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 II

edited by
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Genetics and Physical Anthropology, Metallurgy, Textiles, Geography and Climatology, History, and Mythology and Ethnology

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Genetics and Physical Anthropology

DNA Analysis on Ancient Desiccated Corpses from Xinjiang (China): Further Results

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There are two different approaches to the study of the biological history of human population: physical anthropology and population genetics. The former studies the remains of past populations: it allows diachronic studies, but it is often limited by the scarcity of the fossil record and to the lack of knowledge about the modality of heredity of the macroscopical characters (such as the skeletal and dental features) considered. The latter is based on well-known models of genetic transmission and can be carried out on a large number of individuals, but it has to interpret a historical process, evolution, relying only on the present-day situation. An emerging field, called "molecular archeology", tries to fill the gap between the two methodologies, analyzing ancient samples (as physical anthropology does) at the molecular level (as in genetic analysis).

Early works extracted and characterized ancient proteins, while more recent studies involve the analysis of ancient DNA. This exciting new possibility was promoted by recent advancements in molecular biology, and in particular by the devising of the technique known as Polymerase Chain Reaction (PCR) (Saiki *et al.* 1985). This technology, which is a kind of in vitro clonation, allows the enzymatic amplification in billions of copies of an informative DNA sequence selected by the researcher, starting from a very small amount of DNA. It is necessary to define two primers (short sequences of nucleotides) flanking the region of interest, that can promote with extreme specificity the subsequent amplification. Because of its high stringency, the presence of very different sequences, like bacterial and fungine DNA molecules, does not influence the reaction, since the two primers permit the researcher to pick out selected human sequences even amidst a huge number of exogenous DNA molecules. Neither the amount of nucleic acid, nor its physical integrity in extremely long molecules are an insurmountable problem, although they do affect the efficiency of the reaction. Since ancient DNA is usually present in very low amounts, degraded, and mixed with nucleic acids from microorganisms, the PCR technique, widely employed in many other fields of Molecular Biology, is the methodology of choice (virtually the only one) in the ancient DNA field.

Unfortunately, its application to ancient remains is not as straightforward as to modern samples. In fact, researchers dealing with ancient molecules must face several additional problems that are of little or no importance when working with fresh tissues. Among others, the most noticeable are the poor preservation of nucleic acids in ancient material, often degraded to very short fragments of a few hundreds of base pairs (this implies that only short sequences can be successfully retrieved), the presence of inhibitory factors in extracts from ancient tissues, and possible contamination from modern human DNA. The last problem is felt particularly when studying anthropological remains because of the coincidence between subject and object of the research: in both cases a human being.

In this regard, the very advantage of PCR, i.e., sensitivity and specificity, is also a disadvantage for ancient DNA studies. This paradox is due to the fact that there are a lot of possible sources (dead skin cells from the hands, dandruff, saliva, sweat, blood) that contain enough DNA to contaminate a precious ancient sample. The more a specimen has been handled in a museum, the less will it be free from human modern molecules. These molecules, even if in very low concentration, are obviously in better condition than the ancient ones, and they will be preferentially amplified by the enzyme during PCR. In fact, the kinetics of the reaction are faster with undamaged molecules, and if intact DNA is present, it is very unlikely that any ancient molecule will be amplified. Obviously, the laboratory environment must be kept as clean as possible, but the phases prior to laboratory analysis (excavation and museum storage), usually not controlled by the analyst, are crucial. For all these reasons, even though from a technical point of view the analysis of the ancient DNA can be done in any Molecular Biology laboratory, since no special equipment is required and the analytical methods used are directly derived from those applied in fresh samples, it is necessary to exercise additional care and caution in extracting and amplifying DNA from ancient material.

Because of these difficulties, it is appropriate to focus the attention to a region of the DNA with a suitable ratio between length and informativeness, the ideal being a short region that is highly polymorphic. In addition, a DNA molecule present in a large number of copies per cell has an increased chance that at least one copy could survive through the years. Fortunately, a region of DNA with these features does exist, and it is not in the chromosomes, but in the genome of the cellular organelles called mitochondria.

The mitochondria are formerly independent organisms, similar to bacteria, that entered in symbiosis with the first nucleate cells at the very beginning of the evolution of the life on Earth. The early cell provided them nutrition and protection, while the mitochondria gave in exchange the management of energy. All superior organisms possess many mitochondria per cell which still maintain a sort of autonomy with a separate duplication cycle and their own particular DNA. During the course of evolution, the mitochondrial genome (mtDNA) has been simplified by the migration of many of its genes in the nuclear chromosomes, and presently only a few genes, carried by a very small number of base pairs (bp), are present (human mtDNA has 37 genes in 16,569 bp compared to hundreds of thousands of genes in 3 billion base pairs for the nuclear genome). These genes play an important role in cellular metabolism and they are strictly patched in the genome, with no gaps but existing in a region of about 1,000 bases with no special genetic expression, called a "control region" (it has a regulatory function for mtDNA duplication), that contains two domains of 400 bp each which can vary almost freely in their sequence without consequences for the functionality of the organelle. To be of evolutionary interest, a mutation (in the simplest case just a change in the DNA sequence of the 4 bases constituting DNA, for example a Guanine instead of an Adenine, or a Timine instead of a Citosine) should be neutral, or, in other words, not influenced by the environment, since, otherwise, two unrelated populations living in similar environment could present similar genetic features simply because of convergence (such as the dark color of the skin in tropical Africa and in Oceania). This is the case of two short portions of the control region, called hypervariable segment I and II, that presumably show the highest mutation rate (the first being twice as high as the second) of the whole genome. Even within a homogeneous population it is rather difficult to find identical individuals for the entirety of the hypervariable regions (excluding relatives from the maternal side, see below) and there is almost no sharing among different populations (obviously some overlapping can be observed if we consider short portions of the control region). Other interesting characteristics, besides its simplicity, abundance, and variability, account for the attention paid to this molecule by evolutionary geneticists. The mtDNA has no recombination and it is transmitted only by the maternal lineage since the mitochondria present in the spermatozoa do not enter into the egg but only those of the latter are present in the offspring: both features that drastically simplify the study of its evolution.

For all these reasons, the hypervariable control regions of mtDNA (especially region I) are by far the most often investigated in ancient DNA studies, and the data which they yield can be compared with relevant data derived from modern populations from all around the world. The high mutation rate of this region is at the same moment both an advantage, because it allows for fast differentiation among individuals and populations, but also a difficulty, because of the possible occurrence of the same mutation in independent lineages, thus confusing the reconstruction of the evolution of the mitochondrial types in a given population. In addition, the huge variability induces a background noise of many rare and often conflicting mutations that sometimes hampers adequate statistical treatment of the data. Apparently, not all the mutations are equally important, and my current work, in collaboration with Antonio Torroni, a geneticist of the University of Rome, is aimed to individuate, among the changes in the control region, those of phylogenetic interest (Torroni *et al.*, 1996, in press). The coding portions of the mtDNA are more stable, and a change there is likely to occur only once in the evolutionary history of a population. Our preliminary results show that the parallel analysis of both the sequences of the control region and the various point mutations in the coding areas allows us to define groups of lineages with changes in the control region that are population-specific, at least at a continental level.

It is apparent that no evolutionary interpretation of the DNA extracts from ancient samples can leave out of consideration both the nature and the extent of the variability of mtDNA in modern populations. More precise phylogenetical affiliation of the desiccated corpses from Xinjiang, the object of this study, could be established only when the variability patterns of the mtDNA will be fully understood and the polymorphic sequences from modern individuals from Xinjiang (presently studied by Du Ruofu of the Institute of Genetics of the Chinese Academy of Sciences in Beijing) and from other regions of Eurasia will be known.

Drawings of desiccated tissues were carried out on several individuals naturally mummified, dated 3,200 BP, from the graveyard at Qizilchoqa near Qumul (Hami), in eastern Xinjiang (far northwest China) and from the Museum of Archeology in Ürümchi. All together, 25 specimens from 11 individuals were collected, but up to now only 5 samples belonging to 2 individuals are available for analysis. Every effort has been made to keep these samples free from modern human DNA contamination. The samplings were made wearing disposable rubber gloves to avoid skin contact and a mask to prevent contamination from saliva when speaking or breathing. The drawings were made by disposable sterile scalpels. The gloves and the tools were changed when sampling a new individual to prevent cross contamination among ancient corpses. The specimens, about 1-2 grams of desiccated tissue, of different types—muscle, skin, bone, etc.—and from various parts of the body, were stored in sterile plastic tubes, immediately labelled and sealed, to avoid the growth of micro-organisms. The least exposed parts of the body, such as the inner thighs or underarms, were selected, with the aim of analyzing tissue with limited handling. In some cases, especially at the necropolis where many mummies where unearthed and reburied shortly after, it was possible to draw bone and soft tissue from below the woollen clothes, ensuring protection from handling in those places.

More than one sample (from 2 to 4) was drawn from each individual. This represents the best indirect control of the authenticity of the results. In fact, while all the specimens from the same mummy should yield identical sequences, those from different individuals should reflect the biological variability of the human species.

For the same purpose of mantaining the purity of the sample, strict control of the laboratory environment was exercised by working in dedicated areas and, whenever possible, by using disposable tools and glassware to minimize the possibility of contamination from previous use. As a further caution, possible exogenous DNA has been inactivated by prolonged exposure of all reagents, glassware, and instrumentation to UV light (wavelength 254 nm).

Some aliquots of the two individuals whose tissue was available for the research were processed to obtain nucleic acids for genetic investigations. About 2 grams of tissue were finely powdered under liquid nitrogen and aliquots of 0.5 gram have been transferred to sterile 50 ml tubes and submitted to different extraction methods according to the tissue type: for soft tissue we followed the method of Pääbo (1990) and Hoss & Pääbo (1993) while for bones we applied also the method of Perrson (1992).

The first method (Pääbo, 1990) is directly derived from the most frequently used technique for extracting DNA in Molecular Biology. The sample is processed in an appropriate buffer and treated with Phenol and Chloroform to get rid of proteins and other organic and inorganic compounds and the nucleic acids, after a purification step, are precipitated with ethyl alcohol (to avoid the loss of DNA molecules, the precipitation step has been replaced in some cases by concentration with disposable microconcentrators). The majority of the nucleic acids obtained were of low molecular weight, with an average length from 200 to 500 base pairs. A small fraction of higher molecular weight DNA was also observed. As mentioned above, this finding is quite common in the case of DNA extraction from ancient tissue, since most of the nucleic acids are degraded. The DNA of bigger size is not necessarily related to the presence of longer ancient molecules, but can be due to the occurrence of DNA from microorganisms (bacteria, fungi). In spite of the good yield, the subsequent use of DNA extracted with this method is sometime hampered by the coprecipitation of some inhibitory factor of unknown etiology, whose presence in the mummy sample was indicated by a blue fluorescence in the UV light that is clearly distinguishable from the orange color shown by the nucleic acids.

To circumvent this problem, two other protocols have been devised. That of Perrson (1992) is based on the well-known affinity with DNA shown by hydroxyapatite, the mineral component of bone. The DNA is eluted from this matrix phosphate buffer and the DNA, adequately purified, is precipitated by a specific carrier, such as spermidine. The second protocol (Hoss and Pääbo, 1994) involves the affinity of silica (or diatomite) suspension for nucleic acids, enhanced by the presence of guanidine tyocianate. This method gave positive results only when applied to bone powder from the mummy sample #2, from which a fragment of rib was available, while no DNA could be recovered from the soft tissue of the same individual.

The ancient DNA extracted was submitted to enzymatic amplification (PCR) having as a target a portion of the hypervariable region I of the mtDNA and other short fragments in the coding part (by far more stable in respect to the control region) of the mitochondrial genome that include point mutations of populational interest. Because of the sample conditions, not all the amplifications attempted for the different targets were successful, but it was possible to obtain some informative amplifications (both directly and by applying a repair protocol described in Francalacci & Warburton, 1992) from independent extractions of one individual (mummy #2, from Qizilchoqa). All the PCR amplifications were carried out in parallel with blank controls of both the extraction and PCR reagents.

The amplified products carrying the point mutations, referable to as the haplogroups T, H, M and -10,394 DdeI (Torroni *et al.*, 1996, in press), were analyzed by restriction enzyme analysis, while the 148 bp portion of the hypervariable region was manually and automatically sequenced. The results are compared with the complete human mitochondrial DNA, whose 16,569 nucleotides (or bases) were fully sequenced by Anderson *et al.* (1981). The base numbering and order is conventionally referred to this sample, also known as "the Cambridge sequence", from the place where it was described.

The sequencing analysis of the amplified hypervariable region I, from bp 16,254 to bp 16,400, yielded a sequence identical for all the bases of the Cambridge reference but one, in position 16,278, where a Timine in the ancient sample substitutes for a Citosine.

We can attempt to reconstruct the phylogenetic relationships using sequences by analyzing the pairwise differences among individuals and by tracking the diffusion of a given change. It should be clearly pointed out that the Cambridge sequence of the hypervariable region does not represent either the "normal" one (since the majority of the changes are non-pathological), or the more common one in human beings, but simply that coming from a concrete individual of European origin that happened to be the first person analyzed. For this reason, European samples show a small number of mutations (or, better, changes, since it is not possible to know, in the presence of a base variation in respect to the reference, which nucleotide was the original in mankind and which was the mutant), while, obviously, more distant populations show a higher number of differences in the sequence. European lineages presenting one nucleotide change in respect to the reference in the 148 bp here considered can be found in about a half of the cases (Bertranpetit *et al.*, 1995; Di Rienzo and Wilson, 1991; Francalacci *et al.*, 1996; Piercy *et al.*, 1993) whereas this frequency drops to 15% in Indian (Mountain *et al.*, 1995) and Asian populations (Horse and Hayasaka, 1990) and down to almost zero in Africa (Vigilant *et al.*, 1989). From this perspective, the sequence amplified from the ancient Xinjiang corpse is more likely related to continental European lineages. The nudeotide change found in the ancient sample, the 16,278 Timine, however, is quite common world-wide. Because of its high frequency in Africa, approaching 90% in the African population of the Herero (Vigilant, 1990; Stoneking *et al.*, 1991), it can be considered as ancestral, and it is not surprising to find it in many distant populations. Similar lineages can be found in a wide area ranging from the Basque country at the west corner of Eurasia, to all of Asia proper and the Americas (Bertranpetit *et al.*, 1995; Ward *et al.*, 1991). However, we should take into account the possibility of new independent mutations in this position, and, more importantly, the association of the 16,278 T with other mutations in the coding region, that may be different according to the ethnic group studied.

As previously mentioned, the coding region, because of its physiological importance in cellular energetic management, is less prone to neutral mutations than the control region, and the occurrence of both retromutations, and independent parallel mutations at the same position in two different lineages, is unlikely. For this reason, two individuals carrying identical changes in the coding region are supposed to derive from a common ancestor. It is possible to group different mitochondrial lineages sharing the same change in the coding region in families called "haplogroups". In addition, relevant changes in the control region and those in the coding region can be almost biunivocally associated (Torroni *et al.*, 1996 in press). In Europe nine different haplogroups (H, I, K, J, T, U, V, W, and X) are present, and the loss of a DdeI restriction site in position 10,394 is present in all the European haplogroups but I, K and J. When combined, the nine haplogroups encompass virtually all the mitochondrial variants observed in Europeans (about 98% in Swedish, Finnish and Tuscan samples), while the overlap between European and non-European mtDNA variant is extremely limited (Torroni *et al.*, 1996 in press). Haplogroup H is the more common in Europe, including about 40% of the mitochondrial lineages from different European populations such as Swedish, Finnish, Tuscan, Corsican and Sardinians (Morelli, 1996) and it has been observed in only 3 out of 1,175 non-Caucasoid subjects (Torroni *et al.*, 1996 in press).

Other continents show specific haplogroups. For example, more than 70% of Africans belong to the haplogroup L (Chen *et al.*, 1995), while Asians can be grouped in A, B, F, and M haplogroups, the latter being the most frequent (about 55% of all East Asians and Siberians) (Torroni *et al.*, 1994; Chen *et al.*, 1995). Native Americans belong to four haplogroups of Asian origin (thus pre-dating the colonization of the Americas): A, B, and two (C, D) sub-haplogroups of M (Ward *et al.*, 1991).

The result of the restriction analysis shows that the sample under study belongs to the haplogroup H since it shows the lack of the restriction sites Alu I at 7,025 and Dde I at 10,394, while it yelded negative results for attribution to the haplogroups T and M. It is worthy to note that the transition C-T in the control region at 16,278 is compatible with the attribution to the H haplogroup of this sample.

These preliminary results are in agreement with a possible European origin of the ancient Xinjiang corpses, but further research, especially focused on other continental-specific point mutations in the coding areas of the mitochondrial genome, and extended to other individuals, is still needed to define with more precision their phylogenetic relationships.

The parallelism between biological and linguistic evolution was first noted by Charles Darwin, who pointed out that the mechanism at the base of the differentiation of the languages (diffusion and subsequent isolation) is the same as that which works in the evolution of living beings. However, linguistic transmission is not only vertical (from parents to offspring) as in the case of the transmission of genes, but also horizontal (learning from neighbors). A single individual or an entire people can replace their language in a relatively short time, while obviously this cannot be done for genes. This can explain the incongruencies when comparing the linguistic affiliation of a population with its genetic pattern: for example, Sardinians are presumably of non Indo-European origin, but their language is clearly neo-Latin, while, on the other hand, Hungarians are genetically similar to their central European neighbors, while their language is deeply different. Nevertheless, in most cases, the correlation between the tree drawn from the genetic distances and that based on the linguistic families is strong, as shown by Cavalli-Sforza *et al.* (1988; 1995). In addition, language is not affected by natural selection. From this point of view, a phonetic or semantic change in a language can be considered as a neutral allele (evolutionarily important, as mentioned above) and transmitted without environmental influence. For these reasons, population genetics can help to find correlations among language families and, on the other hand, linguistic similarities can be indicative of a phylogenetic relationship.

The physical appearance of the individuals studied here shows Caucasian features, suggesting a relationship with the Tokharians, an Indo-European people who lived in the area during historical times. The documentation of the early presence of Caucasian people in Northwest China (and the knowledge of their closer affinities with either European or Indo-Iranian modern populations) could make an important contribution on the debated question of the spread of Indo-European languages. It should, however, be pointed out that genetic analysis on the desiccated corpses can shed light only on the origin of their mitochondrial lineage, while the long process of physical and cultural evolution of the ancient Xinjiang people is somewhat more complicated than the knowledge of a fragment of DNA, and it can be understood only by an integrated vision of genetic, linguistic, historical, archeological and anthropological records.

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The Uyghurs, a Mongoloid-Caucasoid Mixed Population: Genetic Evidence and Estimates of Caucasian Admixture in the Peoples Living in Northwest China

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The Chinese nation consists of 56 nationalities and is thought to have originated from two genetically distinct subgroups of ancient Mongoloid population. However, the possible existence of racial admixture in certain nationalities has been suggested. Some Caucasoid genes have been found among Uyghur, Kazak, Dongxiang, and Hui nationalities living in northwest China. Two race-specific genetic markers, immunoglobulin allotype Gm f;b haplotype and Rh blood group cde haplotype, were used to examine the presence of Mongoloid-Caucasoid mixed ancestry and to estimate the amount of Caucasian admixture (m) in the Chinese nationalities. Assuming that the Mongols and the peoples of Middle Asia are the parental populations, the m values based on Gm and Rh can be estimated as 54% and 55% in Uyghurs, 34% and 36% in Kazaks, and 14% and 13% in Huis, respectively. In Dongxiangs the m is 26% on the basis of Gm.

The high proportion of Caucasoid genes found in the Uyghur cohort suggests that this population may be derived from an ancient mixed population formed between a Caucasoid-derived population and a North Mongoloid population. One of the possible sources of Caucasoid genes are the peoples who came from Middle Asia by the way of the Silk Road. The precise time of admixture occurrence and the direction of gene flow can not be determined by this data analysis. If the admixture occurred 2,000 - 3,500 years ago, the admixture rate per generation among Uyghurs would be estimated at 0.55% - 0.97%.

Introduction

Since the classification of ABO blood group antigens at the beginning of this century, several hundred human genetic markers, including blood groups, proteins, human leukocyte antigens, and DNA polymorphism, have been determined at the levels of either gene products or DNA using immunological or biochemical methods. The distributions of these genetically polymorphic markers in different ethnic groups and geographic regions have been widely investigated (Mourant et al. 1976, Roychoudhury et al. 1988, Cavalli-Sforza et al. 1994). One of the few genetic markers that can be used to characterize different racial groups is the human immunoglobulin

Gm allotype. The close linkage of the immunoglobulin heavy chain genes results in the inheritance of fixed combinations of Gm factors as haplotypes. Gm haplotypes are very stable, and crossing over is extremely rare. Some haplotypes are characteristic for a particular race or population. For example, Gm f;b is thought to be a Caucasoid haplotype; Gm a;bst characterizes Mongoloid populations; Gm a;bc3z and Gm a;bc3 are found only in people of African descent. This has made Gm allotype a useful tool in anthropological studies, especially in the identification of ethnic groups and in the detection of gene drift and migration in ancient time (Johnson et al. 1977, Matsumoto et al. 1982, Steinberg et al. 1981).

The Chinese nation consists of the Han nationality and 55 minorities. Han is the major Chinese nationality, comprising approximately 93.3% of the total population. Although the modern Chinese nation is thought to have originated from two genetically distinct subgroups of ancient Mongoloid population (Zhao 1987, Zhao et al. 1987), the Caucasoid Gmf;b haplotype was found among Uyghur, Kazak, Dongxiang, and Hui nationalities living in northwest China (Zhao et al. 1983, 1987, 1989).

The existence of the Caucasoid Gm f;b haplotype among Uyghurs was reported for the first time in 1983 (Zhao et al. 1983). This finding was confirmed by a comprehensive investigation (Zhao et al. 1989). In this paper, a hypothesis that the current Uyghurs may be derived from an ancient mixed population formed between a Caucasoid-derived population and a North Mongoloid population was tested. The amount of Caucasian-admixture (m) among Uyghurs and other minorities living in northwest China has been estimated.

Materials and Methods

Data selection. Data derived using a variety of polymorphic genetic markers (table 1) were subjected to analysis of racial admixture. Gm factors are genetic markers of immunoglobulin molecules. Rh, Kell, Lutheran, and Diego are red cell blood group antigens. Gm haplotype frequencies in the Chinese (Zhao et al. 1987, 1989) and in other ethnic groups (Johnson et al. 1977, Matsumoto et al. 1982, Steinberg et al. 1981) were selected for use. Gene frequencies of red cell blood groups were taken from a previous publication (Zhao 1987). Additional data used for comparisons in this paper were obtained from Cavalli-Sforza's well-known work (Cavalli-Sforza et al. 1994). The demographic characteristics and gene frequencies used in this study are shown in table 2, table 3 and figure 1, respectively. The Chinese populations, independent of nationality, are divided into two genetically distinct groups for this study. The geographical boundary between North Chinese and South Chinese is near the latitude of 30° N, roughly along the Yangtze River (Zhao et al. 1987).

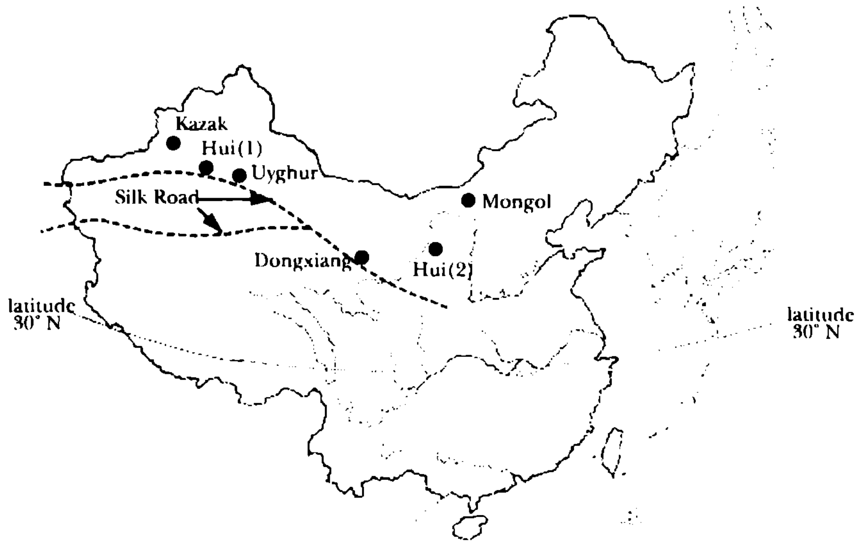

Figure 1. Map of China showing the localities of the populations studied for estimation of Caucasian admixture

Table 1. Polymorphic genetic markers used in this study

Name of locus	Symbol	Chromosome location	alleles used
Immunoglobulin GM1;GM3	*IGHG1G3*	14q32.33	*za;g, zax;g, f;b, za;b, fa;b*
Rhesus blood group	*RH*	1p36.2-34	*cde*
Kell blood group	*KEL*	7q33	*K*
Lutheran blood group	*LU*	19q12-13	*A*
Diego blood group	*DI*	17q12-21	*A*

Table 2. List of the populations studied in this paper

Nationality	Population (1981)*	Main areas of habitation	Linguistic classification family	subfamily
Uyghur	5,957,112	Xinjiang	Altaic	Turkic
Kazak	907,582	Xinjiang	Altaic	Turkic
Dongxiang	279,397	Ningxia	Altaic	Mongolian
Mongol	3,411,657	Inner Mongolia	Altaic	Mongolian
Hui	7,219,352	Ningxia	Sino-Tibetan	Sinitic
Han	936,703,824	all country	Sino-Tibetan	Sinitic

* From: State Statistical Bureau of the People's Republic of China (1982)

Genetic analysis. Gene frequencies and haplotype frequencies were calculated using maximum likelihood estimation. Genetic distances were computed using Nei's formula (Nei 1972). Phylogenetic trees were constructed by unweighted pair-group clustering methods (Sneath and Sokal 1973). The Bernstein formula for determining the extent of racial admixture (m) in a hybrid population was applied (Cavalli-Sforza and Bodmer 1971). The formula is m = (PH - PB) / (PA - PB), where PA and PB are the

Table 3. Gene and haplotype frequencies ($\times 10^{-3}$) in ethnic groups or geographic regions

Locus	Allele	Uyghur	Kazak	Dong-xiang	Mongol	Hui (1)*	Hui (2)	North Chinese	South Chinese	Iranian	Near East	Europe	Uralic
IGHG1G3	za;g	293	345	346	524	374	382	393	176	203	237	183	177
	zax;g	72	141	151	202	274	220	179	81	79	29	79	70
	za;bst	139	156	190	108	147	130	162	135	56	104	12	9
	fa;b	124	123	135	166	108	191	266	607	52	0	10	6
	f;b	372	236	178	0	98	77	0	0	689	600	727	746
RH	cde	174	130	**	45	75	**	38	7	280	285	362	367
LU	A	28	**	**	0	**	**	4	0	14	27	26	19
KEL	K	36	**	**	4	**	**	2	0	29	49	42	30
DI	A	39	**	**	34	**	**	57	38	2	10	1	0

* Two Hui populations were tested. Hui (1) living in Xinjiang ; Hui (2) living in Ningxia.
** : No data are available.

frequencies in the parent populations, and PH is the frequency in the hybrid population. Estimation of admixture rate per generation was carried out using formula m(n) = 1 - (1 - m)n (Cavalli-Sforza et al. 1994). m(n) represents the proportion of admixture after n generations.

Results and Discussion

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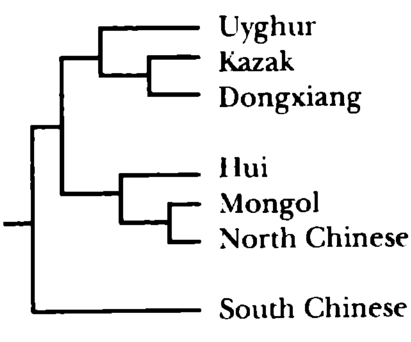
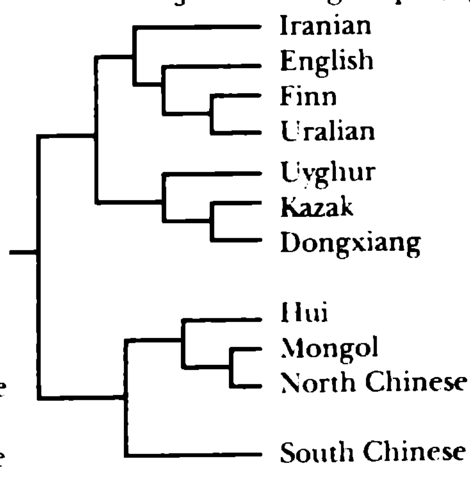
Table 4. Estimated Caucasian admixture (m) in Uyghurs, Kazaks, Dongxiangs and Huis using Gm f;b and Rh cde haplotypes for Bernstein's estimate of m

	Parental population*							
	Iranian		Near East		Europe		Uralic	
Nationality	Gmf;b	cde	Gmf;b	cde	Gmf;b	cde	Gmf;b	cde
Uyghur	0.540	0.549	0.620	0.538	0.512	0.407	0.499	0.401
Kazak	0.343	0.362	0.393	0.354	0.325	0.268	0.316	0.264
Hui (1)	0.142	0.128	0.163	0.125	0.135	0.095	0.131	0.093
Hui (2)	0.112	**	0.128	**	0.106	**	0.103	**
Dongxiang	0.258	**	0.297	**	0.245	**	0.239	**

*: Assuming that the Mongol is another parental population.
**: No data are available

Phylogenetic tree analysis. On the basis of Gm and computed genetic distances, the phylogenetic tree of the Chinese nation can be divided into two clusters: South Chinese and a cluster consisting of two subgroups (fig. 2A). Uyghurs, Kazaks, and Dongxiangs belong to one subgroup; the North Chinese, Mongols and Huis form the other subgroup. However, when Caucasoid-derived populations were taken into account, Uyghurs, Kazaks, and Dongxiangs were clustered together with populations of Iranians, English, Finns and Uralians. This result is reasonable, as there are relatively high amounts of Caucasian admixture among these nationalities. Huis have a low level of Caucasian admixture and remain with the North Chinese and Mongol subgroup. The tree pattern (fig. 2B) meets the features of a mixed population that has a shorter branch than the parental populations from which it originates (Cavalli-Sforza 1994). A similar pattern was observed in the tree for three major ethnic groups (fig. 3).





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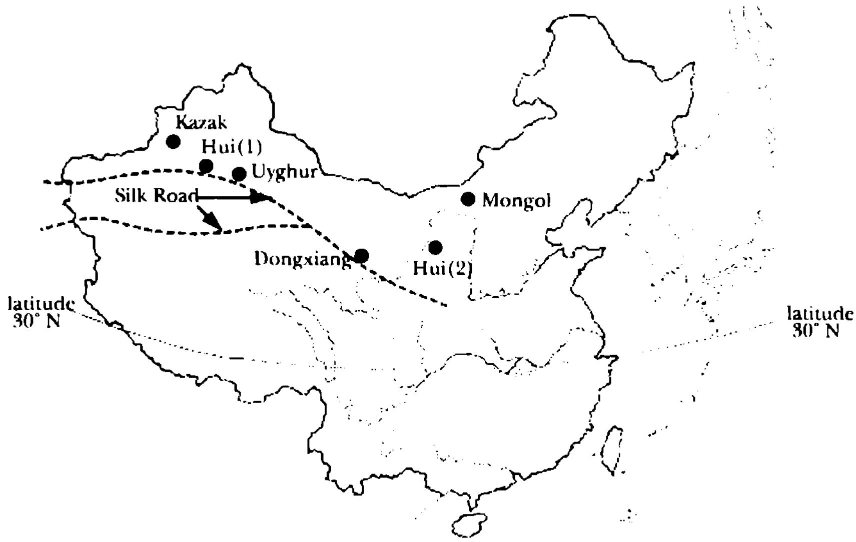

Figure 1. Map of China showing the localities of the populations studied for estimation of Caucasian admixture

Table 1. Polymorphic genetic markers used in this study

Name of locus	Symbol	Chromosome location	alleles used
Immunoglobulin GM1;GM3	*IGHG1G3*	14q32.33	*za;g, zax;g, f;b, za;b, fa;b*
Rhesus blood group	*RH*	1p36.2-34	*cde*
Kell blood group	*KEL*	7q33	*K*
Lutheran blood group	*LU*	19q12-13	*A*
Diego blood group	*DI*	17q12-21	*A*

Table 2. List of the populations studied in this paper

Nationality	Population (1981)*	Main areas of habitation	Linguistic classification family	subfamily
Uyghur	5,957,112	Xinjiang	Altaic	Turkic
Kazak	907,582	Xinjiang	Altaic	Turkic
Dongxiang	279,397	Ningxia	Altaic	Mongolian
Mongol	3,411,657	Inner Mongolia	Altaic	Mongolian
Hui	7,219,352	Ningxia	Sino-Tibetan	Sinitic
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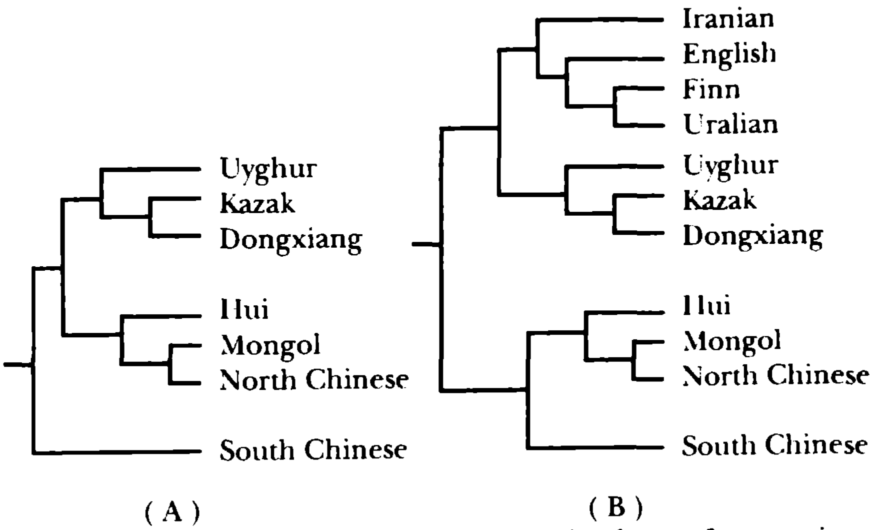

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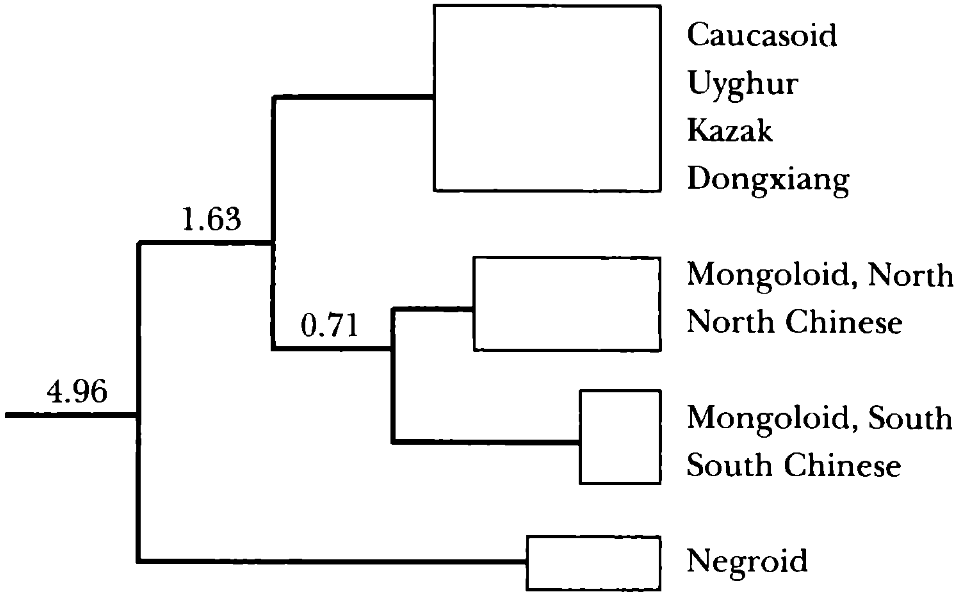

Figure 3. Tree for the major ethnic groups and the Chinese, constructed on the basis of Gm haplotype frequencies

Additional analysis using red cell blood groups. The Lutheran blood group antigen Lu^a is widely distributed among Europeans, Africans and North Americans with a frequency of about 8%, but is very rare or absent in the Chinese (Daniels 1995). The gene frequency of K, a major antigen of Kell blood group, is about 5% in the English, but is less common in black people and is extremely rare in the Mongoloid people (Race and Sanger 1975, Daniels 1995). Compared with either Mongols, South Chinese, or North Chinese, Uyghurs have higher Lu^a and K gene frequencies (table 3). The Diego blood group antigen Di^a occurs almost exclusively among Mongoloid people, and is thought to be an anthropological marker (Daniels 1995). Relative high frequency of the Di^a gene was found among Uyghurs. The above data suggest that Uyghurs have features of both Caucasoid and Mongoloid populations.

Uyghurs may be derived from an ancient mixed population formed between a Caucasoid-derived population and a North Mongoloid population. Xinjiang, 1.6 million square kilometers or one sixth of China, contains more than ten million people. About six million of them are Uyghurs, and three million are Hans; the remainder nationalities are Kazaks, Uzbeks, Tajiks, Tatars, Huis, and Mongols from previous Mongol dynasty garrisons. The inherited pattern of many nationalities living together in Xinjiang may have been formed from ancient times. An archeological discovery of six skulls from an ancient cemetery (2,000 BCE) was made at Kroränn (Loulan) (Han 1986). Morphological observation and measurements revealed that five of the skulls have Caucasoid characteristics and one skull is a Mongoloid cranium. This discovery suggests that there were at least two ethnic groups in the area of Xinjiang 2,000 years ago. If a habitation pattern of racial mixture and marriages between different ethnic groups were maintained for thousands of years, it is reasonable to propose that the current Uyghurs may be a unique population formed between ancient Caucasoid and Mongoloid populations. Even if the above hypothesis is true, the precise time of admixture occurrence and the direction of gene flow can not be determined by this data analysis. The analysis of DNA, especially mitochondrial DNA (mtDNA), may give a direct clue for linking current Uyghurs and the archeological findings from Xinjiang.

The source of Caucasoid genes found in the Chinese. Geographically, the Uyghur, Kazak, Dongxiang, and Hui populations are located along the route of the Silk Road (figure 1). One of the possible sources of the Caucasoid genes found in the above Chinese minorities may be attributed to Caucasian traders along the Silk Road trade route in ancient China. As early as the Han Dynasty (206 BCE-220 CE) and on into the Tang Dynasty (618 CE-907 CE), China's trade with western countries was developed primarily through the Silk Road (Jian 1983). The Silk Road started from the current Xian city (capital of the Han and Tang dynasties), continued westward through Gansu and Xinjiang provinces, through Samarkand (USSR), Faizabad (Afghanistan), Baghdad (Iraq), and Anatolia (Turkey), and finally ended at the Mediterranean Sea (Chen 1987). Over the Silk Road, many trade caravans of Persians, Arabs, and other traders from Central Asia entered China, with some individuals taking up long-term residence within China (Jian 1983). This may be used to explain the hypothesis that one of the parent populations of the Uyghurs came from the people living in Middle Asia. However, the possibility that there was a Caucasoid-derived population living in Xinjiang before the Han Dynasty can not be ruled out. To substantiate the above hypothesis, further work in both the fields of archeology and genetics is needed.

Estimation of the admixture rate per generation. In theory it is possible to determine the admixture rate per generation, assuming that the admixture rate is constant at every generation and the number of generations is known (Cavalli-Sforza et al. 1994). This estimation was made for the Uyghurs (table 5). If the marriages between Caucasoid and Mongoloid populations occurred 2,000 years ago, the proportion m per generation can be roughly estimated at 1%.

Table 5. Admixture rate per generation among Uyghurs

Year	Generations	Admixture rate per generation
2,000	80	0.97%
3,000	120	0.64%
4,000	160	0.48%

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The Physical Anthropology of the Ancient Populations of the Tarim Basin and Surrounding Areas

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The Xinjiang Uyghur Autonomous Region is one of the main areas of contact and movement between the Eastern and Western races of the Eurasian continent. It is also one of the most important segments of the ancient "Silk Road" as it transits Central Asia. Therefore, the physical anthropological study of the racial characteristics of the ancient populations in this region is an important aspect of tracing the racial origins of the modern people of Xinjiang and, indeed, of the whole of Central Asia.

Between 1920 and 1940, only four foreign scholars published the results of their physical anthropological research in this region. These four scholars were Arthur Keith of England (1929), Carl-Herman Hjortsjö and Ander Walander of Sweden (1942), and A. N. Iuzefovich of the USSR (1949). All together, they described a total of twenty skulls. Five of the skulls came from the northern part of the Tãklimakan Desert and Keith thought they characterized the "Loulan racial type." Eleven skulls were collected by Sven Hedin from near Lopnur in 1928 and 1934; they have been subdivided into three groups (Nordic, Chinese, and Alpine) by Hjortsjö and Walander. The remaining skulls also came from the Lopnur area and exhibit Mongoloid characteristics. Iuzefovich considered these to be of Turkic origin (Keith, A., 1929; Hjortsjö, C.H. and A. Walander, 1942; Iusefovich, A.N., 1949).

It should be pointed out that all the materials mentioned above were recovered by Western explorers who did not make systematic archeological excavations. The twenty skulls came from nine different localities which are all poorly dated, so it is very difficult to discuss the racial composition of the ancient population of Xinjiang according to these materials alone. Chinese scientists have conducted systematic excavations in this region since 1940. I myself have studied all the skeletal material housed at the Institute of Archeology of Xinjiang and analyzed the physical and racial characteristics of these human bones. The materials included about 300 skulls which were collected from nine ancient cemeteries in Xinjiang. The cemeteries range in age from about 1800 BCE to 300 CE.

The distribution of these cemeteries (Fig. 1), their precise age, and the racial morphological characteristics of the skeletal material will be described as follows:

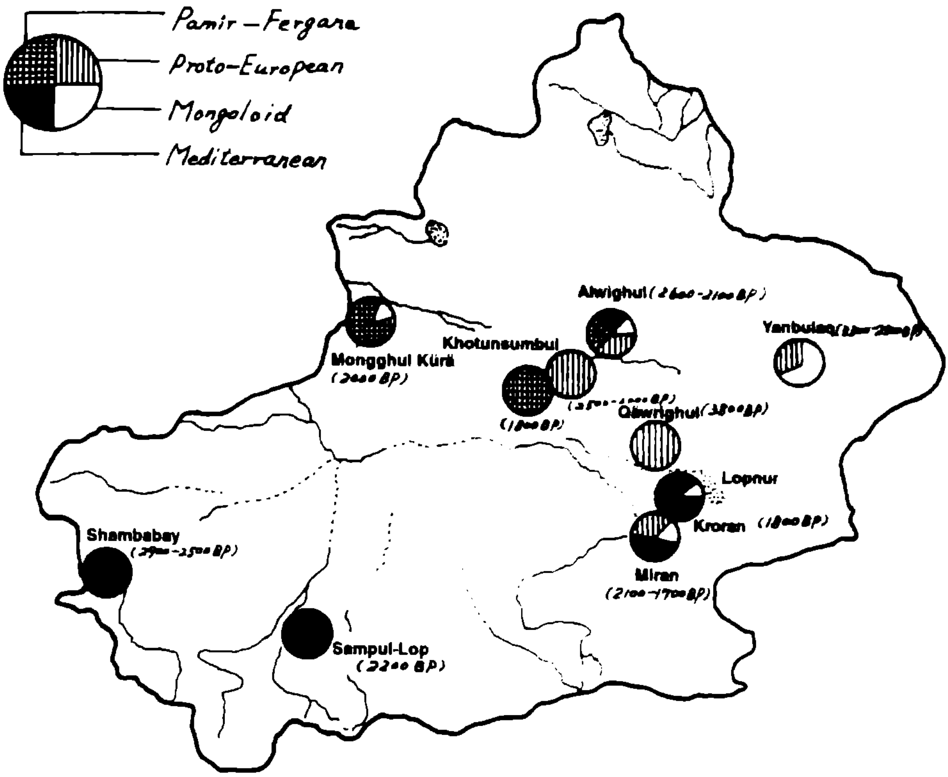

Figure 1: Localities of human skeletal remains and proportion of racial elements.

(1) The Qäwrighul (Gumugou) Cemetery of the Lower Reaches of the Könchi (Kongque) River

The cemetery is situated on the dunes of the second terrace of the northern shore of the lower reaches of the Kōnchi River, about 70 km. east of the dried-up Lopnur Lake. Chinese scholars have different opinions concerning the date of the cemetery, but most of the C^{14} dates hover around 3800 years BP (Wang Binghua, 1983). If we accept the validity of this dating, then it is possible that the cemetery was in use during the Bronze Age. A field team from the Institute of Archeology of Xinjiang has excavated 42 graves at the Qāwrighul cemetery and recovered 18 skulls (11 male and 7 female). The average morphological characteristics of these skulls are as follows: elongated, narrow, and high cranial vault, with relatively low and wide facial dimensions and strongly projecting nasal bones. The superciliary arc and glabella projection of the males are quite prominent, with rectangular orbits and broad nasal aperture. The facial projection is clear in transverse plane and weak in sagittal plane. The occipital region is circular when viewed from behind and the obelion-lambda region is flattened (Han Kangxin, 1986b).

To sum up, these skulls have definite Western racial characteristics. The homogeneity between individuals is also clear. In consideration of the synthetic character mentioned above, they seem to show some primitive features which have collectively been called "Proto-European type" by certain anthropologists of the former USSR in the past. Racially, they are close to the populations of the Bronze Age of southern Siberia, Kazakhstan, Central Asia, and even of the grassland areas of the lower reaches of the Volga River (Han Kangxin, 1986b).

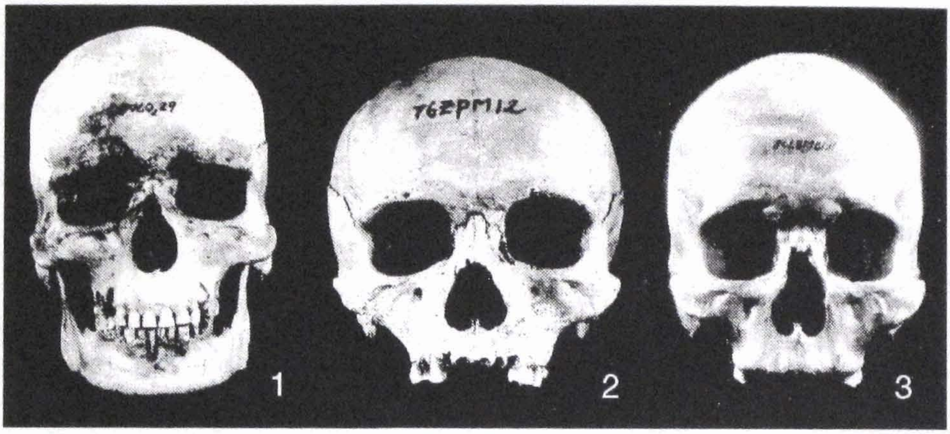

Photo 1: The Qäwrighul (Gumugou) Cemetery.
Photo 2: The Mound (Tudunmu) Cemetery.
Photo 3: The Kroran (Loulan) Cemetery.

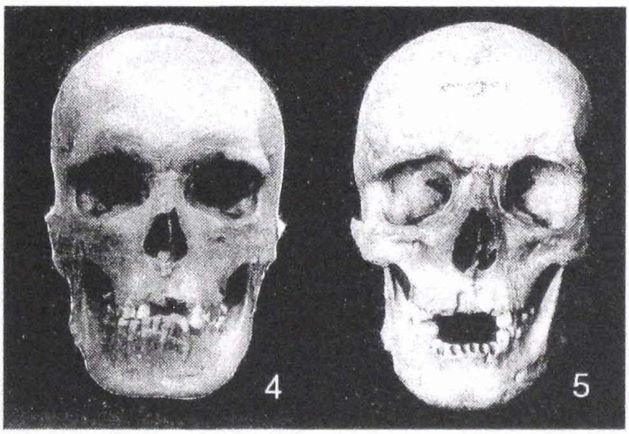

Photo 4: The Sampul (Shanpula) Cemetery.
Photo 5: The Chawrighul (Chawuhugou) No. 4 Cemetery.

(2) The Alwighul (Alagou) Cemetery, Tängri Tagh (Tian Shan)

This cemetery is located in the Alwighul area of the southern margin of the Turpan Depression. There are three different patterns of graves in this cemetery. The human bones were collected from a group grave dug out of large gravel. Their age is about 2600-2100 BP. Among 58 skulls, 33 belong to males and 25 to females. Most of the skulls are possessed of Western racial characteristics but reveal a certain amount of variation. For example, one subset resembles the Eastern Mediterranean type with long and high cranial vaults (Indo-

Afghan), while other crania are somewhat broader or round-headed and similar to that of the Pamir-Ferghana type and the remainder of the crania combine features of both of these groups. Nasal apertures are typically high and narrow as are the orbits, but facial projection in the transverse plane is identical with that of the Pamir-Ferghana group. This may indicate that there was some mixture between the two different European races (Han Kangxin, 1993).

In addition, a few of the skeletons in the group graves of Alwighul are of mixed Mongoloid and European ancestry (Han Kangxin, 1990).

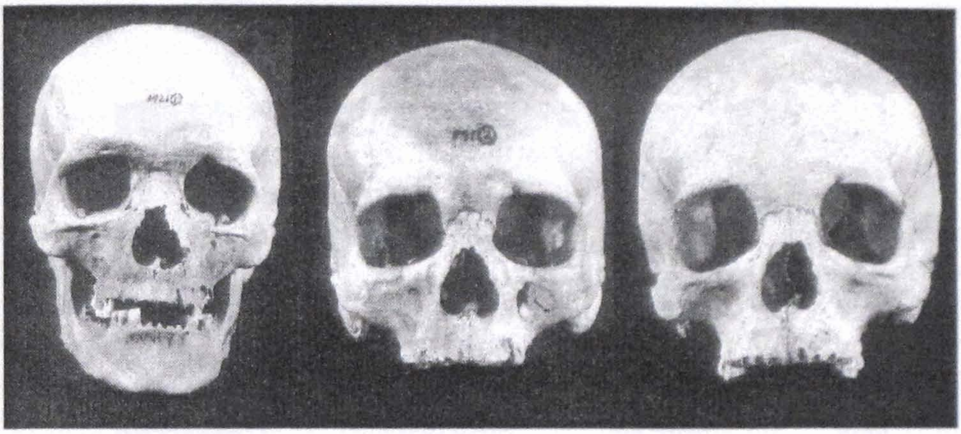

Photo 6: The Alwighul (Alagou) Cemetery.

(3) The Yanbulaq (Yanbulake) Cemetery, Willow Springs (Liushuquan), Qumul (Hami)

This cemetery is situated on an earthen hill called Yanbulaq near Willow Springs in the Qumul region. The rectangular graves were lined with adobe bricks made of sand and earth from the Gobi; their age is about 3300-2500 years BP. Most of the graves have been disturbed and bone preservation is poor. About 76 graves have been excavated but only 29 complete skulls were obtained. Twenty-one of them are of clear Eastern Mongoloid character, while eight can be classified as belonging to the Western race. The general morphological character of the skulls classified as Mongoloid is elongated with fairly wide orbits and is close to that of Eastern Tibetan populations. The skulls with Western racial characteristics are close to that of the Qäwrighul cemetery of the lower reaches of the Könchi River in their morphology (Han Kangxin, 1990).

In a word, elements of Eastern and Western races co-existed in the ancient populations of the Qumul region, but the former are dominant. According to the unearthed painted pottery, the ancient culture of the area bears a close relationship with that of the Bronze Age of areas just to the east such as Gansu and Qinghai (Kokonor) (Han Kangxin, 1990).

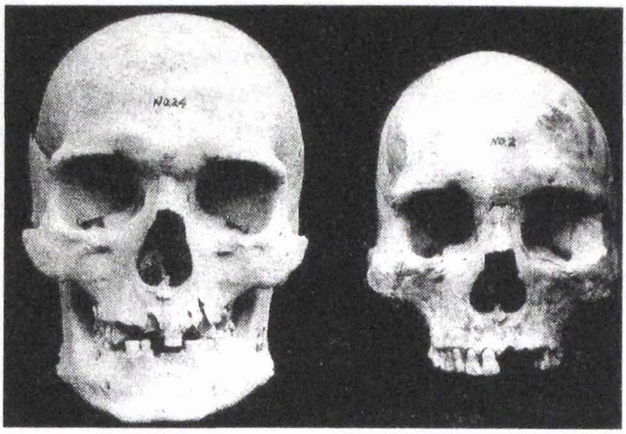

Photo 7: The Yanbulaq (Yanbulake) Cemetery.

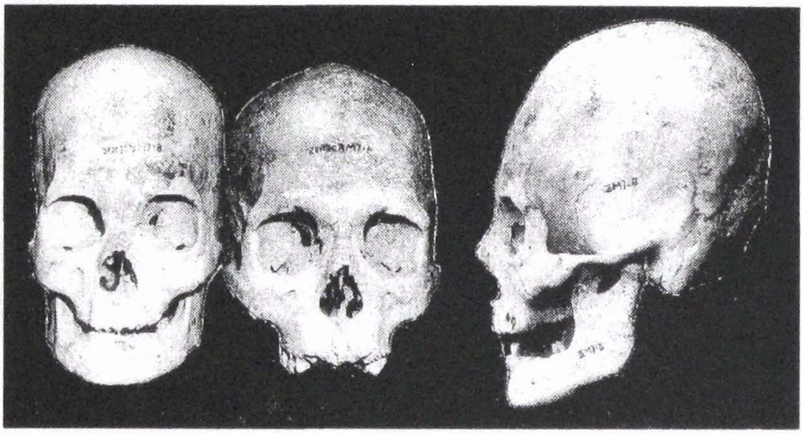

Photo 8: "Annular" deformity from the Charwighul (Chawuhugou) No. 3 cemetery. Photograph on left contrasts deformed and normal skulls.

