelliot pointed out, must have been transcribed from Old Turkic *tängrim*.[16] Obviously, the Huns called the mountain near Dunhuang *qilian* following the original local usage. Thus, *qilian* must derive from the Tokharian dialect spoken by the Yuezhi people of Dunhuang.

Canadian Sinologist E. G. Pulleyblank is the first scholar who noticed this problem. He reads this word *qilian* as *ch'i-lien* < *gii-lien* and stated in his article as follows:

> Curiously, there does not appear to be a known Tokharian word for "heaven", and I can not therefore suggest a definite Tokharian etymology for the word. One must note the difficulty that the Chinese forms all begin with a voiced initial g-, which would be impossible in the known Tokharian dialects, but we cannot assume that this would necessarily be true of the Yueh-chih dialect.[17]

The argument of Pulleyblank is basically correct, but no one has suggested which word it corresponds to in Tokharian. Recently American Sinologist V. H. Mair also noticed this problem. He suggested that the Tokharian word transcribed as Ancient Chinese *qilian* should be the equivalent of Latin *caelum* "sky, heaven".[18] This discovery is very important and helps us locate its equivalent in Tokharian. As is well known, Latin */c/* generally corresponds to Tokharian */k/* as attested in Latin centum parallel to Tokh. A *känt* and B *kante* "hundred". Thus, the Tokharian equivalent of Latin *caelum* must have been somewhat like **kaelum*. In addition, we know from Chinese sources that the Tokharian word for "heavenly" was *qiluoman* 祁羅漫 or *xiluoman* 析羅漫, both transcriptional forms which are attested in the names Qiluoman-Shan or Xiluoman-Shan, alternatives for today's Tian Shan 天山 (Heavenly Mountains).[19]

The above evidence has convinced me that Chinese *qilian* must have come from a Proto-Tokharian form of Tokh. A *klyom* and B *klyomo* "holy, glory", from an earlier form **kilyomont*, probably to be

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Chinese Dictionary], vol. 7 (Shanghai: Hanyu da cidian Press, 1991), p. 830.

[16]P. Pelliot, "Tängrim > tarim," *TP* (1944), 165-185.

[17]E. G. Pulleyblank, "Chinese and Indo-Europeans," *JRAS* (1966), 20-21.

[18]V. H. Mair, "Reflections on the Origins of the Modern Standard Mandarin Place-Name 'Dunhuang'," in *Papers in Honour of Prof. Dr. Ji Xianlin on the Occasion of His 80th Birthday*, ed. by Li Zheng et al., vol. 2 (Nanchang: Jiangxi People's Press, 1991), p. 932.

[19]Cf. Cen Zhongmian 岑仲勉, *Hanshu Xiyuzhuan dili jiaoshi* 漢書西域傳地理校釋 [*Geo-graphical Notes on the Account of the Western Regions of the Hanshu*] (Beijing: Zhonghua, 1981), p. 527.

compared with Latin *caelum* "sky, heaven", Skt. *kalyāna* "noble, virtuous", Greek *kalós/kalón* "virtue, honor".[20] In Common Tokharian (viz. Tokh. A and B) texts this word is employed to render Sanskrit *ārya* "noble, holy."[21] The morphology and derived forms of the word for "noble, holy" in Tokh. A and B are as follows:

Tokh. A Forms[22]

		Masculine	Feminine
Singular	Nominative	*klyom*	*klyomim*
	Accusative	*klyomänt*	*klyominām*
	Genitive	*klyomäntāp*	*klyomine*
Plural	Nominative	*klyomäs*	*klyommāñ*
	Accusative	*klyomäncäs*	*klyominās*
	Genitive	*klyomäncäśśc*	(unattested)

Derived adjectives: *klyomśo* "Würdigkeit"; (*ñom*) *klum* "glorious".

Tokh. B Forms[23]

		Masculine	Feminine
Singular	Nominative	*klyomo*	*klyomña*
	Accusative	*klyomoṃ* (*-mont*)	*klyomñai*
	Genitive	*klyomopi* (*-montse*)	(unattested)
	Vocative	*klyomai*	(unattested)
Plural	Nominative	*klyomoñ*	*klyomñana*
	Accusative	*klyomom*	*klyomñana*
	Genitive	*klyomoṃts*	(unattested)

Abstract: *klyomñe* (=Skt. *āryatā*) "holiness".[24]

The pre-Tokharian form of Tokh. A *klyom* and B *klyomo* appears to be **kilyomont* since the pre-Tokharian */i/* is dropped at large in Common Tokharian. For instance, Kror. *kitsaits* "old" changed into Tokh. B *ktsaits*(*anne*) "old (elder)"; Kror. *tipara* "high" changed into Tokh. A

[20]Cf. M. Monier-Williams, *A Sanskrit-English Dictionary* (Oxford, 1979), p. 263.
[21]E. Sieg und W. Siegling, *Tocharische Sprachreste, Sprache B*, Heft I (Göttingen: Vandenhoeck und Ruprecht, 1949), p. 118.
[22]W. Krause and W. Thomas, *Tocharisches Elementarbuch*, Band I (Heidelberg: Carl Winter's Universitätsverlag, 1960), p. 153 and *idem*, Band. II, pp. 99-100.
[23]W. Krause and W. Thomas, *Tocharisches Elementarbuch*, Band I (Heidelberg: Carl Winter's Universitätsverlag, 1960), p. 153 and *idem*, Band II, p. 190.
[24]E. Sieg and W. Siegling, *Tocharische Sprachreste, Sprache B*, Heft I (Göttingen: Vandenhoeck & Ruprecht, 1949), p. 118.

tpar "high".[25] Therefore, this Tokharian word for "holy" was given as *qilian* in Ancient Chinese. Furthermore, it must correspond to Kror. *kala* which was used as a title of the Shanshan princes. The same title is also seen in the Kushān Inscriptions where it appears as *kara* in *Kujula Kara Kadphises*, the name of Kushān king Wima Kadphises on Kushān coins.[26] The etymology of this title has been obscure for a long time, but now we finally know that it should be a Tokharian word meaning "noble, holy."

The Tokharian word for "mountain" is *ṣul* in Tokh. A and *ṣale* in Tokh. B. This is a masculine noun, while the Tokharian spoken by the Yuezhi people is obviously close to that of the Eastern dialect (viz. Tokh. A) because it prevailed in Dunhuang, east of Turfan where Tokharian A flourished. Thus, the word for "heavenly" in the Tokharian term for "Heavenly Mountains" must have adopted the masculine form of the word in Tokh. A. That is Tokh A *klyom* < **kilyom*, so Chin. *qilian* must have been from this word. As for *qiluoman* or *xiluoman* in Tang texts, they may have come from the oblique (accusative) singular form of the same word, i.e., *klyomant* < **kilyomant*.

Moreover, the place-name Qilian is only a Han-Tang Chinese transcription of this Tokharian word; it does not appear in pre-Qin literature where we find the place-name Qilian transcribed as *kunshan* 昆山 or *kunlun* 昆侖 (the Kun[lun] mountains).

In the "Chronicles of the Zhao State" of the *Shiji*, there is a letter written by one Suli to Zhao Huiwen king of the Zhao State, where it is said that "the jade of the Kun mountains could not be obtained any longer by the king of the Zhao State if the Qin State sent its army across the Gouju mountains to occupy the area near the Hengshan mountains."[27] The so-called "Jade of the Kunshan" is also called "Jade of the Yuezhi" in pre-Qin literature.[28] It is listed as follows:[29]

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[25]W. Krause and W. Thomas, *Tocharisches Elementarbuch*, Band II (Heidelberg: Carl Winter's Universitätsverlag, 1960), pp. 191 and 106; T. Burrow, *The Language of the Kharoṣṭhī Documents from Chinese Turkestan* (Cambridge: The University Press, 1937), p. 82.

[26]T. Burrow, *The Language of the Kharoṣṭhī Documents from Chinese Turkestan* (Cambridge: The University Press, 1937), p. 82.

[27]Sima Qian 司馬遷, *Shiji*, "Zhao shijia" 史記趙世家 [Account of the Royal Family of the Zhao State, *Shiji*] (Beijing: Zhonghua, 1956), p. 1818.

[28]The alternation r/n is often observed in Classical Chinese, therefore the word Yuezhi can be read either as Rouzhi or 牛氏 *niuzhi*; the latter appears in the *Guanzi* (see below). But it seems more frequently to be read 禺氏 *yuzhi* or 禺知 *yuzhi* in pre-Qin literature (cf. Wang Guowei 王國維, "Yuezhi wei xiqian Daxia shi gudi kao" 月氏未西遷大夏時故地考 [On the Homeland of the Yuezhi People before They Migrated to Bactria], *Guantang jilin* 觀堂集林, vol. 4 (Beijing: Zhonghua, 1962), pp. 1156-1157. Thus, here I prefer to use the reading Yuezhi instead of Rouzhi or Niuzhi.

[29]Cf. Guo Moruo 郭沫若, *Guanzi jijiao* 管子集校 [*Comprehensive Notes on the*

1. 玉起於禺氏 [Jade is brought out from the Yuzhi] — "Guoxu" 國蓄, chapter 73 of the *Guanzi.*
2. 夫玉起於牛氏之邊山 [Jade is brought out from the mountains near the Niuzhi] — "Dishu" 地數, chapter 77 of the *Guanzi.*
3. 玉出於禺氏之旁山 [Jade is brought out from the mountain near the Yuzhi] — "Qingzhong" B 輕重乙, chapter 81 of the *Guanzi.*

From all of these data, we can infer that the Qilian Mountains were closely associated with the Yuezhi group of Tokharians and were called *kunshan* or *kunlun* in pre-Qin literature. Thus, *kun* of *kunshan* or *kunlun* in Ancient Chinese should be the earliest Chinese transcription of Tokharian *klyomo* < **kilyomo.* As Chinese linguist Zhang Taiyan pointed out, /l/ and /n/ were not distinguished in Ancient Chinese,[30] so that *kil-* of Tokharian **kilyomo* was transliterated as *kun* in Ancient Chinese. Probably for the same reason, Tokharian **kilyomo* was transliterated as *kunlun* in Ancient Chinese. If this argument is tenable, *kun* of the place-name Kunshan or Kunlun in pre-Qin literature should be the earliest attested Tokharian loan-word in the Chinese vocabulary.

Guanzi], in *Guo Moruo quanji* 郭沫若全集 [*The Complete Works of Guo Moruo*], vol. 8 (Beijing: People's Press, 1985), pp. 59, 186 and 315.

[30]Zhang Taiyan 章太炎, "Guyin niang ri er niu gui ni shuo" 古音娘日二紐歸泥說 [On Ancient Chinese /n/ and /l/], in *Lidai Hanyu yinyunxue wenxuan* 歷代漢語音韵学文選 [*Selected Papers on Chinese Phonology through the Ages*] (Shanghai: Ancient Book Press, 1986), pp. 175-185.

A Linguistic Approach to Inner Asian Ethnonyms[1]

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1. INTRODUCTION. One of the difficult problems in Inner Asian ethnonym studies is that of how historical events and semantic attributes of certain words may be used to explain the emergence of a set of ethnonyms. Many scholars have from time to time tried to construct theories to interpret the origin of certain Inner Asian ethnonyms, but have given little reference to Tokharian and other Indo-European languages. There are many different etymological explanations of Inner Asian ethnonyms. For the most part, these explanations have been derived from mutually unrelated assumptions drawing either on phonetic resemblances or semantic considerations, and many ethnonyms remain without a convincing etymological solution. For instance, among various explanations, scholars have interpreted the ethnonym *Mongol* either in terms of the Mongolian words *möngke* 'eternal' and *mönggün* 'silver' or in terms of Manchu *mangga* 'strong' and Chinese *meng* 'fierce, violent'. The ethnonym *Nikan*, the Manchu name for ethnic Chinese, has been given the meaning of 'pus, worthless fellow'. Both explanations are based more or less on what happened to the Mongols and ethnic Chinese in history. In the first case, the ethnonym *Mongol* was used either for praise in the sense of 'strong' and 'eternal' or for blame in the sense of 'fierce'. In the second case, *Nikan* was only for blame. But the problem is that the ethnic Chinese could hardly have been regarded as worthless fellows by the Altaic people. Instead, central China with her splendid agricultural civilization appealed very much to the nomadic people in the north. And we may ask how we can prove that, when the names *Mongol* and *Nikan* were first used, the bearers of the ethnonyms as a whole were epistemologically evaluated to be eternal, strong, fierce, and worthless, respectively. Although such explanations may be worthy of consideration in their own right, they should be updated by the current accumulation of knowledge of the ethnonyms. We need to have a comprehensive and systematic analysis of Inner Asian ethnonyms from a linguistic standpoint that also takes historical

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and cultural reality into account.

A basic claim of this paper is that language life in ancient Inner Asia was constituted by the interaction between Altaic and Indo-European peoples, forming an areally connected linguistic belt of the Eurasian landmass. Seen in this light, ethnonyms were part of the cultural and linguistic contact between East and West. So the ethnonym-giving practices in Inner Asia have much to do with Indo-European languages and further disclose the historical factors conditioning the occurrence of certain ethnonyms. I will try to place the study of Inner Asian ethnonyms and toponyms within the context of the current issue of Caucasian mummies in Xinjiang and explore the underlying cognitive process of the practice of ethnonym-giving.

Historical documents have recorded many ethnonyms in Inner Asia, but have given only inadequate and scattered accounts of their provenance. An ethnonym may have emerged during a particular period and in a particular environment in which different ethnic groups came into contact. In the course of historical contact there have been numerous ethnonyms in Inner Asia and the adjacent areas, some of which seem to bear a strong phonetic resemblance, but it is not easy to identify what relationships exist among them. As time passed, scores of ethnonyms must have become extinct or have been discarded and replaced by new ones. Much research has been done on this issue by historians in the main, since historians seem to be more interested in onomastics than linguists. However, some of the existing explanations have not displayed linguistic competence. This is quite understandable. The task is far more complicated than it might at first seem, given that onomastics can embody phonological and semantic changes which may pose a difficulty for those who are not acquainted with linguistic techniques, and also reflect a pragmatic and cognitive principle. To account for the historical practice of ethnonym-giving in Inner Asia, I will suggest two specific cognitive processes that can be used to explain etymologically many Inner Asian ethnonyms. The first is that words for 'people' were employed to refer to ethnic groups, since they are perceptually and cognitively easy to process. There is a common psychological reason why certain ethnonyms are associated with words for 'people' and 'land'. Where people share a common mental configuration we may with good reason expect to find that certain naming patterns are common within the people. The second is that reference was often made to the geographical location where the bearers of the ethnonym existed; the words for 'sun' and 'sun-rising direction' can thus account for a set of ethnonyms. In short, the practice of ethnonym-giving may embody the underlying psychology of people in a straightforward way. For this reason I strongly believe that it is not accidental that many ethnonyms in Inner Asia have phonetic similarities and semantic relatedness.

2. THE WORDS FOR 'PEOPLE' IN ETHNONYMS. Generally, there is some sort of natural association between ethnonyms and the words for 'people', 'stranger', 'land', and 'country'. In this section I will explore the psychological motivations which led ancient people to name ethnic groups. If we assume that when two tribes first come into contact without previous knowledge of the name of the opposite party, the first impulse would be for one tribe to refer to its counterpart simply by using its existing word for 'people'. It was this reality that resulted in a generally similar nomenclature for many ethnic groups, be they Mongol, Nikan (Chinese), Hungarian, or Angle to which the addressers referred.[2]

(1) ToA. *lokit*, ToB *laukito* 'guest, stranger'
WMo. *nökör* 'friend, comrade'. Dagur *nugur* 'wife, friend'
WYu. *nöhgör* 'friend'
Ma. *neku*, Jurchen *nekul* 'friend'
MMo. *Negüs* 'a Mongolian tribe'

The lateral *l* of Tokharian *lokit* corresponds to the nasal *n* of Mongolian *nökör*. This match is of great importance for establishing the etymological relationships among a set of words and ethnonyms. During the Ming Dynasty (1368-1644) a Mongolian tribe in northwestern China had the ethnonym *Nökör* (*niekeli*). During the Tang Dynasty (618-907), in what is now Kamchatka in northeastern Siberia there was a tribe called *Lokui* (*liugui*). According to *Xin Tang shu* (*New History of the Tang*), the tribe was engaged in dog-raising and hunting. I relate the ethnonyms *Nökör* and *Lokui* to the words cited above, which were possibly connected with Sanskrit *loká-* 'people, world, territory' and Latin *locus* 'place, region, district'.