(4) The Eastern Suburbs Cemetery of Kroran (Loulan)

The cemetery is situated on the two high terraces of the eastern suburbs of Kroran. Among the funerary objects recovered from the graves here were many artifacts typical of the Han Dynasty culture of the middle-lower reaches of the Yellow River such as brocades, rough silk, silk floss, bronze mirrors, lacquerware, *wuzhu* coins, etc. The date of this cemetery is rather late, about 1800 years BP (corresponding to the Eastern Han Dynasty). Among six skulls from the cemetery, five belong to males and one is that of a female. Only one skull shows Mongoloid characteristics and the rest possess clear European characteristics: elongated and high cranial vaults, narrow nasal aperture, high arched nasal bones, and high orbits. These characteristics are similar to that of the Saka population of the south Pamir within the former USSR about the sixth century BCE. In other words, they are close to that of the Eastern Mediterranean type in morphological character. One female skull with Mongoloid characteristics (viz., flat facial features, high and wide face and low nasal projection, broad cranial vault, and so forth) differs from the other five male skulls in morphology (Han Kangxin, 1986a).

(5) The Sampul Cemetery, Lop County

This cemetery is situated just east of Khotan at the southwest margin of the Tāklimakan Desert. The shapes of the graves in the cemetery vary widely. These include: log coffin burials, boat-shaped wooden coffin burials, combined coffin burials, and large group graves holding more than 100 persons. The human bones studied including 56 individual skeletons came from the latter type of graves. According to the associated archeological artifacts from these graves, the culture of the population occupying this area has a close relationship with that of the middle-lower reaches of the Yellow River. The age of the large group graves is about 2200 years BP (C^{14}). Professor Shao Xingzhou (1988) thought that the human bones from Sampul exhibited primarily Mongoloid characteristics while displaying certain European features as well. But I believe that they are mainly of European character (elongated and high vault with narrow nasal aperture) and actually are close to that of the Eastern Mediterranean type and also similar to that of the ancient Saka of the south Pamir within the former USSR (Han Kangxin, et al., 1987a; Han Kangxin, 1989).

(6) The Shambabay (Xiangbaobao) Cemetery, Tajik County

The cemetery is located in the Tajik Autonomous County, Tashqurghan (Tashikulahan), Pamir plateau. There are two kinds of burials: cremation and underground burial. The age of this cemetery is about 2900-2500 BP (C^{14} dating of coffin wood). Only one skull was collected and this has strong Western characteristics, for instance, small frontal slope, unpronounced superciliary arc and glabella projection, marked nasal projection, narrow nasal aperture, strong facial projection, and narrow facial dimensions. These characteristics are close to that of both the modern Eastern Mediterranean type and the ancient Saka of the south Pamir within the former USSR (Han Kangxin, 1987c).

(7) The Mound (Tudunmu) Cemetery, Mongghul Kūrä (Zhaosu), on the Upper Reaches of the Ili River

This cemetery receives its name from a kind of tomb having the shape of an earthen mound (kurgan). These tombs are distributed in Shota, Boma (??), etc. of Mongghul Kūrä County, near the boundary between China and Kazakhstan. The age of this cemetery is about 2400-1800 years BP according to the geographical position, unearthed artifacts, and C^{14} dating. Some archeologists consider that the human remains from the cemetery belong to the ancient Saka and Wusun. Most of the 13 skulls (seven male and six female) come from the Wusun graves and only two from the Saka, but all their morphological characteristics are similar. These skulls have shortened cranial vaults and 11 among them can be classified as Western Caucasoid. The male skulls are more robust, possessing a middle degree of profile angle of the frontal bone, pronounced projection of the superciliary and glabella region, deep nasion depression, higher and middle degree of width of facial bones, middle degree of facial projection of transverse plane, moderately deep suborbital fossa, mostly with wide orbits and strongly projecting nasal bones. The nasal spine has a moderate level of projection, the lower margin of the piriform aperture is anthropine in form and of average breadth. There exist clear variations between individuals, but in general they bear a resemblance to that of the Pamir-Ferghana type, the latter having broad cranial vaults without strong Western racial characteristics. Two female skulls show obvious Mongoloid characteristics, perhaps constituting a mixed type of the two races. Most of the skulls from the cemetery, as far as their morphological type is concerned, are analogous to those of the Saka and Wusun populations in Central Asia, but differ from those of the Ancient Saka of the Mediterranean type located in the south Pamir within the former USSR who are characterized by elongated and high cranial vaults (Han Kangxin, et al., 1987b).

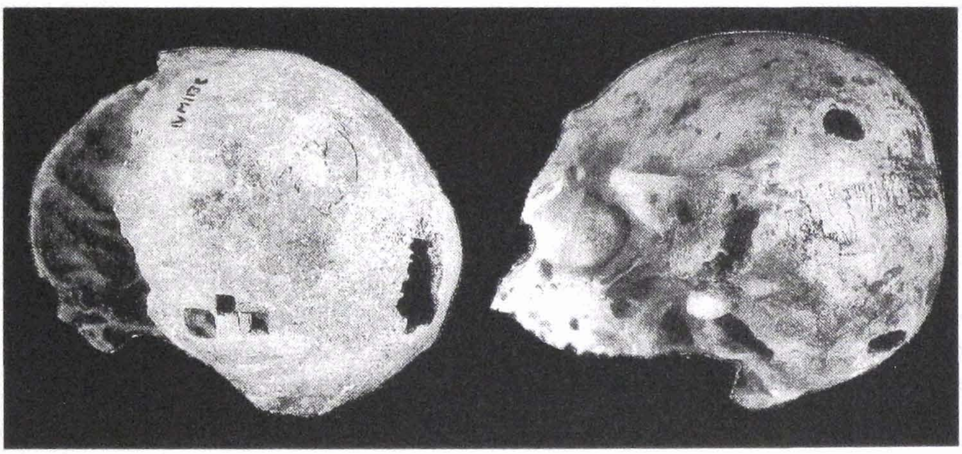

Photo 9: Round and square holes drilled in skulls from the Charwighul No. 4 cemetery.

(8) No. IV Cemetery, Charwighul (Chawuhugou), Khotunsumbul (Hejing) County

The cemetery is located on the terrace of the southwest slope of the Tängri Tagh. 77 skulls were collected from the cemetery dating to about 2500-2000 years BP. Among them, 50 are male and 27 are female. These skulls are distinguished from the "Proto-European" type in having more "modern" morphological characteristics such as high face and orbit, straight frontal slope, and narrow nasal breadth. They are smaller in size yet generally still bear many resemblances to the "Proto-European" type. These are important clues for tracing the relationship between them and the "Proto-European type". There exist many round and square holes 1-2 cm. diameter in some of the skulls. Since the bone had "healed" around the edges, the holes must have been drilled while the individuals so treated were still alive. It is said that the custom of chiseling holes (trepanation) was also found in the ancient human skulls of prehistoric Europe and Mongolia (Han Kangxin, et al., unpublished).

(9) No. III Cemetery, Charwighul (Chawuhugou), Khotunsumbul County

The cemetery is situated in the Gobi to the southwest of the cemetery mentioned above and includes two kinds (round and rectangular) of stones. It is dated to around 1800 BP. The wares unearthed here are different from those of No. IV cemetery. Some scholars believe that they are the remains of Xiongnu (Huns). 11 skulls were collected from the cemetery, 9 being male and 2 female. The main morphological characteristics are shorter cranial length, higher vault and orbital height, narrow face, and nasal projection of middle degree. While they still belong to the Caucasoid race, they show some non-Caucasoid characteristics. It is interesting to observe that three artificially deformed skulls, having a so-called "annular" deformity, were found at this site (Han Kangxin, et al., unpublished).

The racial characteristics and the "annular" deformity mentioned above were also found in human skulls the Central Asian portions of the former Soviet Union. Therefore, this indicates that racial and cultural exchange were carried out between Eastern and Western Central Asia.

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Up to now, no conclusive evidence for paleoanthropological materials of lithic age have been discovered in the Xinjiang region. Various cultural remains referred to by certain scholars as being of lithic age are subject to question. So far as dating is concerned, many of these cultural remains are much younger than previously thought. Thus, before reliable materials of lithic age are found, we may for the moment consider that this region was not within the scope of origin of *Homo sapiens*. Based on the analysis of the materials of the nine cemeteries discussed above, it can be determined that the source of racial morphological characteristics of the ancient population in Xinjiang was not unitary (Fig. 2). For example, there are a minimum of three branches of the Caucasoid race and not merely a single type from the Mongoloid race. Consequently, their emergence and distribution in Xinjiang as well as the origin of their typology cannot be completely the same. The racial composition of the modern population of Xinjiang is closely related to this biological background of complex racial origins (Han Kangxin, 1985, 1991).

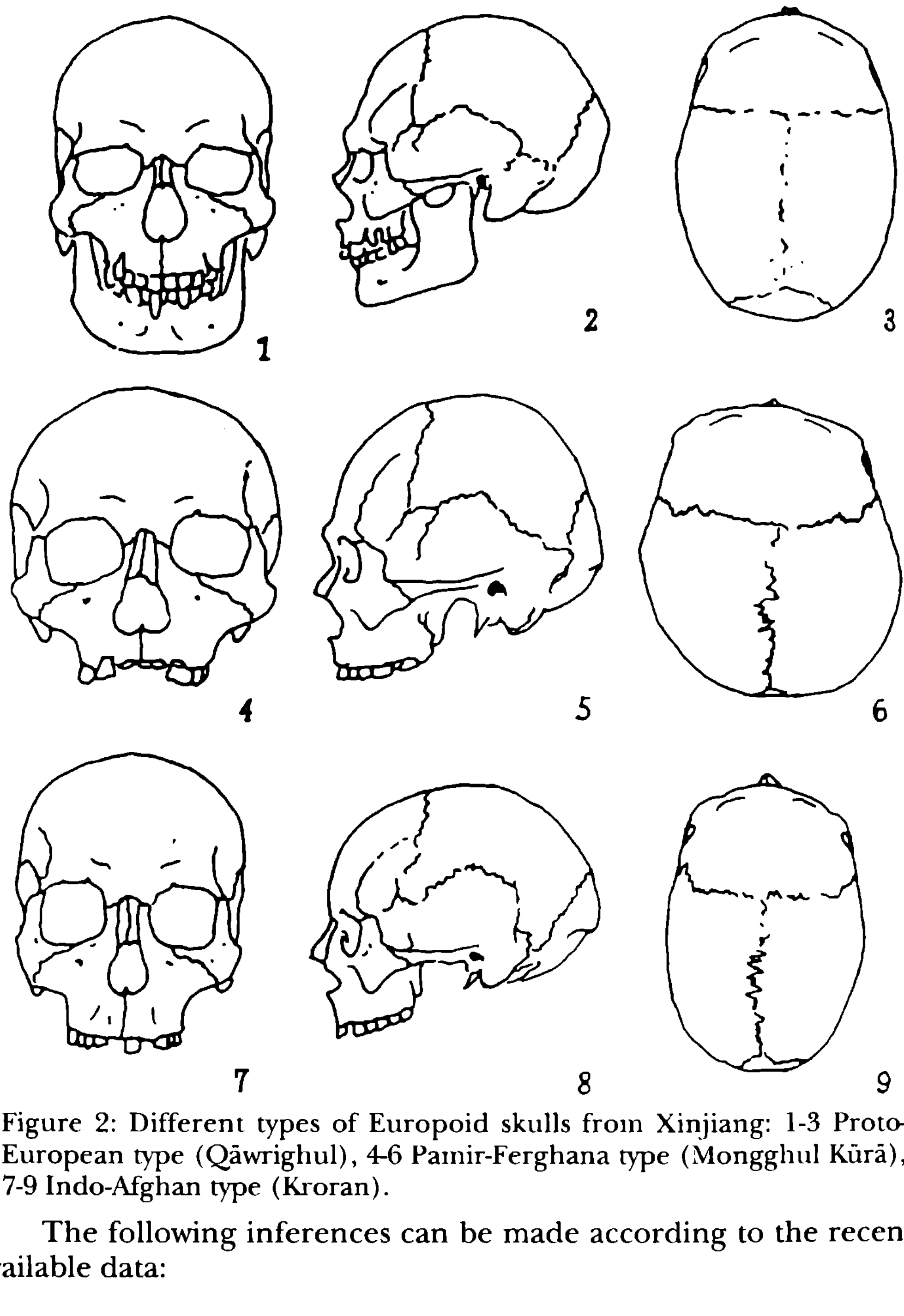

Figure 2: Different types of Europoid skulls from Xinjiang: 1-3 Proto-European type (Qāwrighul), 4-6 Pamir-Ferghana type (Mongghul Kūrā), 7-9 Indo-Afghan type (Kroran).

The following inferences can be made according to the recently available data:

At least by the early Bronze Age of this area, Western racial elements with primitive morphological characteristics had entered into the Lopnur area. Their physical character is close to that of the ancient populations of Central Asia (including Kazakhstan), southern Siberia, and the Volga River drainage basin within the boundaries of the former USSR. So far as their racial origins are concerned, they have a direct relationship with the ancestors of the analogous Cro Magnon (*Homo sapiens*) type of late Paleolithic Eastern Europe. This type of late *Homo sapiens* was also found in the Voronezh region of the Don River drainage basin. The morphological character of these skulls is apparently similar to that of the skulls from the Qāwrighul cemetery of the Kōnchi River, but more primitive than the latter.

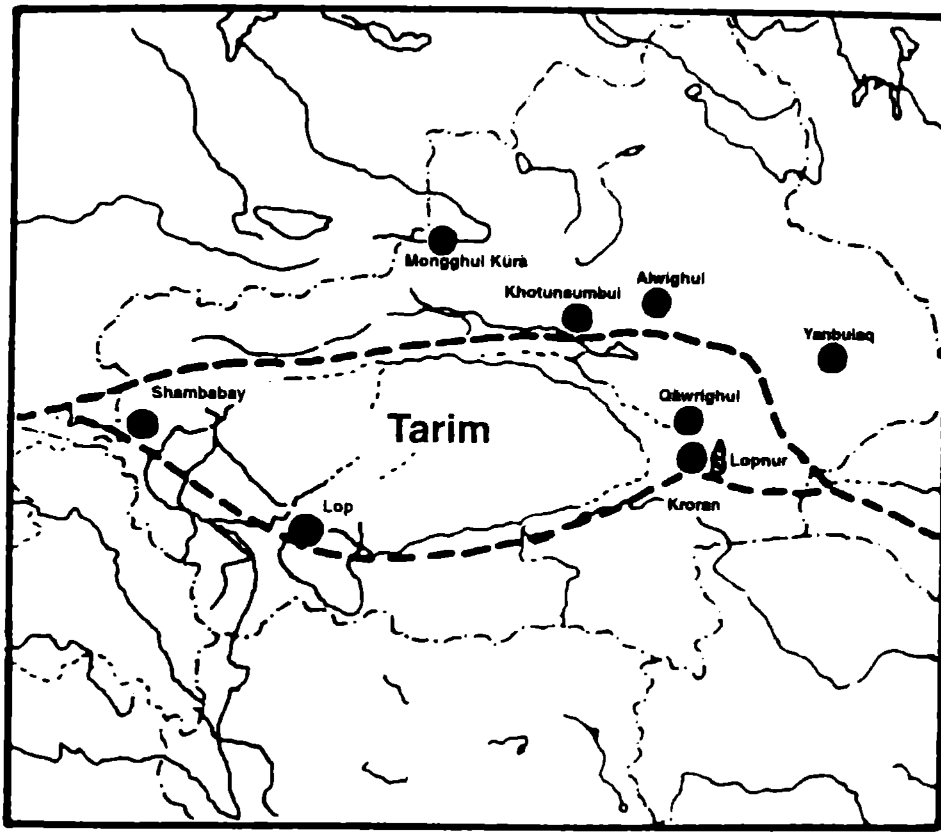

Figure 3: Sites of Bronze Age and Iron Age skeletal remains in relation to the "Silk Road."

Several centuries BCE or a little earlier, other racial elements close to that of the Eastern Mediterranean type in physical character entered into the western part of Xinjiang from the Central Asian region of the former USSR. Their movement was from west to east (Shambabay, Tashqurghan, Sampul-Lop, and Kroran cemeteries). In other words, some of them gradually moved along the southern margin of the Tarim Basin to the Lopnur area and converged with the existing population in the region. This may shed some light on the origins of racial variation in the Kroran kingdom. In addition, it is also possible that some Mediterranean elements crossed to the Tāngri Tagh region along the northern margin of the Tarim Basin and mixed with the previous population (for instance, as in the Alwighul cemetery). It is helpful for understanding the inferences drawn above that the human bones discovered in the Neolithic graves of the Central Asian region of the former USSR (such as Anau of Turkmenistan about 6000-5000 years BP) belong to the Mediterranean racial type and the ancient Saka bones from the south and southeast parts of the former USSR (the Pamirs, circa sixth century BCE), which are adjacent to Xinjiang, belong to the same racial type. All the anthropological materials mentioned above seem to indicate that the opening of the ancient "Silk Road" from Xinjiang to Central Asia supported an eastward migration of the early Mediterranean population of Central Asia across the Pamir plateau (Fig. 3).

Several centuries BCE, or perhaps earlier, some Western racial elements (for example, shortened and high cranial vaults) emerged in the upper reaches of the Ili River and Tängri Tagh (for instance, Mongghul Kūrä and Alwighul cemeteries). It is not obvious how this racial type formed. Some scholars believe that it developed from the Proto-European with a change in cranial morphology to a more shortened vault, with the attendant addition of some Mongoloid features. But it is not certain which Mongoloid elements were involved. Some scholars have argued that it is the result of a mixture of Proto-European and Mediterranean racial elements. How far these people spread into Xinjiang and the extent of the distribution of this racial element are the subject of continued research.

The earliest time of emergence of the Eastern Mongoloid population in Xinjiang is still not clear. They appeared in this area in groups about 3300 years BP or a bit earlier (mainly in the eastern [N.B.] part of Xinjiang, for example, the Yanbulaq cemetery, Qumul). They were also found in cemeteries farther west but highly scattered and in small numbers. Only about 11 percent among the 302 crania described in this report are Mongoloid in morphology. Most of them have elongated and high cranial vaults with a narrow face and are not representative of the typical continental Mongoloid skull with a broad cranial vault and facial dimensions. It can be inferred according to these phenomena that until at least several centuries BCE the eastward movement of the Western race to Xinjiang was more active than the western movement of Mongoloid people. Both the scale and rate of the former were greater. A branch among them had already appeared in the Qumul area of eastern Xinjiang in about the tenth century BCE; the time of large scale westward movement of Mongoloid peoples may not have begun until the Qin-Han period. This is in accord with written records about the tide of westward movement of Xiongnu (Huns) and Tujue (Turks).

According to studies of Chinese archeologists, the ancient culture of Xinjiang was deeply affected by developments in neighboring regions, such as Central Asia, Kazakhstan, Southern Siberia, and the Altai as well as Gansu and Qinghai of China (Shui Tao, 1993). The routes by which various cultures crossed ancient Xinjiang coincide with those by which populations of different races entered the region (Fig. 4).

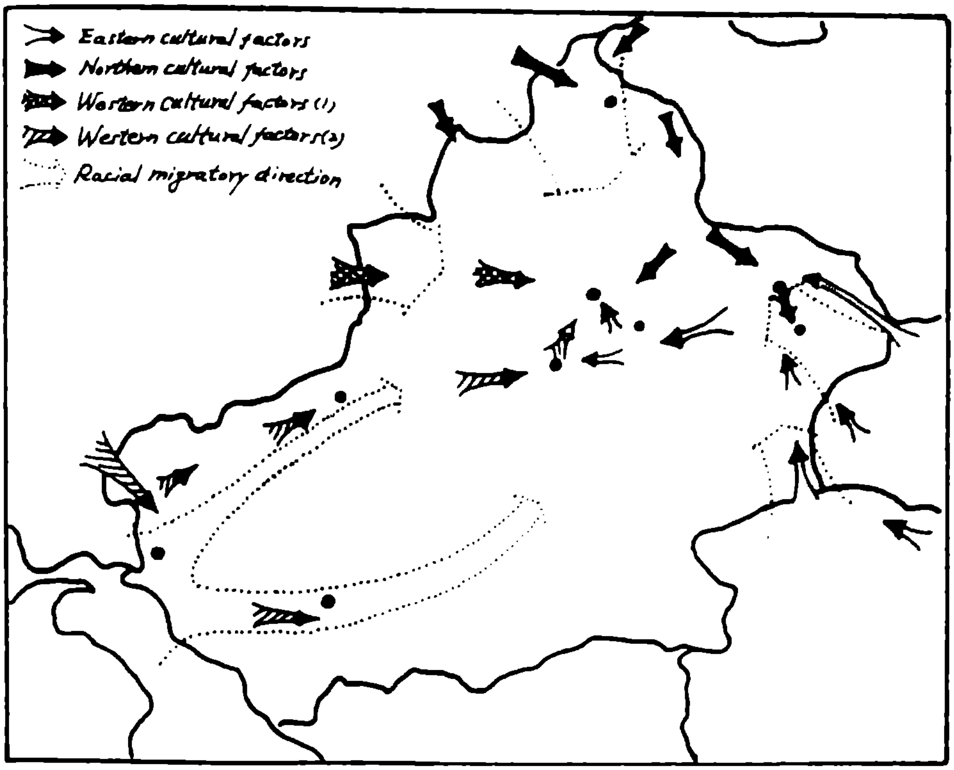

Figure 4: Neighboring ancient cultural and racial influences in Xinjiang.

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Metallurgy

The Andronovo Bronze Artifacts Discovered in Toquztara County in Ili, Xinjiang

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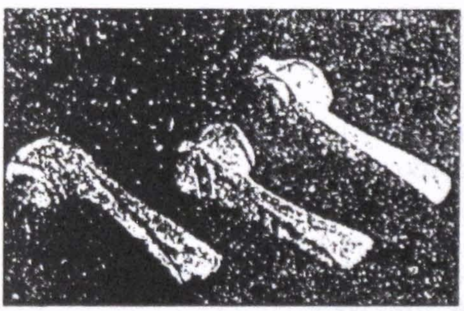
In the summer of 1976, thirteen bronze weapons and tools were discovered in the deltaic region at the confluence of the Tekäs and Künäs rivers. This region is in Toquztara County in the Ili area, Xinjiang Uygur Autonomous Region. In addition to these bronze artifacts, only a broken sand-tempered red pot was found. There are some small tombs with piles of stones near them and the bronze artifacts may be from those tombs(Wang and Cheng, 1989:95-96).

The thirteen bronze artifacts are unique among Chinese archeological findings. They include the following:

1) Axes: 3 pieces (No.A:1-3). They are cast from double molds. Their shapes are almost the same. The only difference is that ax A:2 differs from axes A:1 and A:3 in having a small protrusion on the rear of the socket. The whole weapon is L-shaped. The blade has a long and narrow rectangular profile, but its two lateral sides look like a triangle. The front end of the blade is the edge. The back end is connected with a large shaft-hole socket. The socket is decorated with a herringbone pattern on its two lateral sides. All of the axes are quite large. A:1 is 23 cm. in length; A:2 is 25.2 cm. in length and A:3 is 20 cm. in length(fig.1 and fig.2:1).



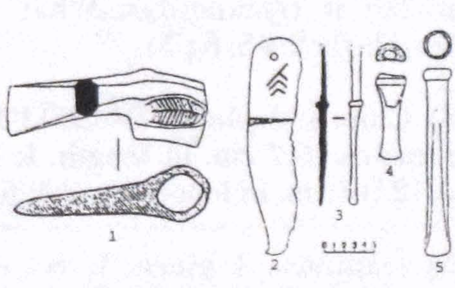


Figure 1 (left): Bronze axes discovered in Toquztara County
left A:1, middle A: 3, right A:2

Figure 2 (right): Bronze artifacts discovered in Toquztara County
1. ax (A:3), 2. sickle (A:6), 3. chisel (A:12), 4. gouge (A:8), 5. gouge (A:7)

2) Sickles: 3 pieces (No.A:4-6). They are cast from molds. Their shapes are almost the same. The tool is simply a single-edged curved blade. Its back is raised and its edge is concave. The tool is perforated at the rear. A:4 is 20 cm. in length; A:5 is 22 cm. in length; and A:6 is 20.9 cm. in length (fig.2:2; fig.3; fig.4).

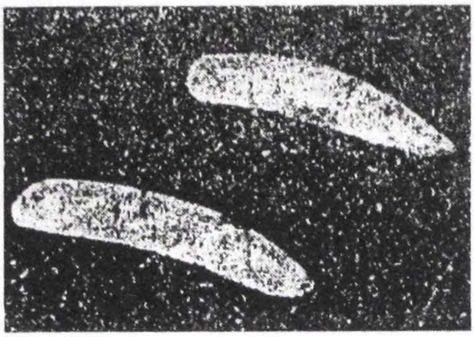


Figure 3: Bronze sickles discovered in Toquztara County
upper A:4, lower: A:3

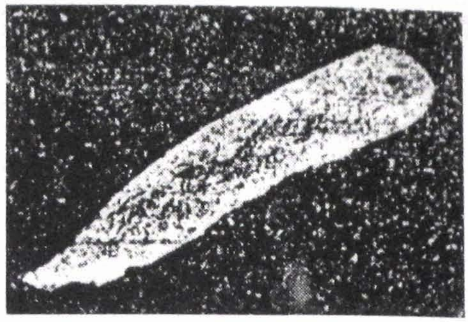


Figure 4: Bronze sickle discovered in Toquztara County
sickle (A:6)

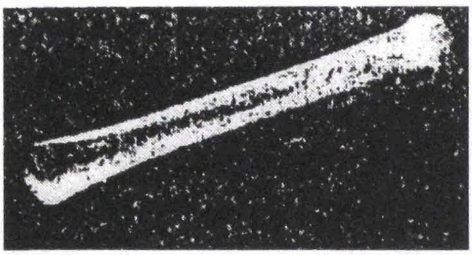


Figure 5: Bronze gouge discovered in Toquztara County
gouge (A:7)

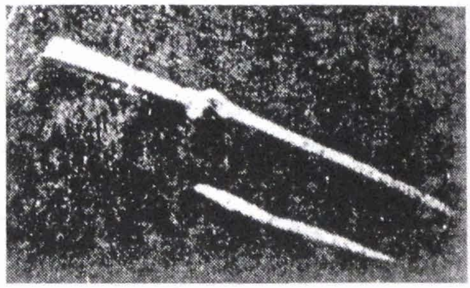


Figure 6: Bronze chisel discovered in Toquztara County
chisel (A:11,12)

3) Gouges: 3 pieces (No.A:7-8 and 10). They are cast from molds. A:7 is 18.8 cm. in length. Its socket is cast and has a round cross section. A:8 is 8.4 cm. in length. The cross section of its cast socket is semiround. A:10 has an incomplete socket. The cross section of the socket is rectangular. What remains of the tool is 6.2 cm. in length(fig.2:4-5; fig.5).

4) Chisels: 2 pieces (No.A:11-12). They are both incomplete. A:11 remains 15.7 cm. in length. It has a collared tang. What remains of A:12 is 8 cm. in length(fig.2:3; fig.6).

5) Hammer: 1 piece. It is cast from double molds. Its shape is rectangular. It is decorated with a triangular pattern and is 6.8 cm. in height, 4.2 cm. in length, and 2.5 cm. in width. The socket hole is also rectangular and 4.2 cm. in length.

6) Cutting tool: 1 piece. It is incomplete. It looks like a willow leaf. The tool has edges at two sides and what remains of it is 7.5 cm. in length and 2.5 cm. in width.

Perhaps because these bronze artifacts are so unique, the reporters do not discuss their cultural affiliation. They date the artifacts to the Spring and Autumn period, but present no further argument. However, if we take the Russian archeological findings into account, we can find that these artifacts are very common in some cultures in the areas to the west of Xinjiang. This makes our study of the cultural affiliation and date of the Toquztara artifacts possible. To study the cultural affiliation of the Toquztara findings, we should first select the most representative artifacts in order to begin our comparison with as few candidates as possible.

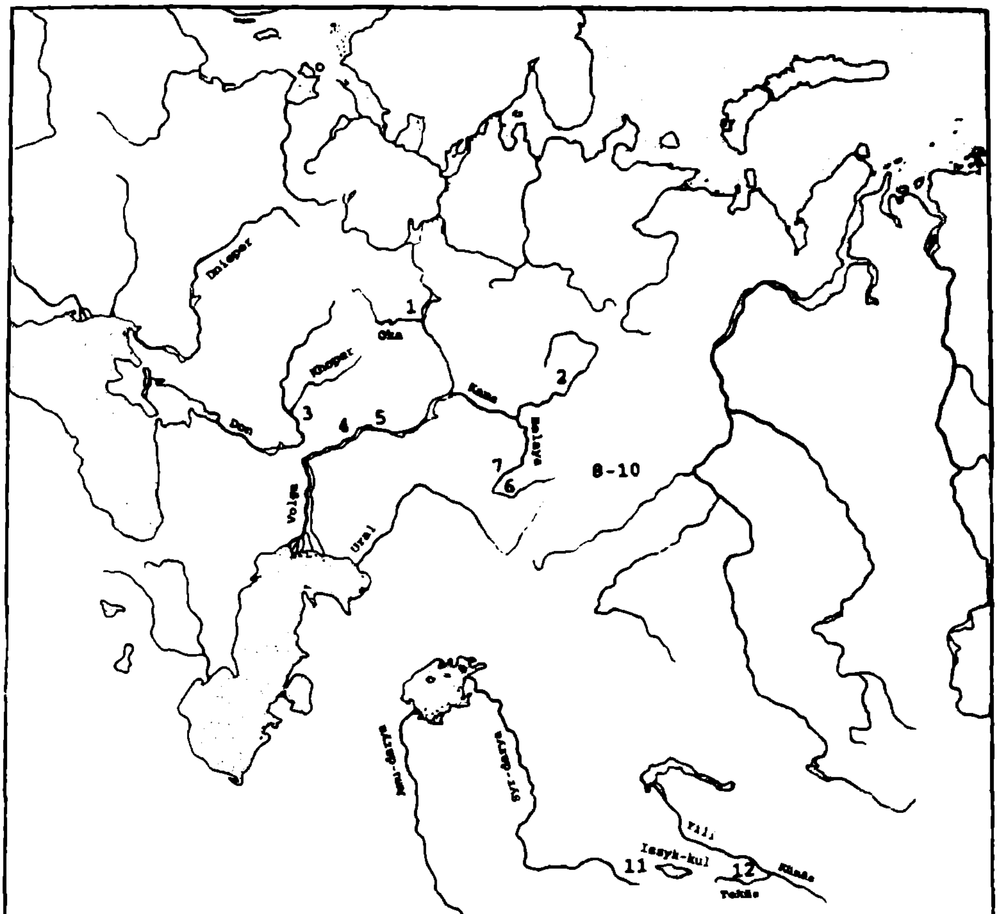


Figure 7: Distribution of bronze axes.
1. Seima, 2. Turbino, 3. Slashchevskaya, 4. Durasovka in the Atkarsk District, 5. Khvalynsk District, 6. Ibrakaevskoye, 7. Sterlitamak District, 8. Timofeevsky cemetery in the Chelyabinsk Region, 9-10. Troitsk in the Chelyabinsk Region, 11. Shamsha hoard in Kirgizia, 12. Toquztara.

Among the thirteen bronze artifacts, the shaft-hole axes are the most comparable and distinctive. Therefore, the comparison of the axes may limit our comparison to a small group of cultures. Axes of the same type have been discovered in sufficient quantity in a large territory of Russia(fig.7). They all share four characteristics: (1) an L-shaped body, (2) a long and narrow blade with a rectangular profile,

(3) two lateral sides in a shape close to a triangle; and (4) a shaft-hole socket which is 1.5-2 times higher than the blade. This kind of ax has rarely been published in the past. Fortunately, however, Chernykh recently published eleven specimens in his book, *Ancient Metallurgy in the USSR* (Chernykh, 1992:204-233;243-247). According to his study, although the eleven pieces are distributed in a vast area from the Lake Issyk-Kul to the Don River, they concentrate in only three cultures of two periods. This concentration makes our study much easier. The eleven axes are:

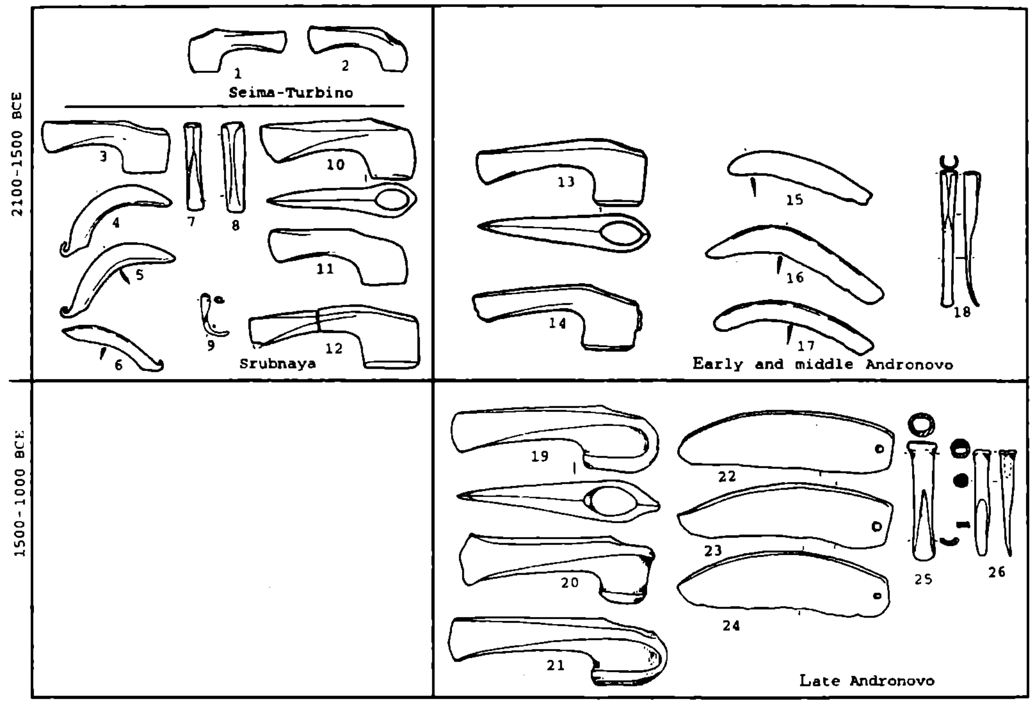


Figure 8: Bronze artifacts in the Seima-Turbino Culture, Srubnaya Culture, and Andronovo Culture.
1-2. Seima-Turbino culture, 3-12. Srubnaya culture, 13-18. Early and middle Andronovo culture, 19-26. Late Andronovo culture.

1) Two specimens belonging to the Seima-Turbino culture. One is from the Seima cemetery on the Oka River and near its confluence with the Volga River(fig.8:1). The other is from the Turbino cemetery on the Kama River(fig.8:2).

2) Four specimens belonging to the Srubnaya culture. One is a stray find from Slashchevskaya on the Khoper River of the Don River valley(fig.8:3). Two other stray finds are from the Volga River valley. One is at Durasovka in the Atkarsk district(fig.8:10). The other is from Ivanovskoe in the Khvalynsk district(fig.8:11). One excavated piece is from Ibrakaevskoye in the Belaya River valley close to the Ural River(fig.8:12).

3) Five specimens belonging to the Andronovo culture. The

Andronovo culture is divided into four basic types: the Petrovka type, Alakul type, Fedorovka type and Valikovaya type. The Petrovka type is in its early phase. The Alakul and Fedorovka types are in its middle phase. The Valikovaya type is in its late phase. The middle Andronovo culture is roughly contemporary with the Srubnaya culture. Two specimens belong to the early and middle Andronovo culture. One is a stray find from the Sterlitamak district on the Belaya River, which is very close to Ibrakaevskoye(fig.8:13). Another is from the Timofeevsky cemetery in the Chelyabinsk region(fig.8:14). The last three are later than the above eight specimens, which are from the early phase of the Late Bronze period, and belong to the Valikovaya type of the late Andronovo culture in the late phase of the Late Bronze period. Among them, one is a stray find from near Troitsk in the Chelyabinsk region(fig.8:19). The other two are excavated from a hoard at Shamsha in Kirghizia, which is very close to Toquztara County (fig.8:20-21).

After further comparison, we find that besides the four basic traits concluded above, there is one trait which is shared only by the Toquztara axes and the late Andronovo axes. It is the oval depression on the two sides of the socket and, correspondingly, the two raised hoops on the top and bottom of the socket. This trait suggests that since the Toquztara axes are the closest to the three late Andronovo ones, they may belong to the late Andronovo culture.

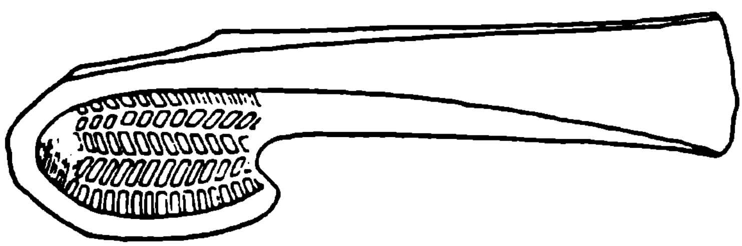


Figure 9: Andronovo bronze ax published by Mongait.

Now, within the three cultures, the less distinctive artifacts can be added to our study. A comparison of sickles and gouges further supports this affiliation. Bronze sickles are rarely reported in the Seima-Turbino culture. Sickles of the Srubnaya culture usually have a hooked tang(fig.8:4-6). They are quite different from the Toquztara ones. The early and middle Andronovo sickles differ less. They do not have a hooked tang. But they still differ from the Toquztara ones in not being perforated(fig.8:15-17). Only the late Andronovo culture has the same perforated sickles(fig.8:22-24). Bronze gouges are rarely reported in the Seima-Turbino culture, either. In the Srubnaya culture and the early and middle Andronovo culture, the gouge sockets are all forged(fig.8:7-9;18). Only the late Andronovo gouges have the same cast sockets as the Toquztara ones. Therefore, we can conclude that the thirteen Toquztara bronze artifacts belong to the late Andronovo culture. This conclusion is confirmed by an early published Andronovo ax(Mongait, 1959:145). This ax not only has the oval depressions on the socket, but also has the same herringbone pattern in the depression as the Toquztara axes(fig.9). In addition, the very proximity of the Shamsha hoard of the late Andronovo culture in Kirghizia to Toquztara County confirms the conclusion.

The result of this cultural affiliation gives us a basis upon which to date the Toquztara bronze artifacts. Series of uncalibrated radiocarbon dates for the Andronovo sites have already been obtained. But they range from the middle of the third millennium BCE up to the middle of the first half of the first millennium BCE. This broad range makes it difficult for us to decide the date. Previously, Mongait dated the Andronovo culture from the second millennium BCE to the beginning of the first millennium BCE (Mongait, 1959:144). But recently, Chernykh dates the early Andronovo culture, the Petrovka type, from the 16th to 15th centuries BCE; the middle Andronovo culture, the Alakul and Fedorovka types, from the 15th to 14th centuries BCE; and the late Andronovo culture, the Valikovaya type, from the 14th to 9th centuries BCE(Chernykh, 1992:194-195, 235 and 241). Since the Andronovo culture has also been found in Russian Central Asia, we can make our decision with references from there. The middle Andronovo culture of the Alakul type has been found in the Amu-Darya River valley, Kirghizia, Fergana and Tadjikistan in the period of Namazga VI. Masson and Sarianidi date them to the second half of the second millennium BCE(Masson and Sarianidi, 1972:137, 146-152). The widely distributed Valikovaya pots are found from both the Valikovaya type of the Late Andronovo culture and the Yaz I type in Russian Central Asia. The Yaz I type is characterized by the appearance of iron. According to Masson and Sarianidi, the Yaz I complex as a whole dates from the 12th to the 7th centuries BCE (Masson and Sarianidi, 1972:158). Therefore, if we follow the Russian scholars, we should date the Toquztara artifacts to the period around 1000 BCE. But the radiocarbon dates that the Russian scholars relied on are uncalibrated. This makes their dates all quite low. As Kohl has pointed out: "For several years Western archaeologists working in Iran and Palestine have questioned the low Soviet dating advanced by Masson and Sarianidi in their English monograph *Central Asia: Turkmenia before the Achaemenids....* If one assembles all the dates reported in the literature, adjusts them to the 5730 half-life, and applies the correction factors advocated by the MASCA Laboratories in Philadelphia, a fairly consistent sequence of nearly fifty dates is obtained that pushes the Central Asian sequence back even slightly earlier than Western archaeologists have favored"(Kohl, 1980: xxviii-xxix). The chronology rebuilt by Kohl is as follows:

Namazga V:2600-2200 BCE;
Namazga V-VI 2300-2100 BCE;
Namazga VIa-VIb:2100-1500 BCE (Kohl, 1980: xxxi).

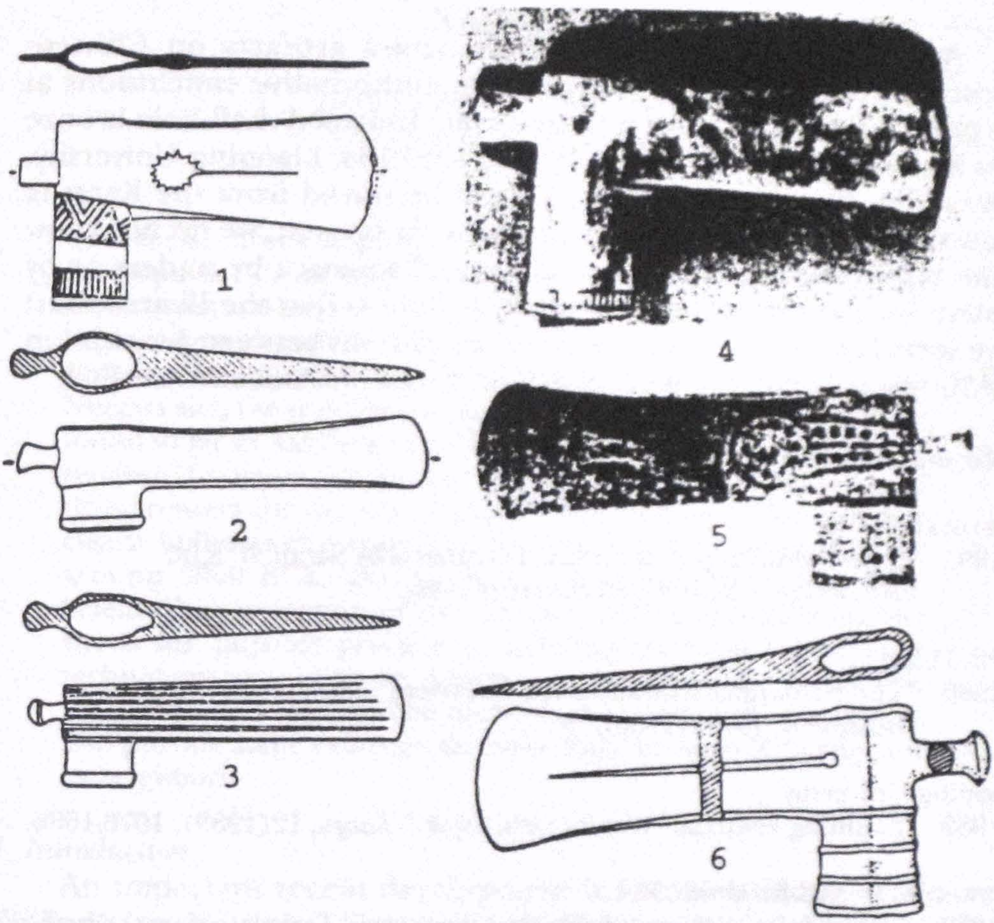


Figure 10: L-shaped bronze axes discovered in northern China.
1-3. Xinmin, Liaoning, 4. Qinglong, Hebei, 5. Xingcheng, Liaoning, 6. Faku, Liaoning.

The Russian scholars' dates have not only been questioned by Western scholars, but also do not agree with Chinese archeological data. The bronze tools of the Qijia culture include single-edged knives and cast socketed axes. Many tools are made of tin bronze. These are typical traits of many Late Bronze Age cultures including the Seima-Turbino culture. According to a series of calibrated radiocarbon dates, Chinese scholars generally date the Qijia culture to about 2000 BCE. This date fits Kohl's chronology very well, but cannot be accounted for by the Russian scholars' dates. Therefore, to date our Toquztara bronze artifacts, we should rely on Kohl's chronology. Since the latest date of Namazga VI in the chronology is 1500 BCE, this date can serve as the earliest date of the late Andronovo culture. According to Chernykh, Masson and Sarianidi, both the Valikovaya type of the Andronovo culture and the Yaz I type have a time span of five centuries. Thus we can conclude that the proper date for the thirteen bronze weapons and tools discovered at Toquztara is from 1500 BCE to 1000 BCE. This date covers the period from the Erligang phase to the Yinxu phase of the Shang culture in the Central Plains of China.

As for the influence of the Toquztara artifacts on Chinese cultures in other areas, we can draw no authoritative conclusions at the present time. In northern China, some L-shaped shaft-hole bronze axes have been discovered(fig.10) (Wu, 1985:138; Liaoning University, 1989:1085). But their genealogy should be traced from the Karasuk culture to the middle Andronovo culture. At present, we do not know if the bronze artifacts were brought into Toquztara by traders or by western immigrants. However, what is certain is that the Ili area must have served as a passage-way for cultural relations between Kazakhstan and Xinjiang during the second half of the second millennium BCE.

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Copper and Bronze Metallurgy in Late Prehistoric Xinjiang

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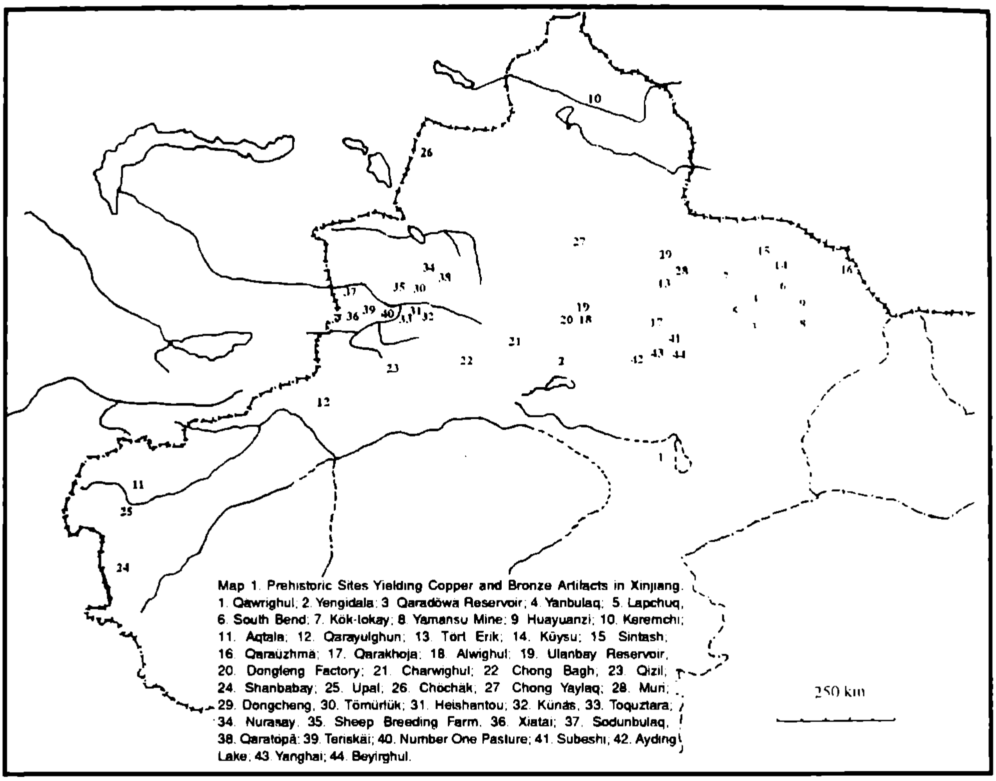
Recent archeological finds have thrown light on the development of metal technology in prehistoric Xinjiang. This paper summarizes the evidence presently available for the beginning and early use of copper and bronze in Xinjiang, and presents some preliminary results of scientific research on the Nurasay site, the only Bronze Age copper mining and smelting site found so far in Xinjiang. A preliminary study of the distribution of recovered copper and bronze artifacts suggests the existence of three centers for the use of copper and its alloys. The evidence clearly indicates that copper or bronze came into use in Xinjiang around 2000 BCE, and became widespread from 1000 BCE. Scientific examination of the Nurasay mining and smelting site shows the possible practice of smelting arsenical copper, the technology suggesting an important advance in the prehistoric metallurgy of Xinjiang. The archeological finds available to date also provide some evidence for close links between Xinjiang and its neighbors.

1. Introduction

An important recent development in the archeology of ancient Xinjiang has been the discovery and identification of dozens of pre-Han remains, mainly tombs or cemeteries, which have aroused much scholarly interest in the prehistoric cultures in Xinjiang. Most of these tombs and cemeteries have been ascribed to the Bronze Age and the early Iron Age. Several important aspects of these prehistoric remains, such as chronology, distribution, origins, racial features of the populations, textile techniques, mutual relations and interaction, links with neighboring cultures, and so on, have been discussed in detail in recent papers (Wang Binghua 1985, 1993; Chen Ge 1987, 1990; Debaine-Francfort 1988, 1989; Shui Tao 1993; Han Kangxin 1994; Mair 1995a, 1995b; Good 1995; Chen & Hiebert 1995). Copper and bronze metallurgy in prehistoric Xinjiang, however, has not yet been fully examined in the light of the recent archeological finds. The purpose of this paper is twofold: first, to summarize the evidence presently available for the beginning and early use of copper and bronze in Xinjiang; second, to present some preliminary results of scientific research on the Nurasay site, the only Bronze Age copper mining and smelting site found so far in Xinjiang. We will also briefly touch on some connections between Xinjiang and neighboring regions with respect to early bronze metallurgy.



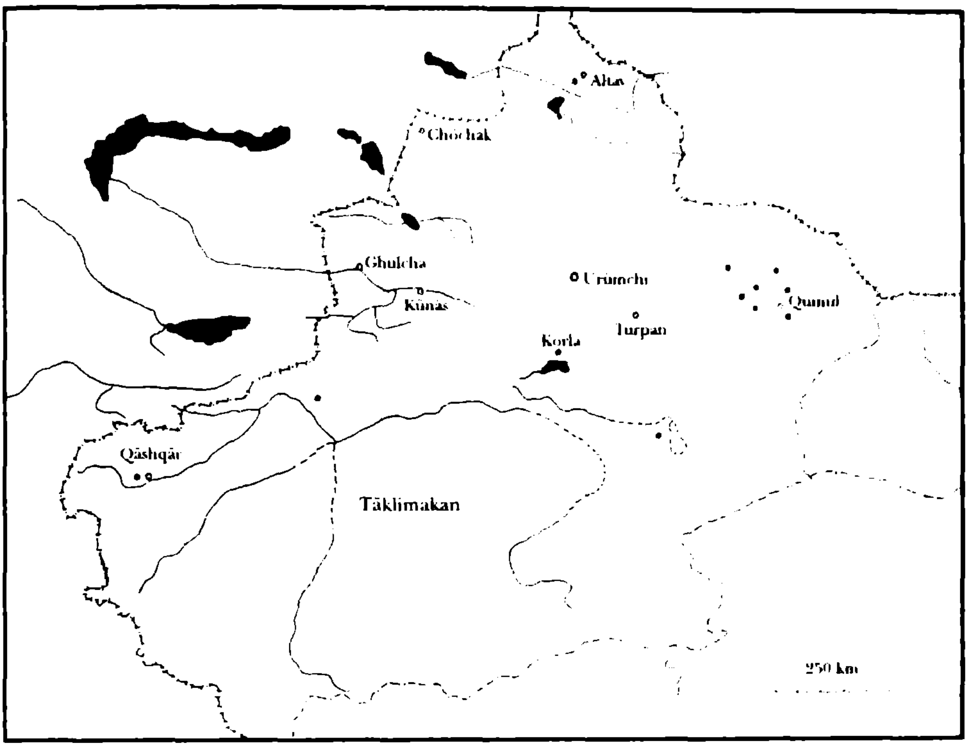
Map 1: Prehistoric Sites Yielding Copper and Bronze Artifacts in Xinjiang.

It is worth emphasizing at the start that any advance in the study of the beginning of bronze metallurgy in Xinjiang will not only enrich our knowledge of the prehistory of Xinjiang, but also has the potential to contribute a new understanding to the origins and early development of bronze metallurgy in China. In a recent critical survey of all the known evidence for early copper artifacts in China, An Zhimin (1993: 1117), the leading Chinese archeologist, remarks that "the appearance of early copper artifacts in China was relatively late; at least, there were still no copper objects produced during the Neolithic, five or six thousand years ago.... Early copper artifacts quite possibly originated from or came into China through the prehistoric Silk Road." Professor An's argument suggests that the Xinjiang region, west of Gansu province, deserves a full-scale examination in terms of the wider discussion on the origins of metallurgy in China.

The archeological finds made in recent decades have thrown light on the early use of copper and bronze in Xinjiang during the late prehistoric period (2000-400 BCE). Most especially, the discovery of a copper mining and smelting site at Nurasay, Nilqa, makes possible a preliminary discussion of early copper metallurgy in Xinjiang.

2. The Beginning and Early Use of Copper and Bronze in Xinjiang

So far, more than sixty late prehistoric sites have been reported in Xinjiang. Among them, more than forty yielded copper or bronze artifacts. The distribution of these copper-yielding sites is given in Map 1. It is clear that most of these sites are found along what later became known as the "Silk Road". Sites are both in the foothills of mountain ranges and associated with oases, particularly in the Qumul (Hami), Turpan (Tulufan) and Qarashāhār (Yanqi) Basin. More than 130 radiocarbon dates are available from the majority of these sites, dating them to a period ranging from 2000 to 400 BCE (IAC 1991: 294-335).



Map 2: The Distribution of the Prehistoric Sites (Before 1000 BCE) Yielding Copper Artifacts in Xinjiang.

Recent studies suggest that these prehistoric sites can be organized into 8 regional cultural groups (Shui Tao 1993) or 10 archeological cultures (Chen & Hiebert 1995) on the basis of typological studies of ceramics, burials, and other finds. It is also suggested that these archeological cultures belong to two periods, corresponding to the Bronze Age and the Iron Age (Debaine-Francfort 1988, 1989; Chen Ge 1990; Chen & Hiebert 1995).

The earliest evidence for the use of copper in Xinjiang comes from the cemetery at Qāwrighul (Gumugou) in the Lopnur (Luobubo) region (Map 2), which is dated to about 1800 BCE on the basis of a series of carbon-14 dates. The Qāwrighul burials are the earliest found so far in Xinjiang to be considered as the remains of a Bronze Age culture. Three small pieces of copper ornament were unearthed from the Qāwrighul cemetery; one of them has been examined and reported to be pure copper (Wang Binghua 1993: 183-201).

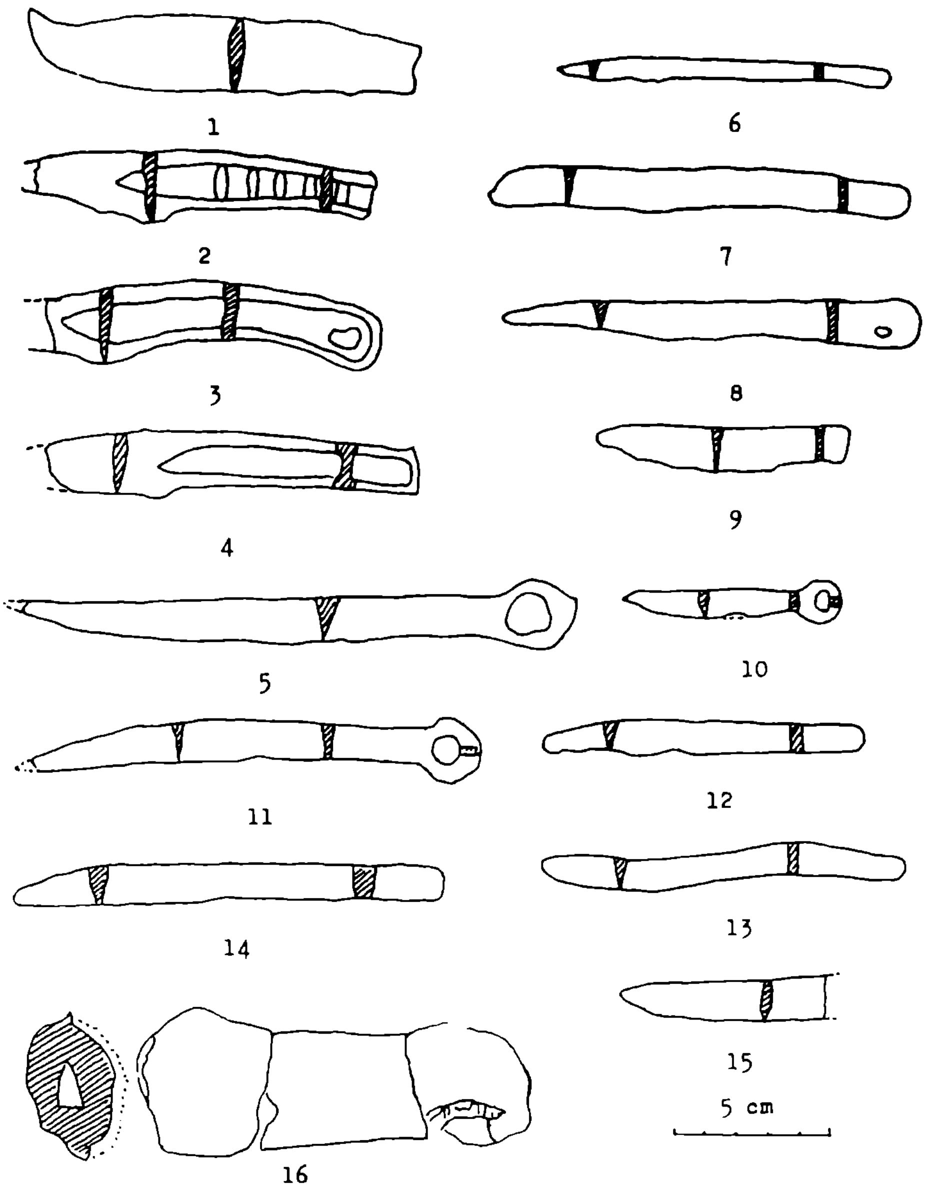


Figure 1: Copper and bronze knives (including a knife mold) found in prehistoric Xinjiang: 1. Yengidala; 2, 3, 4, 5. Yanbulaq (M33, M35, M75, M68); 6, 7, 8, 9, 10, 11. Charwighul I (M4, M5, M13, M35, M26, M44); 12, 13. Charwighul II (M2); 14. Chong Bagh (M10); 15. Aqtala (surface collection); 16. Tört Erik (knife mold).

Another early site yielding copper and bronze objects is Yengidala (Xintala), which is located in Khoshut (Heshuo) county (Map 2) and includes both habitation and burials. Two calibrated radiocarbon dates set its time-span of occupation from about 1700 to 1300 BCE (IAC 1991: 331). An awl and a knife of copper (Fig.1:1) and a stone mold for casting an awl were found in the lower cultural layer. The surface finds include a socketed axe (Fig.3:1), an arrowhead with two-wings, and an awl (IAX 1988a, MX 1986). The find of a stone mold shows clearly the existence of local copper-working and the practice of casting.

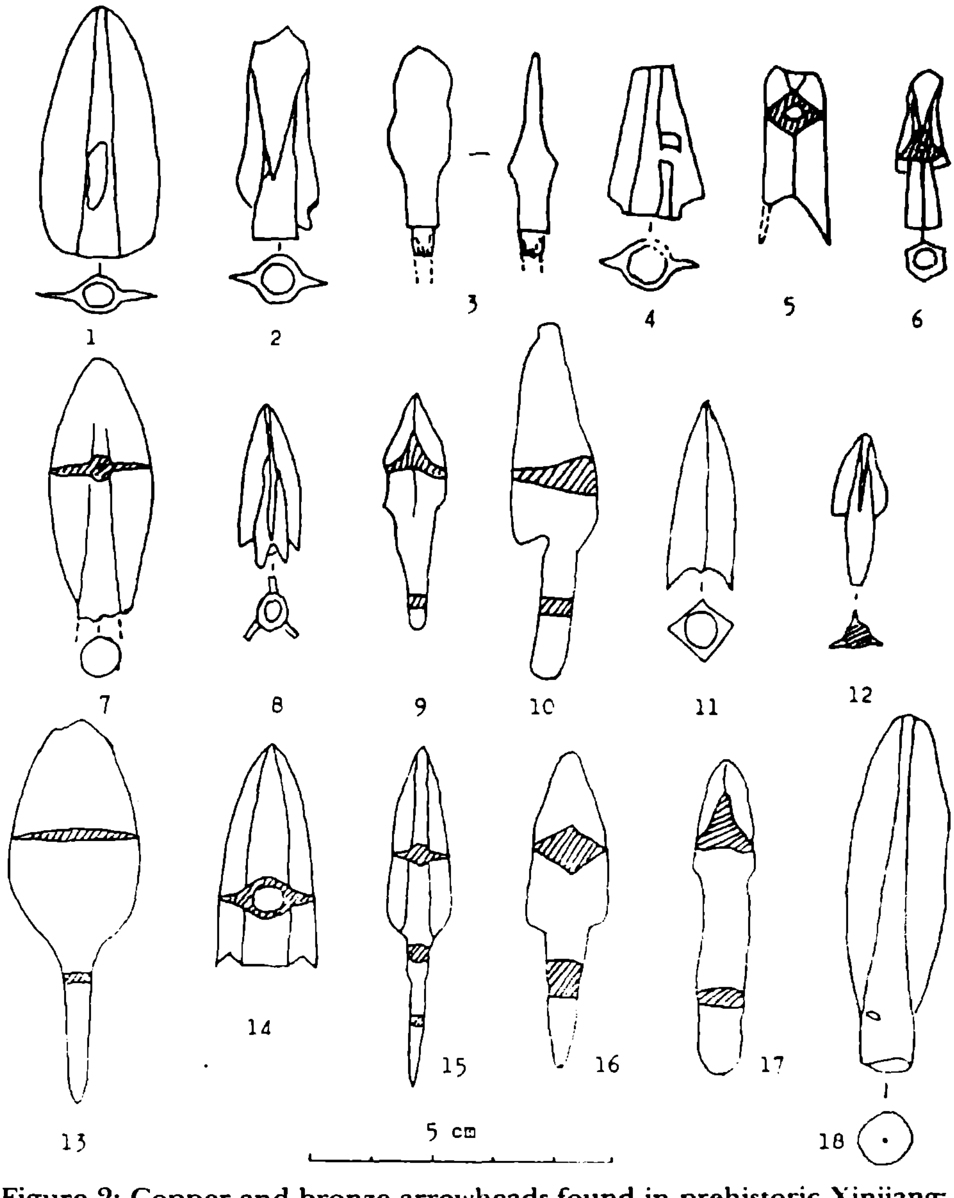


Figure 2: Copper and bronze arrowheads found in prehistoric Xinjiang: 1, 2, 3, 4, 5, 6. Yanbulaq (M6, M68, M75, M75, M6, M68); 7. Qaraüzhmä (stray find); 8, 9. Charwighul I (M16, M25); 10. Charwighul II (M3); 11, 12. Chong Bagh (M3E, IM27); 13, 14, 15. Shanbabay (M39, M29, M39); 16, 17. Chong Yaylaq (M3); 18. Huayuanzi (stray find).

The later part of the second millennium BCE saw a marked growth in the use of copper and bronze. The archeological evidence available presently indicates that the eastern part of Xinjiang, especially the Qumul basin, was an important center for the use of copper and its alloys during that period. In this region have been found the sites of Qaradōwā (Wupu) Reservoir (MX & IAX 1979), Yanbulaq (CROX 1989), Lapchuq (IAX 1984), South Bend (Nanwan) (Chang Xien 1985, He Xin 1987), Kōk-tokay (Lanzhouwanzi) (Wang Binghua, *et al.* 1984), Yamansu Mine (Chang Xien 1989, EGH 1990), and Huayuanzi (Wang Binghua 1986), all of them roughly dating to before 1000 BCE and yielding copper and bronze artifacts (Map 2).

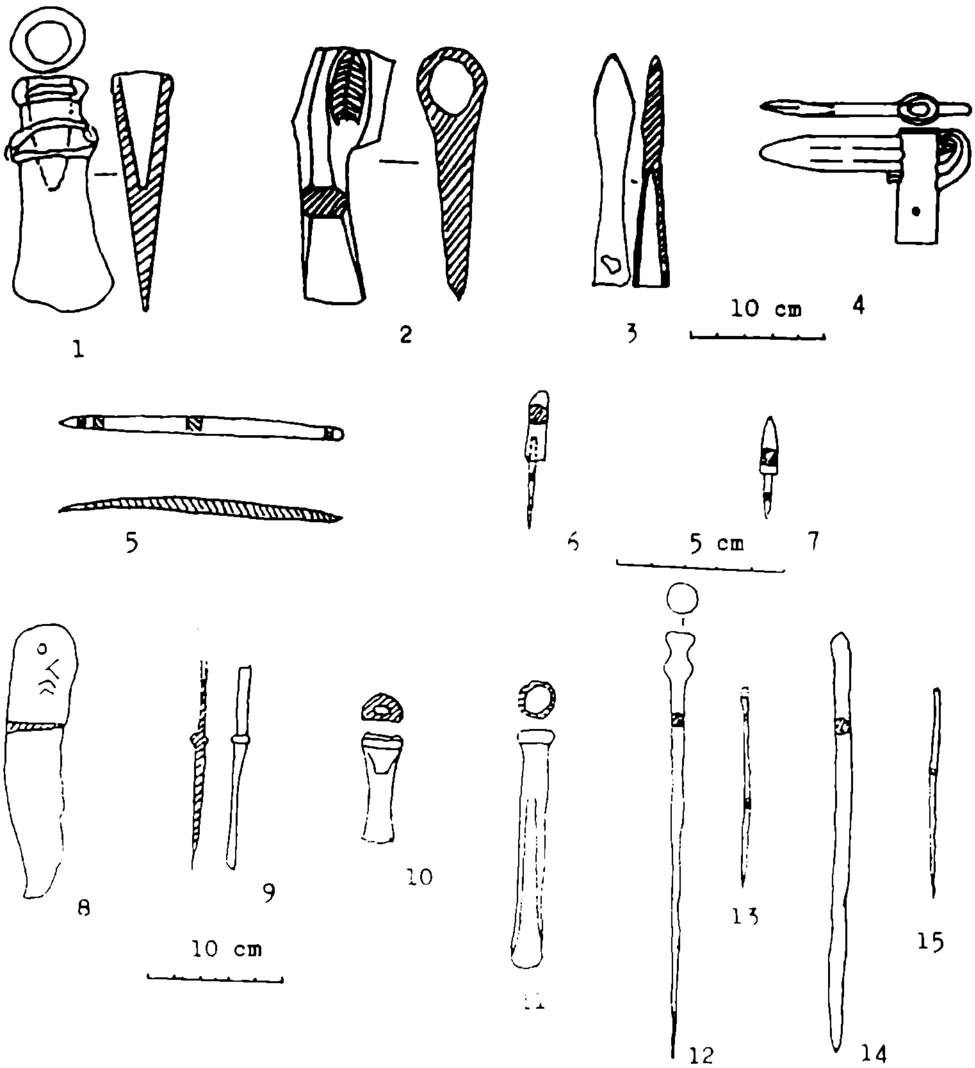
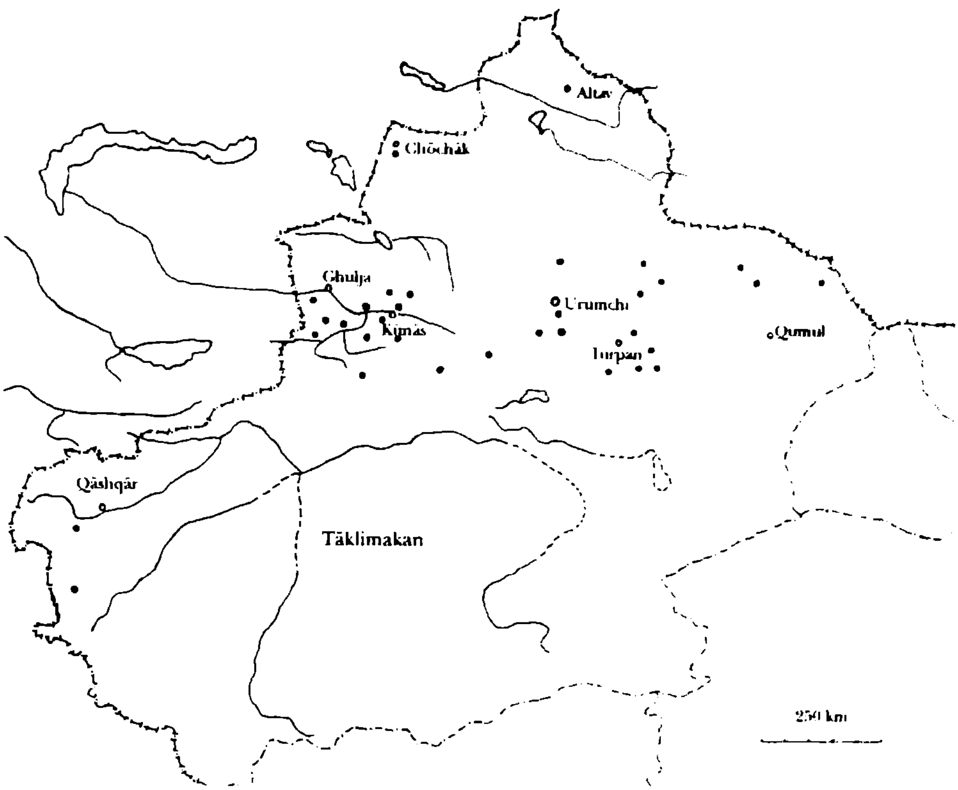


Figure 3: Copper and bronze artifacts found in prehistoric Xinjiang: 1. Yengidala (surface collection); 2. Toquztara (stray find); 3. Charwighul I (M33); 4. Chong Bagh (IM5C); 5. Lapchuq (M1); 6. Yanbulaq (M53); 7. Charwighul I (M47); 8, 9, 10, 11. Toquztara (stray finds); 12, 13. Charwighul I (M4, M5); 14. Charwighul II (M18); 15. Chong Bagh (IM7A).

Among these sites, only Yanbulaq, a cemetery site, has been fully reported. Here, 94 copper and bronze artifacts were unearthed from 76 graves, and a further 18 from the surface collection. The inventory includes knives (Fig.1:2,3,4,5), arrowheads (Fig.2:1,2,3,4,5,6), carving knives, awls (Fig.3:6), mirrors (Fig.4:1,2), plates (Fig.5:14), finger rings (Fig.6:1), earrings (Fig.6:2,3), buckles (Fig.6:12,13), a spindle whorl (Fig.4:6), needles, tubes, beads, and other ornaments. The Yanbulaq site and other similar sites have been ascribed to a Yanbulaq Culture on the basis of their characteristic ceramic assemblage. This large assemblage of a range of copper and bronze items shows that the Yanbulaq people were well acquainted with metalworking, such as annealing and casting, although no mold has been found from Yanbulaq.



Map 3: The Distribution of the Prehistoric Sites (About 1000-400 BCE) Yielding Copper Artifacts in Xinjiang.

Radiocarbon dates for the sites mentioned above fall mainly into the later part of second millennium BCE, but there is an overall problem in their interpretation, not least because of the relatively small number of dates that we have so far from these sites. For example, there are 12 dates available for the Yanbulaq site, but most of them are not identical to the three periods suggested by the excavators on the basis of burial types. Two dates ranging from 2100 to 1700 BCE, and four dates in the region of 1700-1400 BCE have been obtained, but they are discounted by the excavators as too early for the associated materials (CROX 1989; IAC 1991: 318-320). There is no substantial archeological evidence so far to indicate the presence of copper and bronze artifacts in the region earlier than 1500 BCE, but it should be noted that 4 calibrated radiocarbon dates out of 12 are earlier than this date.

Some copper and bronze artifacts unearthed from the sites of

Keremchi (IAX 1981a), Aqtala (ATM 1977) and Qarayulghun (MX & IAX 1979: 170-1) are also considered to be from around 1000 BCE, according to their typological features and the early characteristics of associated materials, though no radiocarbon dates are yet available for them. The stone molds, including composite molds for a spade and an open mold for a knife and awl, indicate that casting occurred at Keremchi during this early period. It is worth recalling that the use of the stone molds for casting is a craft tradition that was widely applied over the Eurasian steppe during the second millennium BCE (Chernykh, E.N. 1992:194-233).

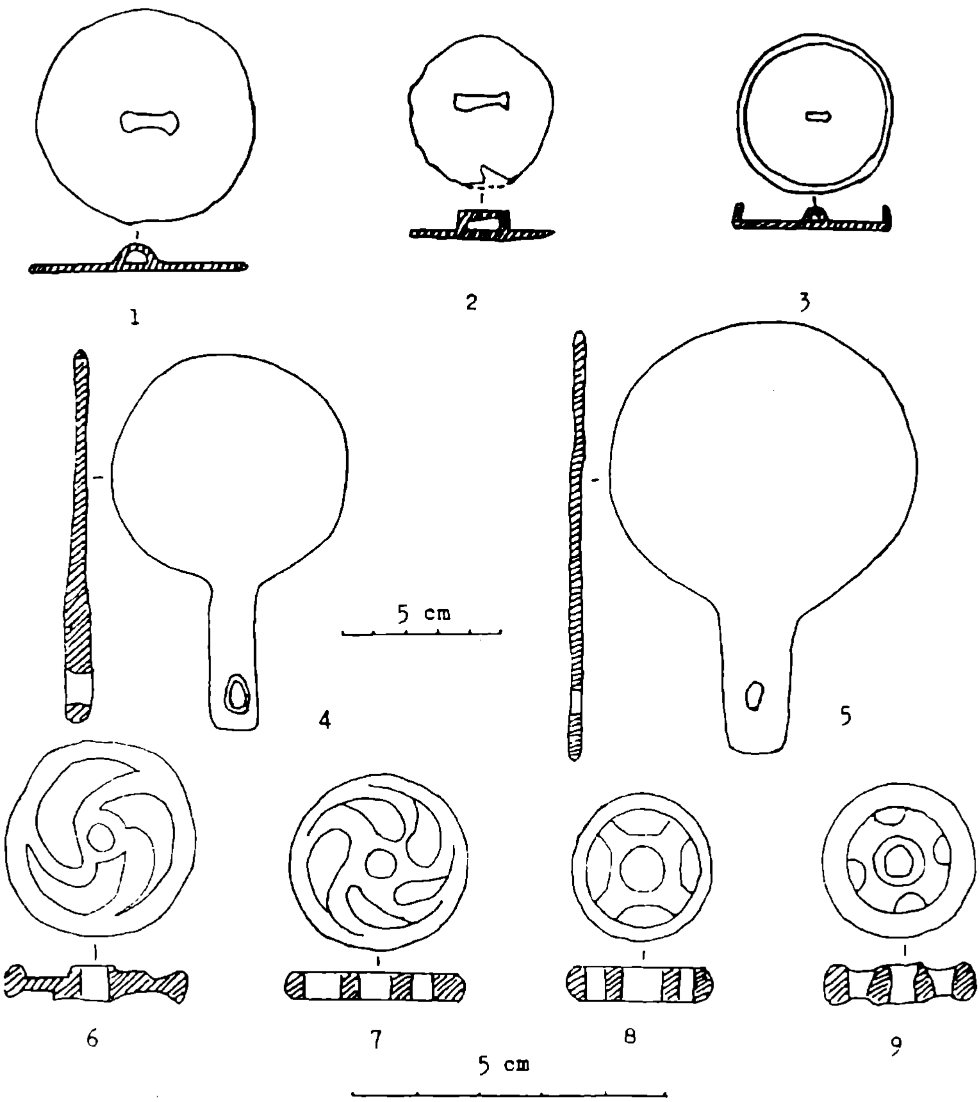


Figure 4: Copper and bronze mirrors and spindle whorls found in prehistoric Xinjiang: 1, 2. Yanbulaq (M64, M45); 3, 4, 5. Chong Bagh (IM1, IM34A, IIM4); 6. Yanbulaq (M69); 7, 8, 9. Chong Bagh (IM17, IM12C, IIM10).

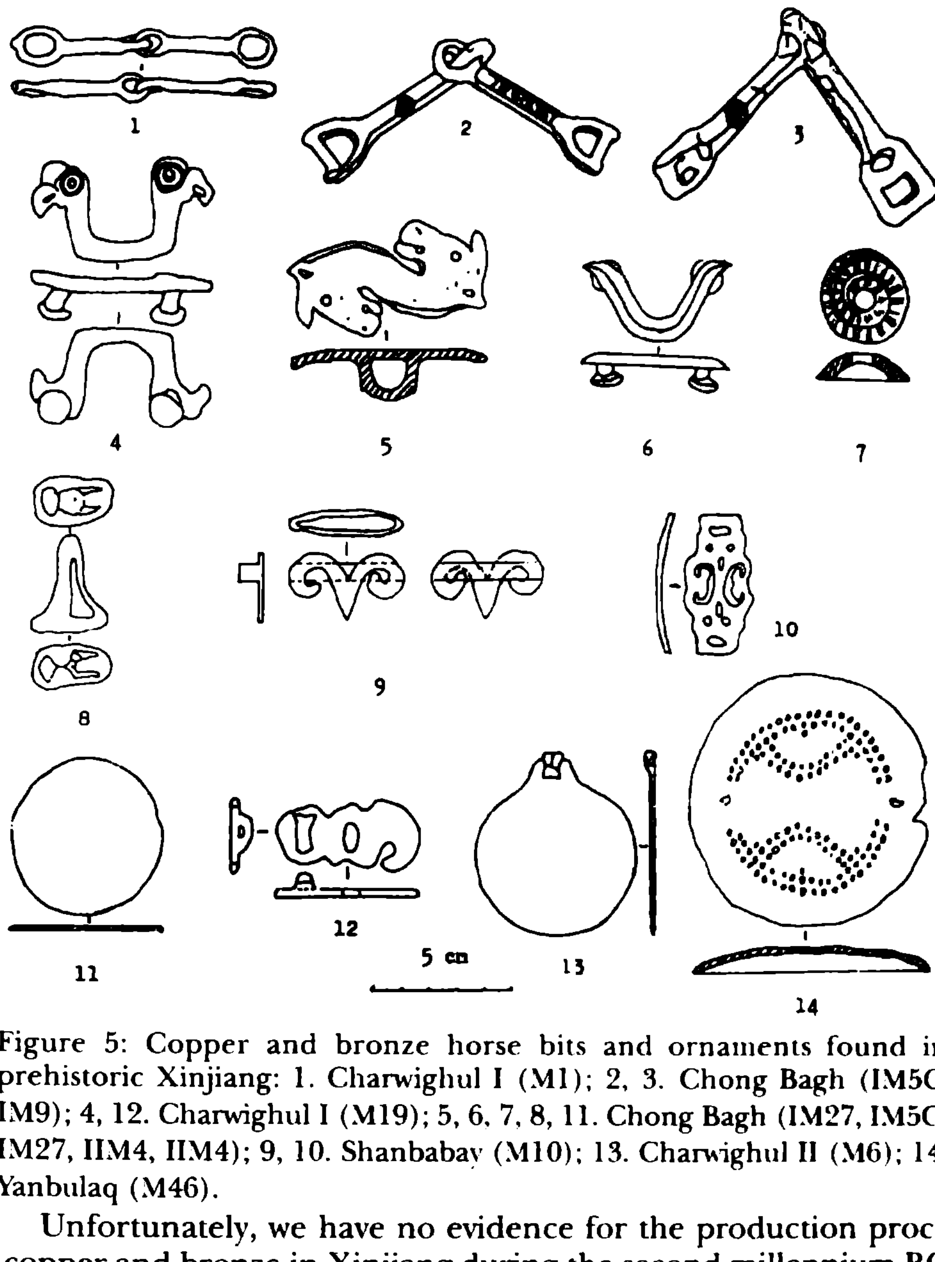


Figure 5: Copper and bronze horse bits and ornaments found in prehistoric Xinjiang: 1. Charwighul I (M1); 2, 3. Chong Bagh (IM5C, IM9); 4, 12. Charwighul I (M19); 5, 6, 7, 8, 11. Chong Bagh (IM27, IM5C, IM27, IIM4, IIM4); 9, 10. Shanbabay (M10); 13. Charwighul II (M6); 14. Yanbulaq (M46).

Unfortunately, we have no evidence for the production process of copper and bronze in Xinjiang during the second millennium BCE, and thus no clear idea about smelting techniques used at that time.

Significant further development can be seen in the production of copper and bronze during the following first millennium BCE. Nearly thirty sites of this period have been reported as yielding copper and bronze artifacts (see Map 3). These sites roughly cluster into two regions: one is the Turpan and Qarashāhār Basin, and the other the Ili River Valley, suggesting the presence and growth of regional cultural centers.

Rich finds of copper and bronze artifacts have come from the cemetery site of Charwighul in Khotunsumbul (Heijing) county, where 102 graves were excavated at cemetery I during 1982-83 (XAT

1988). The inventory of copper and bronze items includes knives (Fig.1:6,7,8,9,10,11), arrowheads (Fig.2:8,9), spearheads (Fig.3:3), hairpins (Fig.3:11), needles (Fig.3:12), awls (Fig.3:7), rings (Fig.6:4), plaques (Fig.5:12), snaffle bits (Fig.5:1), and ornaments with bird-head design (Fig.5:4). It is also reported that a very rare type of bronze bowl was unearthed at this cemetery. There are 16 calibrated radiocarbon dates available for cemetery I, dating it to between 1000 and 400 BCE, with 7 clustering in the period from 1000-800 BCE, 8 from 800 to 400 BCE, and 1 younger (IAC 1991: 327-330). Further evidence for the use of copper and bronze can be seen from cemeteries II, IV, and V, which are thought to be contemporary with, or slightly earlier or later than, cemetery I (XAT 1990; Lü Enguo 1988,1989).

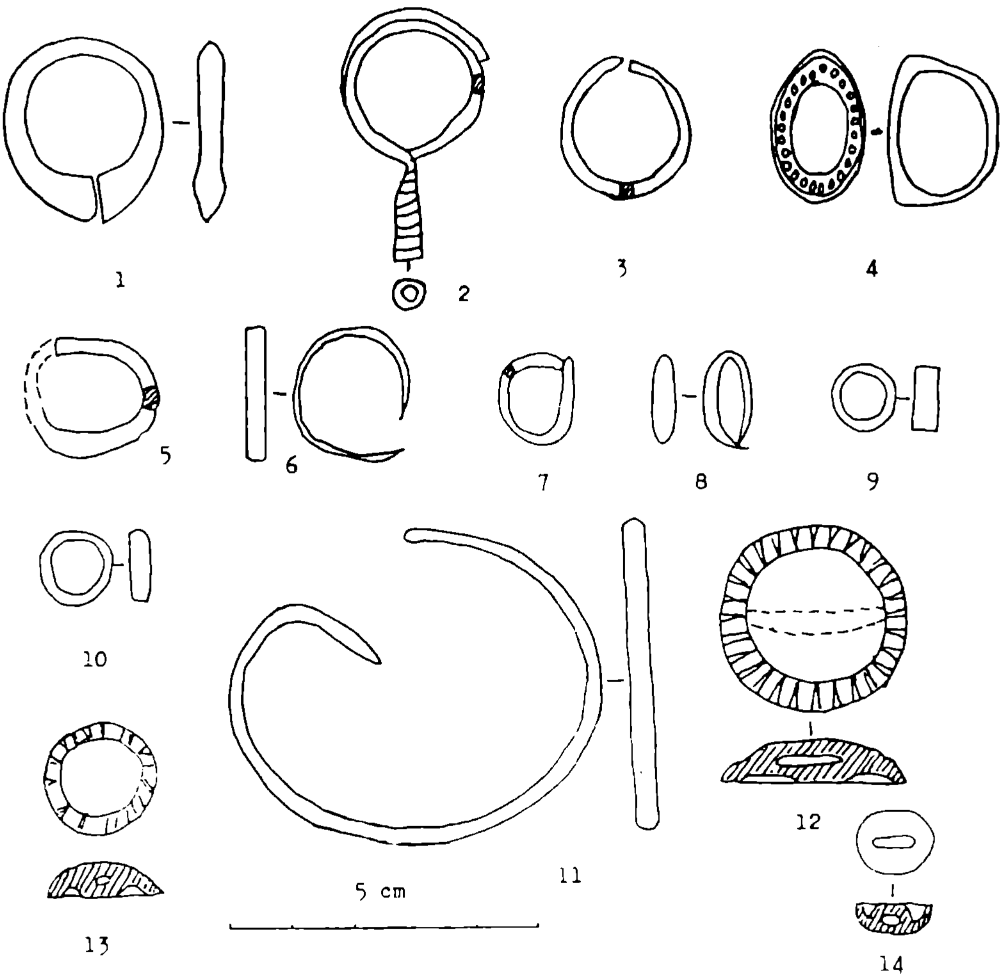


Figure 6: Copper and bronze ornaments found in prehistoric Xinjiang: 1, 2, 3, 12, 13. Yanbulaq (M48, M45, M75, M68, M70); 4. Charwighul (M1); 5. Chong Bagh (IM3); 6, 7, 8, 9, 10, 11, 14. Shanbabay (M26, M39, M4, M37, M37, M37, M39).

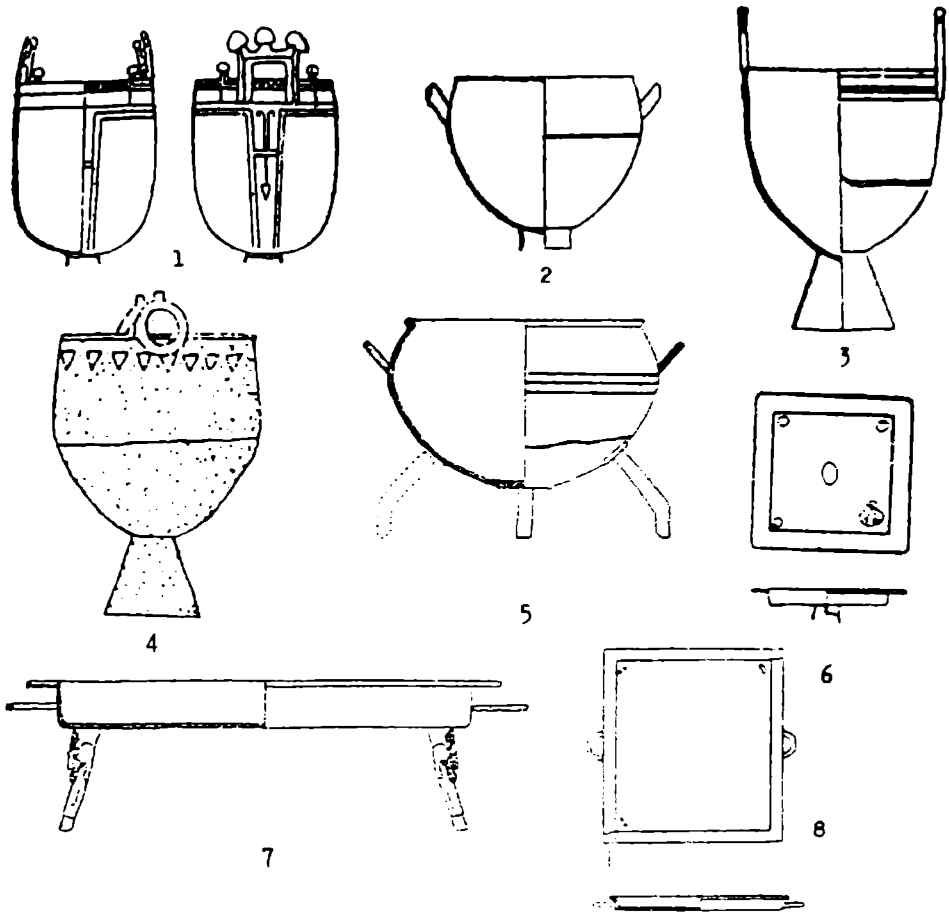


Figure 7: Copper and bronze vessels found in prehistoric Xinjiang (stray finds): 1. Ürümuchi; 2. South Bend; 3. Kök-tokay; 4. Toquztara; 5, 6. Künäs; 7. Chapchal; 8. Toquztara.

Another important cemetery site, also rich in metal finds, is Chong Bagh (Qunbake) in Bügür (Luntai) County, which is ascribed by some researchers to the Charwighul Culture on the basis of similarities between them (XAT 1987, 1991). Eleven of the 14 calibrated radiocarbon dates from this site cluster at about 800-400 BCE, with two younger and one older (IAC 1991: 332-4). Copper and bronze artifacts found at this site include knives (Fig.1:14), arrowheads (Fig.2:11,12), plain mirrors (Fig.4:3,4,5), socketed dagger-axes (Fig.3:4), horse bits (Fig.5:2,3), spindle whorls (Fig.4:7,8,9), buckles, plates (Fig.5:11), needles (Fig.3:15), earrings (Fig.6:5), horse-head ornaments (Fig.5:5), bow-shaped ornaments (Fig.5:6), bell-shaped ornaments (Fig.5:8), and other ornaments (Fig.5:7). The spindle whorls from this site are worthy of special attention: it has been noted that very similar artifacts have also been found in the Yanbulaq Culture in eastern Xinjiang (CROX 1989:345-6), and the Qumquduq (Shajing) Culture (about 900-600 BC) in Gansu (CRT 1981: 34). Furthermore, we can also find samples among Central Asian amulets and seals of the second millennium BCE, which have similar decoration or design as the spindle whorls from Xinjiang and Gansu, although some of them are made of stone (Sarianidi, V.I. 1981: 178-9). A socketed dagger-axe is also an interesting and rare find, because the same type of bronze weapon is commonly seen not only in the Bronze Age cultures in South Siberia, but also in the late Shang bronze assemblages in central and northern China (Lin Yun 1986: 243-5). It is worth noting that the burial site of Beyirghul in Pichan (Shanshan) County is also reported to have yielded two socketed dagger-axes (Wang Binghua 1988).

Evidence for the use of casting comes from the Tört Erik (Sidaogou) site in Muri County. Two phases have been identified at this site. Seven calibrated radiocarbon measurements date the earlier phase to 1036-896 BCE and the late phase to about 700-300 BCE (IAC 1991: 313-4). More than 30 clay fragments of casting molds for knives (Fig.1:16) have been unearthed from the earlier phase, with associated finds that include copper knives and hairpins. Copper knives and other ornaments were also found from the late phase. (CROX 1982).

The Ili river valley, which links Xinjiang with Central Asia, is generally thought to have been inhabitated by the Sakas around the mid-first millennium BC. Several cemeteries found in the Ili region have been excavated and ascribed to the remains of Sakas (Zhang Yuzhong 1989). A noteworthy phenomenon is that copper and bronze finds from the cemeteries are rather small in number compared with the stray finds. For example, the Tömürlük cemetery in Künäs (Xinyuan) County, which is radiocarbon dated to about 400-100 BCE, has only 5 copper and bronze objects, consisting of two mirrors, a hairpin, an awl, and an arrowhead (IAX 1988b). In contrast, the stray finds are much richer in their range of types and total number of copper and bronze artifacts. Three groups of copper and bronze objects found accidently have been reported: 11 items including an axe, a knife, and ornaments from Teriskäi in Tekäs (Wang Binghua 1962); 13 metal tools including socketed axes (Fig.3:2), sickles (Fig.3:8), chisels (Fig.3:9,10,11) and hammers from Toquztara (Gongliu) County (Wang & Cheng 1989); 6 unusual artifacts including a statue, tray (Fig.7:6, damaged), three-legged cooking pot (Fig.7:5), and a bell from Künäs County (Zhang Yuzhong 1985). These stray finds are roughly dated by the reporters to the first or second half of the first millennium BCE. But recent studies suggest that the 13 metal tools found in Toquztara County could be dated as early as 1500-1000 BCE on the basis of typological comparison with the Andronovo bronze artifacts (Peng Ke 1996: 8; Kuzmina 1996). All these finds, together with the discovery of a mining and smelting site in Nilqa County, provide concrete evidence for the presence of a metallurgical center in the Ili region from the early part of the first millennium BCE.

Table 1: The Chemical Composition of Copper and Bronze Artifacts Found in Xinjiang (%)

No	Artifacts	Sites	Cu	Sn	Pb	Fe	Alloys
1	821IBKN M3	South Bend	82.79	0.28	0.01	n.a.	Cu (?)
2	Ring	Kūnās	86.86	>3	0.1	0.001	Cu-Sn
3	Ring	Kūnās	85.5	>3	0.05-0.1	0.001	Cu-Sn
4	Pot	Kūnās	97.27	0.1-0.3	0.1	0.5-0.1	Cu
5	Caldron	South Bend	94.87	0.1-0.3	1-3	> 3	Cu-Pb-Fe
6	Piece	Tört Erik	96.74	0.17	0.015	n.a.	Cu
7	Caldron	Ūrümuqi	92.62	>3	>3	0.001	Cu-Sn-Pb

Note: For the tin and iron measurements, the optical spectrometric analysis was unable to give more precise estimates of the spectral lines employed in the analysis (personal communication from Mr. Wang Bo). In Table 1, 'n.a.' means 'no analysis'.

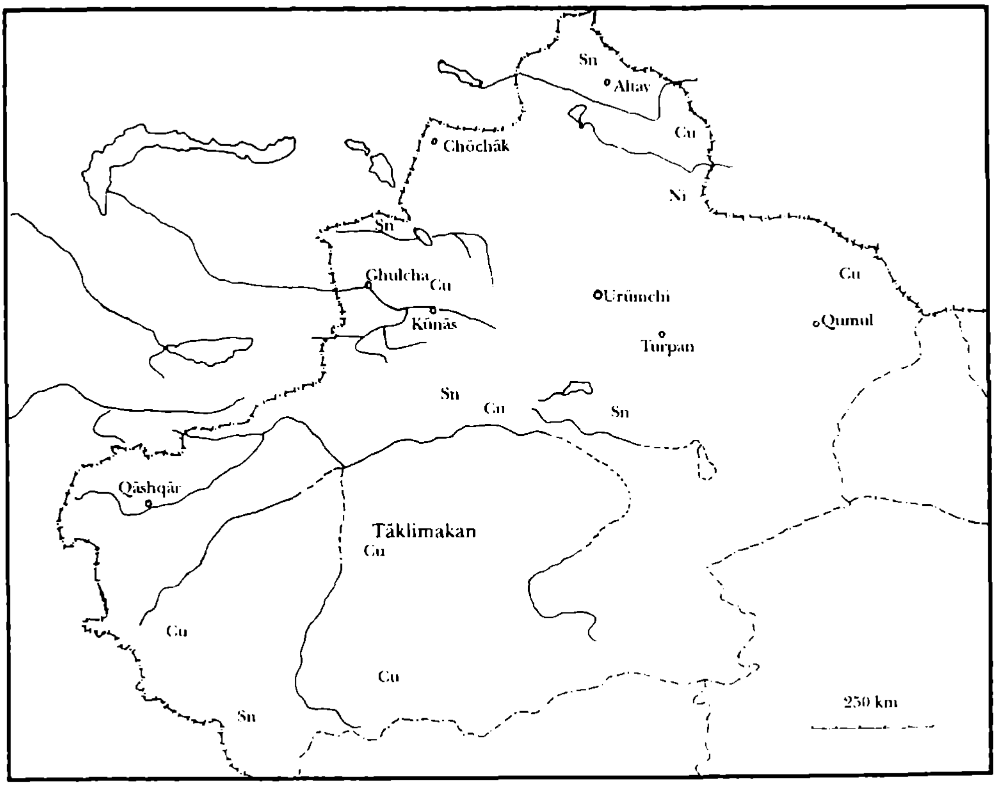
To sum up, the archeological finds available to date indicate that copper or bronze came into use in Xinjiang after about 2000 BCE, and became widespread around 1000 BCE. Evidence for the development of local metalworking, especially copper or bronze casting, can be traced to the mid-second millennium BCE. Apart from a very few large vessels like caldrons, most of the early copper and bronze objects found in Xinjiang are small items, such as tools, weapons, ornaments, and utensils of daily use. A comparative study of the typology of these copper and bronze artifacts shows some evidence for connections between Xinjiang and its neighboring regions. It is noted that bronze mirrors occurred first in small numbers in the Central Plains of China in the late Shang dynasty (about 1300 BCE), but became very rare during the Western Zhou dynasty (1100-700 BCE), and reappeared in much greater numbers during the Eastern Zhou dynasty (700-221 BCE). Considering that both round and handled mirrors have been unearthed in Xinjiang, some of them dating to at least before 1000 BCE, it seems possible that bronze mirrors used in Central China during the Shang dynasty came from the west. It has also generally been accepted that the source of the raw material for jades found at the Shang tombs at Yinxu, Henan came from Khotan (Hetian), southern Xinjiang, suggesting the existence of trade between Xinjiang and Central China around 1300 BCE (Wang Binghua 1993: 167-8). But we have no evidence for any metal objects, especially the typical ritual bronzes of the Shang and Zhou dynasties, diffusing out to Xinjiang at this time. If we do not find such objects in the future, then there must have been special circumstances under which the jade was traded eastward.

In contrast to bronze assemblages from Western Central Asia, there have also been no finds of metal amulets and seals in Xinjiang as yet. It is also worthy of attention that no copper or bronze objects have been found earlier than 2000 BCE. In fact, no clear picture of the Neolithic Age in Xinjiang at all has been obtained from the available archeological material (An Zhimin 1992: 163).

3. Analyses of Copper and Bronze Artifacts

Only a few artifacts from the sites discussed above are reported to have been subjected to scientific analysis. The results are summarized in Table 1 (Yang Yiyong 1985; Wang Bo 1987).

Although the results in Table 1 are by no means comprehensive, they still provide some preliminary information about the types of alloys used in prehistoric Xinjiang. It seems that copper, leaded-copper, and tin bronze were in use from the late second to the first millennium BCE. An ingot unearthed from the Nurasay smelting site has also been analyzed, containing Cu 67.45% and Pb, Fe, As, and other elements (Wang Bo 1987). It is actually copper matte, produced during the initial smelting process.



Map 4: the Distribution of Copper, Tin, and Other Relevant Metallic Ore Deposits in Xinjiang.

4. Metal Ore Sources in Xinjiang

In order to gain a better understanding of early bronze metallurgy in Xinjiang, the distribution of copper, tin, and other relevant metallic ores has been mapped on the basis of studies on ancient mining activities as well as modern mineralogical surveys (Map 4). With the exception of the Nurasay copper deposit in Nilqa County, where a mining and smelting site of the mid-first millennium BCE has been found, we have so far no evidence to indicate whether these metal deposits were exploited in prehistory, but the map still provides some general information concerning the resources potentially available to Bronze Age inhabitants of the region. It is interesting to note that the distribution of copper deposits matches very closely that of the majority of the known copper artifacts. A search for evidence of their exploitation in prehistory must be central to future research. We should recall that tin bronze objects were recovered from the Xinjiang sites, and the potential for the exploitation of the known tin sources nearby needs to be investigated.

5. *The Copper Mining and Smelting Site at Nurasay, Nilqa*

The most important discoveries of prehistoric metallurgy in Xinjiang are the copper mining and smelting site found at Nurasay, and the mining site at Tüz Mountain, both in Nilqa County, West Xinjiang (Map1). These mining sites were discovered by geologists, who mentioned them in their geological reports of 1956. A more detailed geological survey of the sites was carried out during the 1970s. The first carbon-14 dating of a pit-timber from an ancient shaft of the Tüz Mountain site was reported as 2650±170 BP (900-413 BCE by calibration) in 1979. During 1982-84, archeologists from the Institute of Archeology in Xinjiang investigated the Nurasay mining site, discovering a smelting site in its vicinity. A pit-timber from an ancient shaft of the Nurasay site was radiocarbon dated to 2440±75 BP or 481-386 BCE by calibration (Wang Mingzhe 1984; 1985; IAC 1991: 305).

More than a dozen ancient mining shafts have now been found at the Nurasay site. One of them is 20 meters in depth. A number of timbers were used to support the shaft walls. It may be assumed that the shafts are connected by underground drifts. The entrances to these shafts are about 5 meters square. A great quantity of ore, and also stone implements, were found nearby.

The smelting site has been cut into two areas by mountain torrents. On the slope of the mountain valley, a layer of smelting slag 20 meters long and 0.5-1.0 meters thick was found buried at a depth of 1.5-2.0 meters. This slag layer also included ore, animal bone and five circular ingots of matte. The ingots are plano-convex and vary in weight from 3 to just over 10 kilograms. Spectrometric analysis of one ingot showed it to contain about 60% copper. The ingot showed a silvery color in section.

Unfortunately, no formal excavation or investigation report of this mining and smelting site has been published since a brief reference appeared in the *Yearbook of Chinese Archeology 1984*, and a few scant mentions in several papers on Xinjiang Bronze Age cultures.

In recent years, with the support of Professor Wang Binghua, Director of the Institute of Archeology in Xinjiang, preliminary scientific examination of fragments of ore, slag, and matte from this site have been undertaken using chemical analysis and scanning electron microscopy with energy dispersive X-ray analysis at the Institute of Historical Metallurgy, University of Science and Technology in Beijing, China. In summary, the analyses have revealed: (1) The ore from the Nurasay site is copper sulphide ore with 4.5-10.4% Cu, containing Pb, Zn and a small amount of As; the main constituents of the gangue are BaO and CaO. (2) The slags contain Cu 0.26-4.19% , As 0.04-1.06% and S 0.04-3.0%, and its main constituents include SiO_2, BaO, TFe, CaO, and Al_2O_3; (3) The metalloid prills in the slags have been identified as Cu-As, Cu_2S, Cu_2S+FeS, Fe-Pb-Cu, and Pb-As-Fe etc., and show some interesting features of the ancient process; (4) From slag remelting experiments, the smelting temperature of the ancient process at the Nurasay site was in the region of 1200°C. (5) The copper matte contains arsenic and lead, and is comprised mainly of Cu-As, Pb-As and Fe-As-Cu phases. There is no evidence, so far, of tin at this site (Mei & Li 1996).

The above preliminary results suggest that copper sulphide ores and arsenide ores were probably used for smelting a copper-arsenic alloy at the Nurasay site. As it is well known that the technology for smelting copper sulphide ores is more complicated than that for oxide ores, such a smelting practice at the Nurasay site records a distinct stage of advance in the metallurgical technology of Xinjiang during the first millennium BCE. The metallurgy of Cu-As is quite different from that practiced in the Central Plains area of China during the same period. Indeed, little scientific evidence has been reported thus far for the production and use of arsenical copper in central China during the Bronze Age. The Nurasay site is actually the first ancient arsenical copper smelting site found within the present boundaries of China. However, recent archeological finds of copper artifacts from the Siba Culture (around 1600 BCE) in Gansu are of special significance, because scientific examination by the Institute of Historical Metallurgy in Beijing has revealed that 15 copper artifacts from the Siba Culture site of Donghuishan are made of arsenical copper by both hot-forging and cold-working (Sun Shuyun, *et al.* 1994; Xu Yongjie 1995). These far western finds are the first of Cu-As alloy among early copper artifacts in China.

It is worth recalling that arsenical copper was produced and used extensively and widely in Central Asia and the Near East during the Early Bronze Age (Terekhova 1981: 319; Ravich & Ryndina 1995; Eaton & McKerrell 1976; Zwicker 1990; Renfrew 1967: 13-14). For example, among the metal objects found at Altyn-depe, an important Bronze Age settlement in Central Asia, alloys of copper with arsenic

(As 1.5-8%) are widely distributed, while Cu-Pb alloys (Pb 7-12%) are less used and Cu-Sn alloys rarely found (Masson & Kiiatkina 1981). Thus, the possibility that the Nurasay site has a direct link with these earlier processes in adjacent regions should be considered. Unfortunately, the present level of scientific examination of early copper and bronze objects is too restricted to provide substantial evidence for this possible metallurgical connection in the prehistory of Xinjiang. Further research in both an archeological and archeometallurgical context is required on the use of arsenical-copper in prehistoric Xinjiang and its possible links with the bronze cultures of the surrounding regions.

6. Conclusions

Our knowledge of prehistoric metallurgy in Xinjiang has been greatly enriched by recent archeological finds, revealing the earliest appearance of copper, the practice of casting, the use of leaded-copper and tin bronze, and the smelting of arsenical copper. This preliminary study of the distribution of unearthed copper and bronze artifacts suggests the existence of three centers for the use of copper and its alloys. These centers are close to copper ore resources, suggesting the possibility of, or potential for, local metal production. Scientific examination of the Nurasay mining and smelting site demonstrates the practice of the smelting of arsenical copper, indication of an important advance in the prehistoric metallurgy of Xinjiang. The archeological finds available to date also provide some evidence for close links between Xinjiang and its neighbors.

The research that has been done so far is very preliminary. There are many questions that remain to be answered. Furthermore, the complete lack of archeological evidence for the use of copper and bronze before 2000 BCE makes it difficult to discuss the nature of possible influence from the West on the origins of metallurgy in China. Evidence for prehistoric mining and smelting in Xinjiang is presently quite scant, severely limiting further discussion. Some important aspects concerning connections between Xinjiang and its neighbors are still unclear and require further exploration.

There is some evidence to show that the appearance of iron in northwest China was associated with significant changes in economy and culture of the society around 1000 BCE. Thus, the beginning and early use of iron is another important aspect of prehistoric metallurgy in Xinjiang, which has not been discussed in this paper, but has become part of our research focus.

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Abbreviations Used in References

KG *Kaogu* (Archeology)
KGXB *Kaogu xuebao* (Acta Archaeologia Sinica)
KYW *Kaogu yu wenwu* (Archeology and Cultural Relics)
WB *Wenbo* (Relics and Museology)
WW *Wenwu* (Cultural Relics)
XJSK *Xinjiang shehui kexue* (Social Sciences of Xinjiang)
XJWW *Xinjiang wenwu* (Cultural Relics in Xinjiang)
ZKN *Zhongguo kaoguxue nianjian* (Chinese Archeology Yearbook)

Translation of the Chinese Publishers:

Wenwu Chubanshe: Cultural Relics Publishing House
Xinjiang Renmin Chubanshe: Peoples Publishing House of Xinjiang

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Cultural Diversity in the Tarim Basin Vicinity and Its Impact on Ancient Chinese Culture

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Denver Art Museum

Recent archeology in the Tarim Basin and the surrounding areas has yielded a surprising diversity of Bronze and Iron Age artifacts that are not reflections of Central Plains traditions which have been diffused westward. Instead, some of these unusual artifacts reflect traditions that can ultimately be traced back to cultures documented far to the north and west.