(2) OE. *līc*, Gothic *leik* 'body, corpse'. IE **lig-* 'figure'
ToA. *lek* 'appearance, gesture'
Ma. *Nikan*, Solon *Nïhan*, Dagur *Niakën* 'Chinese'

Historians and linguists have suggested that there are Kitan descendants in Yunnan Province, China and have found a number of

[2]The following abbreviations are used below: Bao: Baoan, Dag: Dagur, EYu: Eastern Yugur, Grk: Greek, Jur: Jurchen, Kit: Kitan, Lat: Latin, Ma: Manchu, MMo: Middle Mongolian, OE: Old English, OT: Old Turkic, Sol: Solon, ToA: Tokharian A, ToB: Tokharian B, WMo: Written Mongolian, WYu: Western Yugur. I will transcribe certain terms which occur in Chinese sources with a special romanization that is compatible with Altaic phonological structures and historical phonology but will also add Chinese romanization (*pinyin*) in parentheses if necessary. At the end of the article, the reader will find an appendix where such terms are given in Chinese characters according to alphabetical order.

words supposed to be cognate to Kitan and Dagur. Among those words is *nihëŋ* 'guest' which may be connected with OE *līc*. In Chinese sources the name *Likan/Lihan* (*liqian/lixuan*) was often used to refer to the Roman Empire[3]. *Likan* was also the name of an ancient county established by the Western Han Dynasty (206 BCE- 25 CE) in what is now the southern part of Yongchang County in Gansu Province. The name emerged when the people whose ethnonym was *Likan* came from the west to settle there. It has been noted in Chinese annals that the name was given by the local people. I assume that OE *līc* 'body' was once borrowed into Mongolian and Tungusic languages in the sense of 'people, person'. The semantic shift from 'body' to 'person' is quite understandable, because a body may be a person, and a person may in turn be a people. We have such evidence in some languages in support of this parallel, namely, Dagur *bei* 'body' and WMo *beye* 'body' is parallel to Solon *bëyë* 'people, person'. A people different from us may be strangers, guests or friends, and thus the word for 'people' may well serve as an ethnonym. Lane (1938:8) connected ToA *lek* 'appearance' with Gothic *leik* 'body, corpse'. English etymologists have noted that ME *liken* (< OE *līcian* 'to be or make like, seem likely') was ultimately from IE base **lig-* 'figure, shape, similar, like'.

Manchu *nikan* as an ethnonym is not only used for the ethnic Chinese, but also for some Altaic tribes. During the Liao Dynasty (916-1125), there was a tribe whose name was *Nikan* (*niqi*[4]) *Tanggu*. In addition, Manchu *nikan* serves as a masculine name in the Jurchen and Manchu societies. During the sixteenth century a Jurchen tribal chief named Nikan Wailan was killed by the Jurchen leader Nurgaci (Nurhachi). It has been suggested that the name Nikan Wailan shows mixed origin: Nikan, the Manchu name for Chinese; Wailan, from a Chinese title (cf. Lattimore 1988:127). However, we should note that Nurgaci's grandson was also named Nikan (1610-1652), as were some other Manchu statesmen and generals. Corresponding to Manchu *nikan*, Dagur *niakën* may serve as a masculine name. I myself know a Dagur man whose name is *Niakën*. So the ethnonym and masculine name *Nikan* and *Niakën* are intrinsically derived from its meaning of 'man, boy, person' respectively. And the Khamnigan Evenki word *nekvn* 'younger brother' (< **nekün* < Proto-Tungusic *nekön*, see Janhunen 1991:24) is cognate to Manchu *nikan*.

In one of my papers (Wang 1992) I have made the point that the ethnonym *Nüjin* 'Jurchen' indirectly originated from OE *lēod/lēode*

[3]Some scholars maintain that *Likan* is a partial translation of *Alexandria*.

[4]The word *qi* of the ethnonym *niqi* in the standard Chinese transcriptions is pronounced *kat* in the Cantonese dialect. As Cantonese is believed to preserve many characteristics of ancient Chinese pronunciation, I have transcribed *niqi* as *nikan*. However, we have good reason to transcribe it as *nikat*, for the ethnonym *Kitan* has the plural form *Kitat* in Mongolian. So *Nikan* might also have the plural form *Nikat* in Mongolian.

'man, people, country'. Here I add some more words to this etymology.

(3) ToA. *lyutan-* 'country, region' (?)[5]. OE *lēode* 'people, nation'
WMo. *nutug* 'country'. Sol. *nutug*, Evenki *nitug* 'homeland'

Lüde (*lude*) was the name of an ancient county established in the Xiongnu territory by a Western Han emperor in what is now the northwestern part of Zhangye, Gansu Province. The name *Lüde* was believed to be inherited from the same Xiongnu place name. I connect the name with ToA *lyutan-* and OE *lēode*. A town in the Western Regions had the name *Noci* (*nuzhi*), and some western Turkic tribes were called *Nücibi* (*nushibi*). For the time being I am not certain whether these latter two names have a connection with those in (3).

(4) ToA. *kapśañi*, ToB *kektseñe/kek(t)señ(e)* 'body'
OT. *Kïbcak* 'a Turkic tribe'

The ethnonym *Kïbcak* occurred in the Old Turkic Orkhon inscriptions in the eighth century and was transcribed *Kopčak* and *Capchat* in western literature. Chinese sources recorded the variant forms of this ethnonym such as *Kefucha*, *Kebishao*, *Qincha*, and *Chebishi*.

Lane (1938:12) compares the Tokharian words with Old Irish *cucht* 'color, outer form, kind' and Old Icelandic *hǫ́ttr* 'mode, appearance'. Van Windekens (1941:36) etymologizes the Tokharian words with Sanskrit *kákṣa-* '*espace sous l'épaule*', Avestan *kašа-* 'shoulder, armpit', and Latin *coxa* 'hip'. I would like to connect the words with Latin *corpus* 'body, corpse, person'. Under this analysis ToA *kapśañi* developed from **kaśpañi* through metathesis of **śp*, and Latin *corpus* came from **cospus* through rhotacism of **s* occurring in the environment of V__C. As I have pointed out in my previous papers, metathesis calls for special attention in Tokharian. In support of my position I shall suggest a connection of ToAB *litk-* 'to fall away, be removed' with OE *ālīhtan* 'to take off, take away' (English *alight* 'to get down') through metathesis of **kt*, since both words correspond well in meaning. OE *ālihtan* formed from *līhtan* with the prefix *ā-* 'out, off', which was no doubt cognate with Tokharian *litk-* (< **likt-*).

A further diffusion of the Tokharian words can be found in WMo *kegür* 'corpse, body', *kegüken* 'child', Dagur *këku* 'son, boy', Monguor *këwosï* 'child' and *këū*, 'son'. As we can see, WMo *kegür* and *kegüken* both contain the root *keg(ü)-* which was borrowed from ToB *kektseñe* by apocopating of the last sounds *-tseñe*. The Dagur word *këku* can also serve as a masculine name in the Dagur society. In addition, historical Mongolian documents recorded the masculine name *Köksegü-Sapraqa* during the thirteenth century, and a Mongolian tribe was named

[5]Van Windekens (1941:59) glosses this word as such with a question mark.

Khorchin (< **kökcen*). It seems that the Mongolian names *Köksegü-* and *Khorchin* took their origin from ToB *kektseñe*, whereas the Turkic name *Kïbcak* may have derived from ToA *kapśañi*.

(5) ToB. *$k_u$sai* 'village'
OT. *kişi:* 'man, person, human being, people'
Jur. *ite'e* (< **hite* < **kite*), Evenki *tëgë:* (< **ite*) 'people'
EYu. *hdōG* 'tribe'
MMo. *Kitan/Kitat* 'the Kitan people'. Monguor *cidad/cidar* 'Chinese'
OT. *Kïday/Kïtañ* 'the Kitan people'

As the Kitan people established the influential Liao Dynasty in northern China, the ethnonym *Kitan* has attracted the intensive attention of historians. Much has been written about its etymology, but little is conclusive. My explanation is based both on phonological and semantic correspondences. That is to say, the Tokharian and Old Turkic sibilant *s/ş* was rendered as *d/t* probably in an Old Mongolian dialect, and then the word *kitan* as a noun meaning 'people, villager' came to serve as an ethnonym, which subsequently diffused back into Old Turkic. Eventually, the word became fossilized as an ethnonym in Mongolian, whereas in Jurchen and Eastern Yugur the words have maintained the senses of 'people' and 'tribe' respectively. Interestingly, in Russian *Kitaj* (Китай) now refers only to China. And today the speakers of Mongolian use the ethnonym *Hiatad* (*Kitat*) to refer to the Han (Chinese) people. This is a good example of ethnonym transfer.

The correspondence between Old Turkic sibilants and Mongolian alveolar stops recurs in some other items, for example, OT *kuz* 'steppe', Dagur *kudë/hudë* 'steppe', Jurchen *ude'e* 'steppe', and Manchu *fudehun* 'desolate'. From this word derived several ethnonyms or state names. The *Hude* (*hude*) state was situated north of the Pamir Plateau in 100-300 CE. There was a Jurchen tribe named Udege (*udegai/udigai*) that existed in the middle and lower reaches of the Heilongjiang River. This word also became the ethnonym *Udehe*, a Tungusic tribe. The Jurchens generally used the phrase *ude'e niolma* 'steppe people' to refer to those who lived in the open steppe areas. The Dagurs often use the phrase *kudë Moŋgul* to refer to the steppe Mongols.

ToB *$k_u$sai* 'village' and OT *kişi:* 'people' are also responsible for the ethnonym *Kirgiz*. Among etymological explorations of the name *Kirgiz* is the claim that *Kirgiz* originally meant 'the steppe people', which turns out to be compatible with what I am suggesting here. Consider the following comparison:

(6) OT. *kişi:* 'person'
MMo. *hirgen/irgen* (< **kis+gen*), Manchu *irgen* 'people'

MMo. *Kirgisu* (*kirgi+su*) 'the Kirgiz people'

The Old Turkic sibilant *ş* became rhotacized in the V__C environment of Mongolian. I have discussed this change in my previous papers. Clauson (1972:752) points out that OT *kişi:* means 'man, person, human being', without distinction of sex, often in contrast to animals and supernatural beings. Clearly, *kişi:* was once a generic term for denoting 'people' and thus readily used as an ethnonym. The Dagur people habitually refer to the ethnic Chinese living in the surrounding villages as *irgën* 'people' in contrast with the holistic and formal ethnonym *Niakën*. During the Qin Dynasty (221 BCE-206 BCE) the Kirgiz people were called *Kirgen* (*jiankun*), as recorded in Chinese annals.

(7) ToA. *kälyme*, ToB *kälymy(i)ye* 'region'. Hittite *kuras/kweras* 'country, territory'
Ma. *gurun*, WMo *gurun* 'country, state'
Hexi *gülinje* 'village'

Norman (1977:232) maintains that Manchu *gurun* is a loanword from Chinese *giun* (*jun*) 'province, political division'. Here I venture to assume that the ethnonym *German* may be possibly connected with Tokharian *kälyme*. *Liao shi* (*History of the Liao*, 1974:1541) recorded a place name *Kerman* (*qi'erman*) which probably was from Tokharian *kälyme*.

(8) ToB. *keṃ*, ToA *tkaṃ* 'earth'. Latin *humus* 'earth'
OT. *kum* 'sand'
MMo. *humaki*, WMo *kumag* 'sand (area)'. Dagur *kumë* 'wasteland'
Ma. *kemun*, Dagur *këm* 'measure, dimension'

In ancient history there was an ethnic group in northeastern China which was called *Kumo Hu* (*kumo xi*). In my view, this ethnonym originally meant 'the steppe/desert people' consisting of the word *kumo* 'steppe' and the word *hu* 'people'. *Xin Tang shu* (1975:6173) observed that *Hu*, an ethnic group of *Dong Hu* (Eastern *Hu*) origin, called themselves *kumo hu* during the Wei Dynasty, but as *hu* starting from the Sui Dynasty without prefixing the word *kumo*. This record shows that the word *kumo* modified the word *hu* by indicating the characteristic habitation of the people. Among the nine constituent tribes of the Uigur confederation was the *Humasu* (*huwasu*) tribe. The ethnonym *Humasu* seems to be composed of the word *huma* 'earth' or 'sand' and the suffix *-su*.

(9) OE. *hām*, Old Saxon *hēm* 'village, region, country, home'
WMo. *Kamil*, Uigur *Kamul/Komul* 'Hami', Jurchen *fama'a* (< **ham-*) 'country'

As far as I know, the place name *Hami* (a region in Xinjiang) appeared in Chinese sources quite late during the Yuan Dynasty, but was attested as *Khamil* in the Old Uigur Dunhuang documents from the ninth-tenth century, which was no doubt given a long time ago by the local people by using the word for 'village, region' as recorded in Old English in this sense.

(10) Lat. *homō*, Gothic *guma* 'man'
WMo. *kümün*, Dagur *ku/ hu* 'person, people'
ToA. *ype*, ToB *yapoy* 'country, region'

In the ancient Western Regions there was a state called *Üpen* (*yueban*) which is equivalent to the Tokharian word *ype*. *Wei shu* (*History of the Wei*, 1974:2268) recorded that the *Üpen* state was located to the northwest of the Wusun state. The country previously was a tribe of the northern *chanyu* (king) of the Xiongnu. The state occupied a few thousand square *li* (half kilometer) of land with a population of more than two hundred thousands.

There is a considerable gap between the Tokharian and Latin words both on semantic and phonetic grounds. However, upon careful examination we can give a plausible etymological explanation. Although the Tokharian word has not been found to mean 'man' or 'people', the words for 'country' may simultaneously denote 'people'. For instance, OE *lēode* and *mægð* both mean 'country, people', and Latin *mundus* means 'world, mankind'. Given these semantic distributions, I shall argue that the Tokharian word once connoted 'man, people'. Phonetically, there is a loan correspondence between Mongolian *h* and Tokharian *y* in initial position. For example, MMo *hasak-* (< **hask-*) 'to ask', ToAB *yask-* 'to ask'; MMo *hüker* 'ox', ToA *yuk*, ToB *yakwe* 'horse'. As the consonants *m* and *p* share a bilabial feature, change of **m* to *p* might have occurred in Tokharian. Furthermore, the bilabial nasal *m* of WMo *üimege-* (< **küime-*) 'to confuse' and OT *küymen-* 'to be indolent' corresponds to the bilabial stop *p* of ToA *kip* and ToB *kwipe* 'confusion, disgrace'. So we can reconstruct an earlier form **humo* for the Tokharian word in (10).

(11) ToA. *napeṃ/ naweṃ* 'man, mankind'
MMo. *naiman* 'a Mongolian tribe'
WMo. *ayimag*, Monguor *imaG* 'tribe, clan'
Ma. *aiman* 'tribe'. Dagur *aimën* 'tribe, ethnic group'

With reference to historical records, *Naiman* was the name of a powerful tribe which believed in Nestorianism and adopted a writing system from Old Uigur. Today the Manchu word *aiman* may be used to refer to an ethnic group. Enhe Batu (1992:47) points out that Manchu *aiman* means 'tribe, ethnic group', but specifically refers to the Dagur people in Sanjiazi, a village in Heilongjiang Province,

China, where scores of the Manchus can speak their native language. And the speakers of Dagur often use the word *aimën* to refer to an ethnic group, particularly a minority group. In comparison with Tokharian *napeṃ*, WMo *ayimag* and Manchu *aiman* dropped the initial nasal *n*. We have evidence in support of this loss. Written Mongolian has a number of words with the initial nasal *n* which coexist with those without it, for example, *nimagan/imagan* 'goat', *nilci/ilci* 'heat', *nidugan/udugan* 'shaman', *nikeri/ikeri* 'twin', *nidka-/idka-* 'to hold back'. Manchu also displays this phenomenon, e.g. *nilhi/ilhi* 'dysentery'.

In ancient northern China there was a Xianbei tribe called *Yiman* (*yuwen*). The ethnonym *yiman* might have had a connection with those in (11). The ethnonym *Laban* (*loufan*) occurring in Chinese chronicles may also be added through a correspondence between *l* and *n* in the initial position.

(12) OE. *land/lond* 'earth, land, territory, district'
ToA. *lānt* 'king', *lāntune* 'sovereignty'

This word was once popular in denoting states and tribes in northern China. In Chinese sources there was a nation called *Nanda* (*nandou*) in the Western Regions, and the supreme leader of the Wusun state was titled *nandami* (*nandoumi*). A tribe named *Londu* (*luandi*) and *Lan* (*lan*) were among the major constituent members of the Xiongnu nation. The supreme leaders of the Xiongnu came from the *Londu* tribe. Furthermore, Chinese annals recorded a state named *Londo* (*luntou*) and a region named *Londa* (*luntai*) along the Silk Road in the Western Regions. All these words were most probably connected with OE *land*. It is held that OE *land* originated from Germanic **landam* which was related to Old Celtic **landā*. It appears that the place name *London* might be allied with this etymology. Bailey (1985:71) points out that in a Kuči text the title for king is *lānte*.

Clauson (1972:763) observes that 'no native Turkish word begins with *l-*'. As we know, many words in Tokharian, Old English, Mongolian, and Manchu begin with *l-*, and a number of Xiongnu official titles and ethnonyms have the initial lateral *l*. This piece of linguistic evidence suggests that the Xiongnu people may have been in close contact with the Tokharians, and that Mongolian and Tungusic tribes played a central role in the Xiongnu state.

(13) OE. *mægð* 'people, tribe, country'
ToA. *wartsi* (< **makti*) 'retinue', ToB *wertsye/wertsiye* 'company'.
Old Pahlavi-Pazand *mard* 'man', *mardun* 'people'
Ma. *Manju* (< **mardi*) 'the Manchu people'

Van Windekens (1941:160) glosses the Tokharian words with 'assembly, company' without making a semantic differentiation

between A and B. Having semantically distinguished ToA *wartsi* from ToB *wertsye* as shown here, Lane (1938:12) argues that the Tokharian words can be derived from dental formations of a radical element **wer-* seen in words of similar meaning and suggests a connection with Sanskrit *vṛnda-* 'host, crowd', Old Irish *foirenn* 'division, crowd' and OE *weorn* 'troop, multitude'. This association is not satisfactory. My analysis is that the consonant *g* of OE *mægð* occurring in the V__C environment is rhotacized in Tokharian *wartsi/wertsye* and Old Pahlavi-Pazand *mard*, and the liquid *r* in these words became pronounced as the nasal *n* in Manchu. I have repeatedly stressed the importance of these sound changes elsewhere. Here I would like to provide some more etymologies concerning similar changes within Indo-European languages. The sibilant *s* of ToA *kāsu/kāswe* 'good' became rhotacized in ToB *kartse/kärtse* (< **kastse*) 'good' in the V__C environment. The liquid *l* of OE *molde* 'land, country, world' changed to the nasal *n* in Latin *mundus* 'world, mankind' and in French *monde* 'world, people' in the V__C environment, as did the liquid *l* of ToAB *pälsk-* 'to think' (ToA *pältsäk*, ToB *palsko* 'thought') in Latin *pēnsō* 'to ponder, consider' and French *penser* 'to think'. As for the loan correspondence between Tokharian *w* and Mongolian and Tungusic *m/b*, we can provide the following words: ToA *wät* 'second, other', ToA *wu/we*, ToB *wi* 'two', WMo *busu*, Dagur *biśin* 'another'; ToA *wär*, ToB *war* 'water, body of water', WMo *mören*, Dagur *mur* 'river' and Manchu *bira* 'river'. To the latter etymology may be added OE *mere* 'sea, lake' and OHG *mari/meri* 'sea'. It was therefore quite possible that the bilabial nasal **m* weakened to the bilabial fricative *w* in Tokharian in certain instances.

Historical Mongolian documents and Chinese sources witness the Mongolian masculine name *Mandu* followed by suffixes. In present-day Mongolian and Dagur communities *Mandu* is still a popular masculine name. There is every reason to believe that *Mandu* originally meant 'man, boy, person' sharing the same etymology as *Manju*.

(14) ToA. *oṅk*, ToB *oṅki/eṅkwe* 'man, person, creature'
OE. *Engle/Angle* 'the Angles or English'
WYu. *Ëŋgar*, EYu *ŋgar* 'the eastern Yugur language'
Dag. *Hoŋkur* 'the Solon (Ewenke) people'
MMo. *Honggira* (*hongjila*), *Konggira* (*guangjila*) 'some Mongolian tribes'
MMo. *Mongkol/Monggol* 'Mongol'

In addition to *Honggira* and *Konggira*, Middle Mongolian and Chinese sources recorded the ethnonyms *Onggira* (*wongjila*), *Önggü* (*wanggu*), *Yonggu* (*yonggu*), and *Wonggira* (*wangjila*) referring to Turkic or Mongolian tribes. And the ethnonym *Hoŋkur* is alternatively pronounced *Onkor* (Онкорь, see Ivanovskij 1894:II), i.e. without the

initial fricative *h-*. If we consider the initial fricative *h-* of the ethnonyms *Hoŋkur* and *Honggira* as an archaic sound, the Tokharian words in (14) may be said to have lost the initial *h-*. So did MMo *Onggira* and *Önggü*. But these forms later had a prosthetic initial *w*, which further developed into *m*, resulting in the ethnonym *Monggol*. The prosthesis of *m* is found in some Altaic languages, e.g. Jurchen *isuwen* and Manchu *misun* both mean 'a thick sauce made from soya beans', but the latter has the prosthetic *m*.[6] During the Qing Dynasty (1644-1911) some Altaic tribes used the ethnonym *Hunggar* (*honghuo'er/honghai'er*) to refer to Turkey. Golden (1990:243) argues:

> Here they [the Hungarians] were again under Oghur Turkic (Onoghur) as well as Sabir, Türk and Khazar influence. All of these ethnonyms were reflected in the names by which the Hungarians became known in the eastern and western sources. Thus, *Hungarian, hongrois, Ungar* etc. derive ultimately, according to this theory, from *Onoghur*.

The name *Onoghur* is believed to be composed of two Old Turkic words: *on* 'ten' and *oghur* (ethnonym) meaning 'Ten Oghurs'. However, we have no phonetic evidence of how the two words were contracted through loss of the initial vowel *o* of the ethnonym *oghur*. Thus, at this point I shall include the ethnonym *Hungary* in the etymology in (14), because the ethnonym ultimately derived from Tokharian *oṅk* given by some Altaic-speaking tribes who preserved the initial *h-* in the word.

(15) ToA. *ṣukṣ-* 'village'
WYu. *sukji* (the name for Jiuquan)
Ma. *suksan* 'newly opened land', *suksala-* 'to open up (new land)'
Ma. *tokso* 'village'. Dagur *tors* (< **toks*) 'village'
WMo. *toskun* 'village, settlement'

Three thousand years ago, there was an ethnic group called *Suksan* (*sushen*) in northeastern China, as was well attested in Chinese historical books. There is general agreement among Chinese historians that the Suksan people are ethnically related to Jurchen (Manchu). A thorough investigation of the ethnonym *Suksan* is of great importance to enhance our knowledge of the earliest contact between the Altaic and Indo-European peoples in the Inner Asia steppes. My point is that the ethnonym *Suksan* has an etymological connection with Tokharian *ṣukṣ-*, because an ethnic group might be simply a people, a settlement, and a village in ancient history. The ancient people used the words for 'people, village' to name an ethnic group. There is a place called *Toksun* in Xinjiang, which has a

[6]More such examples can be found in Wang (1992:87).

connection with WMo *toskun* (< *toksun*).

(16) ToA. *śoṣi*, ToB *śaiṣṣe* 'world, people'
Ma. *jušen/jusin* 'common people'
WMo. *jocin* 'guest, traveller'
Kit. *Jojin* (*zhuzhan*) 'the Jurchen people'

Chinese annals recorded a number of ethnonyms and state names in the Western Regions such as *Sośi* (*suxie*), *Sosi* (*xiaoshi*), *Sosun* (*xiuxun*), and *Sosin* (*xiuxian*). The *Sośi* was a nomadic tribe of Saka stock north of the Pamir Plateau during the western Han Dynasty. In Wang (1992:82) I improperly related the Jurchen word *jušin* 'people' (Manchu *jušen*) to Tokharian *lyutan-* 'country, region'. It is better to compare it with Tokharian *śoṣi* through a correspondence between *ś* and *j*.

In discussing Manchu *nikan* in (2) we have noticed that it may serve both as an ethnonym in the sense of 'stranger, guest' and as a masculine name in the sense of 'man, boy'. Turning to the words in (16), we observe two related semantic distributions in Mongolian. First, Chinggis Khan's brother was named *Joci-Kasar* and Chinggis Khan's elder son named *Joci*. During the thirteenth century some other Mongol men's names had the morpheme *Joci* such as *Jocitai* and *Joci-Darmala*. Given this naming practice, I should like to etymologize the masculine name *Joci* with WMo *jocin* in the sense of 'man, boy'. Second, during the fifth-sixth centuries an Inner Asian power was called *Rouran/Ruru/Ruirui* in Chinese sources, which was transcribed Juan-juan in western literature. We should first note that the symbol *r* in Chinese romanization is a voiced fricative retroflex equivalent to [ʐ] in the International Phonetic Alphabet, the voiceless counterpart of which is [ʂ] (*sh* in Chinese romanization). It will be helpful for us to detect the ancient pronunciations of the ethnonym *Rouran* if we observe how this sound is used to transliterate foreign names in Chinese. One Mandarin word beginning with the consonant *r* is *rui* (瑞) which is pronounced [sœy] in Cantonese. The state names *Sweden* and *Venezuela* were first transcribed most probably by Cantonese speakers as [sœytin] (瑞典) and [wainisœylai] (委内瑞拉), which are pronounced *Ruidian* and *Weineiruila* respectively in Mandarin. That is, the consonant *s* of *Sweden* and the consonant *z* of *Venezuela* is transcribed *s* [s] in Cantonese and *r* [ʐ] in Mandarin. The present phonetic pronunciation of the consonant *r* [ʐ] and the transcription of foreign names can help us to restore the ethnonym *Rouran* as *śośin* which was from ToA *śoṣi* 'world, people'.

In this section I have presented an argument which pertains to economy in the practice of ethnonym-giving, i.e., one practice of naming aims at readily equating an ethnic group with people, strangers, and guests. According to this conception, many ethnic

groups in Inner Asia eventually took on their ethnonyms from other people with whom they were in contact. In certain instances such as (2), (4), (13), and (16) words with original Indo-European meanings of 'body', 'company', or 'people' have been fossilized in ethnonyms and masculine names in some Tungusic and Mongolian languages. We should attach special importance to such a patterned shift in our onomastic studies.

3. THE WORDS FOR 'SUN, SUNRISE' AND THE LIKE IN ETHNONYMS. It is a well-established tradition and practice for people of different heritage to use the words for 'sun, sunrise' and constellations such as the Big Dipper as well as various directions to name ethnic groups and regions. For instance, the name *Anatolia* derived from the Greek word *anatolē* 'sunrise', i.e. eastern land. Anthropologists have argued that ancient nations passed, in prehistoric times, through a totemic stage, having animals and plants, and the heavenly bodies conceived as animals, for gods before anthropomorphic gods appeared. The ancient writers of the *Nüzhen zhuan* (*Account of the Jurchens*, 1986:586) observed that Jurchen official titles were based on celestial bodies and constellations. In ancient northeastern China an Altaic-related people called *Fuyu* named their leaders by using the words for six animals including horse and pig. Deer, especially female deer, were among the most honorable animals in Altaic societies. Some tribes simply regarded a female deer as their root and their ancestor. If we consider the cultural factors revolving around deer in early Altaic societies, we can hardly refrain from connecting Manchu *da* 'root, leader' and Dagur *da* 'id.' with OE *dā* 'doe' (female deer). The ancient Chinese people also compared such animals as dog, wolf, fox, and horse to heavenly bodies and constellations. Chinese sources recorded the words *tiangou* 'heavenly dog', *tianlang* 'heavenly wolf', *tianlu* 'heavenly deer', *tianma* 'heavenly horse', *tianshu* 'heavenly mouse', and *tianhu* 'heavenly fox' and so on. Today, for us, celestial bodies are quite different from animals, but ancient people tended to interpret the two kinds of things in the same way. Considering these pieces of evidence we have good grounds for giving an inclusive approach to ethnonyms. As we find in the following discussions, the words for regnal titles and animals may converge with those for heavenly bodies, and thus converge with ethnonyms.

(17) ToB. *astare/ āstre*, ToA *āṣtär* 'bright'. OE *steorra* 'star'
WMo. *altan* (< **astan*) 'gold'. Kazak *astana* 'capital city'

Ji (1988:35, 39) argues that ToA *ārt* may mean 'rays of light'. In support of this suggestion I analyze ToA *ārt* as a rhotacized form of ToA *āṣtär*. To this etymology are added ToA *atär* (< **artär*) and ToB

etär 'hero'. There is a place named *Astana* in Xinjiang where an ancient graveyard was unearthed. The ethnonym *Abta* (*awudi*) is among the Uigur confederation of nine tribes during the Tang Dynasty. The segment *w* of the ethnonym *awudi* in Chinese transcriptions is no doubt pronounced as bilabial consonant *b* in ancient Chinese, being now bilabial nasal *m* in the present Cantonese. The sibilant occurring in a V__C environment may well have developed into labiodental fricative *f* or bilabial stop *b/p* both in Old English and Altaic languages. Consider OE *æftan* 'behind' and *æfter* 'behind', Old Norse *aptan* 'behind' and Uigur *aptap* 'sunlight' and EYu *ārtë* 'north, back', which are included in the etymology, for stars, especially the Big Dipper, function as an important guide for ancient peoples to the northern direction. Thus the word for 'star' came to denote 'north' and then 'behind' or 'after'. This pattern of semantic shift is of recurrent nature, as will be illustrated in the following discussions.

(18) ToA. *Ārśi* < **aksi* (an ethnonym), ToB *yak-*, ToAB *yask-* 'to ask for'
ToB. *aṣkār*, ToA *ṣkārā* 'back, behind'
OE *āxian/āscian* 'to ask'
Dag. *Yarsa* (a village name), *Yaksa* (a town name), *arkën* 'back'
Uigur *Aksu* (a city name and river name in the Tarim Basin)
WYu. yahɢa 'sky, above'
Ma. *hashū*, Nanai *hasukta* 'left, the eastern side'. Manchu *gasha* 'large bird', *Ašgu* (*ashihu/ashi*, a river name)
WYu. *Hasa*, Salar *Hasa*, Kazak *Kazak* 'the Kazak people'

Phonologically, the words in (18) have undergone the following major changes: (a) the loss of the initial consonant *h*, (b) the initial consonant *h* weakened to *y*, (c) the metathesis of the consonant cluster *ks* to *sk* or vice versa, as attested in Old English, (d) the rhotacism or lambdacism of the consonant *k* or *s* occurring in a V_C environment. I assume that the Tokharian and Old English words originally meant 'to pray, worship' as verbs and 'sun' as nouns if they once existed. The ethnonym *Ārśi* has a corresponding Chinese transcription as *anxi* referring to Persia (Arsacid). In addition, we should note that the ethnonym *Scythian* was found in Assyrian sources as *aš-ku-za*, and the continent name Asia was believed to have originated from Akkadian *āṣū* 'to rise (of the sun)'. All the words in (18) did not emerge independently of each other but were the result of ideological diffusion from one original etymon denoting a celestial body. In this regard, we can observe early west Asian influence on Inner Asian civilization. As I have discussed elsewhere (Wang 1995), the English words *light* and *night* have the same etymon through a correspondence between *l* and *n*, since the word *night* originally stood

for a starry sky and the word *night* referred to light emitted by stars and the moon in the sky. As has been noted, in early Sumerian writing the picture of a starry sky came to refer to darkness, blackness, or night.

Before the middle of the seventeenth century the Dagur and Solon peoples inhabited the northern area of the Heilongjiang River and built a town named *Yaksa*. When the Russian Cossacks invaded that area, they were forced to retreat to the Nenjiang (Nonni) River valley. In memory of their former place, the Dagurs who lived in and around Yaksa continued to name their new settlement in Qiqihar countryside as such. However, the consonant *k* occurring in the V_C environment later became rhotacized. It is a similar case with the river name *Arguna* (< **asgun*) and the ethnonym *Halka* (*Khalkha* < **haska*) in Mongolian, the liquids of which are from the earlier consonant *s*. The Chinese transcription of the ethnonym *Halha* is *Hanha*, which is a left-wing tribe of the eastern Mongols. As we can see, the syllable-final liquid *r*/*l* in the ethnonyms *Ārśi* and *Halka* are represented by *n* in transcriptions with Chinese characters, since Chinese words have no syllable-final liquid.

There are several explanations for the meaning of the ethnonym *Kazak*. The first is to refer to 'white swan', the second is 'soldier, free man', and the third is 'escaper, refugee'. The third explanation is based on a historical event. In the late part of the fifteenth century, the Kazak people escaped from the Uzbek Khanate and moved eastward. My explanation is that *Kazak* derived from the word for 'east, left' such as Manchu *hashū*. Of course, this solution is compatible with that of 'white swan', because the word for 'sun' quite naturally denotes sacred birds in the Altaic belief system.

Two more ethnonyms may be added. The Kirgiz people were once called *Haksi* (*xiajiasi*) during the Sui (581-618) and Tang dynasties. The ethnonym *Abka* (*abaga*) referred to a Mongolian tribe. This name was most probably given by the Jurchens (Manchus) by using the word *abka* (< **aska*) 'heaven'.

(19) ToAB. *koṃ*, ToB *kauṃ* 'sun, day'
MMo. *hun* 'swan, goose'

It has been suggested that the ethnonym *Hun* derived from OT *kün* 'sun, day'. This name is found in many languages such as Chinese *Xiongnu*, Sogdian *χwn*, Greek *Hoūnnoi*, Latin *Hūni*, and Old English *Hūne*. Chinese sources have also recorded a tribe named *Hunsu* (*hunsou*) who were supposed to be an early member of the Xiongnu confederation. All these names are related to Tokharian *koṃ*.

(20) ToA. *koṃ*, ToB *kwem* 'dog'
OE. *hund* 'dog', *hind* 'female deer', *hinder* 'behind, back'
Grk. *Indos*, Old Persian *Hindu* 'India'
Ma. *indahun* 'dog'. Solon *hïndēr* 'ox with a single horn'
MMo. *hindus* 'India'
OT. *ït* (< **hïnt*) 'dog'. WYu *undun* (< **hund*) 'east'

We can assume that behind the words for 'dog', 'female deer', and 'ox' in the individual languages there might have existed early words for 'light, sun, star'. And the existence of ToA *koṃ* 'sun, day', WYu *undun* 'east' and OE *hinder* 'behind' lend support for this argument. I am here proposing one etymology for OE *hund* and *hind* on the basis of ideological praxis. As we know, the ancient Germanic (including Anglo-Saxon) people practiced paganism and treated dogs and deer as sacred and heavenly animals. In this sense, the words for 'dog' and 'female deer' both derived from one source. In fact, a linguistic designation for certain animals with one etymon is in no way an isolated phenomenon. The Tungusic people have also attested their pagan practice by producing Manchu *indahun* and Solon *hïndēr*.