The traditions that had defined Imperial China in the past can no longer be considered the result of a single homegrown cultural continuity that originated in the Central Plains region. Instead, the ancient Chinese world was continually enriched by the exploitation of technologies, artifactual types, and artistic motifs from beyond its frontiers. Once acquired, the "borrowed components" were Sinicized through China's unique and inventive ability to adopt, adapt, assimilate, and absorb. This process of continuous cultural enrichment from "outside" was what made Chinese civilization great and kept it from the debilitating excesses of cultural inbreeding throughout history. The fact that certain features present in other ancient cultures are absent in ancient China is not to suggest a cultural deficiency, but to recognize that these absences were due to a process of cultural choice that appears to have governed certain aspects and developments of ancient Chinese culture.

Sinification was sometimes so thorough or resulted in such an unrecognizable sinological mutation that the original sources of certain borrowed cultural components were often forgotten in the vastness of China. This is particularly true in respect to the early knowledge of gold and silver in ancient dynastic China as well as various related metalworking techniques that were learned through contact with other peoples on the northwestern frontiers.

Gold and Silver in Ancient Dynastic China

Gold and silver were major symbols of prestige, power and wealth in many ancient cultures. The graves of the elite in Bronze Age northwest Eurasia abound with artifacts made of gold and silver, depending upon the status of the owner (Clark 1986:50-57).

In ancient dynastic China, this was not the case. Instead, long before the development of metalworking, jade and other natural materials had been awarded pride of place for personal adornment. By the Shang period, cast bronze had become the metal of choice for ceremonial vessels and other prestigious items. The fact that the earliest dynastic peoples featured jade and bronze rather than gold and silver has led scholars to believe that the precious metals were rare and seldom used in ancient China (Bunker 1993:27-28).

Gold and ultimately silver played distinct roles in dynastic Chinese art, but different from those that they played in the art of Bronze Age northwest Eurasia. The ancient dynastic Chinese expressed status and rank by wearing jade or other natural materials and by the possession of large amounts of bronze ceremonial paraphernalia, whereas the peoples of northwest Eurasia expressed status and rank with precious metals, particularly on their bodies in the form of personal adornment. In ancient dynastic China, metal was not worn next to the skin.

The precious metals were clearly available, though not in sufficient amounts to have cast the vast numbers of vessels required to satisfy early dynastic China's ritual needs. The status of gold and silver within ancient dynastic China's hierarchy of metals and their availability therefore appear to have been important factors in the decision to use or not to use them in the Central Plains region during the Bronze and early Iron Age.

Gold was readily available in a metallic state throughout ancient China. The major source appears to have been alluvial gold, known as placer deposits, that had been washed down the mountains and deposited in streams where they were easily collected (Golas forthcoming; Bunker 1994a: 32-33). By contrast, silver was never readily available in China and never considered to be as desirable as jade, bronze, or gold. Silver does not occur in placer deposits, and is not as easy to obtain as gold. It does occur in veins that can be mined in mountainous areas in northwest China, such as Shanxi, Ningxia, and Gansu, as well as in the south, but only in very small amounts (Golas, forthcoming). Instead, it is more commonly acquired through a complex cupellation process in which the metal is extracted from silver bearing ores, such as galena. Although cupellation appears to have been known far earlier in India and the ancient Near East, there is no evidence that it was known in China until the first millennium CE (Bunker 1994a:51, note 56.).

Gold was first used in dynastic China during the late Shang period, but only for decorative purposes. Gold itself did not reflect status or have any intrinsic value in the world of the Shang, but the artifacts that it decorated did. Instead, gold's importance lay in its brilliant yellow color and its workability. It was used to decorate artifacts made of other materials, such as bronze and lacquer. Gold never gained the prominence in Chinese culture achieved by jade, the symbol of excellence that had developed during the Neolithic period, or bronze, the metal of choice for ceremonial vessels and other prestigious items.

Silver appears to have been virtually unknown in dynastic China until the Warring States (475-221 BCE). Like gold, it was first used for decorative purposes to inlay bronze and other materials, and valued more for its color and malleability. The fact that silver loses its shiny whiteness and tarnishes, while gold does not, must also have been a major factor in the lack of interest in silver.

Historical References

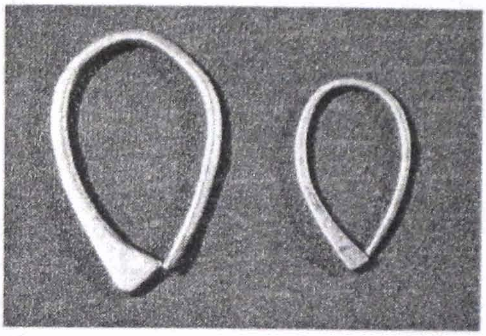
Ancient Chinese literary references to gold and silver are of little help in establishing their origins. A search for gold is hampered by the fact that the character *jin,* which means gold today, is the "metal" radical and also referred to copper and bronze in ancient literature. In the *Erya,* a third century BCE dictionary, gold is described specifically as *huangjin* (yellow metal), by contrast with silver, which is described as *baijin* (white metal) (Bunker 1993:29; 1994b:73-79). After the Han period, silver came to be known as *yin.*

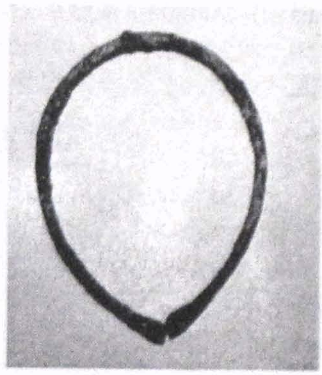
Silver is listed among the items of tribute from the south in the "Yugong" (Tribute of Yu) chapter of the *Shang shu* (*Book of History*), more commonly referred to as the *Shujing* (*Document Classic*) (Legge 1935:110, 115, 121), but this is probably due to a later reinterpretation of the "Yugong" which was not written down until long after the Western Zhou period (Creel 1970:153; Shaughnessy 1993:376-389). The *Shang shu* was also partially destroyed during the first Qin emperor's reign, so the remaining versions may have interpretations reflecting Han concepts that would certainly include silver. A curious passage in the *Shiji* (*Records of the Grand Historian*) reads "the Shang dynasty ruled by metal and silver flowed out of the mountains" (Watson 1993: II, 11). According to Burton Watson, the reference to silver may be a Han interpretation by Sima Qian (Bunker 1994b:73) The passage was apparently taken from a section of the Qin dynasty text titled *Lüshi chunqiu* (The Spring and Autumn of Mr. Lü), where a subsection titled "Yingtong," (Responding to What Is the Same) in chapter 13 says, "the Shang dynasty ruled by the power of metal and honored the color white," but does not mention the metal, silver, specifically (Bunker 1994b:73).

The Earliest Gold and Silver Artifacts Found in Present-day China

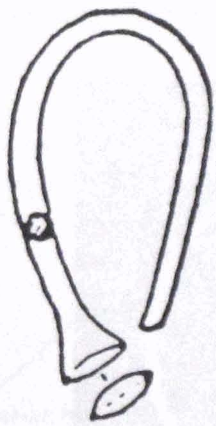
In the absence of written texts documenting how certain cultural components were introduced into ancient dynastic China, we must rely on archeology. A comparison between artifacts excavated from early Bronze Age sites in the Tarim Basin vicinity and similar examples excavated farther east provides fresh insight into the early beginnings of gold and silver metallurgy in nuclear dynastic China, and their connection with the Tarim Basin vicinity.

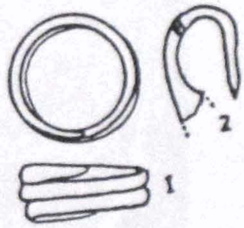
Numerous pastoral peoples who were culturally distinct from the Xia, Shang and Zhou inhabited the peripheral areas in present-day north and northwest China during the second and first millennia BCE. These peoples adorned their bodies with metal jewelry, frequently made of gold, bronze or occasionally silver. By contrast, the Xia, Shang and Zhou peoples did not wear metal jewelry next to their skin.





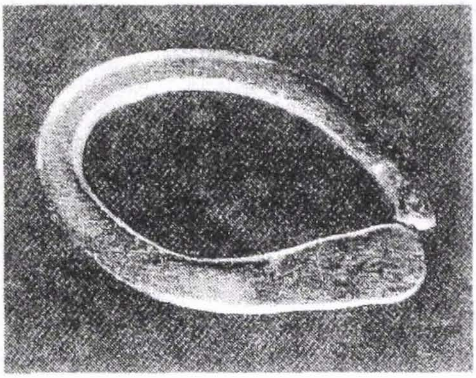
1. Two cast gold earrings from M79, Huoshaogou, Yumen, Gansu (after Han Rubin 1993).
2. Cast bronze earring from Zhukaigou, Yijinhuoluo Banner, Inner Mongolia Autonomous region. Photograph by Emma C. Bunker





3. Copper or bronze earring from Pingdingshan, Fuxin, Liaoning (after Bunker 1993:37, fig. 4).
4. Copper or bronze earring and hair-ring from Liulihe Fangshan, Beijing (after *Kaogu* 1976.1:60, fig. 4).

Excavations at Huoshaogou, in northwest Gansu near Yumen city, have yielded the earliest gold and silver artifacts discovered in present-day China from burials dated by carbon-14 to the early second millennium BCE (Bunker 1993:31; Barnard 1993:25). Two gold earrings found in M79 are each pennanular in shape with a single flaring terminate (fig. 1), and cast in a natural gold alloy containing 93% gold and 7% silver. Such earrings cast in copper and bronze appear farther east at slightly later sites at Zhukaigou in the Ordos Desert (fig. 2); at Pingdingshan, Fuxin, Liaoning (fig. 3), and at Liulihe, Fangshan, Beijing (fig. 4). Recently a gold example was discovered at a lower Xiajiadian site southeast of Dadianzi Village, Aohan Qi, in southeastern Inner Mongolia (fig. 5). Zhu Shoukang has published information about the bronze and copper artifacts from Huoshaogou (Zhu Shoukang 1982, pp. 3-15), but only Professor Han Rubin of the Institute of Archeometallurgy, University of Science and Technology Beijing, and her group have recognized the importance of the Huoshaogou gold and silver artifacts, many of which I was fortunate enough to examine last year with Professor Han in Lanzhou, Gansu (Han Rubin 1993).

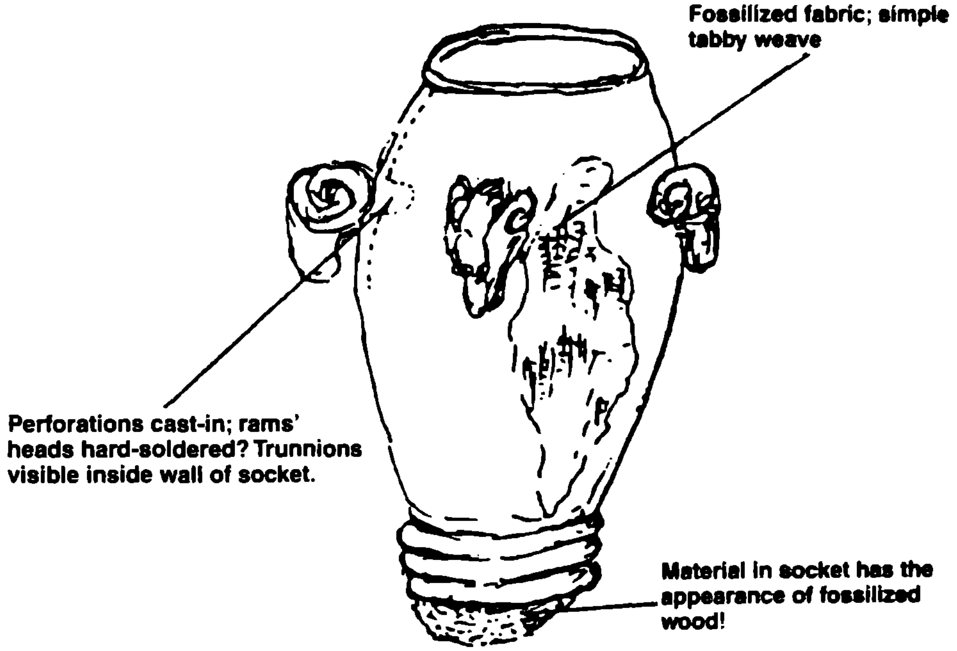


5. Gold earring from Lower Xiajiadian site southeast of Dadianzi Village, Aohan Banner, Inner Mongolia Autonomous Region (after Institute of Archaeology, CASS, 1993:143:2).

6. Cast silver nose-ring from Huoshaogou, Yumen, Gansu (after Han Rubin 1993).

The silver artifact from the Huoshaogou site is a startling item. It is a nose-ring made of a silver/copper alloy and is pennanular in shape with two flaring terminates (fig. 6). Other nose-rings cast in gold and copper were also discovered at Huoshaogou. To date, nose-rings have no precedent in either Central or East Asia. The notion that the nose-ring is an ancient Indian custom cannot be confirmed (Pant 1994:8). Instead, it has been suggested that the fashion may be traceable to some ancient Near Eastern or Egyptian source, although the evidence for this theory is, as yet, slim (Pant 1994:8; Bunker the evidence for this theory is, as yet, slim (Pant 1994:8; Bunker 1994b:73). In any event, the Huoshaogou nose-ring is the earliest known silver artifact excavated within China's present borders.

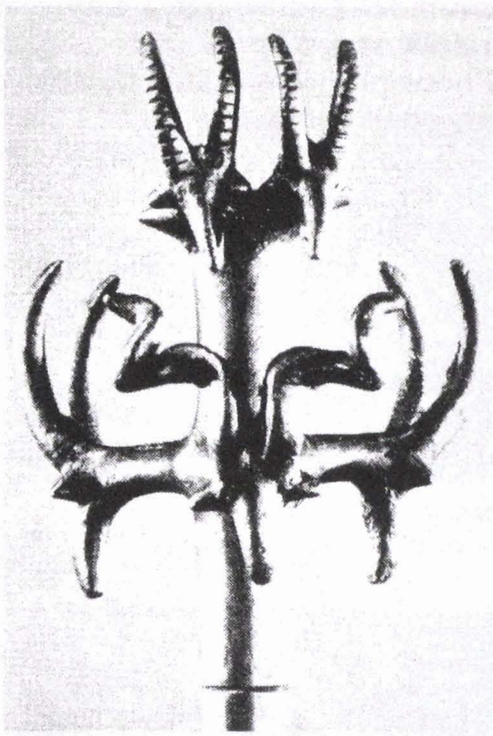
Apart from this example, silver is conspicuously lacking at Chinese Neolithic and Bronze Age sites, and does not appear to have been considered desirable in Bronze Age dynastic China. By contrast, silver ornaments were often used by the pastoral groups that occupied the Ordos region (Zhongguo wenwu jinghua 1993:pls. 104-107) and southern Ningxia between the fifth and third centuries BCE (Zhong Kan 1978: p. 89, fig. 9:1). After contact with these pastoral groups, silver began to be popular in dynastic China, but was used primarily for its color and decorative purposes to enhance bronze rather than for its intrinsic value. In comparison with gold, silver was never plentiful in China, although deposits have been identified in southwest and northwest China, including Gansu. The lack of interest in ancient dynastic China in silver appears to have been a cultural choice. Unlike gold, silver was not associated with the Daoist search for immortality that developed during the late Warring States and Han periods.



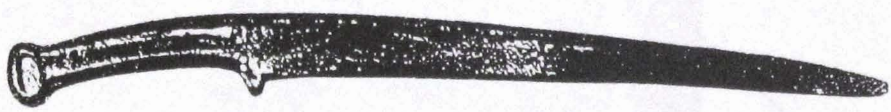
7. Cast bronze macehead from Huoshaogou, Yumen, Gansu (drawing from Noel Barnard 1993:12, fig. 4).

Huoshaogou also yielded a bronze macehead decorated with four projecting goat heads (fig. 7). The macehead is cast by the piece mold technique, indicated by mold marks visible within the shaft hole (Barnard 1993:12, fig. 4). Again we are dealing with a shape that can not be traceable to East Asia. The Huoshaogou design appears to relate to Central Asian and ancient Near Eastern designs, such as a stone macehead from Bactria (Pottier 1984:pl. VIII:190, no. 52; fig.

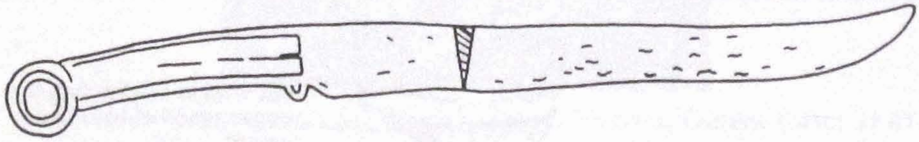
9:143; pp. 17-18) and a copper standard from Nahal Mishmar (fig. 8), discovered on the west banks of the Dead Sea (Levy 1986:91), but not the casting technology. The Nahal Mishmar standard is lost wax cast of an arsenical copper, and dates to the fourth millennium BCE (Hunt 1980:64).



8. Detail of copper standard from Nahal Mishmar, Palestine (after Levy 1986:91).

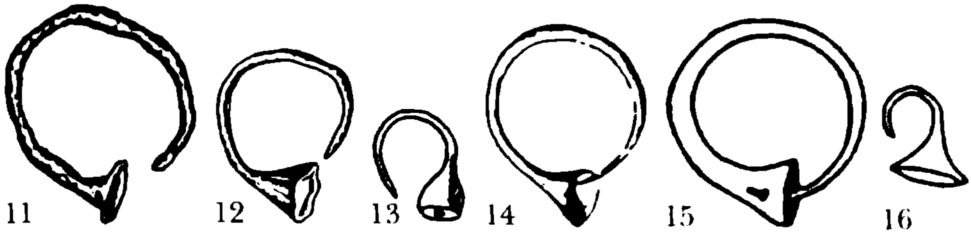


9. Bronze knife from Toqsun, Xinjiang Uighur Autonomous Region (after Mu Shunying et al. 1994:50, fig. 101).



10. Knife from Zhukaigou, Yijinhuoluo Banner, Inner Mongolia Autonomous Region (after So & Bunker 1995: p.37,fig.11).

Contact between the Tarim Basin regions, the Ordos in northwest China, and the Central Plains is not lacking. A long knife excavated from Toqsun, Xinjiang (fig. 9) is almost identical in type to an example excavated from M1040 at Zhukaigou in the Ordos (fig. 10). Another knife found near Qumul (Hami) with an ibex head shaped pommel (Mu Shunying et al.:50, no. 100) is similar to knives associated with non-Shang burial sites in north China (So and Bunker 1995:101, no. 15) and at Shang burials in the Anyang area. A *ge* blade, a typical Shang weapon, excavated in the Ordos at Zhukaigou (Tian and Guo 1988: pl. 8:7-8) provides evidence for contact between the Shang and the non-Shang Ordos region.



11 12 13 14 15 16

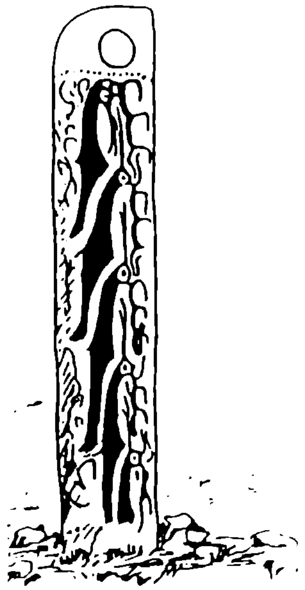
11. Bronze earring from Tagirmen Sai near the Amu Darya River in the Aral Sea region (after P'yankova 1994:366).
12. Bronze earring, Andronovo Culture, western Siberia (after Masson 1992:349, fig. 4).
13. Bronze earring, Malyi cemetery near Tomsk, western Siberia Andronovo Culture (after Gimbutas 1965:101, fig. 61:14).
14. Bronze earring, Andronovo Culture, western Central Asia (after Masson and Sarianidi, 1972:149, fig. 40).
15. Copper earring covered with gold foil from the Altai (after Jettmar 1951, pl. I:B:10).
16. Gold earring from Liujiahe, Pinggu, Beijing (after Lin Yun 1986:249, fig. 50:8).

A later variety of penannular earring also originated to the west of present-day China, and was transmitted eastward to the peoples living along ancient dynastic China's northern frontiers. For example, compare bronze earrings from Tagirmen sai, near the Amu Darya in the Aral Sea region (fig. 11), Andronovo culture earrings from western Siberia (figs. 12 -14), and a copper earring covered with gold foil from the Altai (fig. 15), to a gold earring excavated at Liujiahe, Pinggu, Beijing (fig. 16).

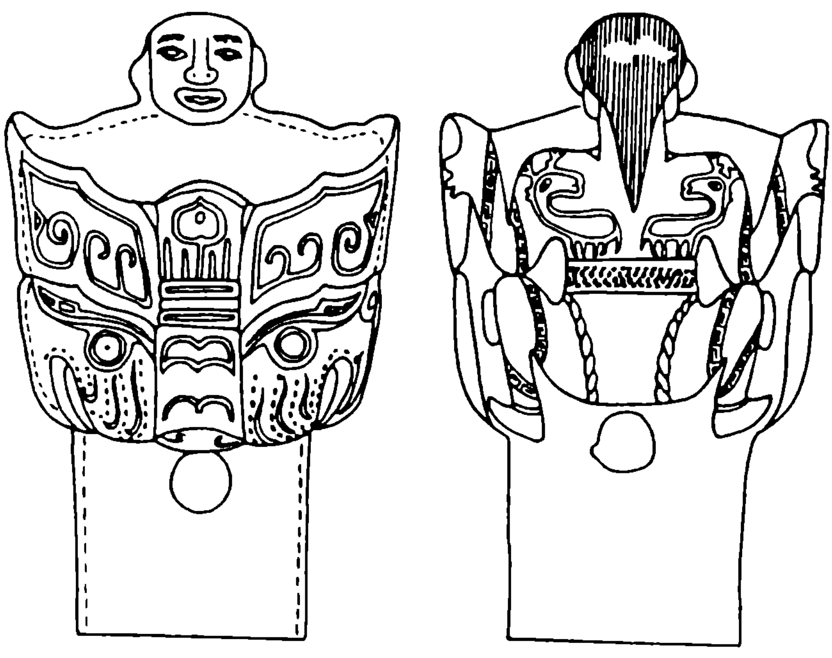
Further evidence for the transmission of cultural features from west to east is provided by a comparison between the so-called "deerstones" found in northern Xinjiang province (fig. 17), and the costume worn by the man that surmounts a chariot fitting excavated from a Western Zhou period site at Rujiazhuang, Baoji xian, Shaanxi (fig. 18). Both appear to wear clothes (perhaps felt) that are appliqued with deer figures. Similar "deerstones" are also found in western Mongolia (Fig. 19).

A later example of cultural transmission from Xinjiang in the Tarim Basin vicinity into China is the introduction of mechanically linked chains into the Ordos region. A gold chain excavated from the ancient tombs of Alwighul, South Mountain (fig. 20) is an example of the "loop-in-loop" construction in which the chain is made by attaching in sequence previously prepared wire loops in a complex way (fig. 21). The links are made of strip-twisted wire (fig. 22)

(Bunker 1994a:46-47). Such a chain was excavated at Aluchaideng, Hangjin Banner, a third century BCE Inner Mongolian site in the Ordos area (Tian & Guo 1980: pl. 12:6). A microscopic examination of gold earrings excavated in the Ordos at Xigoupan, Jungar Banner (Tian & Guo 1986: color pl. IV:2; Bunker 1994a:95, no. 16) reveals that the wire forming the earring cones is strip-twisted, indicated by the spiral seam lines. Strip-twisted wire and the "loop-in-loop" construction ultimately can be traced back to the third millennium

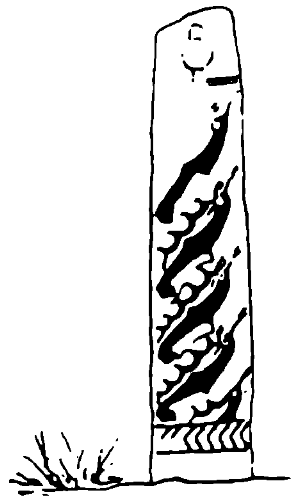


17. "Deerstone" from Kök-totay, Xinjiang Uighur Autonomous Region (after Mu Shunying et. al. 1994:129).

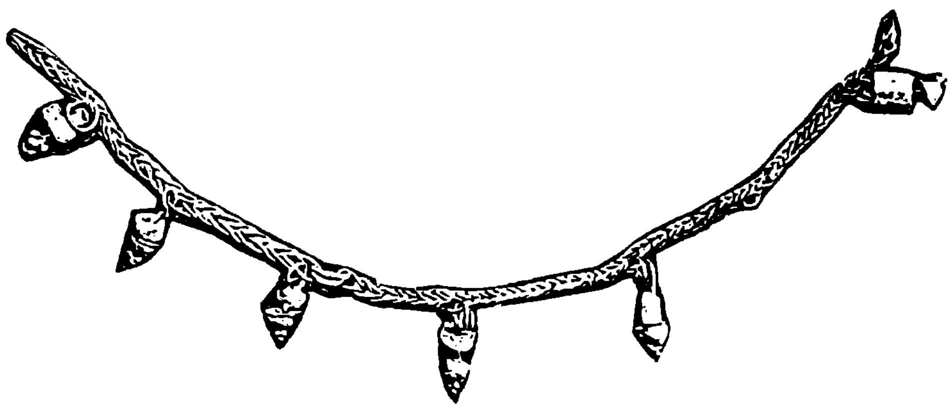


18. Bronze chariot fitting from Rujiazhuang, Baoji, Shaanxi (after Lu Liancheng & Hu Zhisheng 1988: vol. 1:403, fig. 272:1.).

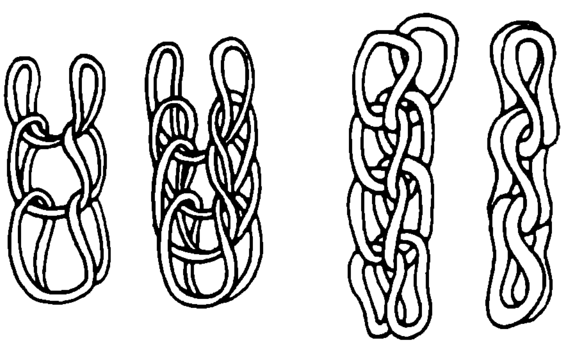
BCE in Sumeria and Egypt (Bunker 1994a:46-47). These chains were introduced into Central Asia by Hellenistic craftsmen during the fourth century BCE. This type of linked chain was also discovered on a gold earring among the grave goods from a mound on the Chilik River in Kazakhstan (Akishev 1978:125). Chains with a loop-in-loop



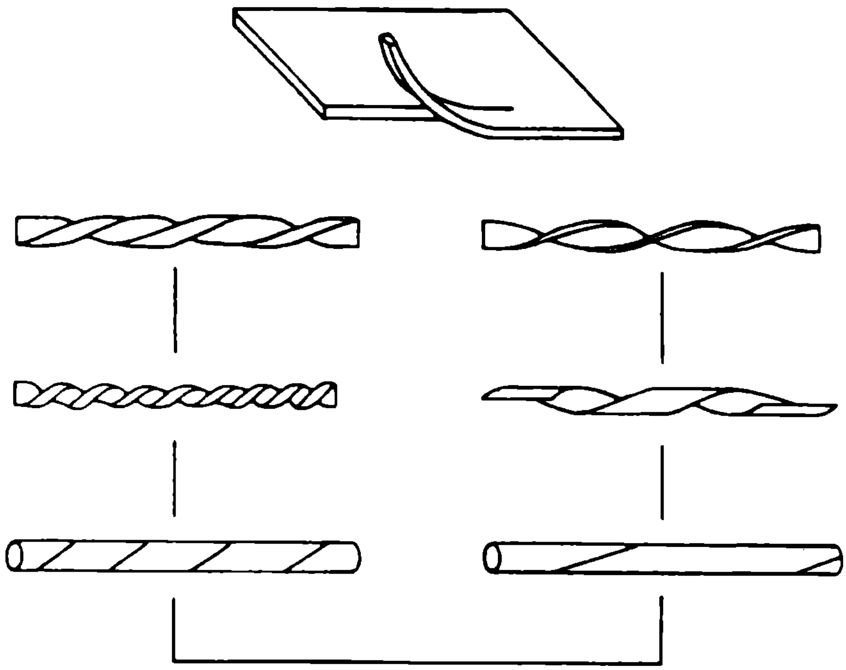
19. "Deerstone" from western Mongolia (after Volkov 1967, pl. 28).



20. Gold "loop-in-loop" chain with jade pendants from Alwighul, South Mountain (Nanshan), Xinjiang Uighur Autonomous Region (after Mu Shunying et. al. 1994:59, no. 144).



21. Stages in the "loop-in-loop" chain construction (after Bunker 1994a:47. fig. 9).



22. Stages in "strip-twisted" wire (after Ogden 1976:46).

construction were likewise found on earrings farther east in nomadic graves near Guyuan, Ningxia Hui Autonomous Region (Luo Feng and Han Kongle 1990: pl. 5:6). Such chains were the metalsmith's counterpart to the time-consuming foundry-produced chains formed by casting and "casting-on" commonly used in dynastic China until loop-in-loop chains replaced them during the first millennium CE.

Chinese metallurgical techniques similarly flowed westward. Mercury-amalgam gilding originated in dynastic China during the Warring States period, and then was transmitted westward. Mechanical gilding by overlaying an object with a thin hammered sheet of gold had been introduced into dynastic China during the late Shang period through contact with the northern hunting and herding peoples. The later more important chemical gilding technique, mercury-amalgam gilding, developed in dynastic China during the Warring States period when a Daoist preoccupation with immortality, accompanied by scientific advances in alchemy, stimulated the search for man-made gold (Bunker 1994a:47-48).

Conclusion

The available archeological evidence suggests that an initial interest in gold was introduced into dynastic China during the latter part of the second millennium BCE through contact with non-Shang peoples on the northwestern frontiers, many of whom had contact with peoples farther west in the Tarim Basin vicinity of Central Asia. By the mid-Warring States period, gold was no longer just used for decorative purposes, but had become a major symbol of wealth and prestige, as well as a talisman with jade against decay (Bunker 1993:47-

48). Further interaction during the first millennium BCE between the dynastic Chinese and other peoples to the northwest stimulated an interest in the use of silver, although it did not really come into its own in China until the Tang period (Bunker 1994b:76-77).

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The Emergence and Demise of Bronze-Producing Cultures Outside the Central Plain of China[1]

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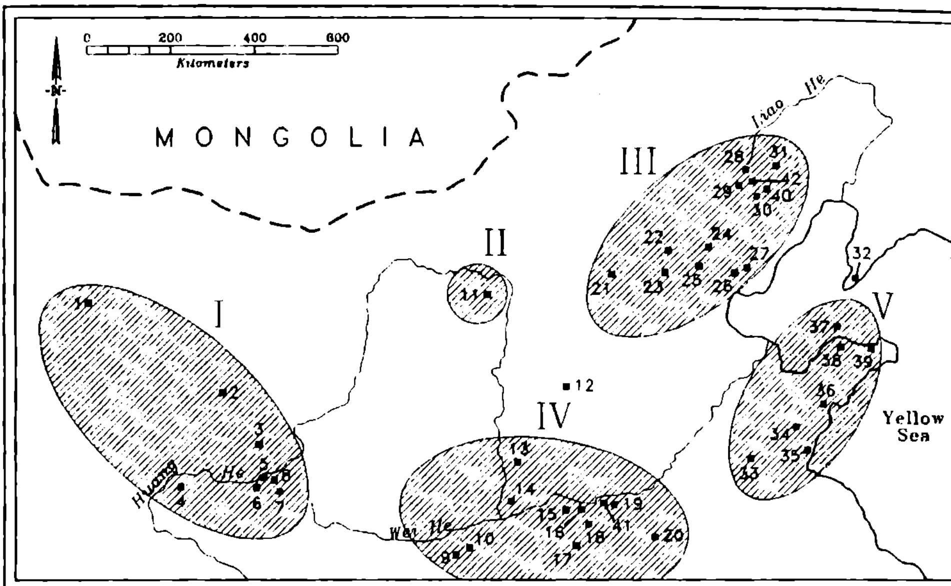
University of Pittsburgh

In the late third and early second millennia BCE metal-using, agriculturally based societies emerged in several locations in north Asia–in Qijia sites in Gansu, Qinghai, and Ningxia; in western Inner Mongolia (Zhukaigou); in southeast Inner Mongolia, Liaoning, and northern Hebei (Xiajiadian sites); in Shandong and in the Central Yellow River Basin (Erlitou). By the mid-second millennium BCE sites in the Central Plain were characterized by cast bronze ritual vessels and had developed into what is often considered the earliest Chinese dynastic centers (Levels 3 and 4 at Erlitou, and the Erligang sites). At the same time, the other areas became "frontiers" and settled into an interdependent relationship with the powerful Chinese groups in the Yellow River Basin. Finally, many of these established locations were abandoned. Why and how these communities grew, changed and disappeared is the focus of this paper.

The relationship between the Chinese and the "others" was a subject of great interest to the early Chinese historiographers. They clearly stated that their forebears were not alone in the Yellow River Basin and its surrounds to the north and west in what has been called the northern corridor by modern historians. Their neighbors who practiced pastoralism and spoke non-Sinitic languages were labeled "barbarians" and were thought of as outsiders, since only the Chinese-speaking agriculturists were included as members of the Central Kingdom. These "barbarians" were, however, often central players in the sagas spun by the early Chinese writers.

Archeological recoveries of the last decade have made it possible to begin to assess the contribution of these groups who lived outside the Chinese political centers. The appearance of distinctive cultures, their independence of as well as reliance upon the cultures of the Central Plain, their role as frontier communities in relation to the dynamics of the Shang dynastic network, and their apparent demise at the end of the second millennium BCE are questions which will be addressed.

[1]I am grateful to Emma C. Bunker for reading an earlier draft of this paper and for making many helpful comments.



— — COUNTRY BORDER ■ ARCHAEOLOGICAL SITE

1	Qingquan *(H)*	15	Donggangou *(E)*	29	Xiajiadian *(L)*
2	Huangniangniangtai *(Q)*	16	Erlitou *(E)*	30	Xiaoyushulinzi *(L)*
3	Jiangjiaping *(M)*	17	Meishan *(L.H)*	31	Dadianzi *(L)*
4	Gamatai *(Q)*	18	Wangchenggang *(L.H)*	32	Yangtouwa
5	Dahezhuang *(Q)*	19	Dongzi *(L.H)*	33	Yijiacheng *(YU)*
6	Qinweijia *(Q)*	20	Pingliangtai *(L.H)*	34	Chengzi *(L.T)*
7	Qijiaping *(Q)*	21	Sanguan *(L)*	35	Wangchenganyao *(L.T)*
8	Linjia *(M)*	22	Xueshan *(L)*	36	Sanlihe *(L.T)*
9	Banpo *(Y)*	23	Liulihe *(L)*	37	Beichangdaodianzi *(L.T)*
10	Jiangzhai *(Y)*	24	Zhangjiayuan *(L)*	38	Yangjiaquan *(L.T)*
11	Zhukaigou	25	Datuotou *(L)*	39	Zhaogezhuang *(YU)*
12	Wuyuanxian	26	Dachengshan *(L)*	40	Niuheliang *(HO)*
13	Taisi *(L.TA)*	27	Xiaoguanzhuang *(L)*	41	Niuzi *(L.T)*
14	Dongxiafeng *(E)*	28	Yuewangmiao *(L)*	42	Sifendi *(L)*

H–Huoshaogou HO–Hongshan L–Lower Xiajiadian L.H–Henan Longshan L.T–Typical Longshan
L.TA–Taosi type of Longshan M–Majiayao Q–Qijia Y–Yangshao YU–Yueshi

Figure 1: The Distribution of Excavated Sites from the Early Bronze Age in Northern China. North Asian Metal-Using Cultures: Late Third to Early Second Millennium BCE.

Introduction

Objects fashioned in metal are found in several late Neolithic communities from the late third to early second millennia BCE in several regions across northern Asia. (Fig. 1: Map I) Known sites where bronze first appeared in East Asia stretch across a large area from present-day western China, across her northern frontier, to the eastern seaboard in and to the north of the Central Plain (Zhongyuan).[2] Excavations in these areas show that these

[2]Two recent studies in Chinese have approached these same questions. Archaeometallurgy Group (BUIST) Beijing University of Iron and Steel Technology, "A Preliminary Study of Early Chinese Copper and Bronze Artifacts," *KGXB*, 1981(3), 287-302; and an article by An Zhimin in which he reversed his long-held claim that bronze was invented in East Asia in the Central Plain; see *KG*, 1993 (12), 1110-1119. See also: N. Barnard, "Thoughts on the Emergence of Metallurgy in Pre-Shang and Early Shang China, and a

communities were populated by sedentary farmers, that metals were both worked and/or cast in simple, direct-process molds, and that the types of objects manufactured were almost exclusively tools and personal ornaments. This evidence, although exciting to historians of metallurgy, does not fit many long-held notions about the emergence of metal use and its corollary, state-level society, in China.

By the mid-second millennium BCE, sites in the Central Plain of China are characterized by cast bronze ritual vessels often considered the hallmark of the earliest Chinese dynastic centers. Social hierarchy was manifest in differential burial customs, in the prescriptive process of bronze designing and casting,[3] and in the ideology evident in the type and decoration of status objects such as bronze vessels and weapons, jade tools, and ornaments. These features suggest that local forces in the Central Plain, or at levels 3 and 4 at Erlitou and its vicinity in the early second millennium BCE were primed to, and did, generate large, stratified and permanent socio-political entities that may be characterized as states.

At the same time, the other communities which had also exhibited pre-state conditions, including the beginnings of metallurgy, experienced no such development and became "frontiers." By the end of the Shang Dynasty, many of these sites were abandoned or their occupants had settled into an ambivalent relationship with the powerful Shang.[4] What was it that worked against their incorporation into the larger dynastic system and/or prevented them from developing statehood on their own? How can the decline or eventual demise of these communities by the end of the Shang be explained?

Data from prehistory for socio-political development in northern Asia and the place of metallurgy in this process are extremely limited by world standards; nevertheless, I present here some "ideas in progress" about it. I will suggest a working model for the study of the formation of cultural traditions in the "Northern Corridor"[5] which

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Technical Appraisal of Relevant Bronze Artifacts of the Time," *Bulletin of the Metals Museum*, Vol. 19, 1993, pp. 3-48; and N. Barnard, "Bronze Casting Technology in the Peripheral 'Barbarian' Regions," *Bulletin of the Metals Museum*, Vol. 12, 1987, pp. 3-37.

[3]See Ursula Franklin, "The Potential of Technical Studies," in G. Kuwayama, (ed.), *The Great Bronze Age of China* (Los Angeles: Los Angeles County Museum, 1983). She connects the multi-task process of bronze production evidenced in the piece-mold casting technique to the necessity for ranked, hierarchical social organization.

[4]Oracle bone inscriptions record hostile relationships as well as such activities as marriage contracts with ethnic groups other than the Chinese–the Qiang, for example.

[5]This is the arid region of grasslands and mountains north of the Central Plain, bound on its south by the rim of the Mongolian Basin. The term is used

takes into account a different, but nonetheless complex, socio-cultural organization at the periphery of early dynastic China. That model will be examined in light of materials excavated from all these metal-using sites, but especially in relation to the site at Zhukaigou[6] in the region of the Ordos, the heartland of nomads centuries later.

Background: Traditional Models

From antiquity to the present day, much scholarly attention has been given to the rise of state-level society in the Central Plain with considerably less research on regions beyond. The relationship between the "successful" dynasts and their neighbors has been characterized as alternating between clientage and antagonism. For example, the well-known origin myth of the Zhou clan includes a period of contact with, and perhaps even conversion to, the ways of the "barbarians."[7] This incident was given a negative interpretation in the early history of the Zhou people. Taking on the ways of the barbarians contributed to their characterization as a people more primitive than the civilized Shang, according to early historians.

Although this attitude may not have characterized that held by the Zhou themselves, it was clear that contact with those "others" created an image problem for the Zhou until the present day[8] and points out that the early Chinese historians both characterized these peoples as different from themselves as well as shunned their way of life, reflecting the social perception of physical features and habits.[9] But the archeological record suggests that at the critical, proto-dynastic period in the late third and early second millennia BCE, these cultures in the Northern Corridor were at a similar level of cultural development to Erlitou in the Yellow River Basin.

This information also contradicts traditional notions about the manner of cultural development which claimed that Chinese civilization developed in the Central Plain and spread from there to other parts of Asia. According to that model, the "core" developed and then spread to "peripheral" areas by way of political expansion and cultural diffusion. Even so, according to that explanation, some

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by Western historians to locate the area eventually inhabited by pastoral nomads in the late Zhou and earlier.

[6]Published in *KGXB*, 1988 (3), 301-331; *KGXB*, 1988 (3), 257-274.

[7]Recorded in the *Shiji*, Takigawa Kametarō, *Shiji huizhu kaozheng*, reprint, (Taibei: Wenshizhe chubanshe, 1993), juan 4, p. 4.

[8]This view, that the Zhou were a primitive, unsophisticated people, was challenged in the account of their early dynastic period by Cho-yun Hsu and Katheryn M. Linduff, *Western Chou Civilization* (New Haven: Yale University Press, 1988).

[9]For a review of the relevant historical texts and the background of these attitudes, see Frank Dikötter, *The Discourse of Race in Modern China*, Stanford: Stanford University Press, 1992, 1-17.

peoples remained "uncivilized" and/or resistant to the ways of the Chinese and to their political control. Several of these early metal-using communities presumably fit that latter description.

Early Chinese accounts clearly stated that their forebears were not alone in the Yellow River Basin and its surrounds, especially to the north and west, precisely in the region where several of the early metal-using communities have been found in the recent decades. The early writers marginalized these peoples by claiming that many of the neighboring peoples were outsiders, or "barbarians," for only Chinese speaking agriculturists could be included as members of the Central Kingdom. But even though they led a pastoral way-of-life and spoke non-Sinitic languages unlike those of the sedentary Chinese dynasts, they were often central players in the sagas spun by the early Chinese writers.

Although these writings cannot be taken as unbiased, historically accurate ethnographic accounts, they do suggest that, during the formative period of Chinese civilization, sedentary lifestyle was the desired norm and that the Chinese thought themselves to be vulnerable to those whom they characterized as living a different lifestyle. In spite of the questionable accuracy of those accounts, this northern zone did become the home of various pastoral nomads during the first millennium BCE. Is it possible that the roots of the pastoral economic system and its distinctive socio-political organization were already embedded in the late Neolithic societies in the Northern Corridor? When coupled with local ecological conditions, a trajectory different from that of the Central Plain could be expected as is recounted in the official histories. After a preliminary consideration of the regions where metallurgy was initially found, I will address this question specifically to the materials known from Zhukaigou in south, central Inner Mongolia.

The Archeological Record and Regional Lifeways

The archeölogical record of the earliest metal-using communities shared many significant features of sedentary lifestyle: they produced metal objects, their economies were based on agriculture and animal husbandry; they used oracle bones and animal sacrifice; they produced ceramics by hand and on the wheel. They are often characterized by Chinese archeologists as late Longshan-style communities. They include, however, quite distinctive local and steppe-style features as well.

How could this uniform beginning lead to such distinctive life patterns that modern historians such as Owen Lattimore could claim that Chinese and steppe cultures could neither absorb nor permanently subdue the other?[10] Of course, Lattimore was talking

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[10]O. Lattimore, *Inner Asian Frontiers of China* (New York: The American

about the Chinese and nomadic cultures of the later Zhou period, and he considered them as dichotomous, if equally potent, political powers. He described their lifestyles as mutually exclusive, the product of adaptive strategies peculiar to their geographic locations. Those to the north were nomadic; those to the south were agriculturists. What he did not know was that both groups probably stemmed from similar agricultural bases and that regional variation in lifestyle and material culture even within the Northern Zone would become apparent in the archeological record.

Initial analysis of these early bronze-using societies in the north suggests that in the mid to late second millennium BCE, they were at a turning point, one which eventually dramatically separated them from their neighbors to the south. This analysis will, hopefully, lead to a new understanding of the process of cultural change in the region.

Is the cultural diversity so clearly important to the ancient Chinese historians already apparent in the archeological debris at Zhukaigou in this period? And were regional, ecological features of topography, climate, rainfall, crop, and animal suitability tied to the future of these communities? These questions will guide my analysis.

Alternative Models for Culture Change

Greater texture has been given to the traditional, unilinear and bipolar views of early Chinese history in the past few decades with increased archeological activity in the "core area" and its anthropological analysis. For instance, K. C. Chang proposed that state-level society in China arose when several groups of equal social complexity, including those finally known by their dynastic titles, the Xia, Shang, and Zhou, were part of a sphere of interaction where the most powerful eventually dominated forming the sequence known as "Three Dynasties."[11] Affected by the traditional view, even this more recent research assumed that Chinese civilization originated from a centripetally formed assemblage of Chinese communities in the Yellow River Basin and then emanated from that center in a centrifugal manner to regions beyond.

From even more recent archeological records, however, evidence can be found which suggests that the contributors to the formation of early Chinese civilization included peoples from a very wide geographic spread and with distinctive regional traditions.[12] As a preface to state formation in the late third millennium BCE, for

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Geographical Society, 1940), p. 512.

[11]K.C. Chang, *The Archaeology of Ancient China* (New Haven: Yale University Press. 1986), 4th edition. The model was elaborated by Chang especially on pp. 242-245.

[12]K. Linduff, "The Many Worlds of China: Recent Archaeological Recovery and The Study of Chinese Art History," *Korean Ancient Historical Society Journal*, 1994, 405-441 and *Meishu xue*, 1995 (13), 7-36.

example, Chang notes that regional and local cultures over a large area were in contact with each other forming a network either through trade or conflict. In addition, sustained contact was thought to be linked to internal development of those involved. Within this wide interaction sphere, all cultures manifest similarities which resulted from contact among them. The formation of the "Chinese" sphere of interaction in this period and the transition to civilization were, therefore, part of the same development.[13] That is, participants were drawn into the Longshan sphere, according to Chang, as well as contributed to it.

Five regions were identified by their archeological debris as part of this interactive network dating from at least as early as 4000 BCE:

1. In Shandong, the region of the Dawenkou culture;
2. In the lower Yangtze Valley, the region of the Liangzhu Culture;
3. In the middle Yellow River Valley;
4. In Gansu where the Qijia Culture emerged at this time;
5. In the middle Yangtze Valley in the region of the Qinglongchuan III Culture.[14]

He proposed that these cultures were involved in an interplay which finally contributed to Chinese historic civilization.[15] What is still a matter of debate, however, is the extent and manner of interaction between the Central Plain and communities outside it.

By the end of the third millennium BCE, those regions in which some interaction can be proposed total five. (Fig. 1: Map I) In these areas, the known Neolithic sequence is deep; metals, occasionally gold but most often copper and bronze, were in use to fashion small implements and decorative items; and interaction among them can be proposed. Those cultures can be described as follows:

I. **The Qijia Culture** (c. 2300-1900 BCE; Zone I: Map 1)[16] in Eastern Qinghai, Ningxia, Gansu and southwestern Inner Mongolia is characterized by advanced farming, by villages located on terraces above rivers with no external fortifications, by "stone circle" ritual sites (reminiscent of the Hongshan practice) where animals were probably

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[13]Chang (1986), p. 243.
[14]Chang (1986), p. 244-245.
[15]Chang (1986), p. 242.
[16]"Copper" (analyses of metal knife and awl showed 99% copper with impurities of lead, tin, and so on of less than 0.4%) implements including knives, chisels, and awls, as well as earrings, finger rings, and mirrors (for instance, at Naimatai in Guinan, Qinghai) were unearthed. See *KGYWW* 1980 (3), 22-24; for general summaries of the Qijia culture, see *KGYWW* (3), 76-83; *KGYWW* 1980 (3), 77-82.

sacrificed, by oracle bones and metal objects (knives, axes, spoons, rings, and small ornaments) including ones of almost pure copper, of bronze, and of gold. Burials show a wide difference in size and amount of grave goods. Some include sacrifice of pigs (in large numbers) and sheep. Local pottery includes yellow or buff ware with combed or incised designs and shapes particular to the culture, especially a flat-bottomed jar with constricted neck, flared mouth, and two large vertical double handles. (Fig. 2: no. 22)

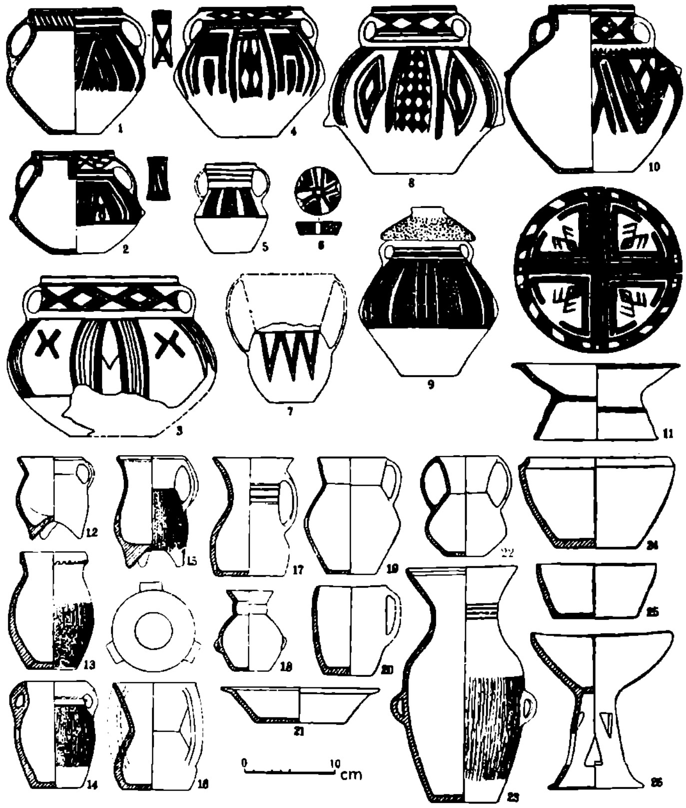

Figure 2: Pottery Types of the Qijia Culture: The double handled jar is also found in Zhukaigou. From *Xin Zhongguo de Kaogu Fajue he Yanjiu* 1(984), fig. 38.

Both hand- and wheel-formed Yangshao and Longshan pottery types and designs show affinities with the cultures in the Central Plains, suggesting indirect contact with groups to their east.[17] Other materials found in tombs at the important site of Huoshaogou,[18] for

[17]The most obvious contact culture is Kexingzhuang II. See Liang Xingpeng, *KGXB* 1987 (4), 407-411, and *KGXB* (1994 (4), 397-424.

[18]Excavations conducted by Wang Hui and Chai Shengfang at the site were begun in 1975 and continued through 1990, but unfortunately publication of the material has not yet occurred. The site is carbon-dated between 2000 and 1600 BCE (uncalibrated), or contemporary with the other metal producing sites in the Northern Zone. 330 tombs were excavated, and although a habitation site is known nearby, it is located under village buildings where

example, include items such as gold, silver/copper alloy, or bronze trumpet-shaped earrings, curved bronze knives, daggers (*bishou*) with leaf-shaped and pierced blades, bronze spearheads, mace heads and socketed axes. These types of artifacts are found among groups identified archeologically in the steppe of eastern Inner Asia and more particularly in Andronovo sites of southern Siberia.[19] Special rough, painted red pottery cups, some with double handles and others footed, and exceptional specimens with turquoise inlays around the base must be of local taste as they do not find parallel examples to date either to the east or west of Huoshaogou.

Of the 330 tombs excavated at the site, differentiation can be documented from evidence within tomb assemblages. For example, there are five types of single burials identified: one included a gold nose ring and a pair of bronze earrings; several had two bronze earrings; several included one gold earring; others had two gold earrings and the fifth type included one bronze earring. Explanation for this differentiation is not yet determined, but it suggests some sort of complexity. These metal items were produced by heat forging, then cold hammering, methods not usually associated with the Central Plain, but with southern Siberia.[20]

II. **Erlitou** in the Central Plain (Strata 3 and 4; c. 1750-1530 BCE; Zone IV: Map 1)[21] is characterized by sites with external walls or ditches, by the stamped earth construction technique used as a base

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excavation is not possible. At another local site, fragments of pottery kilns and a metal furnace including slag have been found. I am grateful to the excavators for showing me this unpublished material in May, 1995 and to Emma Bunker for first bringing the existence of a gold earring from there, as well as its photograph, to my attention. See E. Bunker, "The Metallurgy of Personal Adornment", *Adornment for Eternity: Status and Rank in Chinese Ornament* (Denver: Denver Art Museum and The Woods Publishing Co., 1994), pp. 31-39. Gold was one of the earliest metals worked by the peoples to the west and northwest of dynastic China. Similarly shaped examples have been found in Liaoning at Niuheliang, the Hongshan site (see *KG* 1992 [5], 403, fig. 8:5; *KGXB* 1992 [4], 452, fig. 14:19, and 35 [knife]); in Hebei (see *KG*, 1976 [10], 60, fig. 4:2); at Zhukaigou, Inner Mongolia and in Lower Xiajiadian sites.

[19]E. Kuz'mina (with S. Sorokin, et al.), *The Andronovo Culture* (Moscow: Russian Academy of Science, 1966). These types are also found among the Seima-Turbino material reported by E. Chernykh, *Ancient Metallurgy in the USSR: the Early Metal Age* (Cambridge: Cambridge University Press, 1992), p. 219.

[20]Observation by Han Rubin, May, 1995.

[21]Excavations took place there in 1959 (*KG* 1961 [2], 28-35); from 1960-64 (*KG* 1965 [5], 215-24); in 1972-73 (*KG* 1974 [4], 234-48); in 1975 (*KG* 1975 [3], 302-09; 294; *KG* 1976 [4], 259-63; 1978 [4], 270); in 1980 (*KG* 1983 [3], 199-205, 219); in 1981 (*KG* 1984 [1], 37-40; and in *KG* 1984 [7], 582-90).