Bailey (1985:22-4) discussed the ethnonym Hinduva and provided a great deal of information concerning it. In history, India was a source of Buddhist dissemination into China. Many pilgrims and travelers encountered the ethnonyms for India from Central Asian people. So in Chinese sources the state name India has many transcriptions with different characters such as *Kundu* (*qiandu, juandu*), *Kidu* (*qidu*), *Hidu* (*hedu*), *Indu* (*xiandou*), *Sindu* (*shendu*). I analyze these names into two different sets. The first set begins with consonants *k, h,* and a vowel which resulted apparently from the loss of the initial consonant *h* and also lacks the nasal *n* in the forms *Kidu* and *Hidu*. They are different variants of one ethnonym. The second set is to start with the sibilant *s*. Both sets are taken from various local languages in the sense of 'sun' or 'south, east' or of some sacred animals such as dog and deer which are equivalent to the sun in the indigenous belief system. The first set belongs to the etymology in (20), and the second might be related to OHG *sunt* and Germanic **suntha-* (understood as sun side). In addition, the ethnonym *Indun* (*yangtong*) referred to a Tibetan tribe around the sixth century.

In addition, we need to discuss the Xiongnu queen's title and the Chinese designation for Hephthalites, or the so-called white Huns in the fifth century, which are found in Chinese sources. The Xiongnu queen's title has at least two transcriptions with two characters such as *hida* (*hedi*) and *inda* (*yanti*). The Chinese name for Hephthalites is *Hinda*[7], *Inda* (*yanda*), *Ida* (*yida*) and *itan* (*yitian*), the capital city of

[7]The pronunciation of the first character of this ethnonym is determined as *za* in Chinese dictionaries. I doubt the validity of this pronunciation in this

whom is in what is now northwestern Afghanistan. According to *Xin Tang shu,* the *Ida* State consisted of the Great Yuezhi (Tokharians) of the desert, and the word *inda* was originally the king's surname, by which his descendants named their country with corrupted pronunciations such as *ida* or *itan.* This historical record implies that the word might once have served as a regnal title for a King and clearly shows that the word had alternative pronunciations. All the Chinese transcriptions are to a great degree consistent with the historically attested and currently existing words in (20).

With reference to Chinese sources, when in Bactria the Great Yuezhi divided into five parts, among which was the *Kondon* (*gandun*) state. The ethnonyms *Kondoŋ* (*gandang*) and *Hünden* (*huanqian*) referred to the nations in the Western Regions. The initial consonant *q* of the Chinese word *qian* in the name *huanqian* was pronounced as an affricate [*ts*] or [*t*] in ancient history. For this reason I have adopted the consonant *d* in the ethnonym *Hünden.* And the Kitan official title *künde* (*qinde*) is also added.

(21) ToAB. *luk-* 'to light'. OE *lēoht* 'light'
WMo. *nokai* 'dog', EYu *lögjën,* Dagur *ukcën* (< **nuk-*) 'female dog', Dongxiang *lugo* 'deer'

Added to this etymology are the Xiongnu *chanyu*'s title *nikte* (*ruodi*) and the noble surname *Lugai* (*lijie*), as recorded in Chinese sources, and the ethnonym *Nogais* for a Turkic people. Note that MMo *nokai* (*nahai* in Chinese transcriptions) 'dog' means 'star, light' in the MMo phrase *gurban nakai* 'the three stars in the southern sky'. The ancient place name *Lukcin* (or *Lukchun*) in Xinjiang and Kitan place names *nigte* (*nügudi*) and *lukunsu* (*luokunsui*) also belong to this etymology. We may also be tempted to include Cantonese *luk* and Mandarin *lu* 'deer' in this etymology.

(22) ToA. *yuk,* ToB *yakwe* 'horse'. ToB *okso* 'ox'
OT. *öküz* 'ox', WYu *uhgus/gus* 'ox'
MMo. *hüker,* Dagur *hukur,* WMo *üker* 'ox'

Although the donkey, *eljigen* in Written Mongolian, played no role in the Mongolian nomadic economy, it did come to refer to a Mongolian tribe in history. It is said that the founding leader of the tribe married a woman who came from Chinese territory by riding a donkey, and thus named his son *Eljigen.* This name was subsequently used for the tribe. The Altaic nomadic people were very successful in raising livestock. Horses and oxen were the most important animals for these

particular ethnonym, partly because the major part of the character is pronounced as *xian* and partly because the ethnonym for India has many variants such as *xiandou, xiandu,* and *xuandu* in Chinese sources.

nomads. Chinese sources identified the Turkic people by using the names Wooden Horse Türks, Ox-hooved Türks, White-clothed Türks, and the Yellow Head Türks (cf. Sinor 1990:289). Clearly, horses and oxen were involved in the naming process. The ethnonym *Oğur* (*Ogor, Ugor*) refers to a Turkic tribe. And the ethnonym *Üker* (*wuguli*) and its variants *Üke* (*wugu*), and *Yuk* (*yujue*) had some currency during the Tang and Liao dynasties referring to some Altaic tribes in northeastern China. The tribes led a nomadic life, being rich with horses and oxen. Also, we may be tempted to relate the ethnonym *Yoγur*, the self-designation of the Yugur people in northwestern China, with those in (22). The ethnonym *Yakut* refers to a Turkic people living in northeastern Siberia and is an obsolete use for the Ewenke people in northeastern China. The final consonant *t* of this name is probably a plural suffix. Note that Hittite *yukas* 'yearling' and *tayukas* are used for horses and cattle.

(23) ToB. *ṣukt*, ToA *ṣpät* 'seven'
WMo. *cogtu* 'brilliant, flaming'
OT. *Soğduk* 'the Sogdians', *Soğd* (ethnonym)

The Sogdians, who lived north of the Silk Road—in what are now Tajikistan and Uzbekistan, were engaged in trade as dominant merchants along the route. This ethnonym was recorded in Greek as *Sogdoi*, Latin *Sogdianus*, Parthian *swgd*, Avestan *suγδa*, and Old Persian *sug^{u}da*. To be able to relate the ethnonym with Tokarian *ṣukt* and *ṣpät* 'seven', I will present the following four arguments. First, Tokharian *ṣukt* and *ṣpät* originally denoted the Big Dipper in the northern sky consisting of seven stars; the key words here are 'the seven stars'. Tokharian *ṣukt* and *ṣpät* is cognate to Greek *heptá* 'seven' which was used for the ethnonym of Hephthalites as found in Persian *Heftal/Heptal* and Armenian *Hep't'al*[8]. In discussing the place name Turfan, Mair (1990:27) points out that around 1330, Uch-Turfan was known simply in Chinese as Wochi (reconstructed pronunciation Och or Ōch), and during the Tang its name was transcribed in Chinese as Yuzhu (*Üchük). Mair has noticed that Uigurs explain Uch-Turfan as 'Triple' or 'Third' Turfan (36). Although the use of a numeral for and its occurrence in front of ethnonyms and toponyms was quite common in Inner Asia, only later were the 'numerals' decodified and realized as concrete numbers. Instead, the 'numerals' were initially used for pointing to a total set of stars, which in turn helped to form certain specific numerals. For this reason, the ethnonym *Usin* (*Wusun*), the place names *Ucin* (*Wuchan*[9]), *Uš* (*Wushi*), *Oc* (*Och, Wochi*) and *Üc* (*Üchük, Yuzhu*) in Xinjiang, and the place name *Uc*

[8]The Persian and Armenian forms are taken from Golden (1992:81).
[9]Agni was alternatively called *Ucin* (*Wuchan*) in Chinese sources.

(*Wuzhi*) in Gansu Province are well related to Manchu *usiha* (*usi+ha*) 'star', WMo *ür* (< **üs*) 'aurora', OT *üç*, Uigur *üc*, and WYu *us/vus* 'three' . Note that the correlation between Manchu *usiha* 'star' and OT *üç* shows a semantic development parallel to Dagur *ilan* 'light' and Manchu *ilan* 'three'. These words may mean more originally 'light', and are in this way to be referred to the three brightest stars in Orion's belt. In this regard we should note that the three stars in Orion's belt are denoted as *gurban nokai* '(literally) three dogs' in Middle Mongolian documents.

Second, the ethnonym for the Sogdians was found in the Bahman Yašt as *swptik* and Zoroastrian Pahlavi *swpt*[10]. Note that this set of words contains the bilabial stop *p* for the velar consonant *k/g* or *γ* in the other corresponding set, just as is the correpondence between ToA *k* and ToB *p* in the word for 'seven'. This correspondence is by no means due to coincidence, but rather indicates the etymological connection of these words with those of Tokharian. Third, Ivanovskij (1894:34) recorded the Solon words *cogdono, sogdönno, sogdondo, sogdono* 'back'. As I have argued before, the individual groups of ancient speakers who used the words for 'sun, star, light' enjoyed a great deal of freedom in shifting their meanings to different references conceptually related to one another. So far, for instance, we have had OE *steorra* (Grk *aster-*) 'star' and *æfter* 'behind', *hind* 'female deer' and *hinder* 'behind, back'. Fourth, the Sogdians were alternatively referred to as *Soli, Suli,* and *Sūlīk* in various sources, which had a connection with Latin *sōl* 'sun' and ToA *śolyāk/ṣolyāk* 'companion, comrade'. All these names were designated by words for heavenly bodies. Furthermore, Latin *sōl* was widely diffused into various Altaic languages and thus was popular in naming ethnic groups and places, e.g. Manchu *solo-* 'to go against the current (go eastward)', Kazak *soltüstik*[11] 'north', and *Solo* (*siluo*), the ancient Chinese name for Korea, from which the place name *Seoul* [səul] originated. English *solecism* was from *soloikos* 'speaking with bad grammar': coined in ancient Greece to describe the Greek colonists whose mother tongue had been corrupted by mingling with the people of Soloi, a town across the Aegean Sea in Asia Minor. The ethnonym *Soloi* seems to be allied to Latin *sōl.*

According to Henning (1938:560), it is, as a rule, seldom possible to give any historical reason for the numerals which form part of tribal designations in Central Asia. It is my own personal experience and conviction that the various Altaic peoples highly honor the celestial bodies and constellations, particularly the sun, the moon, the Big Dipper, and the three brightest stars in Orion's belt. For instance, the

[10]These words are taken from Bailey (1985:77-78).

[11]This word consists of the two morphemes *sol,* which is related to Latin *sōl,* and *tüstik* 'south'.

Kazak people treat the Big Dipper as seven omnipotent gods and thus give the number 'seven' a sacred power. The name for the Dipper converges with *nadan* 'seven' in the Jurchen (Manchu) language, and the Big Dipper is called *nadan usiha* 'the seven stars' in Manchu. Both the Big Dipper and the three stars appearing in the eastern sky from late September serve as gods in the Manchu belief system. In Indo-European, the numbers 'three' and 'seven' also carried some mysterious meanings. The Latin word *tribus* 'tribe', which consisted of the root *tri-* 'three', was used to denote a division of Romans. On the north bank of the lower reaches of the Könchi River in Xinjiang, the ancient Qāwrighul cemetery was marked with seven circles of wooden stakes (see Wang 1996:21). Clearly, for practical purposes ancient people used the most prominent heavenly bodies for identifying the directions and further for locating or naming their surrounding ethnic groups and countries. These well-motivated practices can help to remove the difficulty in understanding why the numerals formed or conjoined with ethnonyms and toponyms.

In concluding this section I need to stress that ancient Inner Asian ideology is characterized by animism with a focus on sky-god worship. One linguistic legacy left in the various languages spoken in these areas is the ideological diffusion of the words denoting sun, sunrise, east, and animals. It now turns out that ancient people were quite skillful in shifting these words for different purposes.

4. CONCLUSION. In modern society, ethnonyms are relatively stable, because in international and interethnic exchanges there is a necessity to identify mutual nationality and ethnicity by using standard names. But in the ancient world, ethnonyms were relatively changeable, since they were difficult to standardize. Having no guide but intuition and perception, each people followed their own nomenclature, and hence a great number of ethnomyms were produced with different variants. There were occasions in which one segment of a people gave a different ethnonym to a certain group than did another segment, and a given group did not always use its ethnonym consistently under all circumstances. This type of practice created much confusion in the ethnonyms of Inner Asia.

In this paper I have argued that the historical contact between Tokharian and Altaic constituted an important turn in the occurrence of many ethnonyms and toponyms in Inner Asia. So the study of Tokharian vocabulary represents an essential device for adding to our knowledge of Inner Asian ethnonyms. Recent archeological finds have confirmed many of our linguistic and historical interpretations.

Recurrent correspondences between ethnonyms and the words denoting people, sunrise, and animals are of great importance for recovering the psychological motivation of the name-givers. Homophonous (partially or completely) ethnonyms are not due to

phonetic coincidence and chance similarity, but rather provide important background for how ancient people approached their surroundings. If we ignore the linguistic reflection of ancient ideology, we will of course lose an important source of vital information needed for anthropological studies. Ethnonyms are filled with cultural data which require linguists and anthropologists to interpret.

The study of ethnonyms and toponyms can help us to investigate contact between different peoples with respect to their possible settlement and migration. English has taken many place names from North American Indian languages such as *Chicago*, *Mississippi*, and *Kentucky*. From place names, like Bohemia ('home of the Boii', a Celtic tribe), we assume that Celts early inhabited central Europe (see Lehmann 1992:77). The first major contact of English speakers was with Celtic speakers. When English was brought to the British Isles in the fifth century CE, presumably there were more Celtic speakers than Germanic invaders. Yet English survived and ousted Celtic. English adopted numerous place names such as *London*, *Thames*, and *Dover* from Celtic (see Lehmann 1992:77, 266). Mount Shasta in northern California was visible to a number of Native American tribes. Among these, members of the Hupa tribe referred to the mountain by the descriptive term *nɪn-nɪs-ʔan tak-gai* 'white mountain', whereas the Yana name for it was *wa'galu'*, a word no longer translatable or analyzable. The Yana word is therefore undoubtedly much older, and one may assume that the country dominated by Mount Shasta was home to the Yana long before the Hupa came to the region (see Salzmann 1993:152). The present study shows that Inner Asian peoples adopted numerous ethnonyms and toponyms from Tokharian and other Indo-European languages.

All of the previous researches in Tokharian made by Indo-Europeanists, when approaching Tokharian as an Indo-European language, are essentially confined to an Indo-European comparative framework. A further breakthrough now seems to lie in underscoring the mutual influence between Tokharian and Altaic, although it is important to arrange Tokharian under the category of Indo-European comparative studies. According to the present state of our knowledge, the Tokharians exerted a substantial influence on various Altaic languages. However, the question of whether the Tokharian people were originally native to Eastern Central Asia needs to be investigated from an interdisciplinary point of view.

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Glossary

Transcriptions used in this paper	*Chinese romanization*	*Chinese characters*
abka	abaga	阿巴噶
abta	awudi	阿勿嘀
ārśi	anxi	安息
ašgu	ashuhu/ashi	阿術兀/阿什
chebishi	chebishi	車鼻施
haksi	xiajiasi	黠戛斯
halka	hanha	罕哈
hida	hedi	曷氏
hidu	hedu	乞毒
hinda	xianda	嚫噠
honggira	hongjila	弘吉剌
hude	hude	呼得
humasu	huwasu	斛嗢素
hūnden	huanqian	驩潛
hunggar	honghai'er	紅孩兒
hunggar	honghuo'er	洪豁爾
hunsu	hunsou	渾廋
ida	yida	挹怛
inda	yanda	嚥噠
inda	yanti	焉提
indu	xiandou	賢豆
indun	yangtong	羊同
itan	yitian	挹闐
jojin	zhuzhan	注展
kūnde	qinde	欽得
kebishao	kebishao	克鼻稍
kefucha	kefucha	可弗叉
kerman	qi'erman	起爾漫
kidu	qidu	訖毒
kirgen	jiankun	堅昆
kondoŋ	gandang	乾當
kondon	gandun	肝頓
konggira	guangjila	廣吉剌/光吉剌
kumo hu	kumo xi	庫莫悉
kundu	juandu	捐毒
kundu	qiandu	乾毒
laban	loufan	樓煩
lan	lan	籃
lihan	lixuan	黎軒
likan	liqian	驪軒/力虔
lokui	liugui	流鬼
londa	luntai	輪臺
londo	luntou	侖頭

londu	luandi	攣鞮
lũde	lude	勠得
lugai	lijie	栗借
lukunsu	luokunsui	落昆髓
nanda	nandou	難兜
nigte	nũgudi	女古底
nikte	ruodi	若鞮
nikan	nikan	尼堪
nikan tanggu	niqi tanggu	匿訖唐古
noci	nuzhi	弩支
nõkõr	niekeli	乜克力
nũcibi	nushibi	弩失畢
och	wochi	倭赤
onggira	wongjila	翁吉剌
õnggũ	wanggu	汪古
śośin	rouran/ruru/ruirui	柔然/蠕蠕/芮芮
sindu	shendu	身毒
sośi	suxie	蘇薤
solo	siluo	斯羅
sosi	xiaoshi	小食/小史
sosin	xiuxian	修鮮
sosun	xiuxun	休循
suksan	sushen	肅慎
qincha	qincha	欽察
udege	udegai/udigai	兀的改/烏底改
uc	wuzhi	烏氏
ucin	wuchan	烏纏
usin	wusun	烏孫
uš	wushi	烏什
ũc	yuzhu	于祝
ũke	wugu	烏古
ũker	wuguli	烏古里
ũpen	yueban	悦般
wonggira	wangjila	王紀剌
yiman	yuwen	宇文
yonggu	yonggu	雍古
yuk	yujue	于厥

Three Windows on the Past[1]

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When we investigate the history of a language or a group of languages, a central question has to do with how these are genetically related to each other, and to the other languages of the world[3]. Oftentimes it is trivial to state merely that X is related to Y, since it is becoming increasingly clear that the contemporary languages belong to just a handful of super stocks. For instance, very little new information is contained in the announcement that mice and men are related, both being mammals.