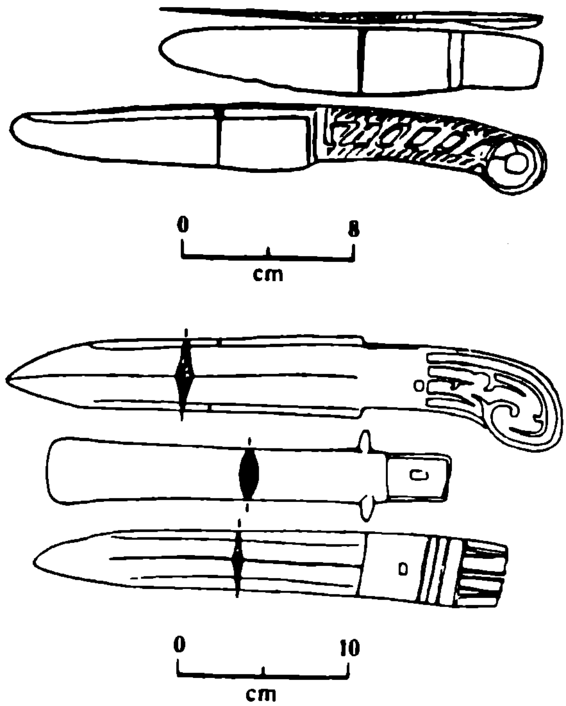

Figure 3: Bronze Tools and Weapons from Erlitou: The Knife with a curved blade and ring-headed handle is typical of steppe taste. From *KG* 1975 (5), 305.

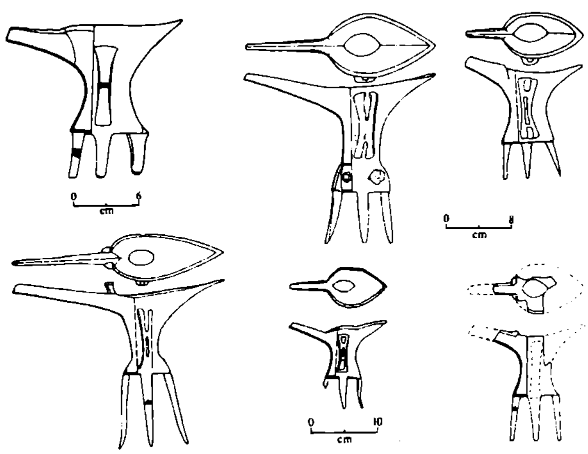

Figure 4: Bronze *jue* from Erlitou. From: *KG* 1975 (5), 305; 1976 (4), 260; 1978 (4), 270; 1983 (3), 203.

for walls and/or large platforms for buildings. Ceramics are both hand-made and wheel-thrown types known in many Longshan sites. Evidence for bronze making in Phases 3 and 4 include *jue* vessels, chisels, arrowheads, knives (of both Central Plain as well as Inner Asian prototypes), adzes and other small objects for decoration. (Figs. 3, 4) On average the alloys contain 5.55% tin and 1.2% lead. Bronze knives, plaques, and disks are inlaid with stones including turquoise. Jade items include *cong*, large knives, and axes. Grave goods included ceramics, shells, jades, and small bronzes; dogs were sacrificed as were human beings whose bones show signs of violence. The economy was based on the production of millet and wheat as well as animal husbandry including the pig, dog, cattle, sheep, and chicken. Strata 3 and 4 include features which underscore local developments–especially the piece mold production of the characteristic vessel known as *jue* –as well as appropriation of practices or items from outside–the use of oracle bones, for instance.[22] Remains of related sites show both clustering and size differentiation. This well-known evidence suggests that Erlitou was probably the center of a complex chiefdom with both social stratification and a centralized political system.[23] Contact with cultures outside the Central Plain is characterized by the appearance of items such as curved bronze knives (Fig. 3) and microlithic tools.[24]

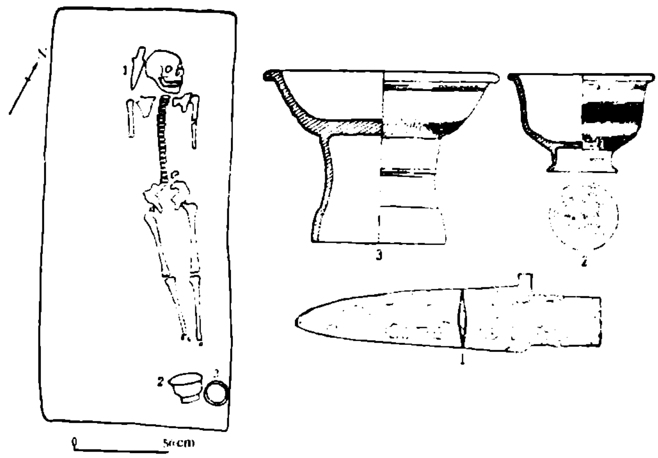

Figure 5: Burial (M1052) at Zhukaigou, Phase V. From *KGXB* 1988 (3), 325.

III. **Zhukaigou** (Phases 3, 4, and 5; c. 2000-1500 BCE; Zone II: Map 1)[25] and related sites in western, central Inner Mongolia, northern Shaanxi and northern Shanxi are characterized by villages on slopes above the water sources. There are graveyards with rectangular pits for single and multiple burials; children are buried in urns inside the community. Grave goods include Longshan style

[22]Polished, drilled, and heated bones appear both at Zhukaigou and Lower Xiajiadian before they do at late Shang sites. Prepared bone was in wide use even before that.

[23]E. R. Service, *Origins of the State and Civilization* (New York: Norton, 1975), pp. 250-251 argues that these features including a defensive system constitute a chiefdom. The definition of chiefdoms is widely debated. See also E. Z. Tong, "Northern China and Southern China: Two Different Trajectories of Social Development toward Civilization," *Bulletin of the Institute of History and Philology*, Academia Sinica, Taipei, forthcoming, where he connects features such as the defense and hydraulic systems with the rise of complex society and the state in north China.

[24]For example, at the Meishan site in Linru, Henan. See *KGXB* 1982 (4), 454, fig. 22.

[25]*KGXB* 1988 (3), 322-331.

ceramics, wheel-turned vessels and tripods as well as local incised types. Bronze items known in the latest three levels include simply cast awls, ornaments including bracelets, trumpet-shaped earrings, knives with curved blades typical of steppe manufacture, mid-Shang style *ge* daggers (Figs. 5 and 6), *jue* and *ding* vessels (in the latest level only), and sacrifice of animals including dogs yield an assemblage of mixed cultural heritage. Oracle bones were prepared by polishing, drilling, and burning, precursing the practice in the Central Plain.

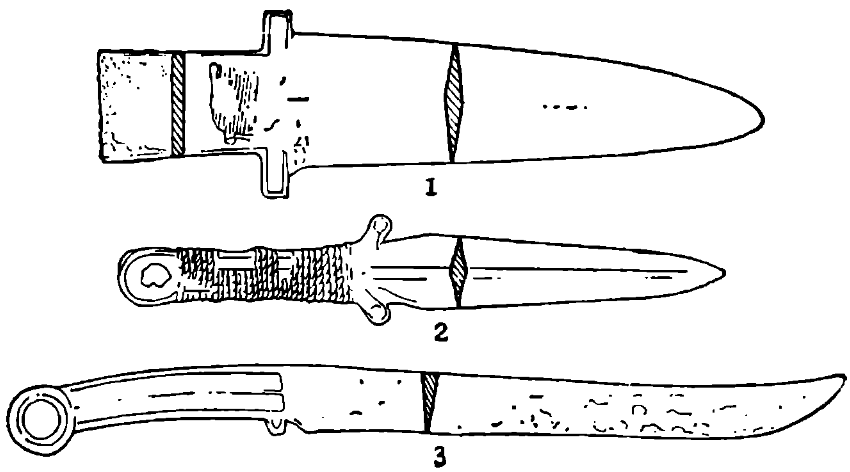

Figure 6: Bronze burial items from Zhukaigou, Phase V: *Ge* of Shang heritage (top), Dagger of steppe heritage (center), Knife with ring-headed handle of mixed heritage (bottom). From *KGXB* 1983 (3), 325.

The excavated materials from the region show a merging of the local and Longshan bases, with elements of steppe preferences (microlithic tools, curved knife shapes, and penannular-shaped earrings), of Qijia types (bronze tools and imported pottery jars with vertical loop handles), perhaps the Lower Xiajiadian (penannular earrings, oracle bones, and tool types), and the cultures of the Central Plain (especially in the latest levels, as evidenced by the presence of the *ge* dagger, ritual vessels, and burial practices). Over time, this community absorbed and incorporated elements from many different cultures. They were agriculturists who depended on crops of grain (millet) and animals including sheep, pigs, and cattle. In the absence of settlement pattern data, we cannot say that this site and its possible correlates represent a regional polity with a centralized administration, but evidence from the site alone shows that this community was a complex society of some sort.[26] Just what sort will be discussed in the next section.

[26]For a discussion of the site, see K. M. Linduff, "Zhukaigou, steppe culture and the rise of Chinese civilization," *Antiquity*, vol. 69, no. 262 (March, 1995), 133-145. New sites have been located in the area and are currently under investigation by Tian Guangjin.

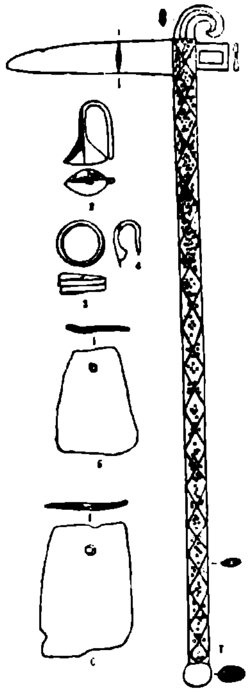

Figure 7: Bronze Items (nos. 2, 3, 4) Excavated from Lower Xiajiadian Sites. From *KG* 1993 (12), 1116.

IV. Sites belonging to the **Lower Xiajiadian Culture** (c. 2000-1600 BCE; Zone III: Map 1)[27] are located in southeast Inner Mongolia, Liaoning, and northern Hebei and are characterized by villages enclosed by stone walls on high terraces near the rivers. The burial customs show intentional arrangements with children in the settlement next to houses and adults buried in pit graves with wood or stone coffins. The tombs are outfitted with jades; ceramics of a very special, high-fired, painted type; bronze and copper ornaments (Fig. 7); and sacrificed jaws or skeletons of pigs and dogs.

Graves are differentiated in number of items and by gender. Tools show the importance of agriculture, including the cultivation of millet. Evidence of domesticated animals include sheep, pigs (the most abundant), dogs and cattle. Microliths are indicators of the continued use of hunting (of deer) for food supplement as well as adoption of a tool type typical of a heritage very far north of the Central Plain. Oracle bones are both polished and drilled showing regularization of this ritual process earlier than that known in the Central Plain. Of the metal objects found in the sites, the most typical were small penannular copper earrings with a trumpet-shaped terminal, rings, knives, and handles. Most are copper, but some are bronze with up to 10% tin. Two part stone molds for casting axes as well as ceramic molds were found. There was a highly developed stone, bone, and jade production.

Burial customs indicate that this culture was differentiated by job, gender, and probably status, and a centralized leadership of some sort is indicated by clustering of small villages around larger ones. The objects in excavated sites betray a mixed cultural heritage–from the steppe, from local northeastern customs, and from the Central Plain. Village clustering, evidence of warfare and social differentiation in the

[27]See *KG* 1978 (1), 23-34; Zhang Zhongpei, *Zhongguo Beifang Kaogu Wenjiu* (*Collection of Articles on the Archeology of North China*) (Beijing: Wenwu Chubanshe, 1986); and *KG*, 1978 (1), 23-34. The earliest C_{14} dates (calibrated) are from Zhizhushan near Chifeng at c. 2350 BCE and the latest are from Dadianzi grave no. 454 (1745 ± 130 BCE) and no. 759 (1775 ± 130 BCE). See *KG, 1977* (4), 217-232; *KG* 1978 (4), 280-287; *KG*, 1979 (1), 33-36.

region suggests that the Lower Xiajiadian group of sites, especially the ones around the Chifeng-Aohan region, had a complex social organization parallel in many ways to that at Erlitou. Their location, economic, and life patterns may have changed drastically by about 1500 BCE, when they may have moved to a pastoral way of life and out of the archeological record.[28]

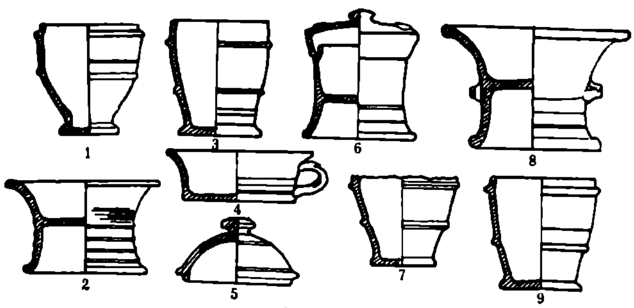

Figure 8: Pottery from Yueshi Sites, Shandong Province. From *KGXB* 1984 (1), 20, fig. 7.

V. The **Yueshi Culture** (c. 2000-1600 BCE; Zone V: Map 1)[29] in Shandong and northern Jiangsu is known by its high fired, wheel-thrown pottery. It shares features with both Lower Xiajiadian and early Shang. A few small objects of bronze were found there as well. (Fig. 8)

These sites, including those in the Central Plain, locate a broad area across northern East Asia where the beginnings of metal use can be located and dated at about the same time. The makeup of each culture, even in this preliminary survey, seems to be culturally mixed. Each develops with Longshan features, but maintains very distinctive local features, especially pottery. The economy is mixed; village centers have yielded evidence of both cultivated crops and domesticated animals, as well as of hunting continued with improved arrowheads made of bronze. The presence of comparable bronze tools and many other shared traits mentioned above suggests that there was a network that either directly or indirectly connected the regions. As part of a network, they may have contributed to dynastic development in the south (oracle taking, for instance, or more

[28]See G. Shelach, "Social Complexity in North China during the Early Bronze Age: A Comparative Study of the Erlitou and Lower Xiajiadian Cultures," *Asian Perspectives*, vol. 33, no. 2 (1994), 261-292, suggests pastoral nomadism. K. M. Linduff, "Early Bronze Age in the Northeast: Lower Xiajiadian and its Place in the Network," Association for Asian Studies, March 24, 1994, suggested a more specific pastoralism based on the tending of sheep as the herding of large animals was not likely in the forested valleys of the Lower Xiajiadian culture area.

[29]Reported in *WW* 1981 (6), 43; *KGYWW* 1984 (1), 92-99 where it was dated to the late Xia or early Shang Dynasty.

substantively through interdependent economic systems)[30] rather than merely acting as passive receivers.

The best-known trajectory is that followed by groups in the Central Plain where, in concert with the emergence of social complexity and ritualized social hierarchy, there developed a sophisticated bronze industry which was apparently the exclusive commodity of the elite.[31] This is indicated in oracle bone inscriptions of the Shang in the late second millennium BCE, where status-based and role-related social decorum operated in the religious, social, and political spheres[32] and demanded the production and use of well-known ritual items such as vessels and weapons cast out of bronze. There the emergence of state-level society was synonymous with bronze production as it was in many other locations in the ancient world.

Excavations beyond the core area in the past decade challenge that traditional view. In the case of the Zhukaigou people, they are not merely clients of their southern neighbors and their future was conditioned by much more than the Chinese dynasts. Although interaction may be the key to generation of state-level society, the complexity of participant groups may not be of the same sort. All the partners are late Neolithic agricultural communities, but their economic strategies, social organization, probably their political systems, and surely their ideologies differed.

I think that understanding those differences is the key to understanding the trajectory of the groups around Zhukaigou. The Zhukaigou system was cradled by the particulars of its location, a geographic region bounded by topography and climate which did not support extensive agriculture, but favored small-scale farming coupled with greater and greater dependency on animal husbandry and pastoral life. This particular community probably included both farmers and pastoralists who herded sheep, and perhaps cattle.

There is sufficient evidence from other parts of the ancient world, for example from Southeast Asia,[33] to suggest that early metal-working communities had a level of social complexity which included job specialization and differentiation in status. The Southeast Asian

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[30]Linduff, 1995; Shelach, 1994.

[31]K. C. Chang, *Art, Myth, and Ritual: The Path to Political Authority in Ancient China* (Cambridge: Harvard University Press, 1983). Although Chang had previously proposed this view, he developed his interpretation most fully in this text.

[32]D. N. Keightley, "Early Civilization in China: Reflections on How It Became China," in Paul S. Ropp (ed.), *Heritage of China: Contemporary Perspectives on Chinese Civilization* (Oxford: Oxford University Press, 1990), p. 42.

[33]Evidence from Ban Chiang is similar, for instance. See J. White, "Early East Asian Metallurgy: The Southern Tradition," *The Beginnings of the Use of Metals and Alloys*, Robert Maddin (ed.) (Cambridge: MIT Press, 1990), pp. 175-181.

examples were not highly stratified, state-level societies, but have recently been identified as simple chiefdoms. Evidence of differentiated status as displayed through accumulation of wealth in some burial contexts, in particular, is taken for evidence of the existence of intercommunity networks and senior ranking persons.[34] Preliminary examination of the evidence from the northern Asian metal-using sites suggests that they, too, were at the same threshold.[35]

Analysis of Zhukaigou

The remains of a settlement at Zhukaigou were excavated between 1977 and 1984 in central, southwestern Inner Mongolia.[36] The site yielded cultural remains in five stages, dating from the late third to the mid-second millennium BCE when it was seemingly abandoned. Because of its deep stratigraphy, analysis of Zhukaigou yields a long view of culture change. A hybrid cultural character is suggested by the inventory of artifacts which delimit a local culture with affinities to other Northern Zone cultures and ultimately with steppe cultures of southern Siberia as well as the Central Plain. Those affiliations were probably fluid with political alliances and exchange of items in Phases I to IV apparently intra-regional. Acquisition of prestige objects in Phase V, however, were both intra-regional and inter-regional (Zhukaigou, the steppe, and the Central Plain). Zhukaigou developed along the lines of other agricultural communities in the Northern Corridor, except in Phase V. The intensification of burial practices from simple to more elaborate and contact with other bronze producing societies suggest that Zhukaigou was perhaps in a strategic position in relation to metal resources or exotic products. The collapse of such a network may explain the demise of Zhukaigou in the mid-second millennium BCE.

In their analyses of this site, the excavators, Tian Guangjin and Guo Suxin, suggest that the bronze artifacts and accompanying pottery found in the fifth Phase at Zhukaigou and the surrounding area signal the origins of the "Ordos style," and they have designated Zhukaigou as the typesite.[37] The culture is thought by them to radiate

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[34]C. Higham, *Ibid.*, p. 186. Wealth was accumulated through already established trade networks, and exotic goods (including bronze ornaments) were indicators of status in mortuary contexts.

[35]In the case of the Thai communities, the stimulation for change to state-level political, social, and economic organization came from the outside in what is called the process of Indianization. See Charles Higham, *The Archaeology of Mainland Southeast Asia* (Cambridge: Cambridge University Press, 1989), pp. 190-233.

[36]The site is analyzed by strata in Linduff, 1995.

[37]The site was published by the Institute of Archeology, Inner Mongolia, "Zhukaigou Site in Inner Mongolia," *KGXB* 1988 (3), 301-331. See also Tian Guangjin and Guo Suxin, "The Origins of the Ordos Style," *KGXB* 1988 (3),

out to other regions and to profoundly effect the development of steppe culture in general. Whether or not this was the case, close analysis of the potential for such a development would have to include an understanding of change in social, political, and economic strategies in the region over time. This paper is a beginning in that study.

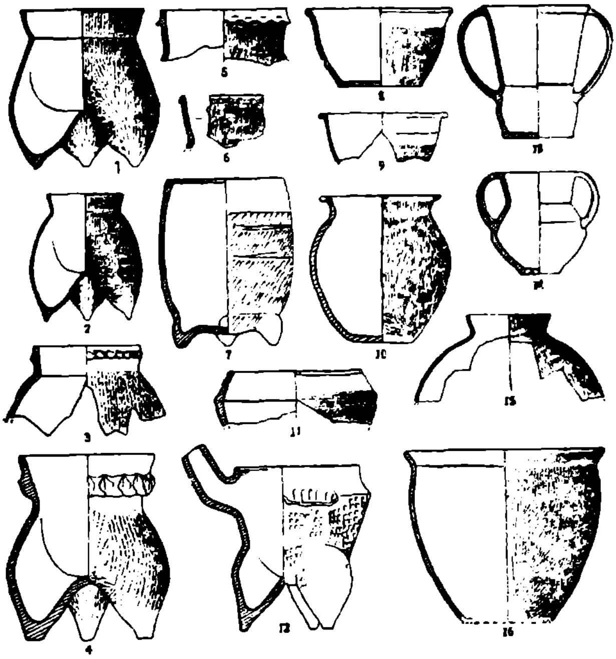

Figure 9: Pottery from Tomb 1052, from Phase III at Zhukaigou: From *KGXB* 1988 (3), 325.

The site has a long history of habitation, at least from the late third through the mid-second millennium BCE.[38] In Phase I at Zhukaigou round and square dwellings covered with white ash; vertical, rectangular, or square burial pits and urn burials of children; gray, brown, and polished black pottery; *li*-, *guan*-, *dou*-, and *he*-shaped pots; stone axes, and knives as well as bone tools bespeak already mixed cultural inheritance from the Chinese Longshan, western and northern Asian Neolithic. Burials included articles of everyday use and do not indicate specialization in craft production for the purposes of ritual. These were sedentary people who cultivated grains, kept

257-274. They use "Ordos style" to describe the culture and materials from the Ordos, or southwestern Inner Mongolia, and not to indicate a broad stylistic category meant to include steppe culture in general. The excavators employed the same core-periphery model of cultural development that has been used by traditional historians of the Central Plain to explain the long-term changes that occurred in the region.

[38]The contents of each strata are charted and discussed in greater detail in Linduff, 1995, 136-137; in addition, I am grateful to Tian Guangjin for sharing his field notes and drawings with me in June, 1993.

oxen and sheep, and supplemented their diet through hunting.[39]

During Phases II and III several new features were added which are identifiable with the Qijia culture known in the upper Wei River Valley, the Yellow River Region of Qinghai, in Ningxia and westernmost Inner Mongolia. Added to the Phase I inventory were flat-bottomed jars with constricted mouths and double handles (Figs. 2 and 9); cord-marked pottery; remains of fabric (mat) impressions on pots; polished oracle bones; burials with jaw-bones of sacrificed sheep, pigs, and other animals (continuing a practice of Phase I, but in greatly increased numbers); bronze implements (awls and needles), and personal ornaments. Increased agricultural production is suggested by the introduction of digging tools and sickles.

Taken together, these features show that Levels II and III are the remains of advanced farmers, among whom domesticated animals were of great importance. The numbers of animals offered up in burial and the introduction of human sacrifice marks an intensification of ritual behavior that may indicate differentiation by merit, ethnic background, or honor, as well as efforts to ritualize social control. The snake pattern and the flower-shaped edge which adorn pottery *li*, identified by Tian and Guo as local features in Phase III, are considered hallmarks of the later, nomadic peoples of the area.[40]

The custom of dog sacrifice (known at Lower Xiajiadian sites as well) was added to Phase IV burials following Shang custom, while other forms of sacrifice decreased. A side chamber for burial goods was introduced while the amount of items decreased. This restriction and variation in tomb size suggest the beginnings of interest in customized sets of burial goods based on social differentiation. Oracle bones in Phase IV were polished, burned and drilled, a treatment known at Middle Shang sites (c. 1300 BCE) which this level at Zhukaigou pre-dates.[41]

In Phase V distinctive burial objects, such as Erligang-style bronze vessels and weapons imply a different type of arrangement with adjacent cultures. Bronze *ge* halberds, *ding* and *jue* decorated with the

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[39]Linduff, 1995, 138; see also S. Plog, "Agriculture, Sedentism, and Environment in the Evolution of Political Systems", in S. Upham (ed.), *The Evolution of Political Systems: Sociopolitical in Small-scale Sedentary Societies* (Cambridge: Cambridge University Press, 1990), p. 193.

[40]Tian Guangjin and Guo Suxin, *KGXB*, 1988 (3) 260. Features of advanced farming and domestication of animals are evident in these sites.

[41]Oracle bones of pigs and sheep are reported from Lingtai; see *KGYWW* 1980 (3), 22-24. Oracle bones of sheep, pig, and cattle as well as copper objects and bones of dogs, pigs, cattle, horses, and sheep, and remains of hemp were found, for instance, at Wuwei sites; see *KGXB* 1960 (2), 53-70; *KGXB* 1978 (4), 421-47. These features of the Qijia culture are parallel to those found at Zhukaigou and Lower Xiajiadian sites.

taotie, and the squared spiral design are comparable to Middle Shang-date materials; curved bronze[42] and microlithic knives recall Andronovo models from Southern Siberia. (Fig. 6) The edges of the weapons and tools, however, were either annealed after casting or finished by hot hammering. Use of this technique, not preferred by Chinese metalsmiths, and the discovery of an axe mold at the site, imply that these items were manufactured locally.[43]

The Zhukaigou community apparently had several options for trade or exchange with outsiders open to it ranging from withdrawal to substitution of partners. This is evidenced by the adoption of burial features from the Central Plain in Phase IV at Zhukaigou as well as in the other sites for comparison. The extent of contact with the incipient Chinese dynastic culture in this whole northern region was, then, seemingly limited, and perhaps highly focused on trade, at this time.

Moreover, many critical technologies, such as metallurgy, were at the threshold of development during this stage. They must have quickly developed locally or diffused from one area to another. Metal technology is simple in each of these areas, and is technologically appropriate to each local context. It must have initially developed, or been further refined, in areas close to natural resources. The characteristic use of almost pure copper to fashion small tools in these regions may have been enforced by the abundance of copper and the mere lack of tin, for instance.[44] It may have also have been chosen in

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[42]See Wu En, "Yin and Zhou Bronze Weapons of the Northern Corridor," *KGXB*, 1985 (2) 135-154, who claims that this is a mixed type: the ring head from northern tradition and the curved blade from a Chinese prototype. Comparable examples of this knife type can be located in the grave goods at Erlitou and Panlongcheng. *KG*, 1983 (3), 204, fig. 10, from Erlitou, illustrates a curved-blade, ring-handled knife very similar to the one excavated at Zhukaigou; see also, *WW*, 1976 (2), 25, fig. 32 from Panlongcheng, Hunan.

[43]Han Rubin of the University of Science and Technology Beijing, reported that not only were the techniques used to produce the fifteen bronze artifacts from Zhukaigou which she tested stabilized, but also that the edges of these weapons and tools were either annealed after casting or finished by hot hammering. Han Rubin, personal communication, June, 1992. These methods are not usually associated with bronze technology in the Central Plain at this time, but are typical of steppe manufacture. Also see Han Rubin, "The Study of Metallic Artifacts Unearthed from Zhukaigou at Inner Mongolia," paper presented at the Northern Chinese Archeological Conference, Hohhot, Inner Mongolia, August, 1992. Whether the combination of casting and cold-cast hammering was used at Shang sites in other regions is not known because those artifacts have not been tested by metallography.

[44]N. Barnard, and Sato Tomatsu, *Metallurgical Remains of Ancient China* (Tokyo: Nichiosha, 1975), Fig. 11; Ping-ti Ho, *The Cradle of the East* (Hong Kong: The Chinese University of Hong Kong, 1975), p. 184, Table 7, map

accordance to type. When pieces such as a *ge* halberd or steppe-style dagger were made, bronze was used as it was in their prototypes.

Taken together, the appearance of so many shared features across northern Asia at this time would seem to confirm a sphere of interaction and that this development apparently took place without the existence of a dominant culture or overarching polity. The multiple core areas were not predictably stable for critically important technologies such as bronze casting and animal breeding but were readily transferable to less developed areas situated closer to natural source deposits or breeding plains for live resources. Consideration of the regional ecosystem is clearly called for in order to consider long-term structural adaptation in greater detail. Nevertheless, economic development and core-periphery dependency seem not to be linked in the northern zone during this early period.[45]

In Phase V quite distinctive ritual objects, such as Erligang-style bronze vessels and weapons, were introduced into burials at Zhukaigou and suggest that a different type of arrangement between two of these core areas had developed. Comparable at these sites are the bronze *ge* halberd, bronze (armor?) plates, *ding* and *jue* decorated with the *taotie*, and the squared spiral design (introduced in Phase IV on pottery) so characteristic of upper Erligang materials from the Central Plain. In both Phases IV and V increased care was taken with dwellings, including earthen foundations and prepared floors, suggesting perceived stability, perhaps social differentiation, and an intent to inhabit the site long-term.

Interpretation and Conclusion

Based on description of material remains, these studies suggest

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available copper and tin sources in relation to Anyang. See original report in Shih Chang-ju, "Yindai di zhutong gongyi," *Bulletin of the Academia Sinica*, vol. 26 (1955). In addition to that report which shows concentrations of copper in the northeast, copper is available in the mountainous area south of Zhukaigou, according to Tian Guangjin (personal communication, June, 1993). Copper mining in antiquity is considered in the following: Shizong Lu, Benshan Lu, Jueming Hua, and Weijian Zhou, "Antiker Kupferzbergbau Tongling bei Ruichang Provinz Jiangxi," *Der Anschnitt* 45 (1993), pp. 50-62; and Zhou Baoquan, Youyan Hu and Benshan Lu, "Ancient Copper Mining and Smelting at Tonglushan Daye," in Robert Maddin, ed., *The Beginning of the Use of Metals and Alloys* (Cambridge: MIT Press, 1988, pp. 125-129; R. Bagley, "An Early Bronze Age Tomb in Jiangxi Province," *Orientations* (July, 1993), p. 36. Tin sources are reported close to Anyang, in Linxi northwest of Chifeng, as well as in Jiangsu and Gansu. See Zhu Shoukang, "Ancient Metallurgy of Non-Ferrous Metals in China," *Bulletin of the Metals Museum*, vol. 11, special issue (October, 1986), 1-13.

[45]Philip Kohl, in *Center and Periphery in the Ancient World* (Oxford: Oxford University Press, 1987), pp. 15-22. Kohl's paper is focused on ancient western Asia. For adaptation of these models to Zhukaigou, see Linduff, 1995.

that relations between the center in the Central Plain and Zhukaigou was that of a trade partner.[46] That relationship, in which the frontier population remained outside of, or only ambiguously associated with, the power center was focused on trade. In that case, local communities or leaders may have competed for dealings with the "state." The relationship between the local population and the state was not likely to have been hierarchical, but channeled through a single site, because exceptional items of prestige goods such as the bronze *jue* and *ding* were found in excavation, rather than bulk-trade items.[47]

This form of interaction is difficult to reconstruct archeologically, because "frontier" groups were generally highly fluid in alliances, ethnic identity and socio-political complexity.[48] In such a situation, we might find a new specialist class or type of site oriented toward trans-border dealings whose task it was not only to conduct exchange but also to maintain a competitive position.[49] Some at Zhukaigou were "successful," judging by the accumulation of wealth evidenced in Phase V tombs including Shang elite-style goods. This success might also begin to explain why occupations of known late Neolithic sites in the Ordos area ceased before c. 1900 BCE except that of Zhukaigou which lasted another 500 years.

The political alliances and exchange of items in Zhukaigou in Phases I to IV were seemingly intra-regional among local polities, but the introduction of prestige goods in the form of bronze implements in Phase V were both intra-regional and inter-regional (between Zhukaigou and the Central Plain). By the time of Phase V, the exchange was between unequal partners, though colonizing was most likely not the reason for their interchange.

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[46]This is developed more fully in Linduff, 1995.

[47]Models for exchange between frontiers and states are discussed by J. Eadie, "Civitates and clients: Roman Frontier Policies in Pannonia and Mauritania," in D. Miller and J. Stefan (eds.), *The Frontier* (Norman; University of Oklahoma Press, 1976); R. Hassig, *Trade, Tribute, and Transportation* (Norman: Oklahoma University Press, 1985); O. Lattimore, *Studies in Frontier History: Collected Papers* (London and New York: Oxford University Press, 1962); Yu Ying-shih, *Trade and Expansion in Han China* (Berkeley: University of California Press, 1967); T. Barfield, *The Perilous Frontier: Nomad Empires and China* (Oxford: Oxford University Press, 1989); and M. Berman, *Prehispanic household and empire at Lukurmata, Bolivia* (Princeton: Princeton University Press, 1994). Application of those models to the case at Zhukaigou can be found in Linduff, 1995.

[48]Barfield (1989).

[49]Eadie (1976), Lattimore (1962), Barfield (1989), Berman (1994).

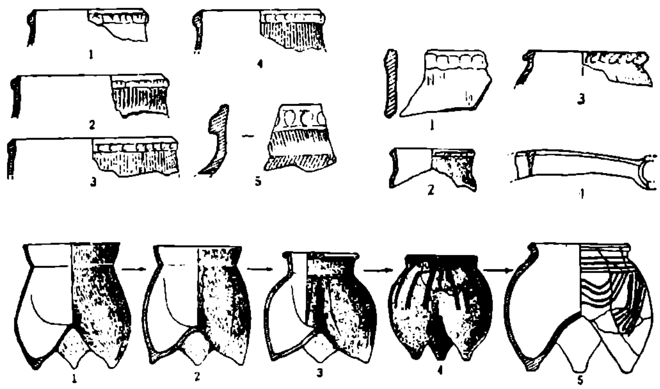

Figure 10: Characteristic Designs and Their Development on *li* from the Ordos Area. Above: Flower Petal Design. From: *KGXB* 1988 (3), 265. Below: Snake Pattern Design. From: *KGXB* 1988 (3), 268.

Zhukaigou was probably a site, therefore, where exchange took place and where goods of non-local prototype, whether of Chinese or steppe manufacture, were innovations and were competed for regionally. Their inclusion in burials would certainly have designated the particular position of the deceased as the successful procurer of "foreign wealth", but they do not seem to indicate broad internal social or political change. Domestic architecture in the latest stages (Phases IV and V) is more substantially built and suggests the intention to remain in one location, but does not suggest a difference in local, household organization. In fact, the family or household unit appears to continue to be the operative unit of organization at Zhukaigou even after importation of prestige goods from the Shang. The appearance of accumulated wealth in burials of Level V at Zhukaigou may be that of successful leaders in trade or competition, differentiated at death. Continued maintenance of a diversified economy which depends both on cultivation and extensive animal husbandry in other parts of the world, and presumably at Zhukaigou, required a flexible as well as variable system of governance.[50]

The identification of the "locally" inspired and developed snake and floral pottery decorations establishes a strong local character to the site and ties it to later, pastoral groups of the region. (Fig. 10) The pottery industry, although specialized throughout the last three levels at Zhukaigou, does not necessarily imply an established social hierarchy either in its execution or use. Job specialization within the community, on the other hand, was surely divided around trade, cultivation, husbandry and pottery production, and perhaps other crafts.

The relationship between the archeological record and the

[50]Ilse Kohler-Rollefson, "A Model for the Development of Pastoral Nomadism on the Transjordanian Plateau," in Ofer Bar-Yosef and Anatoly Khazanov, *Pastoralism in the Levant: Archaeological Materials in Anthropological Perspectives* (Madison: Prehistory Press, 1992), pp. 11-18.

environment, I think, is a critical factor in deciphering the trajectory of the region.[51] Topographically, Zhukaigou is located in the loess highland south of the Yin Shan, and north of the Gansu Corridor. At the time of its occupation, the natural vegetation in the region ranged from loess or grass covered scrubland, to xerophytic vegetation and grassy steppeland.[52] The mean annual rainfall was probably around 375 mm, adjusted from the current level which is just under that figure.[53] It is an agricultural zone suitable for growing millet, an insurance crop for it is hardier than wheat, withstands drought and will flourish on poorer soils with less rain. This region, even prior to the drop in average climate and rainfall proposed at about 1000 BCE,[54] was situated in a region that was not ideally suited as an agricultural zone which could support large populations. Its topography did not allow for farming over large areas as in the Central Plain; rain was unpredictable; the soil was not consistently good; and the climate could be cool and winters long.

The neighboring hilly plains were, however, quite suited to pasturing animals, either large or small hoofed ones.[55] The preponderance of sheep, and to some degree cattle, in excavations at Zhukaigou confirm that a mixed economy was the norm as early as 2000 BCE. Moreover, the shift from Level IV to V shows a noticeable increase in storage facilities without an increase in population. Were the distinctive Erligang-style items accumulated as part of an exchange for grain or other commodities not produced by the local community? In this ecological zone, drought or too much rainfall could readily result in famine and by that time other communities in the region had already diminished or disappeared. The production of distinctive local wares such as the snake and floral-rimmed pottery suggest, however, a vigorous internal economy perhaps stimulated by competition for control of trade with the Erligang group. Could access to goods from the much more productive agricultural zone just south of the 375 mm isohyet have created a dependency on Shang-related peoples living in that region?

If this were the case, the demise of the apparently flourishing site

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[51]Ming-ke Wang, *The Ch'iang of Ancient China through the Han Dynasty: Ecological Frontiers and Ethnic Boundaries* (PhD Dissertation, Harvard University, 1992). The relationship between the ecological and ethnic boundaries is explored in relation to the Qiang.

[52]T. R. Traeger, *China: A Geographical Survey* (New York: Halsted Press, 1980), pp. 33, 131.

[53]*Ibid.*, p. 22.

[54] Shi Peijun, *Dili huanjing yanbian yanjiu lilun yu shijian* (*Theory and Practice of Research Into Geography and Environmental Change*) (Beijing: Kexue Chubanshe, 1991).

[55]R. Cribb, *Nomads in Archaeology* (Cambridge: Cambridge University Press, 1991), pp. 17-20. He compares pastoralism to full nomadism.

at Zhukaigou could be explained in the following way. With the increased availability of grains and other goods, this site, located in a marginal agricultural zone, increased its production of animal products. The consequence of such a relationship would be the increase in size of herds and, thus, the need for pastures across a wider area,[56] requiring movement of the shepherds farther and farther from the settled base. This type of pastoralism is documented in other parts of the world as is the dependence on grain and other goods provided by the home village, or through trade.[57] The increased dependence on pastoralism would leave Zhukaigou and its inhabitants quite vulnerable to the shifts in power or position of her trade partner.

Moreover, was the area between these village pastoralists and the late Shang dynasts increasingly less accessible to them? The historical records locate several groups, such as the Qiang and the "barbarian" companions of the predynastic Zhou, in that in-between region. The Zhukaigou group could simply have been cut off from the Shang by these other competing groups, and moved at that moment to a full pastoral way of life not yet discerned in the archeological record.[58]

Their historical circumstances, the ecology of their homeland, and their mixed economy required maintenance of small, flexible household units and worked against the development of a stable, state-based economy at Zhukaigou. The appearance of metal-using communities over a wide area in the late Neolithic suggests that many such villages could have made use of small-scale metal industries, but their circumstances and type of social complexity worked against their emergence into ranked, hierarchically ordered societies such as developed in the rich lands of the Central Plain. Their economies likely did not collapse, but rather were recast by increased dependence on pastoralism and external sources of grain supplies, thus dramatically separating them in lifeways from the Chinese agriculturists.

Contact with Dynastic China did not stimulate change in this community to mirror that of the Chinese, but conversely may have contributed to the emergence of a pastoral economic strategy through increased dependency on grain supplied by the Chinese agriculturists. Once cut off in the late Shang, the people of Zhukaigou probably had to look elsewhere for grain supplies. Interaction between these northerners and the dynastic Chinese was not over, however, for the activities of the later inhabitants of the Ordos provided a tense

[56]Sheep are destructive of pasture lands, for example, and must be provided with an increasingly broad area for grazing.

[57]I. Kohler-Rollefson, *ibid.*

[58]See Ming-ke Wang, "The Origins of Specialized Pastoralism in the Ordos and Neighboring Areas," *Bulletin of the Institute of History and Philology*, vol. 65, no. 2 (1994), 375-434.

counterpoint to the lives of the Chinese so dramatically described in their histories.

Textiles

Bronze Age Cloth and Clothing of the Tarim Basin: The Kroran (Loulan) and Qumul (Hami) Evidence

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In June, 1995, Irene Good and I travelled to Ürümchi and studied large numbers of the early textiles so phenomenally well preserved by the dry heat of the Tarim deserts. These textiles came chiefly from Chärchän (Qiemo) in the south, from 1000 BCE on, with a few from Qumul (Hami), farther north, and a few from the Kroran area that have been carbon-dated to the early 2nd millennium. We also looked at some from rather later sites of the mid to late first millennium BCE, such as Subeshi and Sampul, but we concentrated on the earliest materials in order to try to deduce something about the origins of the earliest textile traditions in the Tarim area. We wish to thank the staff of the Ürümchi Museum for their helpfulness and generosity in sharing with us the contents of their storerooms. We also thank Dolkun Kamberi for his unstinting help, Victor Mair for his constant encouragement and his financial support—*sine qua non*—and both for their much-valued friendship.

Analysis and inspection have shown that all the early Tarim textiles consisted principally of sheep's wool, with nothing of plant fiber, although such fibers would survive well in the salty sand. Good discusses the details of this wool (in her companion paper to this one); but the predominance of sheep's wool tells us much about the origins of the tradition. All domestic sheep descend from the wild Persian Red Sheep, the natural habitat of which is the Zagros range and the northern "fertile crescent" of the Near East. There we have evidence of their original domestication around 9000-7000 BCE, at the very start of the Neolithic. Surprisingly, however, these sheep are not woolly, but hairy like a deer. The fibers from a modern wool sheep typically measure anywhere from four inches to a couple of feet long, while the diameter of "fine wool", like the wool found in a soft sweater, runs 15-30 microns. On the other hand, in the coat of a wild Persian Red Sheep, the main fibers are three inches long at most and 300 microns in diameter—ten times that of modern fine-wool. Furthermore, the "kemps" (as these heavy fibers are called) are impossible to spin because they are brittle and if you try to twist them they simply shatter. A second type of fiber, only 5 microns in diameter and less than a centimeter long, grows between the kemps. This is the "ancestor" of modern wool, but it too is unspinnable, because it is so short and fine that it just wads up. (See Barber 1991, Chapter 1, for photographs and other data.)

Some 4000 years of domestic inbreeding were needed to develop usably woolly sheep. We can trace the process in the Near East as the slaughter patterns change, which show us that by about 4000 BCE sheep were being kept to old age for wool, rather than killed young for meat. We can also track the subsequent rapid spread of the newly woolly sheep; for now farmers had a miraculous animal—a veritable golden pitcher—from which one could get an on-going supply of food and clothing, in the form of dairy products and woolen fiber, instead of a single hide and a single feast at the moment of slaughter.

The early Tarim inhabitants must therefore have imported their woolly sheep and their knowledge of wool-working from much farther west. Since they themselves were Caucasian, presumably they brought this technology with them, along with their favorite plant cultigen, wheat, which also was domesticated in the early Near East and spread from there. So even without any further tests, we know the approximate direction in which we must look for sources.

The earliest textiles that we saw in Ürümchi clothed three mummies found just north of Kroran and dating to 2000 BCE or shortly after. One woman dug up at Qäwrighul (Gumugou), housed at the Xinjiang Institute of Archeology, wore a fiber-felted cap decorated on the flaps with simple stitching, and a woolen plain-weave wrap subtly ornamented with heavy threads (see color photo, Hadingham 1994, 74). Some of these were twined in over pairs of weft for several inches, starting from a corded edge, while other heavy pale threads lay in the normal sheds for several inches before petering out. There are apparently four closed edges on this cloth, and this corded edge must be the starting border. The original bottom edge is also corded, and the side-selvedge is plain, being seamed to a much coarser piece of plain-weave cloth that forms the "skirt" of the woman's wrap. Two pieces were needed because the cloth, like everything we saw, is at most two feet wide. (This suggests that the loom used in the Tarim Basin was rather narrow.)

A second Qäwrighul woman (the celebrated "Beauty of Kroran") now housed at the Museum wore her wrap similarly, but this cloth was done in basket-weave, with long loops of plied supplemental weft covering it to form insulation (see color photo, Hadingham 1994, 73). Whoever made her cap—probably the woman herself—first wove dark brown wool, then felted paler wool onto its surface, next cut and stitched the cap to shape, and finally added two edge-cords sewn around the face-opening. The first cord was fashioned of brown S-plied wool, and the second of red and probably blue yarns.

This second cord is the only evidence we saw that the makers of these earliest textiles knew how to dye their wool. Clearly the earliest Kroran people were not into (or up to?) dyeing large batches of thread or fabric. The presence of even this much dyed thread, however, makes me wonder whether the "pattern" yarns decorating the edge of the Institute woman's wrap and the flaps of her cap may originally have been colored, although today they appear much the same color as the ground fabrics. But why go to all that work to put a tan design on tan? Producing colorfast dyes involves a lot of complicated chemistry and must have taken many years, even centuries, to work out. Small wonder, then, if some early dyes proved lastingly successful, as with the Museum woman's cord, while others faded away quickly.

One of the few artifacts found with the woman at the Museum is a comb—one assumes for combing her hair. (Others much like it were found by Folke Bergman in his excavations of prehistoric burials around Krorän.) An equally coarse and narrow comb from a cave site in the Judean Desert, in Israel, has just been published, however (Schick 1995, with photos), which suggests a second use. Its long wooden teeth, firmly bound together, show wear marks near the tip suggesting that it was used to beat weft home on some sort of loom. It dates to about 8000 BCE, when weaving was first taking hold in the Near East. Perhaps the Kroran woman's comb, then, found at least intermittent use as a textile tool.

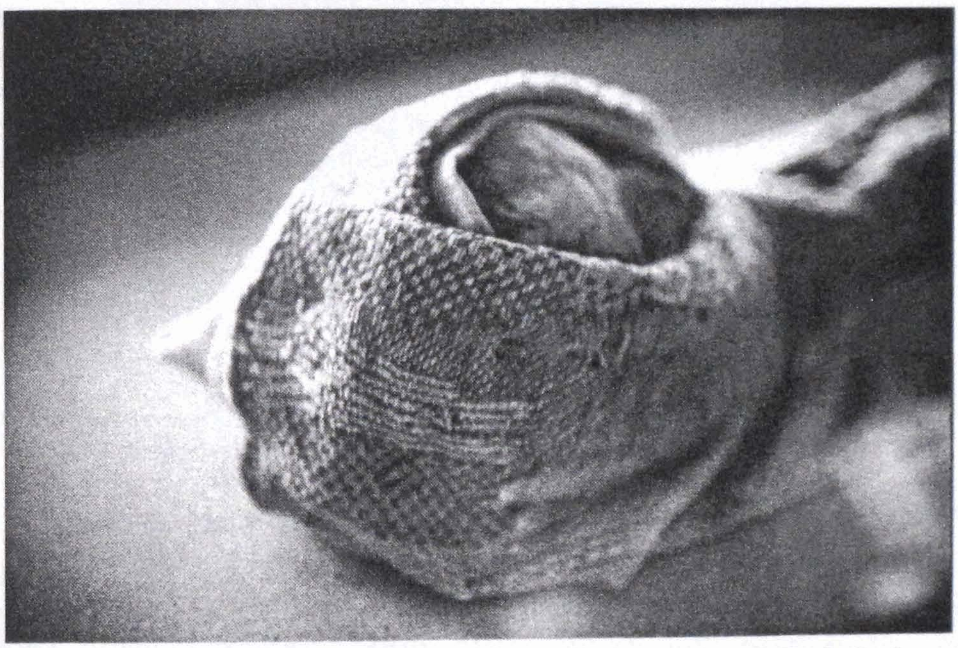

Fig. 1: Top of head of child-mummy found at Qäwrighul. Early 2nd millennium BCE. Ürümchi Museum. (Photo: E. Barber)

The shroud of the young child from Qäwrighul—the third Krorän mummy we were able to see (photo: Hadingham 1994, 75)—got its colors from sorting the natural white from the natural chocolate-brown sheep's wool. Although this piece is fundamentally in plain-weave, the weaver attempted new variations almost every inch, as in a sampler, trying supplemental wefts here, color stripes there, patches of bicolored basket-weave that give a checked effect another place (Fig. 1), along with corded edging, a fringed edging made with supplemental threads, and so on. It was so complex that it took me an entire day to analyze and record all the structures. Overall, we were tremendously impressed by the diversity and ingenuity of construction we found in both the Krorän and Cherchen textiles.

On the other hand, Bergman and Stein found mummies dressed and buried almost exactly the same way as these three. Yet they dated at least some of these mummies to the last century BCE, the time during the earlier Han Dynasty when the Chinese first set up a military post at Krorän. If this dating was correct, it leaves us with the interesting predicament of having to believe that almost nothing in this early Loulan (or Krorainic) culture changed between 2000 and 100 BCE. Only more exploration (and C-14 dating of the Bergman and Stein pieces, if they are not too contaminated) will give us the true answer to that enigma.

The fabrics that I most particularly wanted to analyze were the plaid twills from near Qumul (Hami), which the Chinese archeologists say date to about 1200 BCE (but see below). At that same time period, at the other end of the Eurasian land-mass, the proto-Celts living in central Europe were also making quantities of plaid woolen twills, and I was curious about the degree of actual similarity between these two groups of textiles. Unfortunately, this was precisely the group we were not allowed to study. Nonetheless I can make some relevant remarks from what little was still available to public view.

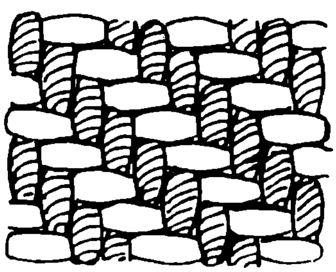

Fig. 2: Diagram of 2/2 (i.e., over 2, under 2) diagonal twill weave.

I have shown elsewhere (Barber 1990) that the use of "twill" weave for cloth, with its threads "twinned" and offset to produce diagonal patterns (Fig. 2), is closely connected with weaving wool, which is stretchy and breakable—quite different from weaving plant fiber, which does not stretch. (Silk, too, generates weaves peculiarly suited to *its* properties—in particular, the "satin weaves" with warp pick-up designs. Some of the patterns produced can look superficially similar, but they are constructed very differently and arise from quite different considerations.) The early use of color, too, tends to be associated with wool, which comes naturally in many hues and is far easier to dye than linen or hemp (although not particularly easier to dye than cotton or silk).

Very little cloth has survived in Europe, because of the destructive climate. But we are lucky to have a group of about 120 fragments preserved, color and all, in the salt mines at Hallstatt and Hallein, together with other gear. (See Barber 1991, 186-96, for photographs of several and discussion of the entire group, with full references to H.-J. Hundt's detailed publications of each piece.) They date from 1300 to 400 BCE and were made by proto-Celts. Already these Celts were wearing the same kind of plaid twills and tam-o'shanters we associate with them today. Two-thirds of the pieces are twills: many plain diagonal, some zigzag, and one diamond. The plaids are invariably bichrome, unlike modern polychrome tartans, and they have the peculiarity that the color stripes never coincide with the zigzag bands in the twill weave.

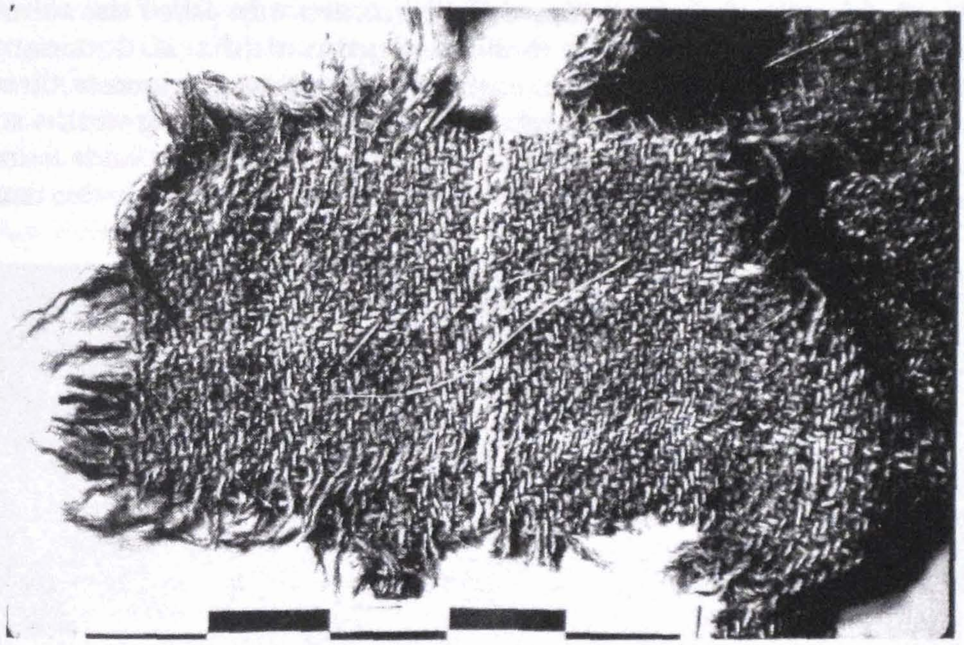

Fig. 3: Fragment of plaid woolen twill from Wupu, near Hami (Qumul). Radiocarbon dated to 770 BCE (calibrated). (Photo: Irene Good)

For comparison, we can analyse the two plaid twills published from the Wupu site near Hami—one by Irene Good in *Archaeology* (Mair 1995) and the other by Wang Luli in *The Great Treasury of Chinese Fine Arts* (1990). The former is natural milk-chocolate brown with narrow stripes of pale blue and white (Fig. 3); it has now been radiocarbon dated to roughly 770 BCE. The latter fabric (if you look carefully) has six colors: a red-brown ground with narrow stripes of light and dark blue, red, white, and black. In Ürümchi we also saw a small scrap of plaid twill on display that had narrow red stripes on a pale blue ground. All of them were woven in plain diagonal 2/2 twill. Despite the strictly bicolor plaids and occasional fancier weaves among the Hallstatt fabrics, the similar play of wide and narrow stripes makes the two groups of textiles look very much alike. Furthermore the weight of the plaid twill cloth from Hami, from Hallstatt, and from modern Scotland is strikingly similar. (The ancient pieces from both East and West, however, are of combed wool, unlike today's softer kilts of carded wool. Carding, which fluffs the fibers rather than laying them parallel, was not invented until about 1200 CE.) A noticeable difference is that all of the visible Hami twills consist of plain diagonals (as in Fig. 2), without any Hallstatt-style zigzags. But this may simply be a figment of the small size of the sample currently available from Hami for scientific study.