Genetic relations become useful when they reflect monophyletic groupings. To paraphrase a biologist who studied such questions extensively, "a monophyletic group is a group of languages in which every language is more closely related to every other language in the group than to any language outside the group."[4] Monophyletic groups are subgroups of larger monophyletic groups in the fashion of tree diagrams, which have become standard devices for representing genetic relations for well over a century, in both linguistics and biology.

A central goal of studying genetic relations among languages then is to determine these monophyletic groups in as precise a manner as possible. Whenever we can, we should quantify the distances among all the languages in the tree diagram by representing the branches with different lengths, so that the linguistic distance between any pair of languages is represented by the sum of the branches in the shortest path between them. Such efforts at quantifying trees have been quite successful in biology in recent years.

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[3]Wang, W.S-Y. 1987. Representing language relationships. Pp. 243-56 in Hoenigswald, H. and L.Wiener, eds. *Biological Metaphor and Cladistic Classification.* U of Pennsylvania Press

[4]Hennig, W. 1979. *Phylogenetic Systematics.* University of Illinois Press. P.73.

Unfortunately, they have not received much attention in linguistics, even though the idea of quantitative trees was suggested by the linguist August Schleicher over a century ago. Later in this paper, we shall attempt to quantify some linguistic trees.

In cases where the time depth is not great, and where there is adequate supporting textual material, the genetic relations are not difficult to establish. This is the case of the Chinese dialects, which began their differentiation some 2000 years ago. Similarly, the Germanic languages seem to have a comparable time depth. In Chinese, the written materials actually pre-date the differentiation into the modern dialects by a considerable margin. For Germanic, the earliest materials go back some 1700 years. Such materials provide an important source of data for studying genetic relations.

Even for languages with long literary traditions, written materials do not ever cover time depths to the degree that linguists wish to investigate. The further back in time we go, the scantier the data become, and correspondingly, the less robust the linguistic hypotheses. It becomes increasingly imperative that linguists should coordinate their work with other disciplines that can help shed light on the distant past of human civilization.

Sharing a past could result in resemblances of many different types and forms. It could result in similarities in painting and sculpture, such as those noted for early peoples on both sides of the Pacific.[5] It could result in similarities in belief systems, such as those involving the tiger among certain Miao tribes of Sichuan.[6]

As a third example of cultural resemblance, we may consider the *fuzi lianming zhi* [父子連名制] , or, patronymic linkage system. This is a system for showing generational order and affiliation, "whereby the name of a son always contains an element from the name of his father, e.g., Sheng-lo-p'i, P'i-lo-ko, Ko-lo-feng, Feng-ch'ieh-i, and so on."[7] This is a key cultural feature, according to Backus, which determines that the rulers of the ancient Nanzhao kingdom in Tang-Song China were a Tibeto-Burman people, rather than of Thai lineage, as had been claimed for several previous decades.

The three windows in the title of this paper refer to three

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[5]Davis, Starr and Richard. 1974. *Tongues and Totems: Comparative Arts of the Pacific Basin.* Alaska International Art Institute. For some discussion of possible Asian origin for precolumbian art in the Americas, see Paul Shao. 1983. *The Origin of Ancient American Cultures.* Iowa Sate University Press.

[6]Pulleyblank, E. G. 1983. The Chinese and their neighbors in prehistoric and early historic times. In Keightley, D. N., ed. *The Origins of Chinese Civilization.* U of California Press. See p.426.

[7]P. 51 from Backus, Charles. 1981. *The Nan-chao Kingdom and T'ang China's Southwestern Frontier.* Cambridge UP. See also Lo, Changpei. 1945. The genealogical patronymic linkage system of the Tibeto-Burman speaking tribes. *Harvard J Asiatic Studies* 8.349-63.

disciplines that have been systematically brought together for investigating prehistory, in the works of some leading scholars studying these questions.[8] These are anthropology, in particular archeology and physical anthropology, genetics, in particular genetics of human populations, and evolutionary linguistics.[9] In the remainder of this paper, I will discuss briefly the light that each of these windows has shed on China's distant past.

1. Archeology

In terms of archeology, the most recent "news" which has caught the attention of the media in the West has to do with a large collection of desiccated corpses found in eastern Xinjiang.[10] These finds are due to the dedicated search of Wang Binghua and other archeologists, starting in the late 1970s. Some of these corpses date as far back as 4000 years, though others are considerably younger. Because they are remarkably well preserved by the desert climate of Xinjiang, they are clearly recognizable as Caucasian.

While the magazine cover may lure readers with the question "What are 4000-year-old Caucasians doing in Xinjiang?", scholars have long known about the important routes connecting the Central Plains [中 原] of China with the rest of Eurasia through the Gansu corridor and Xinjiang.[11] Intensive interactions between the peoples of the

[8]E.g., Cavalli-Sforza, L. L. et al. 1988. Reconstructions of human evolution: bringing together genetic, archeological and linguistic data. *Proceedings of the National Academy of Sciences* 85.6002-06. Also, Greenberg, J. H., C. Turner, and S. Zegura. 1986. Settlement of the Americas. *Current Anthropology* 27.477-497. Renfrew, Colin. 1992. Archaeology, genetics and linguistic diversity. *Man* 27.445-478.

[9]The more usual term, "historical linguistics", is too limiting as the field is currently practiced by many investigators. In addition to the detailed reconstruction of well-accepted families, the field should be concerned as well with larger issues of even greater importance and interest, such as deeper relations among these families, and developing methods for quantifying and dating these relations. In these latter respects, evolutionary linguistics will find much that is useful in the advances recently made in evolutionary biology. A recent effort to address such larger issues is that of Ruhlen, Merritt. 1994. *On the Origin of Languages: Studies in Linguistic Taxonomy.* Stanford University Press.

[10]Hadingham, Evan. 1994. The mummies of Xinjiang. *Discover* 15.68-77. This popular article contains a series of striking photographs. These archeological finds are being effectively publicized by Victor Mair of the University of Pennsylvania. Since the writing of these pages, Mair has provided additional discussion of these finds in his Mummies of the Tarim Basin, *Archaeology* 48.28-35, 1995. See also the *Journal of Indo-European Studies* 23.3/4, Fall/Winter 1995 for an interdisciplinary collection of writings on this topic.

[11]See, for instance, the detailed observations in Pulleyblank, E. G. 1966.

Central Plains with those further west have been copiously recorded in Chinese history books, so despite its commercial allure the question is not really all that new or startling.[12]

On the other hand, we are deeply interested in the language(s) these early inhabitants spoke, even though clear answers may not be forthcoming for some time. An immediate association is with Tocharian,[13] a language that has long been extinct. These materials, written in an Indian Brahmi script during the Tang dynasty, were discovered in Xinjiang around the turn of this century. The language is now universally accepted to be Indo-European. According to Baldi, "it is now generally held that the speakers of Tocharian were part of a very early migration from the Central Indo-European area, possibly as early as 2000 BCE" [14]

If we accept this statement, then we have a match between the archeology and the linguistics not only in place but also in time. But it is not clear what evidence lies behind the date of 2000 BCE which Baldi accepts; perhaps he is following the reasoning that Pulleyblank offered; see footnote 11. Furthermore, it is known that Iranian languages had a much greater sphere of influence in Xinjiang[15]

Chinese and Indo-Europeans. *J. of Royal Asiatic Society* 9-39. "The nearest Indo-Europeans to China in historical times were the Tocharian-speaking inhabitants of the oases on the northern rim of the Tarim basin. The linguistic position of Tocharian makes it probable that its speakers always lay to the east of the Indo-Iranians. This in turn implies that they probably arrived on the western borders of China not later than the time of the Aryan invasion of India in the second millennium BCE. If we posit an Asiatic origin for the Indo-Europeans, their arrival was probably earlier." P. 35.

[12]A good summary of east-west interaction in prehistoric times has been offered by a geographer writing with a linguist: Zhou Zhenhao 周振鹤, You Rujie 游汝杰 · 1986. *Fangyan yu Zhongguo wenhua* 方言与中国文化. Shanghai. A recent statement of how Chinese civilization originated as diffusion from the west is that by L. S. Vasiliev, whose 1976 book in Russian has been translated into Chinese with comments: Zhongguo Wenming de qiyuan wenti 中国文明的起源问题, Wenwu chubanshe 文物出版社, 1989. Emphasizing indigenous development is a series of lectures given in Japan by Xia Nai, published as 夏鼐.1985. *Zhongguo wenming de qiyuan* 中国文明的起源 · Wenwu chubanshe 文物出版社,.

[13]The name Tocharian itself has not gained consensus among scholars. See the remarks by G. S. Lane on the present state of Tocharian research in the *Proceedings of the VIII International Congress of Linguists,* 252-266.

[14]P.142 in Baldi, Philip. 1983. *An Introduction to the Indo-European Languages.* Southern Illinois University Press.

[15]The only Iranian language now officially recognized in China is Tajik. According to Sun [1989:35], an autonomous county for the Tajiks was established in Xinjiang in 1954. See Sun, Hongkai 孙宏开.1989. Zhongguo kaizhan yuyan guihua gongzuo de jiben qingkuang 中国开展语言规划工作的基本情况 *J. of Chinese Linguistics* 17.1-49.

before they were supplanted by Turkic and Mongolian languages many centuries ago. There is no reason to believe that all the unearthed individuals spoke the same language; if anything, the contrary is more likely. At any rate, genetic studies on these corpses will eventually shed more light on their affiliations.

Human activity on the land that is now China goes a great deal further back than a mere 4000 years. According to the authoritative survey of K. C. Chang, stone tools date back some 2 million years[16] [p.35], and the earliest pottery dates to approximately 9000 BP [p.105]. This latter date, which marks some rudimentary form of agriculture, has more than twice the time depth of the Xinjiang Caucasians discussed above. It is also of interest to note that the site of this earliest pottery, Zengpiyan [甑皮岩], is in Guangxi in South China, many thousand miles away from the Xinjiang discoveries.

One of the most important fossil discoveries is the cranium unearthed at Dali [大荔] in Shaanxi, dated to 200,000 BP. This remarkably well-preserved cranium of a male less than 30 years of age is reported to have a cranial capacity of 1120 cc.[17] This indicates a brain size well within the range of modern peoples; indirectly, such a brain size is highly suggestive of a capacity for language.

The number of human fossils increases significantly as we get closer to the present. An experiment was carried out on a series of head measurements made on fossils dated to the range of 4000-7000 BP.[18] This experiment is pertinent for the light it may shed on the distribution of ancient peoples in China. These measurements were analyzed by average linkage, and the resulting tree diagram is shown in Figure 1, taken from Wu and Olsen, p.121.

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[16]Chang, K. C. 1986. *The Archaeology of Ancient China.* 4th ed. Yale UP. Some of the earlier dates are not generally accepted. Referring to a paper by Y. C. Tang et al in *Vertebrata Palaeo-asiatica,* 1981, on which the date of 2 million is based, Desmond Clark writes me: "The paper uses the paleo-mag. column obtained for the classic geological sections at Haojiatai and suggests where, in the sequence, the Xiaochangliang site fits. Since Haojiatai is more than 12 km from Xiaochangliang and there are a number of small faults between the two localities, I would not attach much credence to a correlation of this kind." [Personal communication, April 14, 1994].

[17]Wu, Rukang and J. W. Olsen, ed. 1985. *Paleoanthropology and Paleolithic Archaeology in the People's Republic of China.* Academic Press. The discussion of the Dali cranium is by Wu Xinshi and Wu Maolin; see their figure 6.1 and table 6.2.

[18]The experiment is reported by Wu Xinzhi and Zhang Zhenbiao in Wu and Olsen [1985:107-133]. The statistical analysis used in the experiment, average linkage, is subject to certain limitations which will be discussed later in the paper. In particular, the analysis assumes a constant rate of development along every lineage, which is not realistic. Further, it is important to buttress the data with additional data from a larger number of sites than the nine in Figure 1. Nonetheless, the figure clearly has a suggestive value.

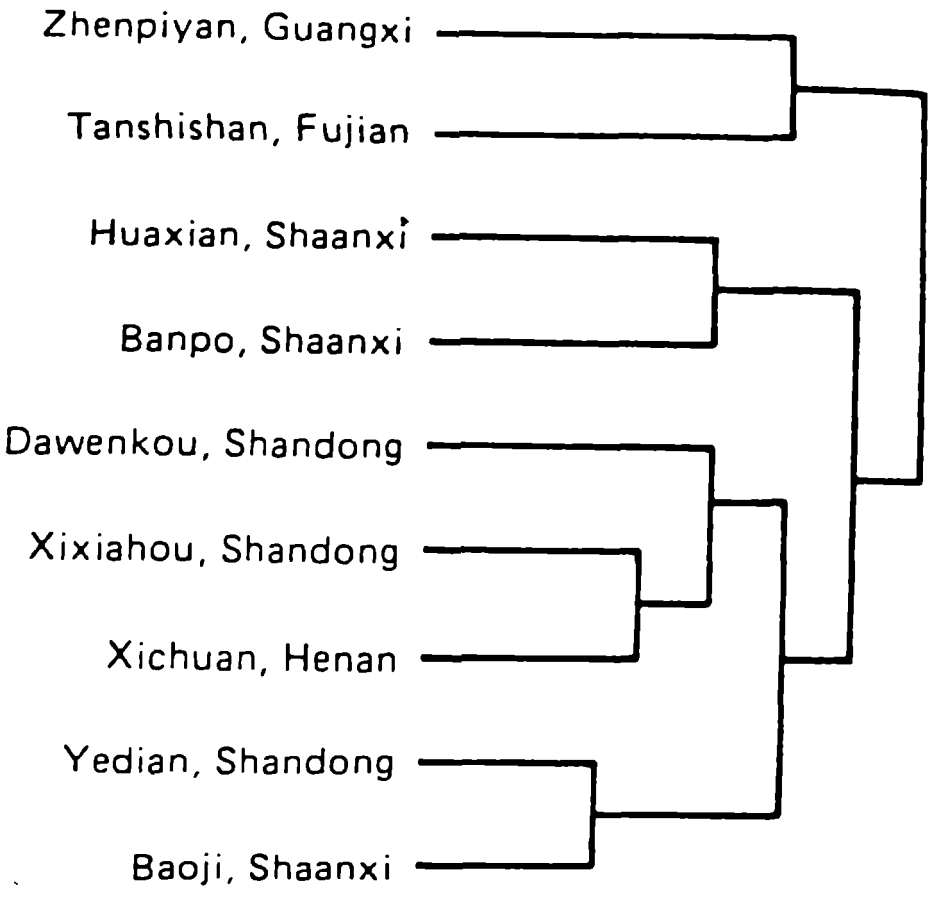

Figure 1. Average linkage analysis of Neolithic humans in China [From Wu and Olsen, p.121]

The basic point to observe here is that the fundamental separation between the fossils is between those unearthed in the southern regions of Guangxi and Fujian, and those unearthed in the northern regions of Henan, Shandong and Shaanxi. This is to say, there appears to be a physical separation among the fossils that is geographically based. In the words of the authors, "Not only can southern and northern Neolithic populations be separated, but the North China group alone can be further subdivided into eastern and western subgroups."

Yet, subject to the limitations of the average linkage method employed by these investigators, we see that the east-west separation is not quite as convincing. The Baoji data are quite removed from the two other sites from Shaanxi; they cluster instead with Yedian in Shandong.

In this connection, we are reminded of the influential paper of Fu Sinian.[19] With copious quotations from historical texts, Fu argued that the basic separation in China during the Sandai era was between

[19]Fu, Sinian 傅斯年. 1935. Yi Xia dong xi shuo 夷夏东西说. In *Fu Sinian quanji* 傅斯年全集 3.0822-0893.

east and west, with Yi and Shang belonging to the eastern system while Xia and Zhou belong to the western system. If we look at China's development on a grander time scale, however, we see that a more basic division is actually between the north and south. This division is seen as early as in Neolithic times, as in Figure 1 above, and persists to the present day, as revealed in genetic studies to be discussed below.