We saw several examples of another, rather different class of plaids from Hami, too. These had skinny red or brown and light or dark blue pinstripes at regular intervals, on a dominant white ground (Fig. 4). Visually, therefore, they differed in two ways from the other plaids: in having a white rather than a dark ground (that is, dominant color), and in the regular placement and uniform narrowness of their stripes, contrasting with the rhythmic interplay of differing widths so characteristic of both Celtic plaids and the darker-ground plaids from Hami. Furthermore, the white-ground "plaids" differed from the rest in not being twills: they are woven in plain weave.

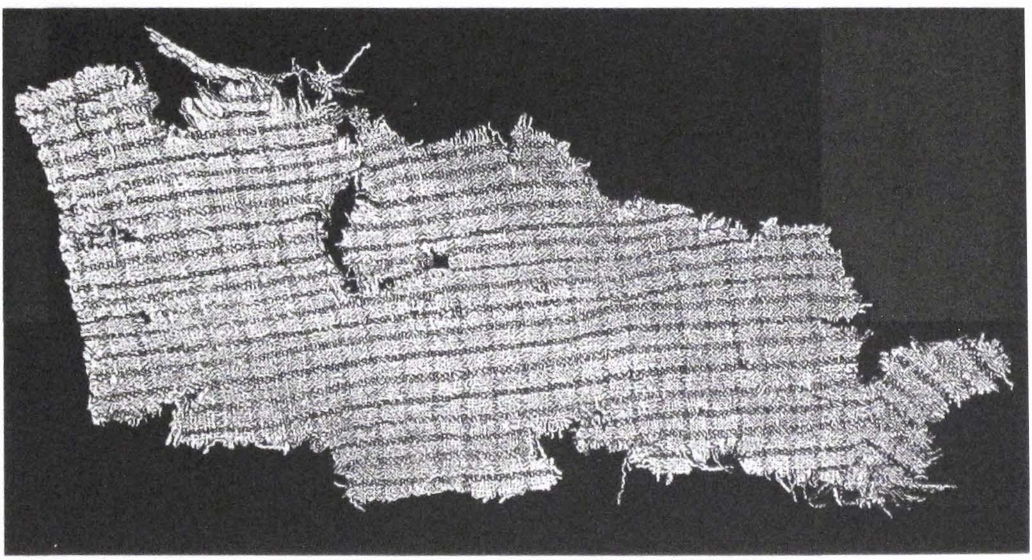

Fig. 4: Fragment of plain-weave woolen cloth from Wupu, near Hami: white ground with red, brown, and blue pinstripes. (Photo: Irene Good)

That difference has a striking parallel in one class of Hallstatt fabrics. There we find one single group of woolen cloths woven in plain weave instead of twill. They, too, have a white ground, and pinstripes of red or brown and light or dark blue at regular intervals. The only difference from the Hami white-ground woolens is that the pinstripes run only in the warp direction.

The impression that these highly idiosyncratic sets of similarities make on me is that the two groups of weavers, those of Hami and those of Hallstatt, must have developed their crafts from the same original textile tradition. To get a better fix on how that most likely came about, we need to look at some more background.

Historically, the earliest known examples of both plaid and twill come from the Caucasus region: a 2/2 twill from Alishar, in northern Turkey, of the late 4th millennium, another 2/2 twill from Martkopi, Georgia, of the early 3rd, and a wool plaid of unknown weave from Tsarskaja (now Novosvobodnaja) in the Kuban area, also early 3rd millennium. Farther west, a loom was set up to weave twill at Troy, level II, about 2600 BCE; and the Minoans show in their frescoes and in their loom design that they knew these patterns in the next millennium. (See Barber 1991 for full discussion of and references to all of these finds.) To the east, impressions on potsherds from the Ferghana Valley show that twill weave had reached that area by the period of the Chust culture—1100 to 800 BCE, according to "low" Soviet dating (Zadneprovskij 1962).

Unfortunately, we have only the scantiest of data concerning color (and therefore plaid) in fabrics in the prehistoric world. It is rare enough for ancient cloth to survive the millennia, impressions on clay (which can show the weave structure but no color) being the commonest way. To find it preserved with its colors still visible is far rarer, requiring extremes of dry heat (as in Egypt) or cold (as in the frozen tombs of the Altai), or preservation in salt (as at Hallstatt). In parts of the Taklimakan, we now have far more information than elsewhere, since the textiles of that area were so lucky as to have both dry heat and salt at work on preserving them. In fact, while working with them we exclaimed that the Tarim fabrics felt like century-old cloth, not cloth from three to four millennia back. They constitute a truly rare and precious treasure, but one which for its very rarity is tough to put into context.

If the Hallstatt plaid twills and the Tarim ones are directly related, the most reasonable scenario from the point of view of the history of weaving is that people bearing this technology spread both east and west out of somewhere in a broad region around the Caucasus during the third and/or second millennium BCE. Twill, as I have said, seems to be an idiosyncratic *northern* response to the advent of wool. The southerly—that is, Near Eastern—response to wool, by contrast, was chiefly weft-faced weaves, apparently leading to tapestry by 2400 BCE in Syria (whence it spread to Egypt about 1500 BCE), and to pile carpet technique, which we first pick up before 2000 BCE beside the Caspian Sea (Barber 1991, 157-59, 171 n. 10). All these techniques eventually reached the Tarim basin, also.

The construction of the early Tarim textiles leaves me feeling, after a year of thinking about it, that the western wool-workers came in at least two waves, one group early in the second millennium BCE, and the other entering the Tarim Basin, apparently also from the north, several centuries later.

The former group, whom we find spread about the hills and ancient waterways just north and west of what in the Han Dynasty became Krorän Station, possessed a rather simple knowledge of weaving, concentrating on plain weave and its immediate variations, largely (though not entirely) exclusive of color. They also produced felt for caps but not for much else. In fact, Vivi Sylwan, who analysed Bergman's collection of Krorän textiles, remarks on how indifferently the felt is made compared to the woven fabrics (Sylwan 1941, 96). This fact suggests that these early immigrants came not from the steppes to the north (where felt was an essential ingredient in daily life), but from the desert oases of Russian Turkestan. The frequency with which bundles and pouches of *ephedra* twigs have turned up in the early Krorän graves found by each and every excavator also points in this direction. *Ephedra* was a favorite hallucination aid of the oasis cultures already in the third millennium as well as later among the demonstrably Iranian tribes (Sarianidi 1994), and hallucinating constitutes a primary way of journeying to the domain of the spirits the world over (Barber 1988), thus forming an appropriate grave-gift for those who knew its properties.

The later group, for their part, possessed new skills at dyeing fibers in quantity and at producing the special twill weave, as well as at combining these talents to produce plaid twills and plain-weaves similar to those made by the prehistoric Celts. This technology seems to emanate ultimately from a good-sized area around the Caucasus, whence it moved both east and west; and it seems to have entered the greater Tarim Basin also by a northerly route, for its practitioners remained to the north of the Krorän people.

Perhaps this relatively independent data from textiles may ultimately help resolve our questions about just "who" (linguistically speaking) arrived in the Tarim Basin when.

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Bronze Age Cloth and Clothing of the Tarim Basin: The Chärchän Evidence

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Until very recently, the study of archeological textiles has been little more than an occasional technical report or a reconstruction of costume, particularly concerning materials from the bog finds of northern Europe or the coastal deserts of Peru. Such technical studies, although useful, have lacked integration with other components of material culture. A more comprehensive approach is to view textiles, fibers, weaving and spinning implements as an array of related artifacts that reveal technological achievement, material culture and the role of cloth production in the economic sphere. The study of archeological textiles and their production has the potential to contribute much to our understanding of cultural interaction in prehistory. The extraordinary textile evidence from the Tarim Basin offers us an unprecedented opportunity to build an understanding of the complex cultural history of Eurasia, and the role played by the ancient inhabitants of Eastern Central Asia.

The Tarim Basin textiles are at present the largest cache of prehistoric textiles in the Old World, and they are of substantial importance from many different aspects. Their fiber content alone offers much to understanding the development of wool in prehistory. All of the early textiles from the Könchi Därya (Peacock River), Chärchän and Qumul (Hami) are composed of animal fibers, namely wool from sheep and possibly mohair (from goat). Preliminary fiber analysis of the materials from Chärchän and Qumul suggests that the breeds of sheep kept at Qumul were different from those kept at Chärchän. This may hold special significance regarding the relationship between the peoples of the southern rim of the Tarim Basin and those of the northeast. To understand the implications of sheep breeds in antiquity, let us step back and first examine briefly the question of sheep domestication, and then review the present evidence for the development of wool.

At present there are four main wild types of sheep, according to most zoologists: the Bighorn (*Ovis canadensis* Shaw) of North America, the Argali (*Ovis ammon* L.) of Central Asia, the Urial (*Ovis orientalis* Blyth, aka *vignei*) of Southwest Asia, and the Mouflon (*Ovis musmon* Pall.) of Western Asia. Some think that there are five or even six wild species.[1] It seems very unlikely that sheep or goats were domesticated at different times and in different areas, but rather diffused from one place, once initially domesticated. This is still an open question, however (see Meadow 1989: 34 for discussion), as sheep are genetically highly mutable. Where and how exactly this may have occurred is still another open question. Therefore any present discussion of sheep breeds and fleece types must be subject to this larger uncertainty.

The wild Mouflon sheep has two varieties, one being to the West and in Europe, the other being confined to the Southeastern rim of the Caspian. Comparative study of blood types points more specifically to the Mouflon population of NW Iran as the sole ancestor of the domestic sheep. However, other evidence suggests that a mixture of Mouflon and Urial was what became domesticated. The area of domestication and the original wild species has yet to be determined; but most likely it is from an area either East or West of the southern coast of the Caspian.

Although much has been discussed in the literature concerning early neolithic textiles, all are of plant bast fibers, and not wool, contrary to some earlier reports. This has caused a major misunderstanding in much of the literature concerning the early development of woolly fleece; which claims that its development occurred on the Anatolian Plateau around 6000 BCE. The earliest *textile* evidence consists of a pseudomorph from Çayonu ca. 7000 BCE composed of a *bast* fiber (Vogelsang-Eastwood 1993:1). There are also textile impressions in pottery from Jarmo (Adovasio 1983) ca. 6000 BCE (at the very earliest[2]). Early textiles exist from Çatal Hüyük (Ryder 1965) and Nahal Hemar (Bar-Yosef 1985; Schick 1988); but these are also bast.

There remains a tendency in the literature to assume that neolithic textile production involved the use of wool, although there is no archeological evidence to back this up. For now, it appears that during the neolithic and even chalcolithic in SE Europe, the Balkans, and Western Asia sheep were used for meat consumption *only*, and that the woolly fleece had most likely *not* fully developed into a useful form before ca. 3500 BCE (see Greenfield 1988).

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[1]Sheep phylogeny is an extremely complex subject. See Meadow 1989: 28-29 for a condensed overview; see also Ryder 1983; Valdez 1982).

[2]The plain-woven textile-impressed clay balls were recovered from a test trench in 1950 (Braidwood 1983:164). There were no radiocarbon samples taken from that trench, but the clay objects were recovered from an ashy lens which was picked up again in later seasons in the main excavation area (JII); and the *possibly* corresponding levels, J2-3, are carbon dated to approximately 3300 BCE (Braidwood 1983b:537). The fact remains that levels from different operations at the site cannot be reliably corrolated (ibid., p. 155). Fiber content of these samples was not determined (Adavasio 1983).

There is, however, a very important clay sheep figurine from Tepe Sarab, in the Kermanshah Valley of Iran, dating to about 5000 BCE. This figurine *seems* to indicate the presence of a long-staple fleece, with triangular or pyramidal incisions on the body (Bökönyi 1977:25). It has been interpreted by the ancient wool expert M. L. Ryder as indicating a primitive form of fleece. Although there is no direct evidence of wool use from Tepe Sarab, this site does hold other important information concerning the history of wool: the age/sex ratios of the sheep bones indicate that they were being kept for a long while, strongly suggesting their use for secondary products.[3] In Europe and other parts of Western Asia, by contrast, neolithic sites yielded sub-adults and juveniles. Such a kill-off pattern would indicate that flocks were being kept for meat production.

Wool during the third millennium BCE had not fully developed from coarse hairy kemp. Sheep shed their wool, and it was plucked. Later, as shearing practices developed, this furthered the domestication process, producing a non-shedding sheep (Ryder 1983: 68). This encouraged the development of intermediary "true hair", rather than thick shedding kemps and fine underwool fibers. The earliest historical records in Mesopotamia clearly state that sheep were plucked. Plucking and shearing are evidenced by two words in the Chicago *Assyrian Dictionary* (1956, B 97-99) *baqamu*; and G 59-60, *gazazu*. Examination of the etymologies of both these words demonstrates that the word for shearing (*gazazu*) was only used later (second half of the second millennium BCE) when refering to procuring wool from sheep. There are reports of cloth made from animal fiber in ca. 3000 BCE at Warka; but in general there are very few actual textile remains from Mesopotamia; fewer still have been able to reveal the fiber content. Among the earliest wool found is a fleece sample from the site of El Omari in Lower Egypt dating to the late fourth millennium BCE. This fleece had lost its pigment for the most part, its staples (the length of the fibers) were at least 22 mm long, and the mean fiber diameter was about 35 μm.

The earliest actual *textile* remains made of sheep's wool are from Shahr-i Sokhta, dating to the early to mid-third millennium BCE in Eastern Iran (Good 1995a). Most of the textiles from Shahr-i Sokhta are composed of wool. Pigmentation in the woolen samples ranges from light to dark brown. No black, grey or white wool is present. The wool itself is very fine, ranging from 15-25 μ, with a large percentage of kemps or outer hairs, which are much larger (35-70 μ). Their average staple length is about 25mm. In keeping with Ryder's scheme,

[3]I acknowledge the recent critique of Chang (1988) cautioning against the inference of husbandry practices from archeozoological remains. However, when there is faunal evidence for change in the archeological record at one site over a sufficient period of time, it is not unreasonable to suggest that a change in herding/husbandry has taken place at that particular site.

then, we have a primitive, "generalized medium" fleece with very little in the way of pigment variation, and no pigment loss in the third millennium BCE in Eastern Iran. Dyes, although *possibly* used in Mesopotamia during this time, were apparently not used in Seistan; at least there is no evidence for them. Wool was plucked, not sheared, and was spun in both directions, in a worsted thread, and combed rather than carded. Some of the textiles from Shahr-i Sokhta *may* be made of mohair (or goat's hair).

To summarize, the development of the woolly fleece took several millennia. According to Ryder, first the fleece lost its pigment and more variation in color took place. Then there were two main divisions in breeding, the first being the separation into "hairy" medium wools and "generalized" medium wools, evidenced by the vestigial breeds of Bronze Age Soay sheep in Europe; and the second being the division of the generalized woolly breed(s) into shortwool, medium and finewool breeds which remain the main divisions of woolly sheep breeds today. The last major significant change in wool was the shift from a coat which shed annually to a coat which must be shorn.

Evidence from third millennium BCE Eastern Iran seems to fit well in this scenario; wools studied from Shahr-i Sokhta appear to be of the most primitive "hairy medium" type, although pigment *reduction* rather than loss would better describe the lighter fibers. Moreover, by the mid-second millennium BCE, textual sources from Drehem (Steinkeller 1995) show that the Mesopotamians had breeds of longwool and shortwool, had a wide range of pigmentation including black fleeces, and practiced shearing.

The fact remains that no one knows exactly when (or where) the fleece of sheep (not to mention goats!) was first used on a regular basis, and valued, and encouraged in the breeding process. This development seems to have taken somewhere between three and six thousand years. Chinese textile history does not include wool, but rather bast fibers and silk (Kuhn 1988). There is no evidence as yet that sheep were ever used in early China for their secondary products (namely dairy or wool). However an intriguing ceramic sheep's head jar lug from neolithic Erlitou in Henan (*probably* period III or IV) (Chow 1984: 365; LAT 1965: plate 5, no. 2) suggests that wool-bearing sheep were introduced into China by the mid-second millennium BCE. This area and time period also saw the introduction of six-rowed barley (*Hordeum* sp) as well as bread wheat (*Triticum aestivum*) (Chang 1983:77-79). Although an indigenous domestication of barley is possible, the introduction of wheat from farther west is almost indisputable. Noteworthy here is the fact that the earliest burials so far recovered from the Tarim Basin, namely from Qāwrighul (Gumugou), Krorān (Loulan) and the Kōnchi River region, contained small baskets of wheat placed at the nape of the neck (Mair

1995). Thus it is likely that not only were these early inhabitants of the Tarim Basin recent arivals from farther west (or northwest); they may well have been instrumental in the transmission of certain material cultural traits into China, such as the use of wheat and barley.

Several important pieces of evidence appear when we look at the textile fibers from the Tarim Basin. First, I will touch on the earliest wools, which are from the Könchi River region and Kroran,[4] for which dates are given as early second millennium BCE. These wools can only be described generally, as they were viewed from display cases in the Museum of Archeology in Ürümchi. Our impressions of this wool were as follows: color variation was from near-white to dark brown, mostly comprised of rather coarse kempy wool of relatively short staple length. Dyes were not in evidence to any great extent from these two early burials, but noted were a few threads with blue dye around the edge of the hat worn by the woman from Kroran (Barber, this volume). The wools show some loss of pigment, but none viewed were completely unpigmented.

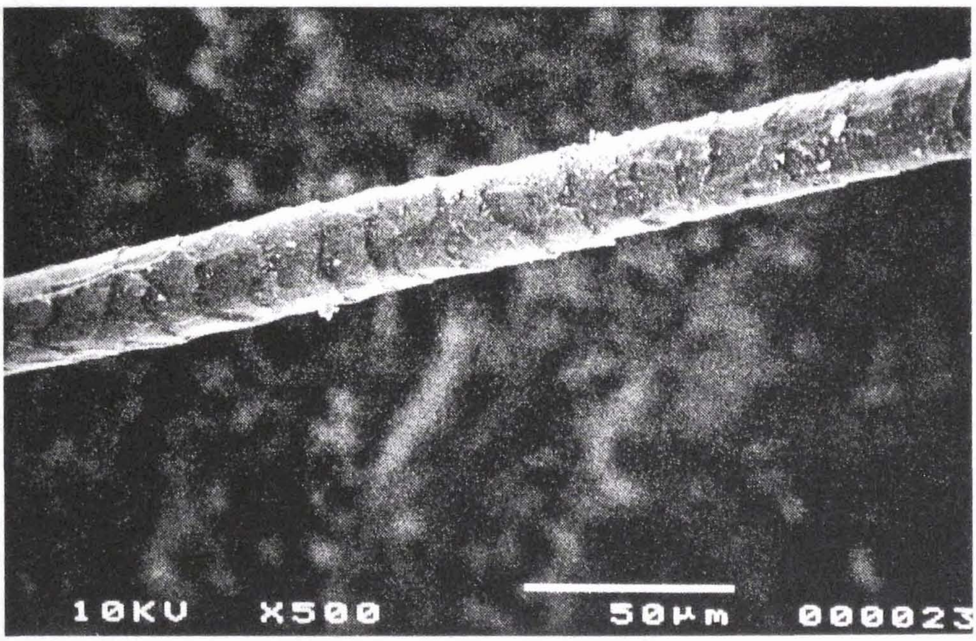

Plate 1. Scanning electron micrograph of possible cashmere from Chärchän burial 85 QZM 4.

Loss of pigmentation is believed to be a relatively early development in the evolution of wool fleece, but prior to the evidence from Shahr-i Sokhta and the Tarim Basin, this was conjectural. It is believed that the loss of color occurred first because all wild and many primitive domestic breeds have color. In England, there is no evidence for white wool until 500 BCE (Ryder 1983:72). Some Hallstatt period Austrian sheep skins also bear white wool. According

[4]The dates given are early second millennium BCE.

to Ryder, judging from the wool fleece found at Pazyryk (ca. 400 BCE), the white and "true hairy" types did not appear until the Iron Age in Eurasia (ibid., p. 74; Ryder 1969).

The wool from the Qumul fragment published in *JIES* (Good 1995b) was not derived from a "generalized" medium type of fleece, from which derived the later longwools and shortwools, but rather from the true "hairy" type which is the other derivation of the primitive "hairy medium". Moreover, it contained unpigmented fibers. In other words, it is not the closest relative but the *more distant* one from the earliest Western Asiatic fleece breeds. The fibers used to make up the threads do not have the "crimp" (that wavy pattern to the fibers) characteristic of woolly sheep, but are straight and round in cross-section. The fiber diameter is generally rather fine, not coarse. The distribution of the fiber diameters seems to indicate a true hairy fleece, according to Ryder's definition.

The distinction between these two types of fleece, the generalized medium and the hairy, is actually quite significant, not only in terms of the overall development of the fleece from the neolithic non-fleeced sheep, but also for our present focus, since there are implications in this distinction concerning the movement of peoples with their sheep across Eurasia which had a significant impact on the development of the later varieties of woolly fleece in Europe. Okladnikov (1959:23), in his summary of Bronze Age Siberia, mentions the appearance of two separate breeds of sheep which took place during the later second millennium BCE; one being coarse-woolled, the other being fine-woolled, citing Kisilev (1951). It is tempting to speculate that the introduction of this new type of fleece corresponds to Ryder's "Asiatic Hairy" fleece which is documented in Europe by the first millennium BCE along with the appearance of shears.

At this point I should mention that a new AMS date[5] for the Qumul fragment dates it not to 1200 BCE, as was thought, but rather to about 770 BCE. Thus it is unclear as to which culture this textile fragment belongs, possibly the period 2 Yanbulaq culture, but also possibly the later Tört Erik (Sidaogou) culture (for review, see Chen and Hiebert 1995). In order to really understand the development of textile technology in the Tarim Basin as a whole, let alone to appreciate any possible influences coming into or moving outward from this area, it is extremely important to be able to control the chronology.

In comparing the wool from the Qumul fragment with some of the fine wool from pieces from Chārchān, several points can be made.

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[5]Dates were obtained directly from the textile fragment, using accelerator mass spectrometry at the Oxford Laboratory for Research into Art and Archaeology (OxA -5771). The corrections were obtained using the CALIB program (calibrated range = sigma 1 793-529 BC).

First, the wools from Chärchän are relatively highly developed, and show great variation in pigment and in quality. The wool from the Qumul fragment seems to be from a hairy rather than a woolly fleece, most likely a very different breed from that of the Chärchän material. The fiber diameters average 20-25 μ, with no "crimp" and a fairly high proportion of outer kemps which average about 75μ . The Chärchän material, on the other hand, contains fine "crimpy" wools, with very little in the way of kemps in the samples studied so far.

Second, we also have the use of what is *probably* a type of cashmere, judging from the morphology of the scale patterns, the fineness and the consistency of diameter of the fibers (about 12-25μ) from a portion of a tapestry woven fabric from Chärchän burial #4 (see plates 1 and 2). It is now uncertain whether this particular burial dates to 1000 BCE or somewhat later, as this particular burial is not described in the preliminary excavation report (Kamberi 1993). Of interest here is the fact that goat skulls were found in another of the Chärchän burials (85QZM-2) as an offering (Kamberi 1994). Extremely fine fiber was found in a number of pieces with virtually no spin to the threads. This indicates a high degree of skill in sorting and spinning fibers, and also indicates a very long stapled fleece which provided the fibers.

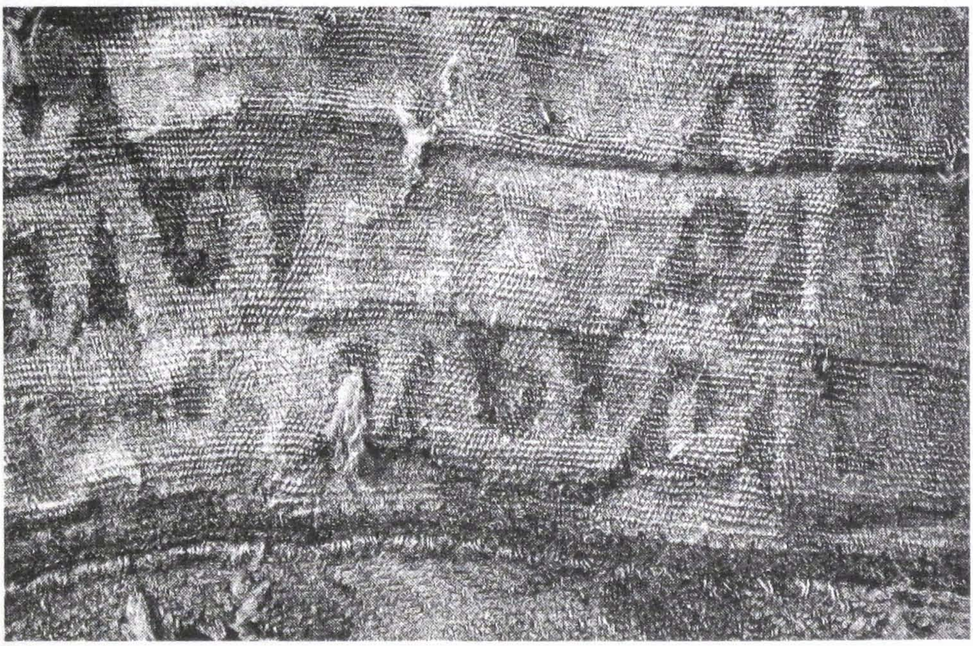

Plate 2. Detail of cloth from 85 QZM 4 from which sample was studied.

Of the actual articles of Chärchän clothing and their construction, gusseted *shalvar* type trousers were present, as well as long, open-necked *galibah* type overshirts. Fitted jackets with gores are also part of the inventory. Interestingly, virtually all of the sewing was either decorative embroidery or for seams and hems and for fitted skirts. We did not observe any *cutting* of cloth but rather all clothing was tailored on the loom. One magnificent overcoat or *chapan*, from burial #85QZM 2, was made of thick coarse brown wool (Kamberi 1994: 5). This coat was pieced together from rectangular bolts of cloth woven in a strongly weft-faced 1/3 twill,[6] with plaited piping sewn along all edges for a finish. This kind of detailing was encountered in much of the Chärchän clothing, in particular the plaited piping was found on many of the trousers and jacket edges. This type of construction and finishing is oddly reminiscent of later European finds from northern Europe (see Hald 1980:336-337), but the significance of this similarity is difficult to assess at the present (see plate 3). Chärchän also has many articles of 3D construction made of plaited bands sewn together, a technique which is not in evidence in the Yanbulaq region as far as we know (see plate 4). As noted earlier, it is quite possible that these materials (e.g., from burial 86 QZ M 4), may date to a later period.

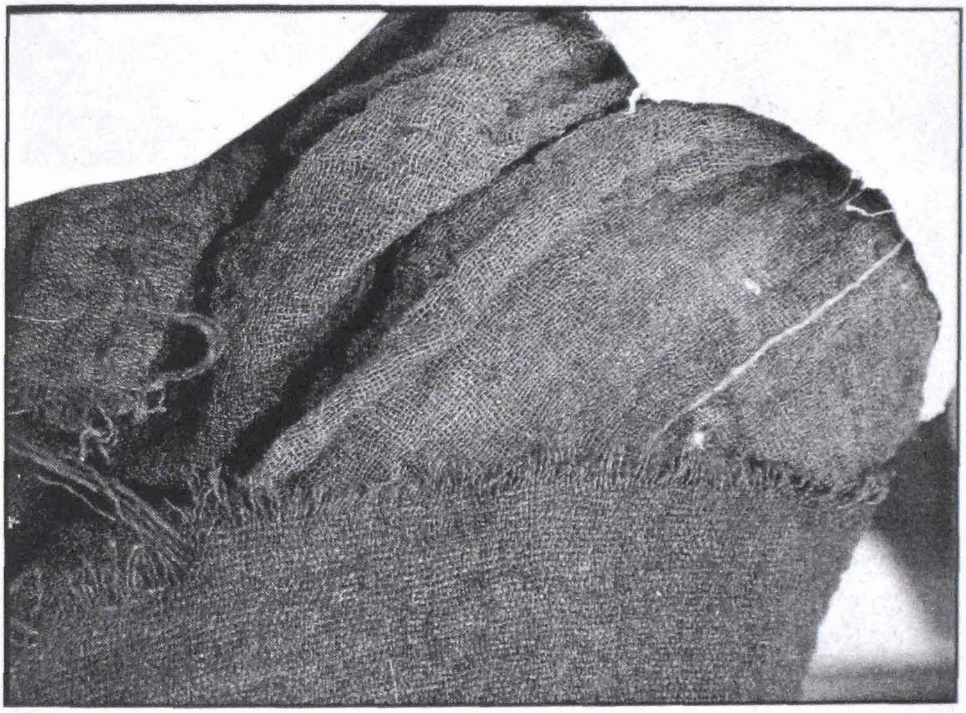

Plate 3. Detail of left leg of man from Chärchän burial # 85 QZM 2 showing red dyed 2-ply thread cord sewn along outer seam of pant as decorative edging. This kind of cloth finishing is also common in many Iron Age textile finds from Schleswig—Holstein in northern Germany.

Finally, mention should be made of some of the design elements utilized in the Chärchän material. The beautifully carved wooden low-whorl spindle from Chärchän (see figure 1), as well as several of the

[6]The fabric was weft-faced to such a degree that the warp threads were not visible, giving the effect of horizontal ribbing; the weft appeared to be one continuous thread laid on top of another.

textiles (see plates 5 and 6), contain distended triangles and scrolls. This iconography is closely related to the so-called animal style of the south Kazakh steppes, Mongolia and Siberia.

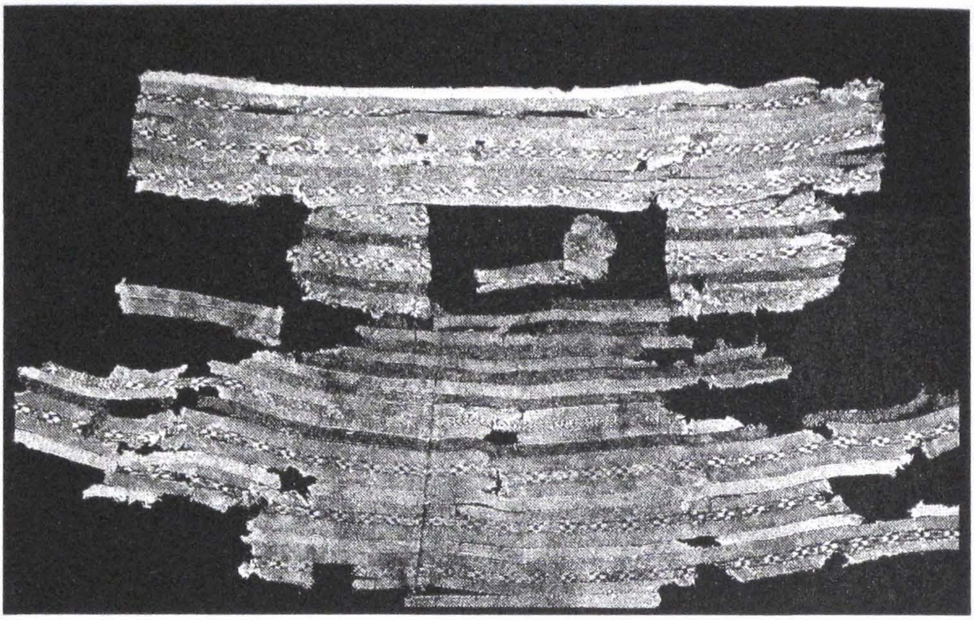

Plate 4. Textile (possibly skirt) of 3D construction made up of plaited bands sewn together. From Chärchän.

Figure 1. Sketch of design carved into the wooden low-whorl spindle from Chärchän. Another whorl from the same site has three interlocked spirals carved on the bottom surface.

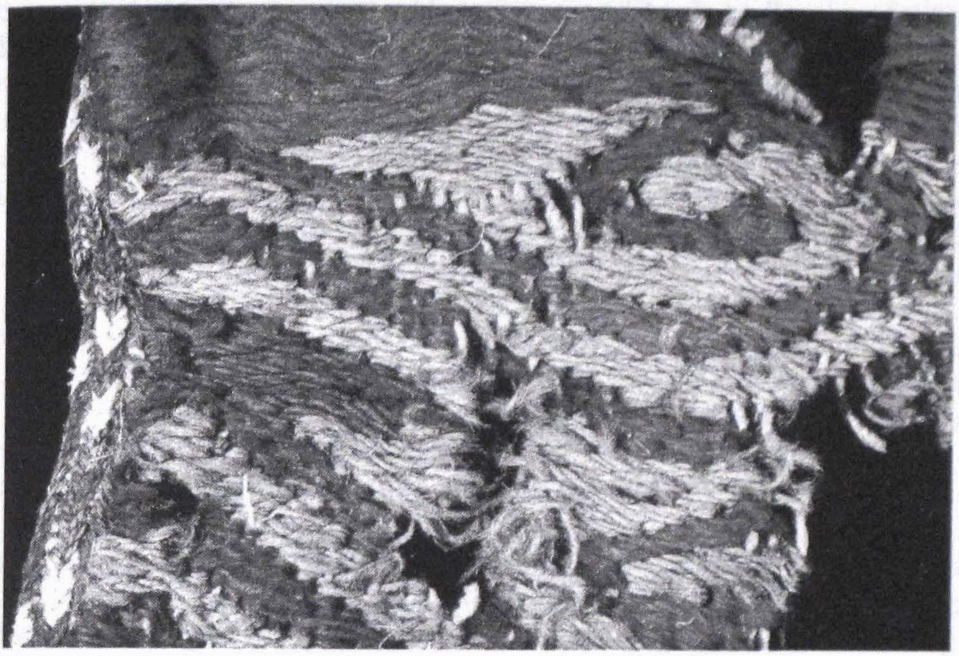

Plate 5. Textile from Chārchān with animal style motifs in tapestry technique (note plaited edging).

Plate 6. Textile from Chārchān of fine wool in repp weave, with painted animal style motifs.*

My overall impressions of the body of material from Chārchān is that it is inherently different from what we have been able to observe from the Qumul (Hami) region, both in terms of the overall crafting

*All photographs and drawing done by author, except plate #6, which was taken by E. Barber.

of cloth, as well as the fiber content. However, common techniques are featured, most notably the skill in dying. At Chärchän darkly pigmented wools were colored with a red dye to give a purplish-brown effect, but this was not the case in any material I observed from Qumul where all dyed threads were unpigmented. Also comparable was the use of multiple shedding mechanisms in their looms. Virtually all Chārchän twills were strongly weft-faced and 3/1 which gives a completely different visual and tactile effect than does a balanced twill. This type of cloth found at Chärchän is strongly reminiscent of some of the the weft-faced red "serge" wools recovered from Pazyryk, although they were mostly 2/2 (Rudenko 1970: 203; plate 133 B&C; Good 1995: 323).

The phenomenal finds from Chärchän and other burial sites from the Tarim Basin are unique and remarkable. Until the cultural histories of the Tarim Basin are better understood with regard to chronology, however, it will be very difficult to assess the true significance of these textile finds within their given contexts. It is hoped that future work in the Tarim Basin will yield important data to help build a sound chronological framework and more complete artifact typologies for the region, as well as to tie in the archeological record from neighboring regions.

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Geography and Climatology

At the Vortex of Central Asia: Mummies as Testimony to Prehistory

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Somnolent now, Central Asia has been a crucial region in world prehistory. Turkistan especially has witnessed many key cultural interactions over the past six millennia and many movements which intruded on the Middle East, Europe and China. I argue that the Bronze Age mummies of Xinjiang (Sinkiang) represent the first great encounter of this long period; not to deny that Turkestan may have played a key role during the Neolithic or much earlier in the original spread of eastern Nostratic, or perhaps even earlier in Dene-Caucasic dispersions.

In the 3rd millennium BCE, early Aryans from the west breached the mountain walls between themselves and several different stocks to the east. Lattimore deduced that Altaic hunters (chiefly Turkic) in the mountain forests, Chinese in some oases of Sinkiang, and Tibeto-Burmans to the south were contacted. I add Yeniseians farther north. Linton suggested that the vigorous Altaic expansions in all directions, based on horse pastoralism and cavalry tactics, were the creative responses of early Turkic peoples to this contact. McCall sees chariotry diffusing to archaic China as an earlier facet of this.

The strategy of this paper is to appraise the biological, cultural, linguistic, and environmental evidence **ensemble**.

I suspect that calling it the *vortex* of Asia is not quite suitable for Chinese Turkistan or High Tartary, even if the connotations of whirlpools or tornados are apt. We need the additional notions of funnels, crossroads, and market places to do justice to this fascinating prehistoric and historic area. Realizing that so many expert colleagues would discuss the mummies of Sinkiang in detail, I discuss here what I call the 'strategy of central Asian prehistory'. One may view the vortex from many angles, but one pivotal original focus has to be on the utterly fundamental geography of High Tartary. One might call this area the 'interface' or 'bottleneck' between eastern and western Eurasia.

Think about the story of the five blind men who tried to describe an elephant, each holding just one body part. Owen Lattimore, for example, in *The Inner Asian Frontiers of China*, was holding the head and ears, but not the trunk. Holding the trunk perhaps is the view from Indo-European—most preoccupied by the mystery of Tocharian. Yet other strong views exist—from the Altai, from Tibet, from more distant places such as former Soviet Turkistan, west Siberia, and greater India, source of a constant northward trickle of people across the great mountains.

As many have said, High Tartary is basically a bowl with impressive mountain sides to the south, west and north. Yet two kinds of breaks in the bowl image occur—the one a kind of narrow tube linking the bowl to vast steppes to the northwest and the other a longer, flatter sort of handle to the east. The famous Dzungarian Gate, only 10 km wide and 75 km long, functions like a funnel or siphon, drawing peoples off the western steppes into the Tarim Basin and adjacent areas. Once drawn in they find themselves confronted by large deserts. What they do after that depends mostly on what they are able to do, on what kind of subsistence economy they arrive with or, in some periods, on whom they conquer and depend on for subsistence. Our mummies are found just where you would expect someone coming through the funnel to be located.

The next critical feature of the greater Tarim Basin is the high walls around it and how oasis societies have snuggled up to the mountains, where the **water** came from—which farmers could use for irrigation. Shades of Mesopotamia! What were the fauna and flora like before farmers began irrigating the land on the edges of the Basin? Perhaps it was a very limited environment for hunters & gatherers. But whenever lakes formed in what is now desert there must have been abundant life in the Basin, reminding one of Ngorongoro Crater in Tanzania. This is all germane to the question of the native peoples of pre-Neolithic, as well as Neolithic, times.

To the northeast and southeast, basically around the Gobi Desert, the bowl becomes more accessible to whoever lives in Tibet, the Yellow River basin, and Mongolia. Call it the handle of the bowl or just a crossroads—from north China to Turkistan and back, from the Tibetan plateaux and back, and from the Mongolian prairies and back. Cultural items could enter the western funnel and show up in north China or central Tibet quite swiftly, or exit through the funnel to show up in Russia or Iran. The famous 'Silk Road' passed through from China to the west, while Buddhism from India and Islam from Arabia—both via Iran—crossed the Basin from the west, but probably over the mountain passes rather than via Dzungaria.

High Tartary has fascinated much of the world in this respect. To Europeans on the west and Iranians on the southwest, there exist expectations of things coming from Central Asia, not only historically documented invasions. Even anthropologists have put the homeland of humanity there. India has always looked north to the Himalayas and beyond as a supernatural realm, while the Tibetans themselves are said to regard the Tarim Basin itself as a similar abode. China's experience has matched that of Europe and Iran, only their hordes of barbarians have come from the northwest. All eyes would seem to be on the two Turkistans. Were there to be a prehistoric Shangri La, an ever-flowing source of new peoples and ideas, the Tarim Basin would be it! Yet, in truth, the bowl was nearly empty, needing constant replenishment from the outside.

Our task then is to dig deeper into Sinkiang's prehistory, hoping to find what was there in older periods and who was there to greet the mummy people. I assume that the latter were intrusive from the west, probably Indo-Europeans of the Tocharian branch ancestral to the late Tocharians of the Buddhist period, unless the Aryans also bubbled up out of Sinkiang. I also assume from several lines of evidence that these Tocharians contacted ancient China and northern Tibet, swapped genes to a significant degree with some Tibetan areas like Amdo, but most of all affected the early Turkic peoples in the Altai and, by domino effect, the Mongols.

The strategy of this proposed prehistory? First, the general approach is what we often call 'four-fields anthropology' because it draws upon the major constituent branches of that discipline. A more accurate label would be 'eight-fields' general ethnology, drawing on both fossil human data and biogenetics, archeology, linguistics, ethnology, paleo-botany, paleo-zoology, and history proper (document history). The fundamental background comes from geography, of course; it cannot be slighted.

Second, the prehistory here follows Irving Rouse in tracking evidence of the past in a number of ways, rather than equating prehistory with what archeologists do. If we follow current archeological custom, we will still need a term for the larger pursuit.

Third, the logic of archeology in lining up evidence through time (i.e., dating strata and their contents) seems more solid than the linear or phyletic orientations of biogenetics and linguistics. Chronology is quite necessary for good prehistory—a sine qua non, if you will—and archeology is master of that. When one has established analytical strata at least, one can then compare them with the lineages of historical linguistics and the cladograms of biogenetics.

Fourth, doing so will basically bring fossil culture evidence into comparison with the languages and bodies of the other sub-fields. While it is true that some prehistory can be squeezed out of the cultural evidence of the contemporary world, we have not been very successful in this endeavour. But we have been prey to the most speculative prehistory, that of cultural evolutionary theorizing, whose conclusions are basically not helpful, being customarily dogma-driven. Much maligned, culture trait distributions do suggest links among specific peoples, yet the suspicion of borrowing adheres to them and they normally are undated.

Fifth, the taxonomies of linguistics and biogenetics are extremely useful, once anchored in archeological time and space. Both yield first-rate evidence of inheritance, of kinship through time, and the preservation of ancestral inclinations. Both also show changes through time and, above all, often show with great clarity who has borrowed what and from whom, and sometimes when and where. They sometimes interdigitate so well that one can read a tremendous amount of prehistory from their interactions. For example, in southern Africa an intrusion of Bantu-speaking West Africans into Khoisan-speaking Bushmen territory and the subsequent emergence of new peoples like Zulu and Xhosa can be read from blood and clicks.

Sixth, in order to find the original natives of Sinkiang, and describe the ebbs and flows of peoples, we set up an archeological template. Into this we pour available evidence. This involves many **tactical problems**, but those are peculiar to the sub-fields and can be discussed by their experts. **Dating** is a constant problem which can be solved in part by association with historically known factors. This is particularly useful in demarcating the many Turkic-speaking peoples.

At any specified time period and region it is customary in standard archeological usage to stipulate, or try to, *who* was *where* with *what kind* of culture (or economy, etc.). The familiar charts use **columns** to designate areas and **rows** to show the time period as well as what was extant during it. Normally, the charts show only archeological material, excavated stuff, and the analysis or classification of it. We can increase the power of the template by adding linguistic and biogenetic conclusions to it.

Thus we can take a time period such as the 20th century CE and focus our template on High Tartary, divided up into as many areas (columns) as we need. In brief, we might have this example:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
(steppe N)	(steppe)	(steppe +)	(mts +)	(desert)	(mts +)	(mts +)
(desert S)	(+ taiga)	(desert)	(steppe)	(oases)		
Kazak,	Turkic,	Uighur	Uighur	Uighur	Tibetan	Chinese
Uzbek,	Russian	Chinese	Mongol	Chinese	Chinese	T-B
Khirghiz,	Yeniseian	Mongol	Chinese	Khirghiz	Tibeto-Burman or	
Tajik	Samoyed			Dulani	T-B	
Russian						

Each of the labels can be filled in with ethnographic, biological, economic and linguistic data, including political relationships. The facts that four regions are predominantly Moslem and five are ruled by China could be noted. The labels are sometimes ethnographic, sometimes linguistic, and sometimes archeological. The gross setting is the Nuclear Age, especially in Tarimia.

Compare the 10th century CE with the 20th CE to note the changes:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Kipchak	Tuvan +	Uighur	Uighur	Uighur	Tibetan	Chinese
Oğuz	Yeniseian	Turfani(?)	Mongol	Tangut	T-B	Khitay?
Persian	Samoyed			Kuchan?	Kuchan?	Tibetan
Pamir Iran				Saka	Tangut	Tangut

The fact that much of the area on the west was Moslem, while most on the east was Buddhist, could be noted, along with the **absence** of the Chinese state but the presence of several strong local states plus a Tibetan one.

Compare the 5th century CE because of interesting data:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Sogdian	Tuvan +	Turfani	Uighur	Kuchan	Tibetan	Chinese
Hsiung-nu	Hsiung-nu	Hsiung-nu	Hsiung-nu	Wusun	T-B	T-B
	Yeniseian		Mongol	Saka	Kuchan?	Turfani?
	Samoyed			Yüeh-chih		

The fact that most of the area was Buddhist and Indian/Sogdian writing was spreading, while some of the north remained 'shamanistic' and illiterate, could be noted, along with the presence of the Chinese state in Dzungaria and Tarimia. Turfani and Kuchan refer to Tocharian A & B.

Now going back into proto-history, compare the 3rd century BCE, where much more of the data are inferential (few archeological data included):

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Iranian	Yeniseian	Turfani	Turkic	Kuchan	Bodic	Chinese
Greeks	Samoyed	Turkic	Mongol	Indians	Kuchan?	Turfani?
	Scythian	Chinese	Scythian	Chinese		Bodic?
		Hsiung-nu		Yüeh-chih		

Dropping back to the Iron Age, compare the 10th century BCE, where all the data are inferential, drawing on the three primary sub-fields:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Horse Iran	Horse Iran	Chariot	Horse Iran	Chariot	Bodic	Sinitic
	Yeniseian	Europoids	Ur-Turkic	Europoids	Mincha?	T-B
	Samoyed	Ur-Turkic	Mongol	Burusho?	Kusunda?	

The probability that much of the area was overrun by horse-riders (cavalry) of Iranian type, as opposed to horse-drawn charioteers presumed to be of Tocharian type, is quite important because the Europoids of Sinkiang would be thought of as Iranian did we not know about Tocharian.

Going back to our Bronze Age limits for the Europoids, compare the 20th century BCE, drawing on the three primary sub-fields:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Chariot	Chariot	Chariot	Chariot	Chariot	Chariot	Chariot
Iranians	Iranians	Europoids	Europoids	Europoids	Europoids	Europoids
Caucasic?	Yeniseian	Ur-Turkic	Ur-Turkic	Burusho?	Bodic	Sinitic
	Ur-Samoyed	Ur-Mongol?	Ur-Mongol	Yenisei?	Kusunda?	

Taking it back to the 30th century BCE, we find a vacuum left by peeling off the Aryan stratum (horse people and the Europoids) because our best guess would place them still far off to the west, near the Black Sea:

Turkistan	*W.Siberia*	*Dzungaria*	*Altai*	*Tarimia*	*Tibet*	*Kansu*
Farmers	Ur-Chariot	Ur-Turkic	Ur-Turkic	Farmers?	Bodic	Farmers?
Caucasic?	Ur-Samoyed	Ur-Mongol	Ur-Mongol	Burusho?	Kusunda?	Sinitic
Kartveli?	Yeniseian		Yeniseian remnants?			

It is to be noted that the Neolithic had arrived in some of the area but probably not all of it. Lattimore believed that the Altaic-speaking peoples were hunters when first contacted by Aryan Bronze Age pastoralists.

In Table 1 (below) these labels marked • require explanation, as follows:

- **Dulani** are a small ethnic group near Maralbashi, reported by Skrine. Evidently speaking a Turkic language (Kirgiz), they are culturally distinct and markedly Europoid in physique. Since they seem not to be associated with merchant groups or resident foreigners, they may be a remnant of older Pamir Iranian, or even Kuchan, populations. **Genetically**, they merit study.
- Pamiran = Pamir Iranians, speakers of the northeastern sector of Iranian associated with the Sogdian distribution and probably descended therefrom. Modern 'Afghan' populations in the high Pamirs are related.
- **Turfani** is an apt substitute for **Tocharian A**, earlier found around the oasis of Turfan. It is thought to have become fossilized by the time of its writing or the discovery of some of its writings.
- **Kuchan** is another substitute for a Tocharian group, in this case **Tocharian B**, earlier found around the oasis of Kucha but also other places. It is supposed to have been a 'living language' when first written.
- **Bactri** stands for the Hellenized carriers of **Buddhism**, derived from Afghanistan and northern India, who probably introduced Buddhism into Tarimia.
- **Kusunda** is an unclassified language of Nepal, unlikely to be either Sino-Tibetan or Munda in affiliation. As a remnant population the Kusunda may be native to Nepal and the Himalayas or evicted from Tibet by Sino-Tibetan or evicted from northern India by other groups.

Table One

TURKISTAN *steppe/N* *desert/S*	*W.SIBERIA* *steppe/S* *taiga/N*	*DZUNGARA* *steppe/N* *desert/S*	*ALTAI* *Mts + steppe*	*TARIMIA* *desert oases*	*TIBET* *Mts. + steppe*	*KANSU* *Mts + steppe*
2000 CE↑ Kazak, Uzbeg, Kirgiz, Tajik, Russian	TuvaTurk Russian, Ket/Kot, Samoyed	Uighur, Chinese, Mongol	Uighur, Mongol, Chinese	Uighur, Chinese, Kirgiz, Dulani*	Tibetan, Chinese, 'Moslem'Tibeto-Burman	**2000 CE**↑ Chinese, 'Moslem' Tibetan, T-B = (Tibeto-Burman)
TURKISTAN **1500 CE**↑	*W.SIBERIA* ↑	*DZUNGARA* ↑	*ALTAI* ↑	*TARIMIA* ↑	*TIBET* ↑	*KANSU* 1500 CE↑
1000 CE↑ Kipchak, Oğuz, Persian, Pamiran*	TuvaTurk Ket/Kot, Samoyed	Uighur, Turfani* (?)	Uighur, Mongol	Uighur, Tangut, Saka, Kuchan* (?)	Tibetan, T-B, Tangut, Kuchan?	**1000 CE**↑ Chinese, Tibetan, Tangut, Khitay?
↑	↑	↑	↑	↑	↑	↑
500 CE ↑ Sogdian, Hsiung-nu	TuvaTurk Hsiung-nu Ket/Kot, Samoyed	Turfani Hsiung-nu	Uighur, Hsiung-nu Mongol	Kuchan, Wu Sun, Saka, Yüeh-chih	Tibetan, T-B, Kuchan?	**500 CE** ↑ Chinese, Tibetan, T-B, Turfani?
0 CE/BCE↑	↑	↑	↑	↑	↑	**0 CE/BCE**↑
300 BCE ↑ Iranian, Greeks	Scythoid Ket/Kot Samoyed	Turfani, Turkic, Chinese, Hsiung-nu	Scythoid, Turkic, Mongol, Hsiung-nu	Kuchan, Bactri* Chinese Yüeh-chih	Bodic, Kuchan? T-B	**300 BCE** ↑ Chinese, Turfani? Bodic?
↑	↑	↑	↑	↑	↑	↑

Table One *(continued)*

1000 BCE ↑ Horse- Aryans	Horse- Aryans, Ket/Kot, Samoyed	Chariot- Europoid, Ur-Turki	Horse- Aryans Ur-Turki Mongol	Chariot- Europoid Burusho?	Bodic, Mincha? Kusunda (*?)	**1000** BCE ↑ Sinitic T-B
1500 BCE ↑	↑	↑	↑	↑	↑	**1500** BCE ↑
2000 BCE ↑ Chariot- Aryans, Caucasic (?)	Chariot- Aryans, Ket/Kot, UrSamoyd	Chariot- Europoid, Ur-Turki UrMongol (?)	Chariot- Europoid Ur-Turki Ur-Mongol (?)	Chariot- Europoid Burusho? Ket/Kot?	Chariot- Europoid, Bodic, Kusunda?	**2000** BCE ↑ Chariot- Europoid Sinitic, Ket/Kot?
2500 BCE ↑	↑	↑	↑	↑	↑	**2500** BCE ↑
3000 BCE ↑ Farmers Caucasic (?) , Kartveli (?)	Herders- Chariots Proto-IE (?) Ket/Kot	Hunters Ur-Turki Ur-Mongol (?) Ket/Kot? (relics)	Hunters Ur-Turki Ur-Mongol (?) Ket/Kot? (relics)	Farmers? Burusho? Ket/Kot? (relics)	Farmers? Bodic, Kusunda?	**3000** BCE ↑ Farmers? Sinitic

The group called Ket/Kot is more properly Yeniseian. Since they are distant relatives of Sino-Tibetan, the space between the middle Yenisei river and China is potentially their territory in ancient times. If anyone cut them off from the Sino-Tibetans, it probably was old Altaic or the Scythoids at a later date.

It must be admitted that both the Altaic and Sino-Yeniseian hypotheses have been challenged vigorously in recent decades. I take the simple position that the attacks on these hypotheses are not as convincing as the evidence for their validity. During discussion of this paper, Eric Hamp dismissed the Sino-Yeniseian hypothesis entirely but declined a chance to argue the matter with the author. Most recently, Merritt Ruhlen (1996) has proposed some telling sound correspondances with Na-Dene, suggesting that the Yeniseian ancestor shared with Sino-Tibetan is older than the one shared with Na-Dene. In that case the Yeniseian remnants may have disappeared in the Tarim basin by such a late date as 3000 BCE, if they have ever been there. By the same token, old Sino-Tibetan remnants in Tarimia increase in likelihood because of the now closer links to Caucasic, instead of Yeniseian, within the Dene-Caucasic overall hypothesis.