Actual language specimens, of course, are not available until somewhat later.[20] It was a major achievement of archeology during the early decades of this century to uncover thousands of shells and bones, inscribed primarily for divination purposes over 3000 years ago. Enough knowledge has accumulated in their study so that there is no doubt that the texts etched onto these materials are in a language that is directly ancestral to the Sinitic languages.

The continuity in the shapes of the written characters as well as in a basic stock of words and phrases over these 3000 years is obvious. We are also beginning to inquire into similarities in syntax. An intriguing question, for instance, has to do with the evolution of interrogative structures of the A-not-A form found in many Chinese dialects.[21] Such structures, quite distinctive in syntactic typology, are constructed by conjoining an affirmative sentence to its negative counterpart, with subsequent deletion of redundant materials. Thus, as shown below, [1] and [2] are conjoined to form [3], which in turn underlies [4] and [5].

[1] *Ta yao chi mian* /He wants to eat noodles
[2] *Ta bu yao chi mian*
[3] **Ta yao chi mian Ta bu yao chi mian*
[4] *Ta yao chi mian bu yao?* /Does he want to eat noodles?
[5] *Ta yao bu yao chi mian?*

It is well known that the typical syntax of asking questions in divination was to inscribe an affirmative sentence on one side of the plastron and its negative counterpart on the other side. Sometimes the same plastron is used for a series of such A-not-A questions. Figure 2 shows five such pairs on a single plastron,[22] as illustrated by Chou. Clearly, much intricate research needs to be done to demonstrate the

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[20]The recent discovery of some potsherds bearing Chinese writing, dated to some 4000 BP, is stimulating much interesting discussion. See, for instance, Zhou Cezong 周策纵, Si qian nian qian Zhongguo de wen shi ji shi 四千年前中国的文史记实, *Mingbao yuekan* 明报月刊 Dec. 1993, Jan., Feb. 1994.

[21]See T'sou, Benjamin K. Y. 1971. *Studies in the Phylogenesis of Questions and Diachronic Syntax.* U. C. Berkeley Ph.D. Dissertation; Wang, W. S-Y. 1967. Conjoining and deletion in Mandarin syntax. *Monumenta Serica* 26.224-36; Yue-Hashimoto, Anne. 1993. The lexicon in syntactic change: lexical diffusion in Chinese syntax. *Journal of Chinese Linguistics* 21.213-254.

[22]Chou, Hung-hsiang. 1979. Chinese oracle bones. *Scientific American* April.

evolutionary sequence in detail. Nonetheless, the similarity across such a large time span is quite striking.

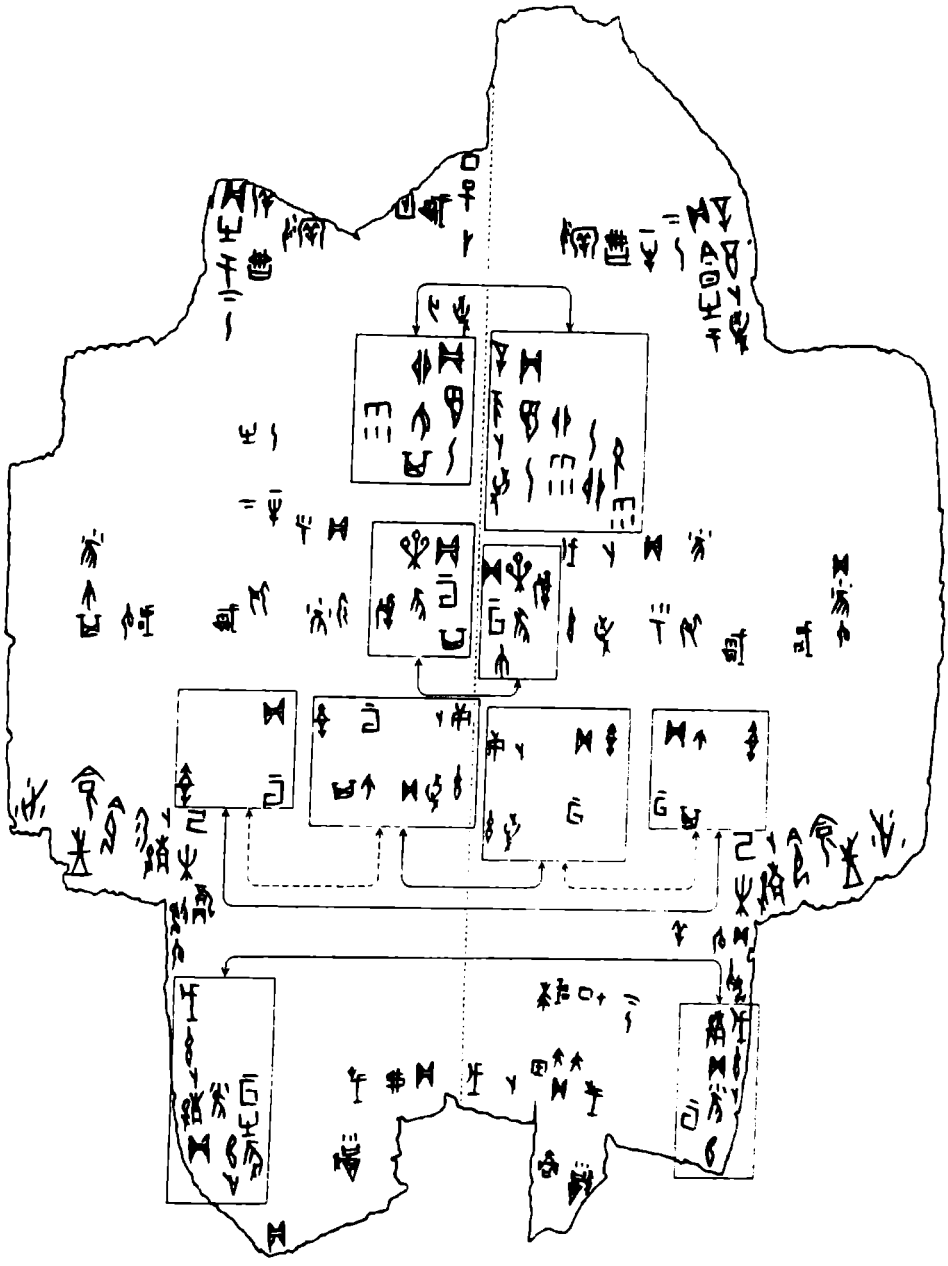

Figure 2: Oracle bone showing 5 pairs of affirmative-negative sentences. [From Chou, H.H. 1979]

2. Genetics

Material remains from long ago, carefully interpreted in the perspective of archeological knowledge, can tell us much about the past. Yet there are other indicators of the past that do not lie buried under some silent mound awaiting discovery, but which are constantly within each of us today. This is our biological heritage, expressed in our genes. Charles Darwin was perhaps the first to connect this to

language when he wrote the following in chapter 14 of his *Origin of Species*:

> If we possessed a perfect pedigree of mankind, a genealogical arrangement of the races of man would afford the best classification of the various languages now spoken throughout the world.

Kroeber was thinking in a similar direction when he remarked that

> While populations can learn and unlearn languages, they tend to do so with reluctance and infinite slowness, especially while they remain in their inherited territories. Speech tends to be one of the most persistent populational characteristics; and "ethnic" boundaries are most often speech boundaries.[23]

Regarding persistence of language, or linguistic loyalty, one is reminded of the rimed admonition of the Kejia people in China: "Sell your ancestor's land, if you must, but do not forget your ancestor's speech!"[24]

On the other hand, a page later in the same chapter, Kroeber reminds us that "Speech and culture have an existence and a continuity of their own, whose integrity does not depend on hereditary integrity. The two may move together or separately." In the Chinese setting, where the boundaries between ethnic groups have always been fluid and ever-changing, it turns out that the two, i.e., genes and language, often move separately.

Given that typically people do pass on both their genes and their language to their offspring, we should expect a strong correlation between the two phylogenetic systems. However, various factors significantly complicate the picture. Although the correlation should obtain in the default case, where the two move together, the interest is all the greater in cases where the two move separately, since they tell us that additional factors have entered the history which we need to sort out.

A special instance of such factors is when the marriage tradition is multiply exogamous, such as that reported for the Vaupes in Southeastern Colombia.[25] When the parents do not share a native language by design, and when adults living in close proximity with

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[23]A. L. Kroeber. 1948. *Anthropology*. Harcourt. Pp. 221-222. I thank Vince Sarich for calling my attention to these remarks by Kroeber.

[24]"Ning mai zuzong tian, bu wang zuzong yan" 宁卖祖宗田, 不忘祖宗言. To recognize the full force of this saying, one should recall the crucial value that land holds for an agricultural people.

[25]Jean E. Jackson. 1976. Vaupes marriage: a network system in the northwest Amazon. Pp. 65-93 in *Regional Analysis*. Carol A. Smith, ed. Academic Press.

each other speak half a dozen or more different languages, we can expect the genes and the language to go separate ways.

The situation is similar for the contexts in which pidgin languages arise. There also, the child of immigrant laborers has no clear model upon which to build its own language, being in an environment where several immigrant languages exist precariously alongside the colonial language. Such situations, as well as cases of multiple exogamy, pose interesting challenges to any historical linguistics that is limited to the tree diagram for portrayal of language relationships.

More generally than the above special situations, one can easily come up with numerous examples of Native Americans whose indigenous languages have been replaced by colonizing languages from Europe,[26] where again the genetic lineage departs from the linguistic one. From China, there are cases which involve larger numbers. Consider the Manchus and the Huis, each with populations numbering in the millions. Yet each community has adopted dialects of Chinese, with little trace left of their original languages.

At present, the languages spoken in China belong to five major stocks: Sino-Tibetan, Austro-Asiatic, Altaic, Austronesian, and Indo-European. However, there is no consensus as yet among scholars on the exact composition of these stocks. The numbers of their speakers may be seen in the following table of the ethnic groups.[27] These groups, it should be noted, are established primarily in terms of the languages they speak, though the correlation between ethnic identity and language use is never perfect.[28]

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[26]In her book, *Flutes of Fire* [Berkeley 1994], Leanne Hinton lists dozens of California Indian groups with no native speakers left and dozens more on the verge of extinction, pp. 27-33. It is not clear precisely how much genetic admixture has taken place with these groups, though one would expect a considerable extent.

[27]The table is largely based on the article by Sun Hongkai, cited in footnote 15, and the population figures given in the *Beijing Review*, December 24-30, 1990. The list of Austronesian languages is based on Paul Jenkuei Li. 1973. *Rukai Structure*, Institute of History and Philology Special Publication 64. Du Ruofu 杜若甫 and V. F. Yip have recently published a useful photographic survey called *Ethnic Groups in China*, 1993, Beijing: Science Press. Tibeto-Burman classification is taken from Dai Qingxia 戴庆夏. *Zang-Mian yuzu yuyan yanjiu* 藏缅语族语言研究. Yunnan minzu chubanshe 云南民族出版社. 1990. P. 434.

[28]Some peoples in Guangxi identified ethnically as Yao, for example, speak a language which is closer to Miao; on the other hand, some peoples in Hainan identified ethnically as Miao speak a language which is closer to Yao. There are various ethnic groups in China who have essentially discontinued the use of their original language and switched over entirely to Han speech; an example is the Manchu, whose original language was a variety of Tungusic.

Table: Population of ethnic groups, based on 1990 Census.

LANGUAGE	SPEAKERS	OTHER NAMES	TOTAL SPEAKERS
1. Sinitic [29] [30]			
HAN	1,042,482,187	Huayu	
MANCHU	9,821,180		
HUI	8,602,978		1,060,906,345
2. Tibetan			
ZANG	4,593,330	Tibetan	
ACHANG	27,708		
NU	27,123		
DULONG	5,816	Rawang	
MONPA	7,475		
LHOBA	2,312		4,663,764
3. Yi			
YI	6,572,173	Lolo	
BAI	1,594,827	Minjia	
TUJIA	5,704,223		
HANI	1,253,952	Akha	
LISU	574,856		
LAHU	411,476		
NAXI	278,009	Moso	
JINGPO	119,209	Kachin	
JINUO	18,021		16,526,746
4. Qiang			
QIANG	198,252		
PUMI	29,657		227,909
5. Miao-Yao			
MIAO	7,398,035	Hmong	
YAO	2,134,013	Mien	
SHE	630,378		10,162,426

[29]As discussed earlier, the Manchus and Huis have almost completely adopted Han speech.

[30]Sinitic is the branch of the Sino-Tibetan family with the largest number of speakers by far. The family was called "Indo-Chinese" in earlier writings.

6. Zhuang-Dai[31]			
ZHUANG	15,489,630		
BUYI	2,545,059	Yay	
DAI	1,025,128		
LI	1,110,900	Hlai	20,170,717
7. Dong-Shui			
DONG	2,514,014	Kam	
SHUI	345,993	Sui	
MULAO	159,328		
MAONAN	71,968		3,091,303
8. Austro-Asiatic			
VA	351,974	Wa	
BULANG	82,280		
BENGLONG	15,462		449,716
9. Turkic			
UYGUR	7,214,431		
KAZAK	1,111,718		
KIRGIZ	141,549		
SALAR	87,697		
UZBEK	14,502		
YUGUR	12,297		
TATAR	4,873		8,587,067
10. Mongol			
MONGOL	4,806,849		
DONGXIANG	373,872		
TU	191,624		
DAUR	121,357		
BAOAN	12,212		5,505,914
11. Tungusic			
KOREAN	1,920,597		
XIBE	172,847		
EWENKI	26,315		
OROQEN	6,965		
HEZHE	4,245		2,130,969
12. Austronesian			
BUNUN		Gaoshanzu	
AMI		"	
PUYUMA		"	
PAIWAN		"	
PAZEH		"	
SAISIYAT		"	

[31]Groups 6 and 7 are sometimes called Kam-Tai, which is essentially the same group of languages some linguists now call Kadai.

KAVALAN		"	
MAGA		"	
TONA		"	
MANTAURAN		"	
BUDAI		"	
TANAN		"	3,000
13. Indo-European			
TAJIK	33,538		
RUSSIAN	13,504		47,042
14. Undetermined			
GELAO	437,997		
JING	18,915		456,912

Groups 2, 3 and 4 in the Table above constitute the Tibeto-Burman branch of the Sino-Tibetan family, which is generally accepted to be the most closely related to Chinese. As such, an understanding of their relationships is especially important for determining the ancestry of Chinese. Dai Qingxia has offered a classification of Tibeto-Burman languages as follows:

Tibeto-Burman 藏緬:
- Northern Branch:
  1. Jiarong-Dulong 嘉戎 - 獨龍
     a. Jiarong 嘉戎
     b. Qiang 羌, 爾龔, 爾蘇, 史興, 扎巴, 納木義, 貴瓊, 普米
     c. Dulong 獨龍
  2. Deng 登
  3. Zang 藏
  4. Jingpo 景頗

- Southern Branch:
  1. Mian-Yi 緬彝
     a. Mian 緬, 阿昌, 載瓦, 勒期, 浪速, 波拉
     b. Nu 怒
     c. Yi 彝, 納西, 哈尼,傈, 拉祜, 基諾, 嘎卓
  2. Bai 白
  3. Tujia 土家

Recently, an extensive genetic study was carried out on 74 ethnic groups,[32] involving well over 10,000 subjects. It is the largest

[32]Zhao, Tongmao and Tsung Dao Lee. 1989. Gm and Km allotypes in 74 Chinese populations: a hypothesis of the origin of the Chinese nation. *Human Genetics* 83.101-110. Similar findings have been reported by Saitou et al. in an earlier study involving fewer subjects. For studies on similar themes, see also Mountain, J. L., W. S-Y. Wang, R. F. Du, Y. D. Yuan, and L. L. Cavalli-Sforza.

investigation of this sort made so far on Chinese populations. The resulting tree diagram, formed on the basis of average linkage, is shown in Figure 3, as reported by Zhao and Lee.

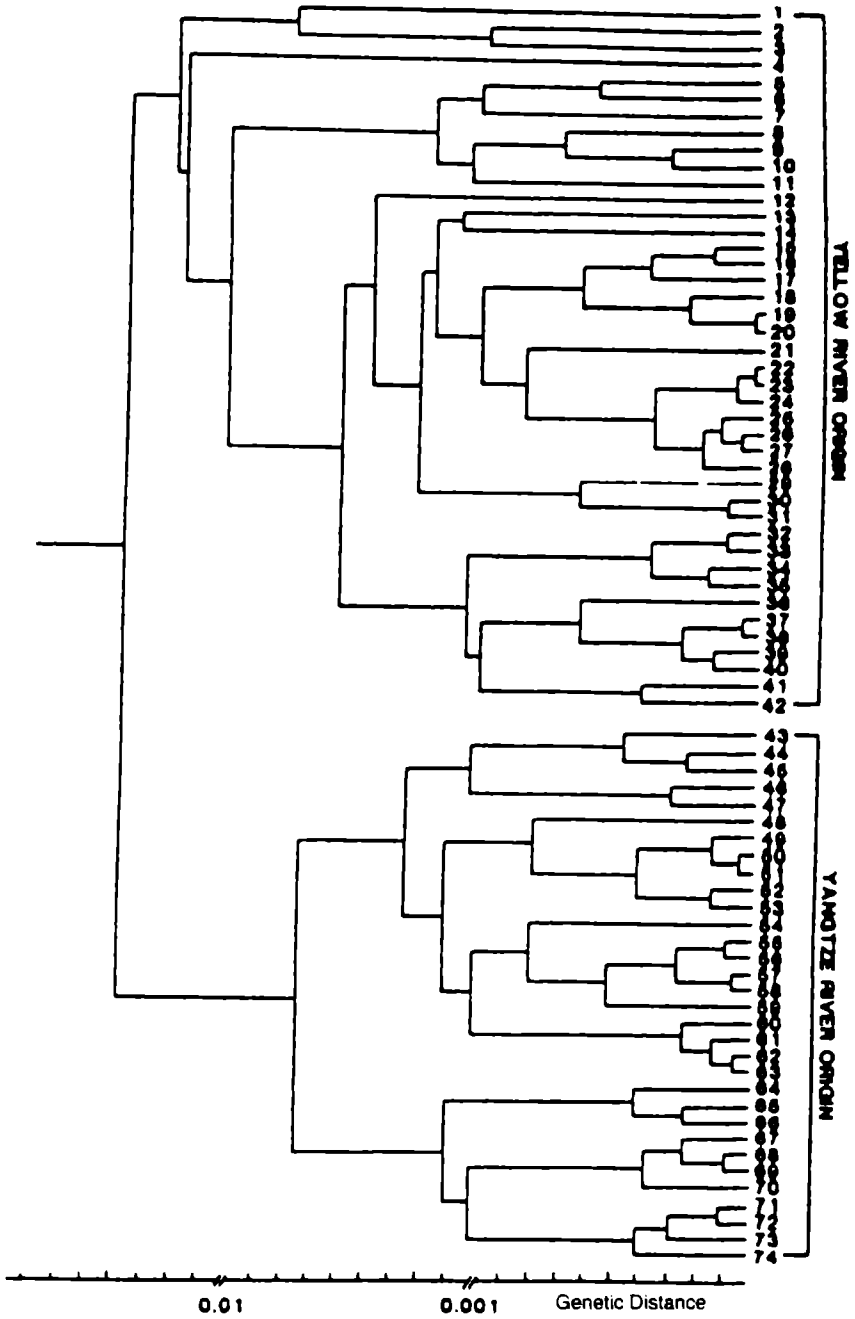

Figure 3: Average linkage tree showing genetic relationships among 74 Chinese populations. [Taken from Zhao and Lee, 1989]

1992. Congruence of genetic and linguistic evolution in China. *J of Chinese Linguistics* 20.315-331. The average linkage method used for constructing the trees in Figure 1 and Figure 3 implies a constant rate of change across every linkage. For most cases of biological and linguistic phylogeny, there is no reason to believe that this implication holds.

Two points are especially pertinent with respect to Figure 3. One is that the basic dichotomy shown in the tree is once again between northern populations and southern populations. We have seen this dichotomy in Figure 1 above in the discussion of Neolithic peoples. Indeed, Zhao and Lee are able to draw a line on a map of China which separates the two populations quite neatly. This line corresponds approximately to 30 degrees north in latitude. While the exact line must have shifted with population movements over these many millennia, the basic dichotomy between north and south has persisted over a remarkable time span.

The other point is even more pertinent to the present discussion on the relationship between genes and language. For the majority of cases where Hans and non-Hans are sampled at sites closest to each other geographically, they also show the closest relationship in terms of the genetic markers used in the study. In other words, time and again the Hans are closer genetically[33] to their non-Han neighbors than to other Hans who live farther away.[34] Most of the closest relationships shown on the tree, i.e., between 19 and 20, 22 and 23, 26 and 27, 32 and 33, 50 and 51, 62 and 63, are between a Han population and a non-Han population.

Seen in this perspective, genes and language have once again gone their separate ways. Many ethnic groups have preserved their original languages, as well as many other aspects of their culture, even though they have been assimilated into the overall gene pool of the Han majority.[35]

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[33]It is important to keep in mind, of course, that these findings are based on Gm and Km allotypes. Other biological traits may yield different results. In an intriguing essay, "Who are the Jews?", Jared Diamond notes that fingerprints may be a more stable biological marker for deeper affiliations. He notes that "the fingerprints of Ashkenazic Jews still resemble those of their ancient Arab and Egyptian neighbors, rather than those of their recent German neighbors, even though these same Jews have by now become thoroughly Germanified in terms of their ABO blood groups." 1993. *Natural History* 12-19, November.

[34]This relationship is nicely captured by the saying "Distant relatives are not as important as close neighbors" 远亲不如近邻, though the saying arose in a different context, of course.

[35]The following calculation is useful for a preliminary idea of the rate of genetic mixture: "Even a modest trickle of genes can produce great effects if it continues long enough. A classic example is that of African Americans, who today derive an average 30 percent of their gene pool from people of European ancestry. This is the mixture that would have resulted had 5 percent of all black unions been with Europeans in each generation since the institution of American slavery and had all the progeny been classified as black. Another 1000 years of such flow would leave but little of the original African genome." From p.78 of L. L. Cavalli-Sforza. 1991. Genes, peoples and languages. *Scientific American* November. A more detailed discussion of the calculations is given on pp. 493-496 of L. L. Cavalli-Sforza and W. F. Bodmer.

3. Linguistics

While archeology works with fossils and artifacts, and while genetics looks for traces in the human body, the data for linguistics are old texts and contemporary languages. As we saw earlier, extant texts of the Hans date back at least as early as the oracle bone inscriptions of the Shang dynasty (c. 1200 BCE). Scholars generally share the intuition that the date will recede further back in time as more materials come to light. For example, inscribed potsherds discovered in Shandong several years ago are believed to be some 4000 years old, although their authenticity and significance are hotly contested.[36]

On the other hand, early texts of the other languages spoken in ancient China are extremely scarce. Furthermore, the analyses of these texts are complicated by the fact that they are usually transcribed in Chinese characters, biased by the Chinese phonology of that time. Nonetheless some progress has been made in this area in recent times.

One example of such investigations is of the Bailangge [白狼歌] of the Han dynasty. This text has been analyzed independently by Coblin, by Ma and Dai, and by Zhengzhang.[37] These scholars conclude that the language recorded in the text represents a Tibeto-Burman language, most closely related to the Burmese and Yi branches. As such, the Bailangge is especially valuable since it is the earliest sample we have of the Tibeto-Burman languages; Tibetan was not written down until the 7th century, and Burmese until the 12th century.

Of the characters contained in the Bailangge, Zhengzhang notes that 115 can be related to Burmese, whereas only 40 some characters can be related to Tibetan. From this evidence, he concludes that the two branches of Tibeto-Burman had already become quite distinct from each other in Han times. He further speculates that at least 2000 years should be added to trace back to Sino-Tibetan unity, which brings it to minimally 4000 years BP.

Another example of progress in the study of ancient minority

1971. *The Genetics of Human Populations.* W. H. Freeman.

[36]For some discussion of these materials, see footnote 20.

[37]Coblin, W. S. 1979. A new study of the Pai-lang songs. *Tsing Hua J of Chinese Studies* 12.135-178. Ma Xueliang 马学良 and Dai Qingxia 戴庆厦. 1982. "'Bailang ge' yuyan shixi" <白狼歌>语言试析 p. 28. *Abstracts of the XVth International Conference on Sino-Tibetan Languages and Linguistics.* The full paper is available in an anthology of the writings of Dai Qingxia 戴庆厦. Pp. 391-417. See footnote 27 for reference. Zhengzhang Shangfang 郑张尚芳, 1994, "Hanyu yu qinshuyu tongyuan cigen ji fuzhui chengfen bijiao shang de zeshi wenti." 汉语与亲属语同源词根及附缀成分比较上的择时问题, ms.

languages is the analysis of the Yuerenge [越人歌] by Wei Qingwen and by Zhengzhang.[38] Here the Han dynasty text is identified as being in a language related to the Zhuang. Yet another area that is being explored has to do with isolated vocabulary items scattered through various classical books. For instance, Li Jingzhong has analyzed many items in the Han dynasty "dialect dictionary", and proposes relationships between them and Zhuang and other languages of southern China.[39]

Similarly, in chapter 8 of the *Manshu*[40] [蠻書], a work compiled by Fan Chuo of the Tang dynasty, there are several dozen items which have been identified with the Bai [白] language of Yunnan. Into this category we can also place the research on cross-language transcriptions in ancient documents, whether of proper names or of entire phrases. Although such finds cannot always be systematic and numerous, nonetheless they are textual treasures comparable to those uncovered by the archeologist's spade. They are riches which have remained largely untapped. Given suitable analysis, they can cumulatively shed much light on the languages of ancient China.

The area in which the bulk of linguistic work has been done is comparative analysis. The famous French Indo-Europeanist, Antoine Meillet, has long ago expressed some pessimism regarding historical reconstructions of languages like Chinese. Contrasting with the situation of Indo-European studies, his words were.[41]

> On n'a presque pas besoin de démontrer qu'une langue est indo-européenne: partout où l'on a trouvé une langue indo-européenne encore inconnue, le 'tokharien' ou le 'hittite' dans les derniers temps, le caractère indo-européen s'en est révéle des le début du déchiffrement et de l'interprétation. Au contraire, les langues d'Extrème-Orient qui, comme le chinois ou l'annamite, n'offrent presque pas de particularités morphologiques, n'ont par là même rien où puisse se prendre le linguiste qui essaie de trouver des langues parentes aux parlers chinois ou aux parlers

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[38]Wei, Qingwen 韦庆稳. 1981. "'Yueren ge' yu Zhuangyu de guanxi shitan" "越人歌" 与壮语的关系试探. Minzu yuwen lunji 中国社会 科学出版社. Zhongguo shehui kexue chubanshi 民族语文论集. Zhengzhang Shangfang 郑张尚芳. 1991. Decipherment of Yuerenge. *CLAO* 20.159-168. Also relevant in this regard is Zhengzhang Shangfang 郑张尚芳. 1990. "Gu Wu Yue diming zhong de Dong-Taiyu chengfen" 古吴越地名中的侗台语成分. *Minzu yuwen* 民族语文 6.

[39]Li, Jingzhong 李敬忠. 1987. "'Fangyan' zhong de shaoshu minzu yuci shixi" "方言"中的少数民族语词试析. *Minzu yuwen*民族语文 1.3.64-68. Reprinted in his 1994 anthology, *Yuyan yanbian lun* 語言演變論. Guangzhou chubanshe 廣州出版社.

[40]樊綽, 蠻书

[41]A. Meillet 1925. *La methode comparative en linguistique historique.* 1954 edition. P. 26.

> annamites; et la restitution d'une 'langue commune' dont le chinois, le tibétain, etc., par exemple, seraient des formes postérieures, se heurte à des obstacles quasi invincibles.

By "particularités morphologiques", Meillet presumably had in mind inflectional systems like verb conjugation and noun declension, judging by his reference to Tocharian and Hittite. It is certainly true that many languages of East Asia and Southeast Asia, in their modern form, are not inflected like Indo-European languages. On the other hand, there is really nothing magical about inflectional systems as a diagnostic for genetic relationship.

Inflectional systems can arise, disappear, be inherited or borrowed, much as any other linguistic trait. Since there is no trait that cannot be borrowed, we have no single litmus test for genetic relationships among languages. The question, rather, is one of probabilities and likelihoods.

The value of an inflectional trait is that it typically involves several words, as in a declensional paradigm, and hence is less amenable to borrowing than single words. In fact, it is likely that several paradigms must be involved before a morphological trait can be transferred from one language to another through contact. While inflectional paradigms are largely absent in many modern languages of East Asia and Southeast Asia, there is reason to believe that they played a more significant role in the grammars of earlier stages of these languages.

On the other hand, there are other types of word families, related not by inflection, but by morphological derivation, compounding, or by semantic connection. These word families may not be as neatly packaged as inflectional paradigms, but their usefulness for genetic investigations should not be overlooked. Indeed, given that Chinese characters often contain semantic information, they provide a source of historical data not available in Indo-European studies.

In fact, this resource was tapped for internal reconstruction in a seminal study by Karlgren. The approach has been followed up by Pulleyblank, and recently reviewed by Mei.[42] Instead of limiting ourselves to an Eurocentric framework based on inflectional systems, we can gain more ground by utilizing the special resources intrinsic to the East and Southeast Asian region, and perhaps arrive at results not achievable elsewhere in the world.

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[42]Karlgren, B. 1934. Word families in Chinese. *Bulletin of the Museum of Far Eastern Antiquities* 5.9-120. Pulleyblank, E. G. 1973. Some new hypotheses concerning word families in Chinese. *Journal of Chinese Linguistics* 1.111-125. Mei, T. L. 1994. Notes on the morphology of ideas in Ancient China. 37-46 in *The Power of Culture: Studies in Chinese Cultural History*. Chinese University Press. See also Dong et al. on the use of word families, based on meanings preserved in Chinese characters, for genetic linkage; reference in footnote 51.

An early hypothesis linking East Asia with the New World is one proposed by Edward Sapir. In a letter written to A. L. Kroeber in 1921, Sapir said:

> If the morphological and lexical accord which I find on every hand between Nadene and Indo-Chinese is 'accidental', then every analogy on God's earth is an accident. ... For a while I resisted the notion. Now I can no longer do so.

Given that the original settlers of the Americas came across the Bering Straits, we have reason to suspect that some languages in Asia are ultimately related to *some* languages in the Americas. Sapir's contribution lies in his perception that evidence for such a relationship can persist after such long time spans, and in his identification of the Na-Dene group of languages in this relationship, a group of languages which he himself was first to classify.

For various reasons, Sapir did not openly publish much of his work in this area,[43] a topic investigated by Bengtson. Recently, however, the idea has received further attention from Starostin,[44] a linguist based in Moscow. The new phylum proposed by Starostin includes not only Sino-Tibetan and Na-Dene, the connection that Sapir worked on, but also four additional clusters of languages with a wide geographical distribution: Basque, Burushaski, Yeniseian, as well as some of the languages of the Caucasus.

Basque and Burushaski have long been considered language isolates with relatively small speech communities, the former in northern Spain and the latter in northern India. Yeniseian has only a single surviving language, i.e., Ket, spoken in northern Siberia. If this new phylum is indeed a monophyletic unit, the questions that cry for an answer are: when did these languages range over such an immense territory, where did they originate, and how did they acquire such a patchy distribution?

Another genetic hypothesis that has generated considerable interest in recent years is being studied by L. Sagart, a linguist based in Paris. Here the linkage is between Chinese and Austronesian.[45] In many ways, the linkage is at first blush rather surprising. Chinese

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[43]Sapir, Edward. 1920. *Comparative Sino-Tibetan and Na-Dene Dictionary.* Ms in the library of the American Philosophical Society, Number 20. See Bengtson, John D. 1994. Edward Sapir and the "Sino-Dene" hypothesis. *Anthropological Science* 102.207-230[Tokyo].

[44]Starostin, Sergei. 1991. On the hypothesis of a genetic connection between the Sino-Tibetan languages and the Yeniseian and North Caucasian languages. Translated from the Russian by William Baxter III. p.12-41 in *Dene-Sino-Caucasian Languages.* V. Shevoroshkin, ed. Bochum.

[45]Sagart, L. 1993. Chinese and Austronesian: evidence for a genetic relationship. *Journal of Chinese Linguistics* 21.1-64.

morphemes have always been monosyllabic, as far back in time as these can been reconstructed, while Austronesian languages typically have disyllabic morphemes. Nonetheless, Sagart has amassed an impressive body of evidence, both morphological and lexical, to argue for a genetic relationship among these languages. He has been able to achieve this by assuming [1] many disyllabic morphemes in the ancestral language have lost their first syllable, and [2] the consonant in the first syllable in some Austronesian morphemes corresponds to medial consonants in Old Chinese.

As shown in Group 12 in the Table presented earlier, the Austronesian languages spoken in China today are now limited to the central mountainous regions of Taiwan, separated from the mainland by the Taiwan Strait. They are collectively called Gaoshanzu ("High Mountain People['s language]") for that reason. However, the separation is not difficult to cross even with primitive vessels; access is easier still when sea levels drop during colder climates.[46] There is reason to believe that the ancient Austronesians originated from the mainland, making it at least a possibility that they shared ancestors with the Chinese. At any rate, such a scenario would be required by any hypotheses linking the two.

So far the most influential hypothesis for the languages of East Asia is that sketched out by Li Fang-kuei, first in 1937,[47] which continues to guide research in China today.[48] The Sino-Tibetan family, which Li also called Indo-Chinese, in this conception has four major branches: [1] Sinitic, shown as Group 1 in the Table above, [2] Tibeto-Burman, which includes Groups 2, 3 and 4, [3] Miao-Yao, which is Group 5, and [4] Zhuang-Dong, which includes Groups 6 and 7. In Li's words [p.2],

> The tendency to develop a system of tones is another characteristic of this family.... These tones are influenced by the nature of the initial consonant. Such has been the case with Chinese, Tibetan, Burmese, the Kam-Tai, and the Miao-Yao languages, and has been considered the most powerful argument for the common origin of these languages.