The Tibeto-Burman sector of Sino-Tibetan is heavily involved in the mountains between Tibet and China, also Tibet and South Asia. Tibetan and its dialects and close kin are labeled Tibetan, while more distant kin are labeled either Bodic or T-B. **Tangut,** for example, came from north Tibet but is not a Tibetan dialect, belonging instead to **Burmic** in a branch along with Qiang (northwest Sichuan) who are depicted in Shang times as shepherds and Primi (southwest Sichuan). Still close are Nung (far to the south) and rGyarong on the Sichuan-Tibet border. This is not to say that Tangut and its close kin are particularly close to Burmese or Kachin or Karen, nor to infer that Tangut et al. are derived from the south. The Tangut and close kin constitute a basically different branch of the family. See Van Driem's (1995) recent corrections of Sino-Tibetan internal taxonomy. Starostin (1995) has also downgraded the status of Sinitic to that of one branch among several.

The Hsiung-nu of Chinese reports are often identified with the Huns. Some have seen them as Indo-Europeans, while some identify them with early Turkic or with Mongol. Surely the Hsiung-nu were a horse people, herders and warriors, but at least by the time they reached Europe incorporated a number of different Altaic, Uralic and even Germanic groups.

Either the Wusun or the Yüeh-chih may be the same as the Kuchan. Chinese sources distinguish them from each other, but how much? The Saka (archeological) are northeast Iranians who may also be the same as one of these groups, except the Kuchan.

Horse Iran or Horse-Aryan refers to Iron Age horse-riding warrior types, speaking Iranian dialects no doubt. Riding on the backs of horses, at least in warfare, apparently came later than attaching horses to chariots. Cavalry depended on the invention of the **stirrup**.

Chariot Europoids refers to the 'mummy people' themselves who most likely used chariots and were phenotypically Europoid physically. Still they could have been riding their horses by the 10^{th} century BCE. Their language is not necessarily part of this label because of dual likelihoods—Iranian versus Tocharian. However, linguistic evidence presented in other papers suggests that Tocharian was probably an earlier arrival in Turkistan than Iranian and is a more likely source of Indo-European loan words in Sinitic than is Iranian. For the 'mummy people' of Tarimia modern genetic research by Francalacci concludes that they were ordinary Europoids. Chinese genetic work on Uighurs and others shows that Uighurs are half Europoid genetically, while other peoples to the east also have substantial Europoid admixture.

Mincha or Bai is said to be the closest relative of Chinese. It is generally western in location (in China) and may have been in Tibet at an earlier date. However, according to Xu Wenkan (personal communication), Chinese linguists believe that—when the borrowings from Han Chinese have been accounted for—Bai is actually a Tibeto-Burman language. In opposition to that revision, however, Starostin (1995) has recently suggested that the Chinese borrowings are not so deep in the language and that Bai really is close to Chinese. There is also a suggestion that a few Chinese linguists have been unduly influenced by Laurent Sagart's (1995) views which separate Bai from Chinese. Paul Benedict (personal communication) recently reiterated his conclusion that Bai is closest to Chinese.

The prehistoric corollaries of this taxonomic debate are not trivial because of the historical importance of Chinese. If Bai is 'just another' T-B language, it does not affect the analysis of Chinese overly much. If it is the closest relative and its present location is any indication of its prehistoric locale, then inevitably it pulls Ur-Chinese towards the west.

Sinitic refers to old or archaic Chinese or old Bai or some ancient relative, now extinct. If Bai is to be divorced from Sinitic, then Bai's potential role in Kansu or Tibet becomes more likely. Conversely, Sinitic proper—Chinese—becomes less likely until the Chinese state reached into Kansu, Tibet, and Sinkiang two millennia ago.

The Neolithic is not firmly established everywhere in the region before its farmers become pastoralists—or so it seems. On the west at least the Neolithic derives ultimately from the Fertile Crescent. But the controversial dates for the north Chinese Neolithic preclude any firm conclusion about Kansu and Tibet or even Dzungaria. There is no doubt that south China's Neolithic with rice is much older than 3000 BCE. None of the papers in archeology at the conference disagreed with these conclusions; indeed some archeologists stated flatly that the Neolithic is essentially unknown in Sinkiang. That probably means "as yet unknown" because early sources like Stein strongly suggested that many surface finds were surely Neolithic in type and age.

Since Dzungaria and Altai at least are so close to the presumptive homelands of both Turkic and Mongolian, the best bet is that they were the natives before 3000 BCE in those parts of the region. Tarimia is genuinely difficult to figure out but again Altaic is more likely than anyone else. On the west Turkistan appears, when Turkic and the Aryans are peeled off, to be uninhabited in this analysis but archeologically it is not. Since it is often supposed that west Turkistan was physically Europoid at an early date, the three linguistic groups most likely to have been living there are Caucasic, Kartvelian, and Burushaski. Or perhaps some of the pre-Aryan groups such as Elamitic, Kassitic or Gutian. In west Siberia north of the Altai the Yeniseians are far and away the most likely inhabitants, at least along the upper and middle Yenisei basin. South/east of Altai is surely Sinitic.

Two key problems are indicated. More intense study of **Tibetan dairy culture** plus **(genetic) lactase tolerance** among Tibetans look promising as research leads into the impact of Indo-European and/or Altaic dairying practices and diet on Tibet. Given the general lack of lactase tolerance in east and southeast Asia which contrasts sharply with western Eurasia and India, and given a general aversion to bovine & ovicaprid milk in China and Southeast Asia, the Tibetans offer a measure of the limits of western Eurasian influences to the east of Sinkiang.

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Did the Xinjiang Indo-Europeans Leave Their Home Because of Global Cooling?

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Paleoclimatic studies indicate four epochs of global cooling during the last 4,000 years, namely the few centuries before and after 2000 BCE, 800 BCE, 400 CE, and 1600 CE. The global temperature-changes influenced regional precipitation patterns. Europe was wetter and China was more arid during the cold epochs. Both sets of cold climatic conditions were unfavorable for agricultural production. Reading the historical records, I suggest that the great migrations during the past may have taken place when poor harvests were not yielding enough food to feed the population. The Great Migration of the Germanic tribes during the first centuries of the Christian era, for example, may be one example, and the southward migration of the Chinese population during the Jin and the North-South Dynasties may be another. Recognizing the evidence that the Indo-European people of Xinjiang could have come from a northern European home, I posed a question as a working hypothesis: Did the Xinjiang Indo-Europeans leave their home because of a global cooling?

Introduction

My colleagues and I in the Limnogeological Laboratory of the Swiss Federal Institute of Technology have been engaged in paleoclimatical researches during the last three decades. We have acquired a global view through cooperative researches with colleagues in Europe, Asia, North and South America. Our data indicate that there have been alternate epochs of global warming and cooling since the disappearance of continental ice sheets some 16,000 yeas ago. Global temperature changes have predictable influence on regional precipitation patterns. During warmer epochs, the middle- to low-latitude temperate lands, such as China, are wetter, whereas high-latitude countries, such as Europe, are drier. During colder epochs. the middle- to low-latitude lands are more arid, whereas high-latitude countries are wetter.

History shows ages of prosperity alternating with ages of famines and epidemics, and those ages seem to correspond to epochs of warmer and colder climate respectively. A correlation of great migrations in history to epochs of global cooling suggests that the migrations may have been a necessity precipitated by years of bad harvests (Hsü 1996)

An ancient desiccated corpse of Xinjiang, with physical features typically European, was first discovered in 1978, and many more were found during the last two decades. Victor Mair (1993) suggested that those original inhabitants of the Tarim Basin during the first and second millennia BCE may have been the ancestors of the Tocharians, who spoke an Indo-European language in northwest China as late as the 9th century CE. The timing of their first arrival shortly after 2000 BCE coincides with an epoch of global cooling. Much is still to be learned about the migration of the Indo-European people from their homeland to Xinjiang. I venture only to pose, as a paleoclimatologist, a question to the experts: Did the Xinjiang Indo-Europeans leave their home because of a global cooling?

I am indebted to many of my colleagues for the decades of cooperation to investigate global changes, especially Professor Kerry Kelts of Minnesota, who first pointed out to me the historical significance of the global cooling around 2000 BCE. I would also like to express my gratitude to Professor Victor Mair of Pennsylvania for inviting me to submit this short note. I might mention that there are considerable uncertainties on the numerical ages of more distant events of prehistory. I have chosen to use, for the sake of consistency, the calibrated carbon-14 ages, even though I am fully aware of the problem of the radiometric dating (see Rohl 1995).

The Post-Glacial Climate

Studies of sediments on land, under the sea, and of polar ice have given clear indications that the earth underwent numerous episodes of continental glaciation during the last two million years. The last glacial stage reached its zenith 18,000 years ago, when half of North America, all of Scandinavia, and large parts of Europe were crowned by continental ice sheets, comparable in size to the Antarctic Ice Cap of today.

The ice caps of continental glaciation started to retreat rapidly after they reached their greatest extent at about 18,000 BP. The post-glacial era began some 16,000 or 15,000 years ago. Shortly after that Denmark was liberated from the ice cover, *Octopella dryas* appeared in the meadows on the periphery of retreating glaciers. This small white Alpine flower is still found growing in mountain meadows of the Alps. These occurrences suggest that the climate of the low-lying land of northern Europe at that time was similar to that of the present-day Swiss Alps at about 2,000 m elevation. Scientists call this first epoch of the post-glacial climate the Old Dryas Stage.

The climate grew warmer during the next few thousand years. Meadows were replaced by forests, and the evergreens were replaced by deciduous trees to form the "mixed forests" in Europe. The global climate eventually became as mild as, or even milder than, that of today. Then suddenly, about 12,500 years ago, the glaciers returned. This relatively brief cold interlude, when the alpine flower *O. dryas* came back to Denmark, is called the Younger Dryas Stage. In less than a thousand years, however, the chill disappeared as quickly as it appeared. A wholly new epoch, called the Holocene, had its beginning some 11,500 years ago, and on the whole global climate has been warm since then.

There have been climatic fluctuations during the Holocene, but the average annual temperatures have not changed very greatly; deviations are rarely more than 1°C. The global climate was warmer during the early Holocene, and that interval has thus been characterized as the time of *Climatic Optimum* or the *Megathermal* stage (Bradley 1992). The second half of the Holocene was colder.

When did the cooling trend start? Was the change to the colder climate abrupt or gradual? Has it been a steady decline, or were there significant and systematic fluctuations?

There is no consensus among the experts, and the first severe cooling, manifested by different lines of evidence, may indeed have come at different times in different places. Our evidence suggests an end of the Climatic Optimum some 4 thousand years ago, or 2000 BCE, in Europe, in North Africa, in the Near East, in the Far East, and in South America. This marks, in our opinion, the start of the Late Holocene epoch, and there were periodic alternations of global warming and cooling during the last four millennia (Hsü 1996).

The Return of Mountain Glaciers

The beginning of Late Holocene in central Europe is manifested by the start of varve-sedimentation in Alpine lakes.

Varves are found today in high-mountain lakes of the Alps. They are deposited in lakes which freeze every winter and in lakes into which the glacial meltwater is emptied every spring (Zhao and Hsü 1984). Varves are absent in the lakes of the Swiss Midland, because those lakes very rarely freeze during the winter.

We found ancient varves in Lake Zurich as the sediments of the Younger Dryas age. Making a comparison to modern-day varves, we could conclude that the lake did freeze every year then, and that the meltwater of the Linth Glacier, which stood then only a short distance upstream from the lake, emptied directly into the lake. This conclusion permits the interpretation that the climate in the Swiss Midland (400 - 500 m elevation) 12,000 years ago was comparable to that of high mountain valleys (1500-2000 m) today (Hsü et al. 1984). It is no wonder that alpine flowers such as *O. dryas*, which are found today in high alpine meadows, grew in lowland during the Younger Dryas time.

The cold Younger Dryas ended 11,500 years ago, and the glaciers disappeared from the lowland. The Early Holocene Climatic Optimum arrived, and then the global temperatures were, on the average, higher than they are now. Varves were neither deposited in lowland nor in Alpine lakes during that period. At that time, Alpine valleys were as warm as the lowland today. The Alpine lakes of the high Engadine Valley, for example, did not freeze every winter, and there were practically no glaciers in the mountains above the valley.

Glaciers did not exist then, but they are now present in the Swiss and Austrian Alps, commonly above 3,000 meters elevation. They are now feeding meltwaters to the Engadine lakes. When did the glaciers come to the Alps?

When there were no glaciers, there were no varves. We now have glaciers, and we have varves in high Alpine lakes. We can thus determine the arrival of the first glaciers by counting the number of varves: each pair of the laminae of a verve is deposited annually. My student, Andreas Lehmann (ETH dissertation 1993), counted 3,600 varves as the youngest sediments of the Engadine lakes, and they lie above the early Holocene mud. The carbon-14 (uncorrected) date for the oldest verve of the continuous sequence is 3600 BP, but the calibrated date should be 3800 BP. We adopt, for the sake of consistency, the calibrated date of 1800 BCE as the date of the first major advance of the Alpine glaciers during the Holocene, recognizing the possibility that some varves may have been missing (having not been deposited or having been eroded away).

The Changing Climate in Historical Time

The climatic changes in Europe and the Mediterranean countries in historical times have been studied by archeologists, historians, and natural scientists. There is good evidence for a period of global cooling around 2000 BCE, a date defining the end of the Climatic Optimum and the beginning of the Late Holocene. The cooling trend has, however, not been steady since then: warmer epochs have alternated with cold epochs.

The global temperature changes have predictable influence on regional precipitation patterns. The Early Holocene climate was warmer and wetter in the Saharas, in the Near East, and in Central Asia. The Saharan rock paintings, depicting scenes of hunters chasing elephants, rhinoceros, buffaloes, hippopotami, antelopes, giraffes, etc., have been dated by C-14 to range mostly from 6000 to 5000 BCE. When global cooling came, the deserts of North Africa and Central Asia expanded, driving the hunters and grazers to the alluvial plains where agricultural civilizations began to flourish: in Egypt, Mesopotamia, and China (Lamb 1982:138-142). The Climatic Optimum apparently ended with the collapse of the civilizations of the Middle Bronze Age, when many settlements were abandoned because of aridity. The global cooling brought with it wet climate to the northern latitudes. The Lake Dwellers of the Middle Bronze Age in central Europe, who had enjoyed a warm and dry climate, had to abandon their flooded settlements when the water-level of the lakes rose. The shores of Lake Zurich remained, for example, uninhabited for 400 years before, and 400 years after 2000 BCE (Bureau of Archeology, City of Zurich, personal communication).

Global cooling and increasing aridity at the beginning of the Late Holocene in the regions of the middle or low latitudes can also be discerned from a reading of Chinese history. When the legendary king Huangdi ("Yellow Emperor") ruled, at about 3000 BCE, mulberry trees grew in north China where elephants and rhinoceros roamed. Natural-history studies give clear evidence of a transition from the Early Holocene optimum to the Late Holocene temperate climate; the change took place at about 2000 BCE (Shi 1992). The first chill thus came to China at about the same time when the first mountain glaciers advanced in the Alps and when the first lake-dweller's settlements were flooded.

Historical records suggest that favorable climate came back during the Shang and early Western Zhou dynasties, before many cold and dry years were recorded during the first two centuries of the last millennium BCE. There were drought and famine during the reigns of the four Zhou kings Li, Xuan, You, and Bing. Weakened by internal rebellions, King Bing was forced by foreign invaders to abandon Chang'an; the capital was moved to Loyang at the beginning of the Eastern Zhou Dynasty, around 800 BCE (Liu 1982).

There were parallel changes in the Near East and in Europe. After the collapse of the Middle Bronze communities, the civilization of the Late Bronze age flourished. But the warm interlude was terminated by a change again to colder and more arid climate; this transition around 800 BCE is recorded by the deposition of salts in the Dead Sea (Negendank 1996). A remarkable cooling also came to Europe around 800 - 700 BCE, at the end of Hallstatt Late Bronze age. The event is thus more or less synchronous with the end of the Western Zhou in Chinese history. In central Europe, alpine glaciers advanced, and lake levels rose. The lake dwellers of Zurich, for example, again left their settlements around the time of 800 BCE. Meanwhile, tree-lines were depressed, and broad-leafed trees in mixed forests were replaced by conifers. Salt mines were abandoned, and commerce was curtailed (Gams 1937).

Historical records of China suggest that the cold interlude ending the Western Zhou was relatively brief. The climate was again optimal during the Spring and Autumn and the Warring States eras (722-221 BCE). Rice, the staple crop in south China, grew in Shandong, Henan, and Hebei, provinces which are now noted for their winter cold and aridity. Rice could then grow in the north, because there were numerous warm and snow-free winters, as recorded in Chinese historical texts (Liu 1982).

Europe also became warmer after 800 BCE. Civilization returned after the Greek Dark Age (Lamb 1982:165), and the city of Rome was founded in year 753 BCE. The change from a cold and arid climate to a warm and humid climate during the Roman-Hellenistic era is recorded by sediment cores from the Dead Sea (Negendark 1996). The flourishing Greco-Roman civilization during the centuries before the birth of Christ was contemporary to the "golden age" culture of China. This is another manifestation of a parallelism in cultural developments at an age of optimum climate.

Chinese historians wrote that the climate continued to be mild and wet during the Ch'in and Western Han years (221-29 BCE). Settlements on the Silk Roads at the edges of the Täklimakan Desert were built during those warm and wetter years. The first significant change to colder climate came, however, when the Han Dynasty was usurped by Wang Mang. He may have been a good ruler, but the cold and the drought brought forth widespread famines. Hundreds of thousand hungry people abandoned their homes, and eight or nine-tenths of those starved to death. The rest joined the rebellions in the overthrow of the imperium. After better years during the early reigns of the Eastern Han emperors, famines in year 184 CE caused widespread peasants' rebellions.

Climate continued to deteriorate and extremely cold and dry climate finally arrived during the late 3rd century CE. The worst drought was recorded during the reign of Jin emperors: drought visited China continuously during the decade 281-290 CE. Aridity was widespread in north and central China, and famines led to death by starvation and even to cannibalism. The catastrophic climax was the year 309 CE, or the 3rd Yongjia year of emperor Huai, when "the Yangtze, the Han, the Yellow River, and the Luo were all desiccated, so that people could wade across then" (Liu 1982). That the smaller Han and Luo rivers of central China should have been desiccated can be readily envisioned, but it is almost inconceivable that the Yangtze and the Yellow River could dry up. The Yangtze is, for example, 60 m deep below the Yangtze Bridge in Nanking, and is more than a dozen meters deep in its upper reaches. When people could wade across the Yangtze River, the groundwater level must have been tens of meters below the surface. It was thus not surprising that the Western Jin Dynasty, weakened by famines and rebellions, was overthrown by marauders from the north. Five foreign tribes established the 16 kingdoms of the Northern Dynasties in central China. The Han Chinese migrated en masse to the south, where they were ruled by the emperors of the Southern Dynasties.

In Europe, the first Christian eras were also the chaotic years of the Great Migrations of the Germanic tribes. The mild climate which had prevailed in central Europe during the Roman times came to an end before the late 3rd century, as indicated by studies of tree rings, tree lines and glaciers in central Europe (Lamb 1982) . The climate still fluctuated during the next two centuries, and it was, on the whole, wet and cold during the 6th century. That the Age of Võlkerwanderung was a cold episode in history is verified by evidence from the Greenland Ice cores; the coldest years were the two centuries from the late 4th century to the early 6th century (Lamb 1982:173-186).

After China was reunited toward the end of the 6th century, the Sui, T'ang and early Sung years were again a period of prosperity. It is probably not a coincidence that this age of Chinese glory coincided with another 400 years of warm-and-wet years (600-965 CE). The Han cities on the Silk Road around the Tãklimakan Desert were rebuilt and again settled.

The peoples of Europe also enjoyed the warmest climate during the Age of the Vikings, 800-1050 CE. Fields for planting and meadows for grazing in Europe significantly expanded, when the tree-line advanced to higher altitudes. W. Dansgaard's isotopic record of the Greenland ice cores suggests that the warming started in the 7th century and reached its zenith during the 10th, 11th, and 12th centuries. The evidence from tree rings suggests that precipitation was reduced during the warm years. High-pressure and sunny weather prevailed over Britain, Germany, and Scandinavia, where the summers during the 10th century were mostly warm and dry (Lamb 1982:189-214).

Rice fields and bamboo forests had long disappeared from the Yellow River region in China sometime before the beginning of the second millennium. Elephants and rhinoceros had also migrated to the south. After the turn of the millennium, there were reports, year after year, of heavy snows, bad harvests, and of people starved or frozen to death. There were, however, brief episodes of warmer and wetter years during the 13th century (1192-1277 CE, Southern Song), the epoch of the Mongol conquest. Like the Vikings in northern Europe who flourished during the European warmer centuries, it seems that the greening of grasslands also served to strengthen the economy of the conquering peoples of northern Asia (Liu 1982).

The cold and dry years in China grew more severe toward the 16th and 17th centuries, the time of the "Little Ice Age" in Europe. The worst came during the reigns of the last two Ming emperors Tianqi and Chongzhen. During the forty-odd years, 1601 to 1644, historians recorded two episodes of *balian-dahan*, "eight years of severe drought." History records that the catastrophes were not local (Liu 1982):

> During the 6th to 16th years of Chongzhen, the whole nation suffered from drought, and starving people were ubiquitous. Driven by hunger, cannibalism was practiced. The rebels conquered one city after another.

Chongzhen was doomed and he hanged himself when the rebels entered the Forbidden City. The Ming Dynasty perished when the northern Asiatic tribes from Manchuria came down to establish the Qing Dynasty.

The climate of northern and central Europe was very cold during the Little Ice Age. In those high-latitude countries, the climate was, as mentioned above, not arid but unusually wet. Mountain glaciers of Switzerland came down to below 2,000 m elevation and they laid end moraines on Alpine meadows. The northern Europeans suffered many a cold and stormy winter. The average winter temperature between 1550 and 1650 CE in Middle England was, for example, more than 1.5° C colder than it is now. The last decade of the 17th century was particularly cold, when the hills of Swiss Midland (900 m altitude) were snow-covered until April or May (Pfister 1975). The devastating effects on agriculture led to famines in many parts of central and northern Europe. The colder and wetter climate prevailed also at very high latitudes, where the increased snow fall caused the expansion of the polar ice and induced a southward migration of Eskimos (Lamb 1982:232-266).

The first signs of warming came after 1700 CE, but the rise was not steady. The years 1769-71 CE were, for example, unusually cold and wet years, when the Alpine glaciers readvanced (Pfister 1975). The second decade of the 19th century was also a time of global chill, when the climate of England was comparable to the worst during the Little Ice Age (Lamb 1982:275). Finally, the most recent warming trend started during the 19th century, in China and in Europe. The 20th century has been a century of global warming, reaching an optimum during the 1940s. Interrupted by cold spells during the 1960s and 1970s, the continuing global warming of the 1980s and 1990s brought alarm to a sensitized public. Alpine glaciers have been retreating, and are rapidly disappearing as the warming trend persists.

Periodicity in Climatic Changes during Historical Time

Separating "noises" from "signals," I suggested that there may have been a periodicity of climatic changes in historical time (Hsü 1996). The available data indicate a periodicity of about 1200 years during the last four millennia, six hundred cold years alternating with six hundred years of warmth. Counting back from the present, the historical cooling epochs reached their zenith during (a) the Little Ice Age, (b) the Great Migrations, (c) the decline of Western Chou, and (d) the time when the first Alpine glaciers appeared, with minimum temperatures in the years around 1600 CE, 400 CE, 800 BCE, and 2000 BCE.

The direct effect of the rise and fall of temperatures of a few degrees may be insignificant to human perception, but the indirect effects on regional precipitation has had grave consequences. A warm climate has been, on the whole, beneficial to the mankind in Europe and in Asia. Prevailing warmth in Europe was beneficial to agricultural production. A concurrent reduced precipitation rarely led to severe drought; and the warm and dry summers favored dairy culture and wine growth. A warmer climate in the middle to low-latitude countries of Asia also brought good harvests, when the concurrent increase of precipitation changed deserts into grassland, and steppes into grain fields. The adverse climate during the epochs of global cooling, in contrast, has brought disasters everywhere. In Europe, the concurrent increase of precipitation, especially in the form of heavy snowfall and late frost, damaged the agricultural economy; there has been a systematic correlation of bad harvests to cold and wet years (Lamb 1982, p. 326). In Asia, the colder climate did not bring rainfall, but severe droughts, and Chinese history records many episodes of starvation, famine, or even cannibalism during the unusually cold years, which were always arid (Liu 1982).

Did the Xinjiang Indo-Europeans Leave their Home because of a Global Cooling?

Julius Caesar in his *Commentary on Gallic Wars* described a great migration of Indo-Europeans. In March, 58 BCE, 263,000 of the Helvetii, men, women, and children, and some 100,000 of the Boii and other Celts crossed the Jura Mountains and "invaded" France. Caesar, who had refused them permission to enter the Roman provinces, utterly defeated them near Bibracte. Caesar claimed that the 130,000 survivors returned to Switzerland. Excavations have, however, revealed remains of rectangular dwelling houses, a temple, workshops of iron and bronze workers and enamelers, etc. Caesar apparently did not kill that many of the invaders. The majority did not go home; they established instead a new colony in France.

Why did they leave Switzerland? Caesar did not tell us. Historians have used the common excuse that the Helvetians "decided to migrate to western Gaul" because they were "hard pressed by the Germans." That does not make sense. The "hard pressing" Germans never came, and the Helvetians could more easily have defended their home from marauders across the Rhine than to fight the military might of Rome. More probably the Helvetians had many years of bad harvests. Or there may have been pesky epidemics. At any rate, it seems to have been a manifestation of an Indo-European instinct for mass migration, to look for "green pastures" in distant lands, for the

Celtic adventure was followed, a few hundred years later, by the Great Migrations of the Germanic tribes.

Why did the Germanic peoples want to leave their home?

Invasions are usually cited as a cause by historians. The *Völkerwanderung* in the 4th and 5th centuries were allegedly "precipitated in Europe by the westward movement of the Huns." In fact, the Germanic tribes on the move had migrated south sometime before the Hun invasion. The Goths had migrated from Sweden to the Vistula region before they reached the Black Sea region and started warring against the Huns in the 4th century. The Burgundians had first settled between the Oder and Vistula before they moved to Gaul early in the 5th century. The Lombardians had lived in the lower Elbe region and fought against the Romans there during the first century, before they wandered through the regions between Elbe and Oder and appeared in Austria toward the end of the fifth century. The Vandals had lived in the Oder region and went down to Silesia, before they started their great migrations to Pannonia, Rhineland, Gaul, Galicia, Andalusia and their mass invasion of North Africa early in the 5th century.

Invasions may have precipitated the migration of the invaders to the conquered lands, but rarely the mass exodus of the conquered people. Some of the greatest invaders were the Vikings, who left their homes intent on raiding or conquest. Their descendants settled in Normandy, in the Loire Valley, in England, in Ireland, in Sicily, but the conquered people stayed and prevailed. Genghis Khan and his descendants invaded eastern Europe, the Near East, and China, but the Great Khan made Karakorum his capital. Later when the Mongols were defeated by the Ming Chinese, the invaders went to join their folks back home in Mongolia. In more recent times, we see that the European immigrants to America drove the natives away, or they forcefully resettled the Indians to reservations' but there were no instances of voluntary mass-exodus because of an invasion. I myself experienced the history of the Japanese invasions of China. The invaders forced the central or the local governments and their employees into exile, but the indigenous population stayed. The farmers, which made up about 95% of the Chinese, had to stay home, because their livelihood depended upon the farming of their land at home. They could not afford the luxury of great migrations.

Why, then, did the Germanic tribes leave their home?

I spent last year in Berlin and visited many local museums in the cities between the Elbe and the Vistula. I realized a startling fact that the home left behind by the wandering Germanic tribes was apparently not resettled until the 6th or 7th century. It was either sparsely populated or a "no man's land." The northern German and Polish plains, with their good soils, are the most fertile agricultural lands. Why should have the Germans have wanted to leave their home? Why should the Germans have wanted to return after the 9th century?

The answer probably lies in an analysis of the chronology of their departure and their eventual return: the timing is correlative first to a change toward an extreme cold and wet climate and then a return of the warmth!

Talking to farmers in the region between the Elbe and the Vistula, I was impressed that the harvest was dependent upon the length of the planting season. The 20th century has been a relatively warm and dry period, and the farmers could usually start plowing in March or April. In a cold year when Spring comes late, planting cannot be started until mid-May. One can imagine the situation during the "Little Ice Age," when the frozen ground of a late Spring hindered the plowing of the land until it was too late to permit a good harvest. It is thus not surprising to read the historical accounts of famines during the Thirty-Years' War: it was not so much the warring as the severe climate which caused the failure of crops.

The mild climate of the Greco-Roman era was similar to that of today. Toward the beginning of the Christian era, there were increasingly colder and wetter years in Europe. The Goths may have left earlier, but the Lombards, Burgundians, and Vandals appear to have stayed in the region between the Elbe and Vistula until the cold climate reached its extreme during the 4th and the 5th century. Many Germans had gone away to serve as mercenary soldiers, but money could not buy food when there was no food for sale. Finally, the whole population had to go, when the land could not yield enough to feed the population. This, in my opinion, was the underlying cause of the Great Migrations.

The plains between the Elbe and Vistula were resettled by the Slavic tribes after the 6th century, when global warming returned. The good soil again yielded good crops. The Germans, the Franks, and the Saxons organized a re-conquest of their homeland after Charlemagne, and this Drang nach Osten continued until the mid-20th century.

Historians have also blamed the Huns and other barbarians as the culprits of causing the great migrations of the Chinese people from central to south China. Reading the historical accounts of droughts in north and central China, it is more reasonable to postulate that the Han farmers moved to the warmer and wet south because nothing grew at home in the North. Yes, the "barbarians" did overrun China. The Jin government could not resist invasion when there was not a healthy population to support a strong army. But the invasion was the consequence of the migration, not its cause.

People migrate, of course, also in good times. The Viking people followed their conquering heroes to France, to Britain, and even to Greenland and North America. Their homeland seemed to have possessed a practically inexhaustible surplus of manpower: many left but still more stayed home. The Viking centuries, we should recall, were years of rich harvests in northern Europe, and there must have been a population explosion as Friderick Schiller described in his *Wilhelm Tell.* Somebody had to go, but most could stay home.

This was the case of the more recent European immigration to newly discovered lands; Europe was not depopulated when the immigrants left. This was also the case of the Chinese immigration to Southeast Asia and to America during the 19th and 20th centuries. Only the poor people had to leave home; the well fed stayed behind.

The great migrations of the Indo-European people took place in the few centuries before and after 2000 BCE when they went to Greece, to Anatolia, to Iran, to India, and to Xinjiang. They moved again in the few centuries before and after 800 BCE, when the Dorians went to Greece, the Medes went to Iran, and the Scythians went to southern Russia. Unlike the Vikings or the Mongols who raided and conquered during the centuries when the climate was good at home, the early Indo-Europeans migrated during the few centuries before and after 2000 BCE or before and after 800 BCE. Those were hard times when the people may have had to leave their home en masse, because the climate had deteriorated to such an extent that they faced starvation and death.

This brings me back to the original theme of this paper: did the Xinjiang Indo-Europeans leave their homeland because of a global cooling?

Most probably yes, because they arrived in Xinjiang shortly after 2000 BCE. But where was their home and when did they leave their home?

Mair (1993) noted that the Qäwrighul (Gumugou), Qaradöwä (Wupu), and Zaghunluq people of ancient Xinjiang, with their long noses, deep-set eyes, blonde hair, etc., may be of Nordic extraction. He also thought that some of the Xinjiang Indo-Europeans may have been related to the Scythians and the blond-haired Ossetes. This hypothesis supports the speculations that the Scythians and Ossetes came from the east, but gives little clues as to the original home of the Xinjiang men. More interesting is the fact reported by Mair, citing Irene Good, that one of the ancient Xinjiang textiles "is the easternmost known example of a characteristically European twill patterned weave": there is a "remarkable similarity between plaid woolens from Wupu and from Danish burials at roughly the same time, both in terms of weave and of pattern." Finally, he postulated that those original inhabitants of the Tarim Basin were the ancestors of the Tocharians of northwest China, whose language is "linguistically more closely related to Western European Germanic and Celtic rather than to the geographically nearer Iranian and Balto-Slavic." As he indicated, "there are many other specialties that we will bring to bear in our study of the ancient inhabitants of Xinjiang," but the available data point to a working hypothesis that northern Europe was the original home of the Wupu men.

Linguists have tried to place the home of the Indo-Europeans on the basis of finding a vocabulary in common among the various Indo-European languages. One school, citing the common origin of the Indo-European words beech and salmon, postulated a homeland between the Vistula and Rhine rivers, in a region where the beech trees grew and where salmon used to flourish. Such a placement suggests the possibility that the Xinjiang people came from the same general region as the Germanic tribes before their Great Migration. Is it possible that the Xinjiang men were the forerunners of the wandering Germanic tribes? Is it possible that they left their home because of repeated crop failures during years of global cooling?

Note

The manuscript for this paper was completed two years ago when I was only starting to work on a project to relate the history of civilizations to climatic changes. The four episodes of cooling in the few centuries before and after 1600 BCE, 400 BCE, 800 CE, and 2000 CE are now well established on the scientific basis of studying lake sediments, ice cores, pollen, historical and archeological records. The quasi-periodicity, averaging some 1,280 years, is an expression of the 7th-order fundamental harmonics of the varying solar radiations; the sunspot cycle being the 1st order. Earlier cyclic changes of climate are found in the record of post-glacial sea-level oscillations.

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History

China in Early Eurasian History: A Brief Review of Recent Scholarship on the Issue

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This paper is a review of the debate that has developed concerning the degree to which early Chinese civilization was linked to other early cultures in Eurasia. I give a short history of the controversy, provide a brief survey of some of the recent archeological finds that have forced a re-opening of the debate, and discuss some of the possible avenues for future research on the problem. My central argument is that we are now finally gaining enough empirical data to begin a complex exploration of the historical development of cultures across Eurasia, and that we need to undertake such an exploration in a way that will avoid the excesses of previous scholarship on the issue.

The question of the degree to which early Chinese civilization was linked to other early cultures in Eurasia has been an enduring one in Sinological studies, and one that has been marked by radical swings of scholarly opinion. This paper will be an attempt to survey briefly the history of this controversy, to explain why it has come to the fore again, and to argue that some of the recent archeological discoveries may finally allow us to start conceptualizing this issue in a more helpful way. Although a full narrative of the debate would have to begin with Jesuit views in the seventeenth century, I will, for the purposes of this paper, pick up the controversy with the rise of archeological study in this century.

I. History of the Major Themes of the Debate

Until roughly the 1960's, the dominant means of explicating the development of civilizations throughout Eurasia was in terms of processes of diffusion. By far the most influential proponent of such a view was V. Gordon Childe, who held that the rise of what he called "civilization" occurred through a series of innovations that began in the Near East and were thereafter diffused to Europe and the rest of Eurasia (see, for example, Childe 1936 and 1954). The Near East, therefore, was seen as the birth-place of the Neolithic, Bronze Age, and Iron Age, each of which was introduced in succession to the rest of the continent.

Such views were widely held in the study of early China as well. With few exceptions, scholars tended frequently to assume that early Chinese civilization had developed through, and in large part because of, influence from West Asia. Childe himself took this position (1954: 170), as did most Sinologists. Indeed, diffusionist theories were frequently invoked to account for the great archeological finds in Anyang during the 1920's and 1930's, which revealed to the world that a Bronze Age, state-level society, possessing chariots and a written language, existed in northern China in the twelfth century BCE. Since all of these inventions (metallurgy, chariotry, writing, perhaps even statecraft itself) seemed to appear suddenly in the archeological record, they were commonly posited as having had a single origin in West Asia, from whence they were diffused. For example, E. G. Pulleyblank, writing in 1966, claimed:

> Viewed as a part of a world historical process, the beginnings of civilization in China take their place as a natural extension of the gradual spread outwards of cultural developments from the Fertile Crescent which we can trace in other directions (1966: 9).

Accordingly, argued Pulleyblank, the rise of the Shang state should be seen as a "...shock coming from the outside" (1966: 31).

In the late 1960's and 1970's, however, diffusionist theories that had held sway for so long became increasingly suspect in the study of Eurasian history. The reasons for this shift are several, involving a combination of a general change in theoretical concerns throughout archeology in general, increased empirical knowledge, and, in some areas, political views. Let me begin by discussing the first of these.

It was during this period that neo-evolutionary thought was once again coming into prominence, and with this came a broad disenchantment with diffusion as an explanatory principle. Indeed, Julian Steward, as early as the 1950's, had argued:

> The use of diffusions to avoid coming to grips with problems of cause and effect not only fails to provide a consistent approach to culture history, but it gives an explanation of cultural origins that really explains nothing.... One may fairly ask whether each time a society accepts diffused culture, it is not an independent recurrence of cause and effect (Steward 1955: 182).

In other words, the use of diffusion as an explanatory principle is missing the point: what is of relevance is the internal evolution of the society and economy in question. If a given society was not at a point in its evolution when it could utilize a given technology, then the technology could not have been successfully accepted anyway. As Marvin Harris claimed in a similar vein, diffusion explains nothing (1968: 377-378).

This rejection of theories of the development of civilization through diffusion became particularly prominent in Anglo-American anthropology during the 1960's and 1970's with the rise of processual archeology, a movement expressly concerned with discovering universal laws of internal evolution. One of the guiding principles of processual archeology was that internal processes had to be the focus of interest, for only then could one explicate why and how a given technology or practice was employed, regardless of the origin of that technology. Although such a position did not necessarily entail a claim that diffusion never occurred historically, there was nonetheless a tendency in much of this scholarship to emphasize independent invention, out of the argument that internal processes are so commanding in a given society that diffusion was a much less common occurrence in antiquity than earlier analysts had maintained.

Perhaps the best example of the radical shift in emphasis that processual archeology created can be seen in the complete re-evaluation of European pre-history undertaken during the 1970's. In explicit opposition to Gordon Childe's thesis that European pre-history could be understood as a gradual acceptance of successive innovations diffused from the Near East (including, most importantly, agriculture and metallurgy), several studies were undertaken to analyze the internal development of pre-historic Aegean and European societies (see, for example, Renfrew 1972 and 1984). Indeed, one of the leaders of this re-evaluation, Colin Renfrew, described much of his project during this period in terms of the question: "how do we find some alternative explanation for the various developments in Europe (or in the other areas under consideration) which we may put in place of the 'diffusionist' accounts so widely offered until the last decade?" (1984: 5).

A similar emphasis on internal development came to characterize Sinology as well, and, here too, such an emphasis frequently took the form of a commitment to studying indigenous origins. This shift in theoretical orientation was accompanied, and greatly aided, by developments within mainland China itself. In the first few decades of its existence, the People's Republic of China explicitly took up the issue of the origins of Chinese civilization, interpreting the claim that Chinese civilization was a product of diffusion from the West as an example of imperialistic thinking, i.e., a failure to believe the Chinese capable of creating a civilization (see the useful summary by Tong Enzheng 1995). Accordingly, the government funded a large number of archeological projects to trace the development of early Chinese societies. The results, as is well known, were tremendous: numerous sites were found that finally enabled archaeologists to trace the gradual, internal development of society and statecraft within a progression of cultures in what is now China, and to demonstrate that such markers as Yangshao and Anyang itself were clearly products of a lengthy, evolutionary process. The claim, for example, that Anyang marked a radical break, that it had emerged through a diffusion of technologies from the Near East, seemed increasingly unconvincing.

Based upon these finds, K. C. Chang, the leading Chinese archeologist in the United States, was able to propound his "nuclear" theory of the origins of Chinese civilization, arguing that Chinese civilization had grown internally from a nucleus in the Yellow River valley (1963). By the early 1970's, it had become common to argue not just that Chinese civilization had arisen through internal developments, but that in fact most significant technological advances had been made through independent invention. Thus, Paul Wheatley, in his study of the emergence of the Chinese city, could state that China was "effectively insulated from contact with other foci of high civilization," and that it enjoyed "autonomy in its development" (Wheatley 1971: 8).

A stronger claim of this sort can be found in Ho Ping-ti's well-known work, *The Cradle of the East*, a work explicitly devoted to arguing for the "indigenous origins" of Chinese civilization. Professor Ho, borrowing from Morton Fried's definition of a "pristine" state as one that "... has developed sui generis out of purely local conditions" (1960: 729), claimed the following:

> The Chinese civilization was just as pristine as the Mesopotamian and in terms of originality could claim equal primacy. It can no longer be treated as one of the several "peripheral" civilizations of the Old World. As Mesopotamia is rightly known as the cradle of the West, so the loess region of North China deserves to be called the cradle of the East (Ho 1975: 368).

Such a position, to be sure, would have been opposed by most processual archaeologists, insofar as Ho was still arguing for diffusionism: he wanted to say that the origins of China were indigenous, but that the rest of East Asian civilization was diffused from China, just as, he claimed, Western civilization had been diffused from Mesopotamia. Nonetheless, the argument that the development of Chinese civilization was based entirely in internal developments, and that the major technological advances in early Chinese history were a product of independent invention, met with widespread acceptance: it seemed to be true archeologically, and it fit in well with the dominant theories of the day. Indeed, it would not be an exaggeration to say that the view had become orthodox by the early 1980's.

However, the tide then began to turn yet again. Increased archeological research throughout Eurasia, as well as a wider circulation of Soviet studies of Central Asia, began to reveal more and more that a great deal of interaction had in fact occurred in the ancient period. This led to a number of attempts by archaeologists to question such notions as a "pristine state." For example, analyses of trade by C. C. Lamberg-Karlovsky (1989), Philip Kohl (1989), and Rita Wright (1989) revealed the complex systems of exchange that existed among several proximate societies in the Near East and Central Asia. Similarly, K. C. Chang revised his earlier theory of the nuclear origins of Chinese civilization and came instead to stress what he calls an "interaction sphere" involving several distinct cultures within the current political borders of China (1986).

Of particular interest to the topic at hand, however, are the archeological finds which have suggested possible interaction between some of the cultures in Central Asia and some of the cultures in what is now China. Certainly the most provocative of these, and the ones most likely to generate the greatest debate, concern metallurgy. As will be discussed in more detail below, archaeologists have demonstrated with increasing clarity the gradual spread of metallurgical techniques across Central Asia (see in particular Chernykh 1992), reaching Xinjiang by the beginning of the second millennium BCE (Chen 1990). The fact that such dates fit well with the emergence of bronze metallurgy in the Central Plains site of Erlitou in the first few centuries of the second millennium BCE has led several scholars to begin considering the possibility that such technologies were introduced (Childe would have said "diffused") to the Yellow River valley cultures from Central Asia. Nothing could signify this shift in scholarly attitudes more completely than the fact that An Zhimin, one of the leading archeologists in the People's Republic of China and a long advocate of the indigenous origins of Chinese civilization, has recently argued precisely this position (1993: 1117). Similarly, the fact that iron technology has also been shown to have reached Xinjiang in the early first millennium BCE, again a few centuries before iron technology came to be practiced in northern China, has led Tang Jigen (1993: 564) to argue that iron metallurgy as well may have been diffused into China.

These arguments, as well as others that will be discussed below, suggest that the strong emphasis in the scholarship of the 1970's and 1980's on "indigenous origins" and "pristine states" is coming to be seen by at least some scholars as extreme, and that the issue of diffusion, a notion deemed taboo for so long in Sinological studies, is once again being seriously entertained. And, as with the last swing of the pendulum in this debate, there does appear to be at least some archeological evidence to support the shift.

Does this mean then, that we should return to speculations such as those of V. Gordon Childe, that the pendulum should swing back to the forms of diffusionism dominant in anthropology before the late 1960's? I would argue, on the contrary, that the materials now being discovered should instead allow us a means of breaking out of the old "diffusionism/indigenous origins" debate itself. Now that we are finally gaining enough archeological material to begin to piece together a coherent view of the development of societies across Eurasia, we may be able to begin constructing an understanding of Eurasian history that should both lay to rest some of the old controversies as well as open up a host of new and exciting questions. Before turning to these issues, however, it may be helpful first to outline briefly some of the evidence that now exists for interaction between the cultures in the central plains of China with those in the remainder of Eurasia. The discussion that follows is not in any way intended to be comprehensive; the hope is simply to present enough basic material to allow for a more detailed discussion in the third section of this paper about how these issues should be conceptualized and what implications they may have for the study of early Eurasian history. Specialists, of course, may wish to turn directly to section three.

II. Evidence of Interaction in the Early Period

Speculation ran rampant in the early diffusionist literature about the rise of the Neolithic itself, the spread of pottery motifs across Eurasia, etc. As discussed above, views such as these went out of favor with the rise of processual archeology, and now increased archeological research has rendered such doubts all the stronger. It seems clear that, with the climactic shifts that occurred following the end of the last Ice Age, domesticated agriculture began independently in several areas of the world. Although agriculture then spread from these foci into neighboring regions, there is no evidence to suggest that such techniques actually spread across the entirety of Eurasia at such an early date. In short, significant contact between western and eastern Eurasia at the beginning of the Neolithic period seems highly unlikely. Attempts by earlier scholars to link, for example, Yangshao pottery motifs to those from Mesopotamia are thus, based on our current knowledge of Eurasian prehistory, implausible.

By the end of the third millennium BCE, however, we do begin to see the movement of particular technologies across Eurasia. Certainly one of the more significant of these was bronze metallurgy, which spread through much of Central Asia during this period (see Chernykh 1992). Bronze begins appearing in Xinjiang by the beginning of the second millennium BCE (Chen 1990), and can be found in Qijia sites, located in Gansu and Qinghai, soon thereafter (see Zhang 1987). Bronze casting spread to the northern frontiers of China by around 2000 BCE as well (Pak 1995).

The fact that bronze metallurgy begins in Erlitou fairly suddenly in the first few centuries of the second millennium BCE renders it possible that northern China could also be seen as one of the areas to which these metallurgical techniques spread. To be sure, the evidence is by no means definitive one way or the other, and much work remains to be done on the issue. Moreover, even if such an introduction did occur, the exact route is quite unclear. An Zhimin (1993: 1117) has recently argued that the techniques probably came in through Xinjiang, presumably through the Qijia cultural complex. On the other hand, the documented interaction between Erlitou and those cultures farther north (summarized well by Pak 1995: 385-389) reveals that this is a possible route of transmission as well.

A crucial point to emphasize here, however, is that, even if bronze metallurgy was introduced at this time, it was introduced into a culture in Erlitou that had already developed a great deal of hierarchical differentiation. Thus, the possible introduction of metallurgical technology cannot be presented as an adequate explanation for the emergence of the state itself in northern China at this time—a point that I will discuss in more depth below.

Slightly later, the chariot came into use in the western regions of Eurasia. Although the exact place of origin is still unknown, the northern steppe appears to be a likely possibility. Excavations from the Sintashta-Petrovka culture, located southeast of Magnitogorsk, have yielded chariots from around 2000 BCE (Anthony and Vinogradov 1995). Soon thereafter, chariots began appearing in the Near East, and within a few centuries chariot warfare became predominant in the area (see Littauer and Crouwel 1979: 73-81, as well as the more speculative discussion by Drews 1988: 84-120). The Andronovo cultural complex, which grew out of Sintashta-Petrovka and came to dominate portions of western Central Asia over the course of the second millennium BCE (see the summary in Chernykh 1992: 210-215), relied heavily upon the chariot. Indeed, the successful use of war chariots may in part help to explain the tremendous expansion of the Andronovo horizon. Petroglyphs seem plausibly to suggest the spread of chariot warfare into eastern Central Asia (Littauer 1977), and the first chariots in northern China are then found in Anyang tombs around 1200 BCE (von Dewall 1964 and Yang 1984). The technical similarities shared between Near Eastern and Central Asian chariots with those found in Anyang render it extremely likely that the chariot was introduced into China (Piggott 1974 and 1978, and Shaughnessy 1988).

The introduction of the chariot into Anyang, moreover, seems to have been only one part of a fair amount of contact that occurred around 1200 BCE between the Shang and groups to the north. Anyang tombs from Yinxu Phase II have revealed bronze animal-headed knives and bronze bow-shaped objects (presumably used for driving chariots) clearly connected with those found in the Northern Zone (see Lin Yun 1986: 264-266 and Watson 1971: 51-52 and 61-63), and four bronze mirrors found in the tomb of Fu Hao closely resemble those found to the north as well (Lin Yun 1986: 251-253).

Other possible links with Central Asia during this time have recently been suggested by Victor Mair, who has argued, based upon linguistic and archeological evidence, that the *wu*, the figures usually translated as "shamans," might in fact have been Iranian magi who entered China at this time (1990). Mair has also argued that the Chinese word for "chariot," *che*, may be of Iranian origin as well (1990: 47). Since virtually all scholars agree that the Andronovo cultural horizon was in all likelihood Indo-Iranian, such suggestions deserve consideration.

During the first few centuries of the first millennium BCE, full pastoral nomadism began in Central Asia (see the summary by Askarov, Volkov, and Ser-Odjav 1992). Horse riding was introduced into China around the fourth century BCE (Goodrich 1984: 280), and, by the third century BCE, cavalry had fully replaced the use of the chariot in warfare.

Iron technology also became widespread throughout Central Asia, reaching Xinjiang in the early first millennium BCE (Chen 1990). Within a few centuries, iron use began in China as well, and became predominant over the course of the fourth century BCE (Wagner 1993). As with bronze technology, these dates raise the possibility that iron use was introduced into China from Central Asia (Tang 1993: 564). The pre-eminent authority on the subject, Donald Wagner, had tried to argue as recently as three years ago that iron technology was indigenous to China (1993). Now, however, he has changed his position dramatically:

> New finds, together with old finds only recently studied and published, have made this position untenable. It now seems likely that the technology of iron smelting diffused to China by the 8th century BC[E] from the west via [Scythian] nomads in Central Asia (1996).

Finally, after the formation of the major empires in China and the Mediterranean, the so-called "silk road" began. At this point, as is well known, interaction among cultures throughout the Eurasian continent developed to a far greater degree than before. Religious movements started spreading throughout Eurasia, as, of course, did diseases (for the latter, see McNeill 1976: 97-121). Hereafter, the histories of cultures across Eurasia became closely linked, and later inventions, such as gunpowder, were to spread fairly quickly across the continent.

III. Implications and Avenues for Research

In terms of the old debate about diffusionism and indigenous origins, a few basic points should be made at the outset. First, and most obviously, the increased empirical knowledge that we are finally gaining about early Eurasia should allow us to move the discussion to a higher level of complexity. In the period before the 1960's, the archeology of areas outside of the Near East and Mediterranean regions was far less developed than it is now, and relatively little empirical data existed to check diffusionist speculation. However, the outline of early Eurasian history that is beginning to emerge renders many of these speculations highly implausible, and allows for a far more nuanced discussion of the types of interaction that can be documented.

Moreover, the scholarly community has learned, and should continue to embrace, the important insight of processual archeology, namely that diffusion is not a sufficient explanatory principle for analyzing complex societal change. As the processualists correctly emphasized, internal processes are crucial, for only these can reveal how a given technology, even if introduced from outside, is accepted and employed. The attempts by earlier diffusionists to explain complex historical processes through the claim of an introduction of a single technology should be regarded as highly suspect.

This point is certainly crucial for the study of early China. For example, the rise of the state in the north China plain during the second millennium BCE certainly cannot be attributed to the use of bronze metallurgy. The fact that bronze metallurgy came to be practiced throughout much of Eurasia during this period, while states did not emerge in all societies that utilized such technology, shows clearly that there is no direct relationship between the two, and, as comparative studies with New World civilizations easily attest, state societies are certainly possible without a significant use of the technology. Clearly, as the processualists have long argued, the study of the rise of the state involves complex internal processes, such as the development of hierarchical differentiation, not the emergence (whether through diffusion or independent invention) of a single technology. Accordingly, the recently re-opened debate about the origin of bronze metallurgy in East Asia should not be allowed to become conflated with such old diffusionist concerns as whether or not the state in China was introduced from the Near East: the state clearly emerged in north China from local processes, and bronze metallurgy, whether introduced or not, could not singly have created it.

A similar point can be made with iron technology. V. Gordon Childe made large claims for the impact of iron metallurgy on Eurasian societies, arguing that it helped to "dissolve the established ideologies that corporations of anonymous priests and clerks had wrought into dogmatic theologies in the Bronze Age" (1954: 218), thereby paving the way for the rise of philosophical speculation and, later, universal empires. But such a purely materialist explanation leaves unanswered the question of how iron technology in itself could create such changes, and unexamined the problem of why the vast majority of cultures across Eurasia that employed iron technology in the first millennium BCE did *not* undergo such developments.

A further corollary of this point is that the simple discovery of an imported object cannot in itself be taken as a sign of significant cultural contact. Clearly, an exploration of the full historical context is a necessary prerequisite to making any conclusion as to the significance of imported items.

A case in point is to be found in the imported materials found in the Anyang tombs of the late Shang. Although these tomb materials have revealed significant interaction with northern states connected with Central Asia, one should be cautious in interpreting such finds. Shaughnessy (1989: 2-3), for example, has suggested that much of this was a consequence of a brief series of military successes in the reign of King Wu Ding, during which the Shang may have penetrated into the Ordos region and thus came into contact with southern Siberian and Central Asian materials. If this is true, it would imply that the materials that have been found in tombs were primarily elite status objects—important for understanding aspects of Shang elite culture, but not necessarily indicative of a significant impact of foreign influence on the Shang polity. Even the chariot seems to have been primarily an object of status during the late Shang—not a significant weapon of war and not of great social consequence at the time (Shaughnessy 1988: 213-221). Accordingly, the excavated materials indicating interaction around 1200 BCE with cultures to the north do not, in themselves, necessarily imply tremendous foreign influence on late Shang culture.

However, if we need to avoid the mistakes of diffusionist explanations, it is also important to avoid some of the excesses of the scholarship of the 1970's and early 1980's: the importance of focusing on internal developments should not be turned into a prior commitment to pristine states, independent invention, and indigenous origins. Just as we should not reduce the analysis of the rise of the state to the question of the origin of bronze metallurgy, it is equally unacceptable to allow such an emphasis on local processes to turn into a denial of the significance of cultural contact.