The decades of research in experimental phonetics that followed Li's original classification, however, have taught us that the kinds of interaction between consonant articulation and tone systems can be

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[46]On the other hand, sea levels can also rise during warmer climates, resulting in marine transgression. See Figure 36 of Chang 1986 for some dramatic changes in China's coastline over the millennia.

[47]Reprinted as Li, Fang-Kuei. 1973. Languages and dialects of China. *Journal of Chinese Linguistics* 1.1-14.

[48]A recent attempt at an overview of this area is contained in the monograph *The Ancestry of the Chinese Language*, W. S-Y. Wang, ed. *Journal of Chinese Linguistics* Monograph No. 8, 1995.

expected from physical considerations.[49] For example, voicing in initial consonants invariably depresses voice pitch, especially in the first part of the syllable, cf. "bill" with "pill" in English.[50] Since such interaction is to be expected on the basis of the general mechanisms of speech production and perception, it is not as powerful an argument as was once thought for the genetic grouping of languages.

This new knowledge from phonetics, and an expanding data base on more tribal languages which provide better lexical comparisons, have led some scholars to link languages of Groups 5, 6 and 7 to other families, e.g., Austro-Asiatic. On the other hand, recent lexical comparisons based on word families argue again for the inclusion of Kam-Tai languages within the Sino-Tibetan,[51] supporting Li's original proposal.

As the field now stands, then, there is a large degree of consensus that the Sinitic languages are genetically related to Tibeto-Burman. Beyond this, the evidence for any other grouping, insofar as the claim is meant to be monophyletic, has not been sufficiently compelling as yet to win any general agreement. Central to the debate is the problem of conflicting traits, that is, where traits x indicate a grouping of B with A, while traits y indicate a grouping of B with C. Until this theoretical problem reaches some satisfactory solution, it is difficult for the larger hypotheses surveyed above to achieve universal acceptance.[52]

4. An experiment in subgrouping and dating.

In the remainder of this paper, I will report a preliminary experiment on language grouping, using methods from phylogenetic systematics.[53] All methods of analysis depend for their success on the

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[49]See, for example, Mohr, B. 1971. Intrinsic variations in the speech signal. *Phonetica* 23.65-93 for discussion of how consonants influence voice pitch. The term "intrinsic" is taken from a paper by Wang, W. S. and C. J. Fillmore, 1961. Intrinsic cues and consonant perception. *Journal of Speech and Hearing Research* 4.130-136. It applies to cases where variation is predictable in terms of the mechanisms of speech production and perception.

[50]The so-called voiced stops are in the process of losing their voicing in many varieties of English; a pair like "mill" and "fill" would illustrate the same point.

[51]Manomaivibool, Prapin. 1976. Thai and Chinese—are they genetically related? *Computational Analyses of Asian and African Languages* 6.11-32. Dong, Weiguang 董为光 et al. 1984. "Hanyu he Dong-Taiyu de qinyuan guanxi" 汉语和侗台语的亲缘关系. *Computational Analyses of Asian and African Languages* 22.105-121.

[52]For some discussion of recent work on classification in linguistics and in biology, see the references in footnotes 3, 4, 8 and 9.

[53]I have reviewed these methods recently in Wang, W. S-Y. 1994. Glottochronology, lexicostatistics and other numerical methods. *Encyclopedia*

quality of the data that are used. Unfortunately, the data currently available, for a variety of reasons, are not ideal for the experiment. As ideas from systematics become increasingly applied in linguistics, one would hope that appropriate sets of data for computational purposes will be increasingly available. Nonetheless, the present preliminary effort may be useful toward some tentative conclusions regarding the ancestry of the languages of China.

The data I use for the Chinese dialects are those given in Xu.[54] The Indo-European data are taken from a recent monograph by Dyen, et al.[55] For Sino-Tibetan I used the lists published by Benedict for lexical comparisons, with occasional reference to the very useful monograph by Coblin.[56] Xu's data were compiled for glottochronological calculations. The data of Dyen, et al. were compiled for purposes of lexicostatistic comparisons. Although their purposes are different, the data from Xu and Dyen et al. are readily convertible for use in the present experiment.

The method I used is that first proposed by Fitch and Margoliash, and programmed for the computer by Felsenstein. The results are cross-checked against the neighbor-joining method described by Saitou and Nei, and programmed for the computer by Saitou.[57] Essentially, the input data are in the form of a matrix which specifies the distance between every pair of languages. In this experiment, this distance is based on the percentage of shared cognates,[58] as recognized in the three sources.

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of Language and Linguistics, Longman. It is interesting to note that A. Schleicher had a clear idea of the usefulness of additive trees well over a century ago for expressing language phylogeny, though he did not have the computational and mathematical resources to develop the idea.

[54]Xu, Tongqiang 徐通锵. 1991. *Lishi yuyanxue* 历史语言学. Shangwu yinshuguan 商务印书馆. I thank Professor Xu for sending me the unpublished data from which the numbers in his book are derived.

[55]Dyen, I., J. B. Kruskal and P. Black. 1992. In Indoeuropean Classification: a Lexicostatistical Experiment. *Transactions of the American Philosophical Society* vol.82, Part 5. I thank Dr. Kruskal for sending me the unpublished data from which the numbers in their monograph are derived.

[56]Benedict, P. 1976. Sino-Tibetan: another look. *Journal of the American Oriental Society* 96.167-97. Coblin, W. S. 1986. *A Sinologist's Handlist of Sino-Tibetan Lexical Comparisons. Monumenta Serica* Monograph Series 18.

[57]Fitch, W. M. and E. Margoliash. 1967. Construction of phylogenetic trees. *Science* 155.279-284. Felsenstein, J. PHYLIP: Phylogeny Inference Package. Department of Genetics, University of Washington. Saitou, N. and M. Nei. 1987. The neighbor-joining method: a new method for reconstructing phylogenetic trees. *Mol. Biol. Evol.* 4.406-425. I thank Drs. Felsenstein and Saitou for assistance in the use of their programs, and Dr. Chris Meacham for the use of his program in plotting the trees in Figure 4.

[58]The percentage of shared cognates is converted into distance by taking its negative logarithm.

From this input matrix, the computer program then solves for an unrooted binary tree whose tips correspond to the languages being analyzed. According to the solution, the distance between any pair of languages is represented by the sums of the branch lengths along the shortest path connecting these two languages. Ideally, these distance values will be the same as those specified in the input matrix, though such a perfect match is extremely unlikely, given the complexity of linguistic development. The degree of mismatch between the input matrix and the solved values can be easily calculated. In all three cases under consideration, however, the match is surprisingly good, and none of the solutions need be rejected.

The unrooted tree obtained so far has no directionality; so the next step is to determine the location of the root. A common procedure for doing this is to take the midpoint of the longest path. I have used this procedure in the present experiment, realizing that it may introduce an artificial amount of "leveling" on the evolutionary rates across the lineages. The three trees thus obtained are shown in Figure 4. Note that these trees are significantly unlike those in Figures 1 and 3 in that the branch lengths are typically different from each other.

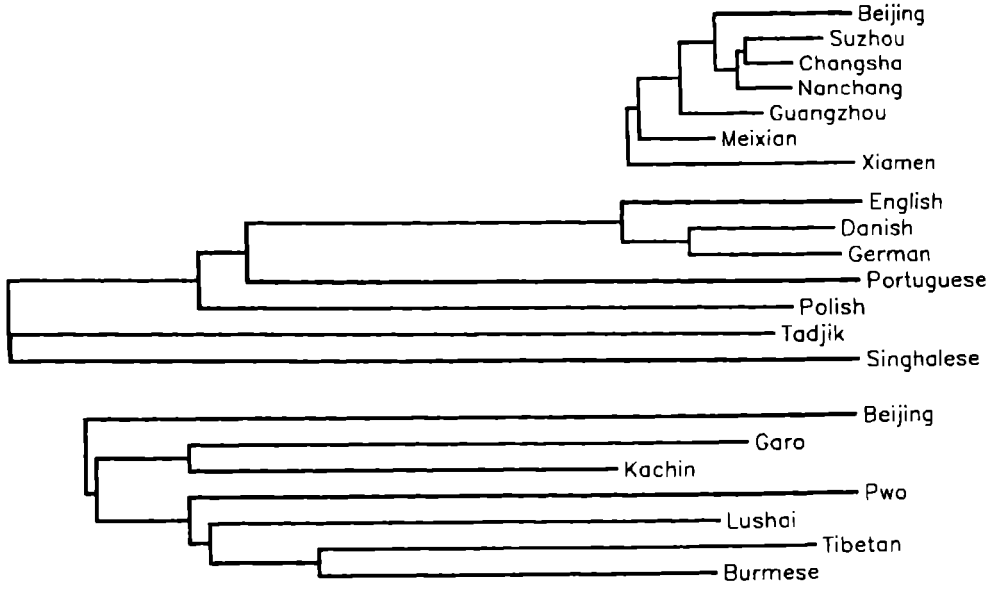

Figure 4: Additive trees for Sinitic, Indo-European, and Sino-Tibetan languages.

The Sinitic tree shows that the closest relationship is between Suzhou and Changsha. This is an interesting result because it is paralleled by phonological considerations: the Wu and Xiang dialects are the only ones which have largely preserved the voiced obstruents of Middle Chinese that are lost in all other major dialects. Suzhou, Changsha and Nanchang cluster together as a monophyletic unit, forming a belt of central dialects, as shown in the tree. The southern

dialects, on the other hand, show no such clustering.[59]

The seven Indo-European languages were chosen to maximize the diversity in the group. The deepest split is between the Asian languages and the European ones. It is surprising that the tree shows such great time depth for the separation between Tadjik and Singhalese, almost as much from each other as their separation from the European languages.

Another unexpected result is that German groups with Danish rather than English. The received view here, based on phonological development, is that Danish is North Germanic while English and German are West Germanic. Here is another instance, then, where linguistic traits are in conflict—in this case, phonology versus basic vocabulary. Yet, the result from vocabulary should not be surprising, considering the effect centuries of Dane law and Norman rule must have had on the English vocabulary.

The next observation of interest comes from comparing the depth of the Germanic subtree with that of the Sinitic tree directly above it in Figure 4. The fact that these two groups of languages have approximately the same time of divergence—each is about 2000 years old—is nicely captured by the depths of these two trees. This gives us encouragement that perhaps we can use this tree depth as a yardstick to measure the date of divergence of other groups of languages.

Indeed, when we apply this yardstick to the entire Indo-European tree, we find that the tree is roughly three and half times as deep. This gives a divergence date of some 7000 years ago for the family as a whole. At present, there are two contending hypotheses among archeologists regarding this date.[60] The "Kurgan invasion" hypothesis, as argued in detail by M. Gimbutas, places the first split at 6000 years ago. C. Renfrew, on the other hand, based on consideration of the diffusion of agriculture, prefers an earlier date of 8500 BP. The date indicated by the trees in Figure 4 is in between these two proposals. At any rate, this result points to the possibility of extending the yardstick to situations which have not received as much attention.

Again, when we apply this yardstick to the Sino-Tibetan tree as a whole, we find that the divergence time is about 3 times as great as that for Sinitic alone. This gives a date of approximately 6000 years

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[59]For general discussions on the languages and dialects of China, see: Chinese Academy of Social Sciences and Australian Academy of the Humanities. 1988 and 1991. *Language Atlas of China.* Longman Group. (Available in both Chinese and English editions.) And also, Wang, W.S-Y., ed. 1991. *Languages and Dialects of China. Journal of Chinese Linguistics* Monograph 3.

[60]See Colin Renfrew, The origins of Indo-European languages. *Scientific American* October 1989. J. P. Mallory is a strong advocate of the 6000 BP date; see his *In Search of the Indo-Europeans.* 1989. Thames and Hudson.

BP. In a recent study which discusses Sino-Tibetan and Austro-Tai,[61] Peyros and Starostin propose a divergence date of 5000 to 6000 BP. Although they give no justification or procedure for arriving at this number, it is nonetheless consistent with the results arrived at here.

This date may be pushed further back in time, of course, if we should later add to the Sino-Tibetan tree a language whose distance to another language in the family is greater than that between Beijing and Pwo. Similarly, the split dates further back if we later re-classify cognates as borrowings. Conversely, if we are able to increase the percentage of cognacy through deeper phonological relations, the date would move closer in time. Such qualifications apply, of course, to all phylogenetic analysis, and there is no reason to believe that the Sino-Tibetan tree analyzed here is an exception. At the present state of our knowledge, it appears that Sino-Tibetan is a younger family than Indo-European, by perhaps 1000 years or more.[62]

This date of 6000 BP, when the Tibeto-Burman languages first split off from Sinitic, receives some indirect support from the prehistorical scenario that archeologists have constructed. This can be seen from Figure 5, which is adapted from the important synthesis of K. C. Chang.[63]

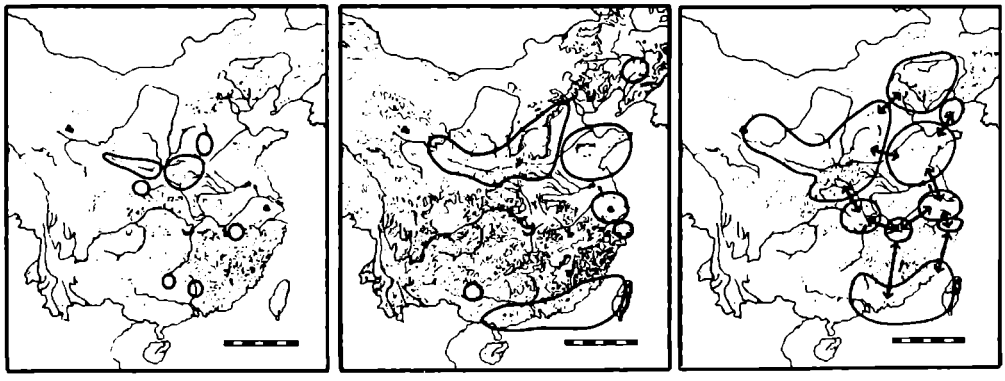

Figure 5: Linking of cultural spheres at 6000 BP, forming the roots of Chinese civilization. Taken from Chang 1986, p.235.

The three maps in Figure 5 show the geographical distribution of these early cultures at different stages: 9000 BP, 7000 BP, and 6000/5000 BP. The archeological record shows that each cluster of sites expands its domain as its assemblage of cultural artifacts grows more extensive and complex, and, presumably, as the population increases.

The most remarkable fact shown in the map on the right of

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[61]Peyros, I. I. and S. A. Starostin. 1984. Sino-Tibetan and Austro-Tai. *Computational Analyses of Asian and African Languages* 22.123-127.

[62]A fascinating question is whether these two momentous events in the distant past were related to each other in any way, or whether both were driven by some more global circumstance, created by nature or by man.

[63]See reference in footnote 16. The map is taken from Chang 1986, p.235.

Figure 5 is that at around 6000 BP, these cultures began to reveal a significant degree of interaction. Apparently, cultural advancement and population density had reached a threshold by that time. Earlier the clusters were largely independent and isolated from each other, as the map on the left shows for 9000 BP, though they were increasing in scope, as the map in the middle shows for 7000 BP. 6000 BP marked a transformation of these clusters into a linked network, sharing many common archeological elements. This network was such that the cultural similarities within it were qualitatively greater than with those outside it.

It is reasonable to infer that these similarities were brought about by a significant amount of population movement, so that peoples brought their cultures with them as they moved into new spheres. A linguistic consequence of these movements is the splitting of communities from an original population, such that each community would eventually evolve its own language. In any case, the linkages of these Neolithic cultures were so strong by 6000 BP. that, in the charming words of K. C. Chang:[64] "When the Wei-shui River valley sneezed, as it were, the Lake T'ai-hu region caught cold." He called this network of cultures an "interaction sphere", the "initial China".[65] Indeed, when the Qin dynasty first unified China in 221 BCE, it was building on this complex amalgam which had begun to come together some 4000 years earlier.

It is appropriate to underscore again the preliminary nature of the experiment reported here, bearing in mind the limitations of the data and the newness of the method as it is applied in linguistics. Our knowledge in this area needs to be significantly deepened before conclusions can be drawn with any degree of confidence. Certainly I am not alone in my hesitation on the use of tree diagrams to represent linguistic history, since these diagrams deliberately ignore the effects of contact. A useful simplification for some purposes, clearly, else these diagrams would not have found such favor in historical linguistics for over a century. Until we eventually can complement the inherited traits with those that are borrowed, our knowledge will remain incomplete and insecure.

Nonetheless, with all due qualifications, the results reported here from the linguistic window appear to be reasonable enough at the present state of our knowledge. It is all the more encouraging, of course, that they seem to correspond in time to events seen through the archeological window. We may hope that with additional and more fine-tuned studies from the genetic perspective, our understanding of the distant past will be enhanced as well. With the coordinated views from these three windows, as well as others yet to be

[64]Chang 1986:410.

[65]Chang 1986:234.

explored, we will ultimately be able to derive a truer, multi-dimensional reconstruction of the past more effectively than any single discipline can hope to offer on its own resources.