On this point, it may be that one of the problems with early processual archeology was embedded in its initial program. As discussed above, many of the original theoretical formulations that ultimately led to the rise of processual archeology were based upon evolutionary models, and much of early processual archeology as well was concerned with the search for evolutionary laws of internal development. While this had the laudable consequence of focusing attention on the socio-economic conditions underlying change and development, it also resulted in a tendency to treat societies in isolation, for only in this way could they be seen as test cases for discovering internal laws of development. Although such an approach may be acceptable from the point of view of evolutionary theory, it can be misleading if used to account for complex historical processes,

processes which may in fact involve the impact of technologies invented elsewhere.

To return to the example of the chariot: as mentioned above, the chariots found at Anyang are not necessarily indicative of a significant foreign impact at the time. Later, however, chariot warfare certainly did have such an impact. Indeed, Shaughnessy has argued that the use of the chariot may even be linked to the Zhou conquest: the fact that the Zhou people were farther west, and thus came to be far more proficient in the use of chariot warfare, may help to explain their conquest of the Shang, who, during the last century and half of their rule, had largely retreated behind the Taihang Mountains (1988: 229-231). Over the next few centuries, as Shaughnessy has shown, chariot warfare gradually became predominant in north China (1988: 221-227), a fact that, clearly, had important social ramifications.

If such a reconstruction is accurate, it would imply that the precise ways in which the chariot was introduced may have had tremendous repercussions for early Chinese history. The same point would hold true for other technologies, such as bronze and iron metallurgy. The former certainly did not create state organization, nor did the latter create philosophical debate and, later, imperial centralization. At the same time, however, metallurgy unquestionably had a fundamental impact on early Chinese culture, politics, and social organization. As K. C. Chang has argued, bronze metallurgy played a crucial role in the political culture of pre-Qin Chinese states (1983), and iron technology was undoubtedly of great technological importance from the Warring States period on. Developing a solid historical understanding of the emergence and socio-cultural impact of metallurgical technologies, therefore, would be invaluable. For iron technology, Wagner has already done a great deal to write such a history (1993), and we are now developing a sufficient empirical knowledge to at least begin doing the same for bronze metallurgy.

In short, I am arguing that a fully historical approach is needed to avoid both the simplistic causal explanations that were maintained in diffusionist analyses and the prior commitment to indigenous origins that held sway for so long in processual archeology. On the one hand, we must be careful not to return to the error in diffusionist literature of reducing cultural phenomena to particular diffused traits, and of reducing our explanation of complex historical processes to the assumed spread of single technologies. On the other hand, however, we should also avoid the tendency in early processual archeology to an a priori commitment to analyzing societies in isolation, as simple instantiations of universal laws of internal development.

And, on this latter point, a final set of observations should be made. Many of the technologies and practices that have been mentioned in this paper, such as metallurgy, chariot warfare, and cavalry formations, are not only common to but crucial to the ancient cultures of Eurasia, and are found only to a limited degree or not at all in ancient cultures outside of Eurasia. Although this fact may be of little importance from the point of view of evolutionary theory, it is a crucial and necessary point in discussing the particular historical development of Eurasian cultures, and it opens up a host of intriguing comparative questions. In other words, not only are we now in a position to perform careful historical analyses of the spread and introduction of various technologies and practices throughout Eurasia, but we should also start posing comparative questions from a more broadly Eurasian perspective.

One avenue for research along these lines involves comparative studies of the ways that various cultures across Eurasia employed the same technologies. For example, in what different ways were metallurgical techniques utilized in the various cultures that began employing the technology, and what effects did the technology have on the different societies in question? In what different ways were various military practices put into place, and with what social and political effects?

Moreover, such a comparative approach would allow us to confront successfully the sorts of problems that V. Gordon Childe was attempting to solve via the inadequate explanations of simple diffusionism, and that early processual archeology, with its commitment to studying cultures in isolation, simply dropped from the discussion, namely, why certain phenomena became so prevalent in several societies across Eurasia in specific periods. For example, why is it that one finds the rise of comparable intellectual debates in several cultures between roughly the fifth and third centuries BCE? V. Gordon Childe attributed such similarities to the spread of iron technology across Eurasia in the first millennium BCE, a solution which, as mentioned above, is in itself inadequate. Moreover, considering the outline given above, it seems unlikely that philosophical notions were being diffused at this early a date, and, even if they were, it is unclear how any such diffusion could create the socio-cultural conditions in which the intellectual debates flourished. The explanation, therefore, would have to lie not in the diffusion of a specific technology or idea but rather in the fact that common socio-economic conditions were developing in these civilizations. But, if this is the case, then what precisely were these common socio-economic conditions, and why did they arise in so many places in Eurasia at roughly the same time, in societies that were not in direct contact with each other? And why did they not develop at this time outside of Eurasia? The only way to answer such questions, I would argue, is through a careful comparative exploration of the internal processes of development within each culture, alongside of a study of the forms of interaction that resulted in the fact that, in at least a few cases, these processes developed along similar lines.

As another example of this same problem, why is it that one sees the emergence of empires across Eurasia in the last few centuries before the Common Era? Here again, simple processes of diffusion are inadequate to solve the problem: the diffusion of a single technology, or of the idea of empire, could not possibly create the social and political conditions in which empires emerged. The solution must surely be found instead in the new methods of statecraft and social organization that arose in the second half of the first millennium BCE, and only a careful comparative and historical analysis can explain why such methods were employed in several societies at roughly the same time across Eurasia.

Other forms of comparative analysis should be encouraged as well. Precisely because of the above-mentioned similarity of various societies across Eurasia at certain periods, comparative studies of such cultures can be highly illuminating. In other words, beyond the question of why certain phenomena emerged in several cultures across Eurasia at roughly the same time, much work remains to be done on comparing those phenomena themselves. Thus, comparative studies of the intellectual debates in early Greece, China, and India from roughly the fifth through the third centuries BCE should be encouraged. Similarly, studies of imperial institutions and cultures in the last few centuries of the Common Era would be valuable as well.

Overall, then, I am arguing that the fact that we are now finally gaining a coherent view of the development of a number of cultures across Eurasia should allow us to move beyond some of the old debates of diffusionism versus indigenous origins. We are now beginning to have enough empirical data to begin careful historical scrutiny of precisely what technologies and practices were introduced into each culture and how each culture utilized and was affected by such an introduction. Moreover, we can and should develop comparative studies of Eurasian cultures, analyzing how different cultures employed the same technologies and practices, and studying similar phenomena in different cultures at comparable levels of development. As regards China in particular, I am arguing, in short, that the geographical commonplace that China is a Eurasian civilization should be taken seriously from an historical perspective as well.

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Textual Evidence for 04c Sino-Bactrian Contact[1]

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In this paper, I should like to report some results from a project to restudy the chronology and mutual relations of the pre-Imperial Chinese texts, in which my colleague Taeko Brooks and I have been engaged for the last quarter century. The value of these results for the theme of the present volume, if any, may lie in the fact that the project has been carried out as a purely philological exercise, without reference to any larger historical implications. As a philological exercise, however, the results have proved to be mutually consistent, and we now have reasonable confidence that our general picture of the chronology of the classic Chinese texts will hold up under further scrutiny. It therefore seems appropriate at this point to make a first attempt to confront this text chronology with the archeological evidence for Chinese contacts with other peoples.

The text project itself has been described elsewhere, and further publications are forthcoming.[2] I may note here only three relevant points: (1) The project ignores traditional commentaries, which consist largely of cultural exegesis rather than philology, though it does follow up the work of a minority tradition of critical scholars, which has suggested that certain of these texts are not monolithic, but miscellaneous in character; (2) It finds that many of these miscellaneous texts can be rationalized as *accumulative sequences*, with the writings of each philosophical school being gradually extended by that school itself, in response to new challenges over a period of time; and (3) By coordinating parts of different textual streams which have *the same date*, it is possible to recover a lively dialogue between competing philosophies, in what has always been called the Hundred Schools period, essentially the late 04c through the middle 03c. The *interactive character* of this admitted Golden Age of Chinese thought stands forth with a new vividness when seen from the viewpoint of this

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[1]In this paper, for compactness as well as greater cultural universality, years and centuries BC are preceded by a zero (0); a prefixed "c" means "circa," and a suffixed "c" means "century."

[2]An overview of the method and its results will be found in Brooks **"Prospects,"** and an annotated translation of one text, with methodological apparatus, in Brooks ***Original***. The implications for foreign contact are explored in greater detail in Brooks **"Frontiers."**

new chronology of the source texts. It is this recovery of a dialogue which has always been assumed to exist, but which on previous assumptions has not been visible in the texts themselves, that convinces us that our conclusions are an improvement on the older model.

Given that revised chronology, if we proceed to correlate passages in these texts which seem to refer to foreign peoples or to concern trade activity or cultural contact, we find that they suggest a considerable long-range trade activity, part of which would appear to have traversed the area inhabited by the Ywèjr̄ peoples, and to attest the results of that activity in the form of apparent cultural borrowings. I shall give examples from three different periods.

1. The 05c: India

The eastern Chinese state of Lǔ,[3] one of the few which is well-documented textually in this period, seems to have been originally oriented, both economically and diplomatically, not to the north but to the south: toward the Yángdž River states of Wú and Chǔ. This situation continued through the lifetime of Confucius (0549-0479) and for the rest of the 05c. Literary echoes in the *Analects* of Confucius imply contact with India, via the Yángdž River artery and the Indianized state of Dyěn in what is now Ywnnán,[4] rather than with the steppe cultures. Among the cultural artifacts that made their way from this Indian culture area into the Chinese sphere are the crossbow, whose folk prototype is widespread from Assam to Ywnnán,[5] and perhaps also the technique of smelting iron, which seems to have been known earlier in India than in China, and which is first developed in China in the states at the mouth of the Yángdž River.[6] An East Indian phenomenon which appears to have left literary and conceptual traces on this portion of the *Analects* is early Buddhism, which is the most likely source of the concept of the sage (which turns up in the *Analects*, without precedent, at mid-century) and the technique of meditation (which is visible slightly earlier).[7] There seem to be several verbal echoes in *LY* 7 (c0450) of what looks like the earliest textual state of the *Mahā-Parinirvāṇa Sūtra*, which describes

[3]Chinese words are spelled in this paper in a system which is intended to be accessible to specialists in other fields, and which accordingly is based on standard Western alphabetic practice ("consonants as in English, vowels as in Italian"), plus v for the vowel of "bug," ae for "cat," r for "fur," z for "adz," and w for "umlaut u." For a fuller description and three-way conversion tables, see Brooks ***Common***.

[4]Tong "**Interpretation.**"

[5]Needham ***Science*** v5 pt 6 135-136.

[6]Wagner ***Iron*** 95-96; compare Brooks "**Technology.**"

[7]For the affinity of Chinese quietism and Indian yoga, see Mair ***Tao*** 140-148.

the death of the Buddha.[8] The name of one of two wisdom texts referred to in *LY* 9:24 (c0405) might easily be a translation of "*Dharma Sūtra.*" And the whole of *LY* 10 (c0380), as Waley has noted, is close in content and organization to the *Āpasthamba Sūtra.* We thus seem to have, over this 70-year period, not a random set of resemblances to Indian texts, but a seemingly gradual expansion of awareness, beginning with bits of lore and technique that might have been transmitted orally, and ending with what might be knowledge of an Indian text as such.

The society of Lǔ in the 05c was evolving out of a feudal situation, in which military force was supplied by a small group of hereditary warriors who with the leaders of the great clans monopolized positions at the Prince's court. The society which was replacing it, and which Confucius, who was himself from an elite warrior family, strongly deplored, was an entrepreneurial one, based on direct rather than manorial taxation. Those who rose to prominence at court under these new conditions emphasized expertise, and based their calculations openly on profit rather than virtue.

It seems likely that trade was in the air as well. Mass-produced silk, so cheap that it was displacing plant-fiber cloth for ritual purposes, is mentioned in *LY* 9:3 (c0405). This staple of trade was thus available in good quantities, and with a good profit margin, by the end of the 05c. We know from surviving documents that the trade along the Yángdž was regulated by Chǔ, whence it follows that such trade was a routine and not an exceptional venture. It is therefore not a bold conjecture, but a natural inference, that a regular trade, down the Hwáı Valley and up the Yángdž to Indianized Yŵnnán or to eastern India itself, existed in this period.

2. The Early and Mid 04c: The Altai

In this period we have text evidence from the state of Chí, the more powerful northern neighbor of Lǔ, in the earliest segments of the *Gwǎndž.*[9] They seem to date from the 0357 accession of the ruler who in 0342 would shock the eastern states by usurping the title of King from the powerless Jōu rulers. They show a strong systematic interest in the organization of society not only for political order but for economic effectiveness, and are already concerned to control

[8]It will be seen that this finding supports the "long" chronology of the Buddha's life, which assigns him a death date of 0483. The current fashion in Buddhology is the Bechert thesis supporting the short chronology. In my view this will have to be once again reconsidered. I note that the only two articles in the recent symposium Bechert ***Dating*** to be based on epigraphical evidence rather than speculative arguments, namely Narain "**Gotama**" and Aryasinghe "**Lithic**," agree in supporting the "long" chronology.

[9]*GZ* 1-3 and *GZ* 7; see Rickett ***Guanzi*** 52-98 and 137-147.

excessive luxury among the people, a problem that presumably arose from considerable wealth already being accumulated, at that period, by trade. A distinctive knife-shaped coin was common to the area of Chí, part of Jàu on the west, and Yēn on the north, extending into the area of modern Manchuria, and apparently defining a cooperative trading bloc.[10] By the end of the 04c, the Chí merchants were organized as a hereditary component within society, protected by exemption from military service and controlled by their own set of laws. From the ratio of merchant residence areas to normal residence areas, it can be seen that, by this time, the proportion of state resources *dedicated to commerce*, exclusive of silk or other production, was 6 out of 21 counties, or 29%.[11] On the production side of the economy, the study of small metal objects and other artifacts of the period has conclusively shown that whole classes of objects were made, sometimes in a steppe-influenced style, for the steppe market.[12]

The text-based inference of a major Chí economic impetus in 0357 fits rather well with the likeliest dates of the Pazyryk tombs in the Altai, at which Chinese objects have been found: silk, lacquer, and a bronze mirror of late 04c type. It seems consistent with the dendrochronological and radiocarbon evidence to date the Pazyryk tombs to the years 0390-0326.[13] Within that span, tombs containing

[10]Li ***Eastern*** 387-389.

[11]*GZ* 20 (c0306); Rickett ***Guanzi*** 324-329.

[12]So ***Traders***, especially chapter 4.

[13]As recapitulated in Hiebert "**Chronology**," of the six tombs (or kurgans) in question, #1-2 and #4 form an early group, and #3 and #5-6 a late group. All tombs of the late group contain Chinese objects. Growth rings in the larch logs with which the tombs are lined gives this relative chronology: #1-2 are of the same date and define Relative Year 0, then follow #4 after 7 years, #3 after 30 years (Relative Year 37), #5 after 11 years (Relative Year 48) and # 6, unfortunately, indeterminate. Larch sections from the original excavation have been retested by the Aegean Dendrochronology Laboratory at Cornell University; the results confirm that the gap between #1-2 and #5 is 48 years. The total age of the tree from which a tomb #1 log was cut was 122 years; that of a tomb #2 log was 209 years; two samples from tomb #5, possibly from the same tree, gave 181 years (information from Jennifer Fine, of the Aegean Dendrochronological Laboratory, 13 August 1996). These tree ages are higher than those previously reported, and used by Hiebert in correcting the radiocarbon datings. The radiocarbon tests themselves (Hiebert p121) give a center date of c0400 for #2 and c0525 for #5. Since by the dendrochronological results, tomb #5 is firmly known to be 48 years *later*, rather than 125 years *earlier*, than tomb #2, one of these dates must be wrong. It seems likely that the tomb #5 date is distorted by being based on older, inner wood (that tree being 209 years old), and that it must be discarded, and a slightly-adjusted date for #1-2, c0390, accepted. This would put tomb #5 (Relative Year 48) at c0342, the year of the Chí Kingship. Given an average gap of 16 years between tombs, we might intercalate #6 at Relative Year 64, or

Chinese objects would fall in the final phase, 0353-0326. That is, the first Chinese objects at Pazyryk seem to turn up 4 years after the accession of a vigorous, trade-minded new Chí ruler.

The Chinese *objects* in the Altai do not of themselves document a Chinese *presence* in the Altai, since indirect trade or successive diffusion of booty are also possibilities.[14] But direct contact seems to be rendered more likely by the possibility that the Scythian divination system may have passed at about this same time from that culture area to the eastern Chinese states. That this type of divination, mentioned by Herodotus as typical of Scythian culture, was known to the Altai peoples seems to be firmly established by the set of short sticks of unidentified function found in Pazyryk tomb 5.[15] Chinese tradition about sortilege divination is that it goes back to the beginning of the Jōu dynasty, but no archeological or firm textual evidence supports this; the Jōu kings seem to have continued to use the Shāng method of bone divination. Nor can it be shown that Confucius (0549-0479) was aware of the sortilege method, or its text, the *Yì*. That text is first quoted in the *Dzwŏ Jwàn*, a work of c0312, by which time there seem to have been in existence two versions of the *Yì*, an early one divergent at some points from the present text, and a later one identical with it. A first conjecture as to the date of the earlier of the two might be c0350. The text of the *Yì* gives grounds for suspecting that it arose in a context of trade, or at any rate of difficult journeys. It uses, in a positive sense, the trader's term lì 利 "profit, benefit" for a favorable auspice.[16] It symbolizes undertaking a venture by "crossing the great river."[17] And one particularly vivid passage sides with the traveler against the local resident: "The traveler's gain is the townsman's

c0326; the maximum 30-year gap would give instead c0312. The tomb #6 mirror is of a type for which molds have been found at the later capital of Yēn, relocated after the disturbances of 0314-0313. Whether this favors the later of the two extrapolated dates for tomb #6 depends on whether we envision Yēn as retaining, or redesigning, its stock mirror types when it rebuilt its capital and its economy. The former hypothesis is here adopted, but the question remains open to further argument, and further evidence.

[14]It is cogent that, as Hiebert "**Chronology**" 122 observes, later excavation of more than 170 tombs of the same culture has yielded no Chinese objects, so that the Pazyryk finds are unique and isolated. It may be, however, as Hiebert himself suggests (p118), that higher sites such as Pazyryk vertically dominated lower sites of the same culture. This, plus extensive looting of all the sites, might help to explain the seeming concentration of Chinese artifacts at one site. It remains true that the period of Chinese contact, whatever its nature, is brief. Suggestions in the present paper attempt a rational explanation of that brevity.

[15]Rudenko ***Frozen*** 324, listing "a large quantity of thin sticks" in tomb #5.

[16]In Wilhelm ***I*** this crass term is softened and philosophized as "furthering."

[17]In Hexagram 5 (Wilhelm ***I*** 1/25) and several other places.

loss."[18] One can readily imagine it to have drawn on the experiences of commercial travelers, and to have been written in the first place to give them a cheap and portable prediction system. Here, then, may be a Chinese *literary* artifact symbolic of travel, balancing the Chinese *physical* artifacts found in the tombs of the Scythian culture area. The two-way cultural interchange, if such it proves to be, seems somewhat to favor a direct-visit hypothesis over an indirect-diffusion one.

3. The Late 04c: Bactria

A much more extensive pattern of reverse loans, from a foreign civilization to China, exists in the case of contact with West Asia, and specifically with Bactria, celebrated in antiquity as the trade crossroads of the entire Asian world.

Needham has listed a number of parallels between Greek and Chinese culture, and concluded that they do not imply a process of transmission between west and east Asia in this period.[19] One reason for accepting Needham's conclusion, when it was first published, was that the Chinese halves of these resemblances did not make any very convincing pattern in the data. They were scattered over several texts, seemingly both early and late, and seemingly at random. Some of them, Needham argued, would have required almost simultaneous transmission, such as the recurrence of a saying of Xenophon in the writings of the Mician school. Xenophon and Mwòdž, notes Needham, were contemporaries. This turns out to be a red herring. The question is not whether the respective *individuals* were contemporaries, but whether the *texts* in question are of the same date. No one doubts that the stylistically coherent works comprising the Xenophon corpus (always excepting the *Constitution of the Athenians*) were actually written by Xenophon. But the very diverse writings of the Mician school a priori cannot be, and by a study of their content and linguistic peculiarities[20] can be shown not to be, by a single hand. The separate date of the portion of the Mician corpus in which the Xenophon theme occurs gives ample time for west-to-east transmission, and thus in effect reopens the question of transmission as a serious possibility.[21]

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[18]Hexagram 25 line 3 (Wilhelm *I* 1/109). This is by no means the most cynical saying in the book; compare for example the changeable friends of Hexagram 2 (Wilhelm *I* 1/10).

[19]Needham ***Science*** v1 151-157.

[20]For a preliminary analysis, see Brooks "**Triplets**."

[21]The Xenophon source is *Memorabilia* 1B9, noting that government, unlike the trades, is wrongly assumed to require no special training. The date of this portion of the *Memorabilia* is c0381. The Mician echo, *MZ* 47:8, can be dated from the portions of the *Analects* with which it interacts to c0309, giving an interval of 72 years during which eastward transmission might have taken place. The Xenophon remark also appears in other texts contemporary with

If we plot the Greek members of such resemblances according to their date of probable composition, we get a very striking pattern: all of them, down to some observations of Aristotle which are the latest of them, occur before the year c0340, at which time Aristotle was tutor to Alexander, and resident at Alexander's court in Pella. It is known that Aristotle returned to Athens in 0335, and that Alexander set out in 0334 to conquer the world, devoting the years 0329-0327 to the subjugation of Bactria and the establishment there of a Hellenized garrison capital with not less than 30,000 of his soldiers as its first citizens. Aristotle being a sufficiently capacious repository of Greek culture down to his own time, and Alexander (and quite likely some privileged members of his staff) being direct students of Aristotle, it is obvious that all the necessary Greek elements will, with a high degree of probability, have been present in Bactria from c0328 onward. As for the Chinese counterparts, it turns out that they too have a relatively well-defined limit: none is in a text which it is necessary, on internal grounds, to date to earlier than the year 0326. The source cut-off (c0340, Aristotle) is precise, the destination cut-in (c0326, the relevant Chinese text strata) is precise, the two agree well with each other, and the transmission of an Aristotelian version of Greek culture to Bactria, thus cutting the required transmission distance in half, would seem to remove the last substantial barrier to regarding these *apparent* borrowings as *actual* borrowings.

An additional point in favor of this conclusion is that the fragments in question are neither systematic nor recondite. They do not imply an acquaintance with Greek culture as a whole, or esoteric mastery of any phase of it. They are essentially gee-whiz items: striking tidbits that might have been shared over a drink after the conclusion of some Bactrian deal. One of them is the dilemma of rival loyalties expressed in Plato's *Euthyphro*, where a son shocks Athens by accusing his father of a crime. The name Euthyphro itself symbolizes the dilemma, since it is based on the stem euthy-, meaning "upright." The same dilemma is expressed in *Analects* 13:18 (c0322), where Confucius expresses his disapproval of another zealous and legalistic son, who has accused his father of a crime. Again the name of the son is symbolic, and again it is based on a stem, jŕ 直, meaning "upright."

There could hardly be a neater correspondence, but the matter does not end there. The *Euthyphro* is also the one of Plato's dialogues in which, for the first time, definition is insisted on. It is here that Socrates first says, Don't cite me an *example* of virtue; define for me what virtue *is*. And it is in *LY* 12 (c0326) that, for the first time in Chinese thought, previously undiscussed basic terms are defined; indeed, *LY* 12 consists of nothing but a string of definitions of terms.

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this portion of the *Mwòdž*, notably *Mencius* 1B9 (c0316, apparently the first of the set) and *Analects* 15:34 (c0305, the last).

And finally, it is in this same span of the *Analects*, *LY* 12-13 (c0326-c0322), that we are for the first time aware, in this and in other Chinese texts, of a dialogue *between the texts themselves*. This implies a wider awareness of the ideas of others, and a need to provide a counter to them. In that atmosphere of lively discussion, tidbits of exotic thought from Bactria were all the more likely to be met with interest and curiosity, and to become, themselves, part of the Chinese philosophical debate.

We may then with some confidence conclude that the Hellenization of Bactria, the point of overlap between eastern and western trading zones, brought for the first time within reach of Chinese travelers a smattering of Greek culture, down to the period when Aristotle had served as Alexander's tutor, and that the climate of contemporary philosophical inquiry in China itself was such as to be receptive to the interest and stimulation of that smattering.

Conclusion

There is much else that might be explored in a longer paper, such as the Indo-Iranian influence on the yīn/yáng and five-planets proto-science of this same late 04c period, or the Iranian divine kingship theory which, to its lasting sorrow, China in the 03c adopted as the cornerstone concept of its unified political state.

But I wish in conclusion to consider just one general question that naturally arises in connection with this inference of direct borrowing from Hellenized (and pre-Hellenized) Bactria. It is this: Why, if there was the long-range contact between China and Bactria which these numerous and important borrowings imply, is there not a more direct mention of such contact in the texts themselves?

It may be enough to say, in answer, that no European history textbook known to me acknowledges the tremendous debt of so-called Renaissance Europe to Chinese statecraft and technology. Virtually every characteristic feature of this period can be shown to derive directly from eastern Asia.[22] The magnetic compass and stern-post rudder which made open-sea navigation possible and thus engendered the Age of Exploration, are Chinese inventions. The economic theories of the Physiocrats, with their agrarian bias, derive directly from Chinese policies. The music of Bach, which rests on the equal temperament system and thus ultimately on the 12th root of 2 as the frequency ratio of adjacent keys on the harpsichord, is indebted to the Míng-dynasty treatise which for the first time set forth that system, and whose transmission, through the Jesuit misionaries to the circle of philosophers around Father Mersenne in France, Needham has chronicled in convincing detail.[23] The art of printing from

[22]There is a convenient conspectus in Needham *Science* v1 242.
[23]Needham *Science* v4 pt1 214-228.

movable types, and thus the enabling of mass literacy, makes use of a Korean version of a much older Chinese invention. The arts of war, including cannon and exploding shells, had been in use in China since the time of the Mongol conquest in the 13th century. These and other established facts have been available to scholars and the educated public for generations. But the beginning student of European history is systematically kept ignorant of them.

A similar process of what can only be called cultural denial can be seen in the Chinese texts. In the 230-year span covered by the series of writings that we know as the Confucian *Analects*, there is only a brief period of something like 20 years at the end of the 04c during which non-Chinese peoples are mentioned at all. In the huge Mician corpus, there is also such a period, beginning earlier but ending about the same time, late in the 04c. In the beginning of that period, foreign or indigenous peoples are mentioned with interest, and even accepted as possible sources of good ideas. At the end, they are seen as a threat to Chinese culture. After the 04c, they are not mentioned at all. I believe that the key to this situation is the fact that the end of the period when foreign peoples were readily mentioned seems to coincide with the period when the steppe peoples, notably the Syūngnú, were becoming a military threat to China. This seems to be the time when the first defensive walls were built along that border, and when the nomad practices of mounted warriors and horseback archery were adopted, in self-defense, by the Chinese, who had previously driven horses hitched to chariots, but so far as the record shows had never sat astride them. The increasing level of cultural hostility seems a plausible explanation for the change in cultural receptivity above noted.

Despite this apparent taboo in the texts, there are a number of evidences of ongoing contact with Bactria, which can only have been incidental to trade. Among the most striking are the frequent and exact echoes of Jain metaphysics which are embedded in the 03c text *Jwāngdž*. The Jains, as distinct from the Buddhists, were influential in west India, or just south of the Bactrian trade center. The likelier scenario for their transmission is not a deeper penetration of India along the old 05c southern route, but a penetration beyond, or at the very least a cultural mixing at, Bactria. It seems that, for all the systematic paucity of the evidence, the least drastic inference to draw is of continuing trade between northern China and Bactria, at a level of profit sufficient to justify its difficulty, into the 03c.

The literary record itself is not as barren of hints of western journeys as might appear at first glance. There are a number of surviving writings, from the end of the 04c and during the 03c, which attest to the thrill and excitement of distant journeys to exotic places. The *Story of Emperor Mù* recounts a journey of a Jōu King to a land far in the west, reached by a route whose better-defined portion coincides with the later Silk Road, where allurements and adventures await him. This tale is from the end of the 04c; a copy was buried in the tomb of a Ngwèı King who died in 0296. The spiritual wanderings ascribed to a dying soul in two pieces of the *Chǔ Tsź* anthology contain what look like remembered details of a series of travels, to the west and other directions. The motif of a far journey is common in the *Jwāngdž*, and though it is certainly metaphorical for a journey of the disciplined mind in meditation, its details may resonate with remembered or recounted actual journeys. What we seem to have, in these and other symbolic literary journeys, are not genuine records, but perhaps more accurately *sublimated memories*, of western and other journeys, which survive in a privileged domain of extravagant metaphor after the shutting down of direct mention of such foreign journeys and foreign peoples, around the year c0310.

I believe that, on present evidence, isolated and sometimes indirect as it is, we are justified in concluding that Chinese trading parties must have repeatedly traversed the lands of the Ywèjr̄ peoples, in the last decades of the 04c, and quite possibly in later decades also. And when the dust of new discoveries at last settles, it is quite possible that a stronger claim will then appear to be justified, namely, that access to, or exclusion from, foreign trade routes may have played an important part in determining the ultimate victor in the protracted struggle of the Warring States. The victory of Chín in this struggle has been repeatedly ascribed to its exploitation of iron weapons. Archeology, just as repeatedly, has refused to support this idea with evidence, showing instead that Chín was, if anything, backward in this respect. What Chín obviously had, that may be of more consequence than has yet been suspected, was the shortest route to the trading emporia of West Asia, and a geographical position from which the trading missions of the eastern Chinese states could easily be interdicted. It seems that this possible economic fact may help to supply the need that historians have heretofore sought, without success, in an imaginary military fact. The actual fighting, on this view, would be merely a tactical wrap-up, and the real superiority of Chín would rest, not only on its unmatched expertise in political administration, but perhaps also, in part, on its possession of the shortest, and least contested, route to the west.

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Victor H. Mair, editor

Mythology and Ethnology

The Myth of Languages and the Language of Myth

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The fact that desiccated corpses, numbering well over a hundred, exhumed since the late nineteen seventies in the Tarim Basin show Europoid features lends particular interest to their discovery. From prehistoric times to the present, the vast majority of the population of East Asia was thought to have belonged to the Mongoloid stock. The same can be said of the populations of the eastern regions of Inner Asia, i. e. of the lands bordering on historical China. Ethnically Mongoloid, most of these people speak an Altaic (Turkic, Mongol, or Tunguz) language.

It is usually assumed that over the centuries if not millennia, the geographical distribution of the two language groups—Sino-Tibetan and Altaic—has not undergone major changes, and it is also at least tacitly assumed that some correlation exists between geographic races and language families. Hence a population with Europoid ethnic features would presumably speak an Indo-European language.

This belief is just plain wrong. Genetic and linguistic relationships are not correlative. The fact that languages L^1, L^2, L^3, L^4 derive from a primary *L does not prove that the peoples P^1, P^2, P^3, P^4 have the same *P ancestry. Racial features provide no reliable linguistic information: the Negroid African-American population of the United States speaks English.

Having made this fairly strong statement, let me moderate it with some common sense. If thousand-year-old Negroid human remains are discovered in Zaire, it is reasonable to surmise that their tongue was not Icelandic. It is also a plausible assumption that, while alive, the Europoid people whose bodies were exhumed in the Tarim Basin did not converse in Proto-Chinese. But then, what was their language? Here we are confronted with the problem similar to that faced by the fictitious scholar of Anatole France's novel *L'Île des pengouins*, who worked on a monograph dealing with the Penguins' primitive paintings. Unfortunately, since none of these has survived, he feels compelled to reconstruct them by studying the French, Dutch, and Italian primitives.

Prehistoric material remains seldom shed light on the anthropological features of the population that produced them; they are always mute on the language of their users. While the human remains found in Western China satisfy our curiosity on the first account, they provide no clue to the linguistic appurtenance of this early population. Also, the interpretation of archeological or anthropological finds unconnected with evidence culled from written sources is a dangerous undertaking. Unfortunately, those who engage in such an exercise are seldom aware of its pitfalls.

With more or less caution, and stronger or weaker reservations, most contributors to the fine Fall-Winter 1995 issue of *The Journal of Indo-European Studies*, who speculate on what might have been the language of the Caucasoid mummies, suggest a Tokharian connection. We are faced here with another "penguin paintings" situation since, to use Douglas Q. Adams' felicitous remark (1995: 399), the mummies are "mum" when it comes to determining the language they might have spoken. Therefore, I will not pursue this path of inquiry here. One can neither prove nor disprove the Indo-European, let alone the Tokharian, connection. For all we know, when still among the quick, these mummies might have been using a non-Indo-European language spoken by Europoids, for example a Caucasian language—of which some forty still subsist—or one of the paleoasiatic languages now all but extinct. Several hundred languages must have disappeared in the last three thousand years.

It has been argued by some, probably most strongly by H. W. Bailey (1981), that Iranian loanwords in Chinese show early contacts between Indo-Europeans and Chinese. Though Bailey's etymologies are very often highly speculative, there is no reason to deny the existence of such contacts. It can be taken as an *a priori* certainty that—as is the case with all other languages—Chinese vocabulary incorporates loanwords. Some may have been taken from an Indo-European language, others not.

In their recent contribution to the "mummy" discussion, Pulleyblank (1995: 424) and Ringe (1995: 442) both cite the well-known etymology of Chinese *mi* "honey" (<**mjit*) which links the word with Tokharian B *mit*. I have no quarrel with this idea, but must call attention to the fact that the word appears to be a pre-historic word of civilization (*Kulturwort*) since it appears also in the Finno-Ugric languages such as Finnish *mete-*, Lapp *mītt*, Mordvin *m'ed'* etc. The exact place of Tokharian within Indo-European is still subject to controversy, and the undeniable presence of Tokharians in the Tarim Basin dates from about 600 CE. There is thus a gap of a millennium and a half separating the Cherchen man and lady from the Tokharians. I am not suggesting that the Chinese borrowed the word for "honey" from Lapp; I am merely calling attention to what may be the underlying theme of this paper, namely that before the diversification of cultures which set in with the arrival of the Neolithic, northern Eurasia was in many respects something of a cultural entity. In it, peoples, languages, techniques, conceptions of all sorts, as it were, floated freely.

Victor H. Mair (1990) followed the archaic, transcontinental peregrinations of a word and a concept, exemplified by English "magician". Let me add my bit by calling attention to another word family which extended from the Atlantic to the Pacific. Chinese *he* 合 (<**gâp*) "to shut, to close" and *he* 盒 "small box, casket" must be borrowings from one member of an extended family of languages, most probably from Turkic. Common Turkic *qap* "receptacle, vessel" and its derivations are present in most Turkic languages. In some of them it has a verbal meaning "to close, to shut; to seize, to hold". In various forms the word is attested not only in Mongol and Tunguz[1] but also in a great many Indo-European languages, going back to IE **kap-* "to hold, contain, grasp" as realized e. g. in Latin *capio*-[2] It is also the base of Latin *capsa* "case" continued by our own "capsule". According to Marcel Cohen (1926), the Latin word may also have Semitic connections.

The desiccated corpses discovered in Tarim Basin are not the only remains of prehistoric Europoids to have become known far away from the presumed Indo-European homeland. For example, of particular importance from our point of view is the Early Bronze Age Afanasievo culture which appears around 3000 CE in the very heartland of Inner Asia, in the steppe island around Minusinsk. The physical type of the Afanasievo people is Europoid, with dolicocephaly prevailing and an average height of about 168 cm. They were the earliest pastoralists of the region who bred cattle, sheep, and horses, used wool, but had not yet begun to use domesticated animals as beasts of burden. Afanasievo shows some links with the Ponto-Caspian cultures but, in essence—as shown by the burial rites—it continues the Neolithic cultures that preceded it in the same region. It also shares some features, such as the use of ochre in the graves, with the coeval Kitoy culture of the forest belt still entirely Neolithic (Levin-Potapov 1964: 35). Knowing the way scholarship works, it should come as no great surprise that, disregarding distances in time and space, Afanasievo has been linked with the Tokharians. While I would definitely reject such purely speculative identifications, I agree with J. P. Mallory's view (1995: 381) that "there are no serious grounds for excluding the Afanasievo culture as non-Indo-European." All this shows that, in order to find parallels to the presence of Europoid mummies in the Tarim Basin, there is no need to go all the way to the west.

Around 1700 CE a new civilization appears in the Minusinsk Basin: that of the Andronovo people, also Europoid but brachicephalic. The Andronovo period lasted for about a thousand years and its end in the 7th century CE brings us to the threshold of

[1]On the Altaic forms see Sinor 1996.

[2]On the many Indo-European forms see Bailey 1954, 146-53.

historical times. The relatively short domination by the mainly Mongoloid Karasuk people was followed by the people of the Tagar culture, 8th-3rd century CE. Of the 262 skulls examined by Debec, all but two were Europoid of both the dolico- and brachycephalic kind (1948: 126). In fact, a Mongoloid population began to appear in the Southern and Northern Altai as late as the 5th and 6th century CE (Levin-Potapov 1964: 306). Maenchen-Helfen (1973: 369-75) devotes a whole chapter to "Europoids in East Asia". In it he examines various data—literary as well as archeological—ranging from the the 5th century BCE to the 4th century CE. In his view (p. 374), "After the conquest of present-day Tuva by the Hsiung-nu in the second century CE, the population, which had been racially mixed with a preponderance of Europoid features, became not less but more Europoid." To this group must have belonged the Wusun of the 2nd century BCE, described as having green eyes and red hair, and at least a substantial part of the population of the Tashtyk culture (first centuries CE) for which the portrait-like burial masks reveal a mixed population of Europoid and Mongoloid types.[3] The presence of Europoids in China can be followed across many centuries. Let me cite the well-known story in which, in 349 CE, a Xiongnu group, recognizable by their high noses and full beards, is doomed to be massacred (Maenchen-Helfen: 372). Even later, in the 6th century CE, the Kirghiz with their fair skin, green eyes, and red hair appear in our sources (Chinese and Greek).

The importance of the evidence produced by this random choice of data pales in comparison with the conclusions arrived at by physical anthropologists. Let me just cite the result of the investigations conducted by Kangxin Han and his colleagues, as reported by Xu (1995: 359) and Mair (1990: 289): "the earliest known inhabitants of the Tarim Basin were almost exclusively Caucasoid; Mongoloid types show up only later and, while they initially came in small numbers, their proportion gradually grows." In the words of Xu (1995: 360): "...most of the ancient residents in Xinjiang were white people...." "The massive immigration of the Mongolians probably began in the Han or even later periods."

In view of all this, and as a counterpoint to our justifiable interest in Europoid presence in East Asia, we might as well rephrase the question. We wish to know not only the date when Europoids first appeared in the region, but also that of their disappearance.

In summation, since the attribution of a given language to a prehistoric population, be it of Afanasievo culture or in the preliterate Tarim Basin, is a purely mythical exercise, let me now turn to

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[3]Reith (1974) provides a good survey of the Tashtyk and Tagar cultures. Kiselev (1951) remains the basic source.

the myths in search of some realities.

In the description of the Trojans' advance against the Achaeans the *Iliad* (III, 1-9; tr. Rieu [1954] p. 64) has this to say:

> ...the Trojans advanced with a shouting and a din like that of birds. They filled the air with clamor, like the cranes that fly from the onset of winter and the sudden rains and make for Ocean Stream with raucous cries to bring death and destruction to the Pygmies....

The way Homer uses this comparison makes it clear that he expected his listeners to be familiar with the recurring battle between Pygmies and cranes. He was referring to a story which had pre-existed the creation of the *Iliad*, a story firmly embedded in Greek consciousness. From the point of view of mythical logic, the passage contains a curious contradiction. In Greek antiquity the Ocean Stream, though theoretically surrounding the earth, was always associated with the north. Yet at the approach of winter, the cranes and other migratory birds fly south, not north. On this point, the words of the *Iliad* run counter to geographic realities.[4]

As a literary theme, the combat between Pygmies and cranes enjoyed great popularity in Latin literature. On the scholarly side, let me cite Pliny the Elder (VII,ii,26, tr. H. Rackham [1947]):

> ...in the most outlying mountain region [of India] we are told of the Three-span men [Trispithami, taken from the *Iliad* III,6] and Pygmies who do not exceed three spans, i.e. twenty-seven inches, in height; the climate is healthy and always spring-like, as it is protected on the north by a range of mountains; this tribe Homer has also recorded as being beset by cranes. It is reported that in springtime their entire band, mounted on the backs of rams and she-goats and armed with arrows, goes in a body down to the sea and eats the cranes' eggs and chickens, and that outing occupies three months; and that otherwise they could not protect themselves against the flocks of cranes that would grow up; and that their houses are made of mud and feathers and egg-shells.

The Pygmies are again mentioned by Pliny (X, xxx, 58) in connection with the migration of birds which, according to him, gives relief to the Pygmies in their fight with the cranes.

In his *De situ orbis* (III,8) Pomponius Mela places the Pygmies,

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[4]In connection with Greek mythical conceptions about the North, one is bound to mention Bolton (1962) which covers well the Greek material. Unfortunately, his vain, often almost ludicrous attempts to link it with historical peoples and, in general, with the "real world" is a throwback to the Tomaschek tradition.

thought to be extinct at his time, in Africa, inland from the Red Sea. "In times past there lived the Pygmies, a minuscule race, destroyed in the wars waged in defense of their cultures against the cranes."

The topic had become something of a commonplace among the poets of Rome. Ovid (*Fastes* VI, 175-176) rejoiced that the bird "that fed on the blood of the Pygmies" was unknown in Latium. "The Pygmy warrior marches forth in his tiny arms"—writes Juvenal (*Satire* XIII, 166-170)—"... but soon, no match for his foe, he is snatched up by the savage crane." Not only Ovid and Juvenal, but many minor Latin authors were familiar with the topic which is encountered in a great many scientific treatises, from Aristotle (*Historia animalium* VIII,12) to Pliny the Elder and Solinus (3rd c. CE). Not surprisingly, some of the authors, such as Rutilius Namatianus (early 5th century) considered the story fictitious (*De reditu suo* I, 291-292). It is clear that the theme of Pygmies and cranes was borrowed by one author from another. There are reasons to believe—even on simply logical grounds—that some of these literary occurrences, at least the ones earliest in date, are the precipitates of a geographical concept pre-existing all of them. The proof of this statement can be seen in the occasional emergence of motifs not to be found in Homer or other early sources and yet fitting into the general pattern.

The Greek tradition of the combat between cranes and Pygmies survived through the Middle Ages and the Renaissance, and became part of our classical heritage. Through the ages, the fight has often been depicted on a wide range of objects, from Greek terracotta vases, through frescoes in Pompei, to the gates of the cathedral of Autun. The story found its way into medieval Jewish literature (Scheiber 1948: 49-51) and appears in the thirteenth-century *Cosmography* of al-Kazwīnī.[5] The Pygmies and cranes also appear on most world-maps of the Middle Ages, e.g. on the Catalan world-map (1375) where they are pictured northwest of Cathay with the explanation: "little men who have but five palms in length and though they be little and not fit for weighty matters, yet they are brave and clever... and valiantly they defend themselves from the cranes and take and eat them" (Yule, vol II: 208). As late as 1544, in his commentary to *Georgicon* I of Virgil, Pomponius Laetus (1554: 50) speaks of a small people thought to be the Pygmies and a multitude of geese and cranes to be found beyond Thule—i.e., in the north—but adds that "nothing is known about their fight".

Western sinologists, who in times past knew their Classics,

[5]Cited by Laufer (1915): 204. I cite this source because it says that many of the Pygmies are one-eyed; the loss of the other eye is ascribed to their fight against the cranes. As we shall see later, one-eyed individuals are associated with the wind and with the North. For lack of space I cannot explore here all the implications of the facts cited.

remembered this motif when they came across it in Chinese texts, recognized the essential identity of the Classical and the Chinese traditions and, not surprisingly, attributed a Greek origin to the Chinese tales. Foremost among them we must rank Berthold Laufer (e.g., 1915), whose opus contains many first-rate observations on Greek-Chinese contacts. The story about the Pygmies and the cranes did not escape his attention, and he followed the myth into its American variants (Laufer 1926).

Let me give a very few examples of how the story appears in Chinese sources where the Pygmies are called by such names as *xiaoren* 小人, *duanren* 短人, *jiaoyao* 僬僥, and many other variants.[6]

Perhaps the minimalist statement of the *Tongdian* (193, 12r) on the Little Men (*xiaoren*) would be suitable to set the stage. It reads:

> The Little Men live to the south of Da Qin.[7] At sowing they are afraid lest they be eaten by the cranes. The people of Da Qin give them help and succor. The Little Men exhaust their treasure in compensating them.

The *Tongdian* provides more details on the Short Men (*duanren*):

> At the time of the Wei, mention is made of the Short Men located to the northwest of Kangju. Men and women are three feet tall and the population is numerous. This land is far away from other kingdoms such as Yancai. According to a tradition reported by old men of Kangju, merchants traveling to the countries of the North had lost their way and reached that country [of the Short People]. Besides many real pearls, *yeguang* 夜光, and *mingyue* 明月, pearls are also to be found there. The travellers [who saw them] did not know their name.[8] Locally they are called "superior". It is thought

[6]On these names, see Chavannes (1905a: 314, note 8) remains instructive. The term 朱儒 *zhuru* for "dwarf" cited by Chavannes does not seem to make much sense. Even if we replace the first character with 侏 *zhu* "dwarf", the meaning remains unclear. If, however, we replace the second character by 襦 *ru*, we get "red jacket". Speaking of the *xiaoren*, the *Bian yi dian* notes that the Pygmies wear red jackets. I cannot explain why they do so.

[7]Since we are dealing here with mythical and not physical geography, the location of the countries mentioned is largely irrelevant. There is general agreement that Da Qin referred to the Roman Empire or at least to one part of it, Kangju is Samarkand. The location of Yancai is less well established (see Zürcher, p. 129).

[8]On these pseudo-pearls—in fact they were said to be found in the eyes of whales—see Laufer (1915: 59-73). Laufer cites a Chinese story about the *mingyuezhu* "the moon bright pearls" and traces its parallel in Aelian's *Historia animalium* (VIII, 22). In the Greek version, this particular gem is connected with a stork; in the Chinese version a crane takes the part. On their return

> that this country lies at approximately ten thousand *li* or more from Kangju. The work entitled "On the origins and the development of the Türks" reports that at a distance of one month on horseback there is the kingdom of the Short Men. They have no hair on their heads, which have the shape of the womb of a sheep. The Türks call them the Kingdom of the Sheep-Womb. In their [the Short Men's] proximity there is no [people] with whom to fight. They do not engage in brigandage. Yet there are big birds of seven feet continually watching the Short Men so as to pick at them. As a precaution [the Short Men] carry bows and arrows. It is thought that Short Men may be found also in the northwest, namely those mentioned in the *Weilue.*

The *Weilue* does indeed speak of the *Duanren* located at a distance of more than ten thousand *li* of Kangju but does so without any reference to the Pygmies.[9]

If cranes are mentioned in connection with Pygmies, the reverse is also to be found. According to the *Ciyuan* The Land of the Cranes (Haoguo 鶴國) is populated by Pygmies. According to the 4-5th century *Book of the Spiritual and the Change* (*Shenyi jing*) the inhabitants of Haoguo are but seven inches tall, learned and very polite, and fear only the cranes which attack them from the sea.[10] It should be mentioned that, among the migratory birds, not only the cranes attack the Pygmies. In the *Bian yi dian,* hyperborean geese (*gu* 鵠, *Cygnus bewicki jankovskii*) are the foes of the Little Men.

Laufer (1916: 210) opined that the Chinese versions of the story of the Pygmies and the cranes were of Greek origin. He saw in the Chinese range of ideas (*Gedankenkreis*) nothing else but a reflection of Greek concepts transmitted via the Hellenistic Orient and Central Asia. I suggest that the Greek and Chinese versions are both rooted in North Asian cosmological concepts such as these assembled by Y. H. Toivonen (1937) who was familiar with the Classical data but unaware of the Chinese parallels.

Let me summarize the characteristic motifs of these concepts as they appear in North Asia. Every year, before the onset of the cold season, the migratory birds start on a journey toward milder climates. There lies the land where the birds molt. The Lapps and the Finns, the westernmost peoples of the North, both know of a "birdland" whereto the migratory birds—not only cranes but also swans and geese—fly for the winter. In both traditions, the land is inhabited by Pygmies, though in the Lapp variant no mention is made of a conflict

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from their migration both birds carry the gem as a present to the person who had healed them.

[9]See Chavannes (1905b: 561).

[10]See Laufer (1916: 201-202).

between them and the cranes. The birds are caught with a loop and eaten, and great care is taken not to break any of their bones. In Finnish folklore there is fighting between the cranes and the Pygmies. The land where these live is called *lintukoto* ("bird-land"). We may here recall that the inhabitants of the aforementioned Haoguo ("the crane country" of the Chinese tradition) are also Pygmies. In several versions, this land lies beyond where, in an acute angle, the umbrella-shaped sky touches the earth. The space is so restricted that only Pygmies can live there. In fact, as explicitly stated in one of the Finnish versions of the Pygmy-story (Toivonen 1937: 122), their small size is due to the lack of space which would allow them to grow. In these same regions there is an opening, a gate or a doorway, through which the migratory birds pass on their way from their northern habitats to their winter quarters where they molt. It is there that they meet the Pygmies and fighting ensues. The air becomes filled with flying feathers. The combat, the casualties caused by the wind and the pendulous rim of the sky, coupled with the fact that the birds are molting, explain why the air is filled with feathers. The story makes sense and, in the given mythical context, is perfectly coherent.

The West Siberian Vogul and Ostiak mythical geography knows of the birdland but makes no mention of Pygmies. In these versions the key element is the flapping, curtain-like lower edge of the sky. It either causes the wind or is moved by it. In both variants it crushes many of the birds exiting to the birdland. An old couple feeds on the fallen birds while taking great care not to break any of their bones.[11] Farther to the east, the Yenissei Ostiak tradition (Toivonen: 108) knows of a spirit which feeds on swans. He lives in a place where there is an opening, the "Hole in the Earth", through which, when winter approaches, all birds of passage, swans, ducks, and others, fly to the sunny side, which is identical with the South. In the Chukchi version, mention is made of the Gate of the Birds, located where the rim of the sky bounces back from the earth. Beyond this gate lies the Land of the Birds where they fly to take up their winter quarters. Many of them are crushed by the billowing rim of the sky, so that both the rim of the sky and the land which it touches are covered with their remnants and the air is permanently filled with feathers. Most importantly it should be mentioned that the North American Indian legends relating the fight between Pygmies and cranes[12] and cited by Toivonen (pp. 111-15) fully agree with the Eurasian stories as traced from Greece and Finland to China.[13] These parallels are particularly striking in that the

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[11]These will be needed to resurrect the birds. This is another archaic Central Eurasian mythical concept with wide-ranging implications.

[12]Toivonen's principal source is Dangel (1931) to which I have no access.

[13]It should here be mentioned that other concordances between Chinese and

American versions also contain the concept of a gap between the sky and the earth.

It seems certain that, in all these variants, the opening through which the migratory birds pass is either identical to or confused with that through which the winds blow. In the Gilyak version (Toivonen: 109), the opening has both functions. The cave of Boreas, the Cave of the North Wind of the classical tradition, the Chukchi Gate of the Birds, the "Hole in the Earth" of the Yenissei-Ostiaks, are but variations on the same theme. Its range can be extended to include China.

The Chinese "Gate of the Wild Geese" *yanmen* 雁門 mentioned in the *Shan hai jing* (ch. 6) through which the migratory birds pass, the "Gate of Heaven" 天門 *tianmen* which in *Laozi* (ch. 10) "opens and closes" (*tianmen kai he* 天門開闔), the "Gate of Cold" (*han men* 寒門) mentioned in the *Shi ji* (ch. 107,101) and elsewhere, all mirror the same cosmological concept. Pliny (VII,i,10), using the Greek term *ges clithron* (γης κλεῖθρον), speaks of the Earth's Door Bolt "not far from the actual quarter whence the North Wind rises." Close by is the land of the Arimaspians who have but one eye placed on their foreheads and are engaged in a continuous battle, not with cranes but with the mythical griffins.

The birds leaving the earth face many dangers. As we have seen, the opening through which they must pass is narrow, sometimes a strong wind is blowing and, in some versions, the curtain-like edges of the sky flap so violently that many birds are squeezed to death. The combat with the Pygmies, the casualties suffered through wind and the flapping doors of the sky, and the fact that the birds are moulting explain why the air is filled with feathers.

These feathers, floating in the air, had already puzzled Herodotus. He reports (IV. 7) that according to the Scythians, in the extreme north the air is filled with feathers. With his sturdy and in this instance inapplicable Greek rationalism, Herodotus (IV. 31) proposes the following "solution": "No doubt the Scythians and their neighbors when they talk of the feathers really mean snow because of the likeness between the two" (1972 ed.: 281). Pliny the Elder, who presumably recorded a tradition not entirely dependent on Herodotus, places (IV. 26) beyond the land of the one-eyed Arimaspians the "country called feather-filled" (*pterophoros apellata regio*), although following Herodotus he too "explains" the feathers as being nothing other than snow. Herodotus and Pliny were quite aware of the climate in which the Scythians (for them a northern people *par excellence*) lived. To suggest that the Scythians cannot distinguish

American mythical concepts have been identified and studied by Erkes (1926).

between snow and feathers is but a desperate attempt at rationalizing a mythical reality. The land of "Accumulated Feathers" (*ji yu* 積羽) mentioned in the *Bamboo Annals* (Legge 1865: 151) crossed by King Mu in his wandering in the extreme North may be a reflection of the same concept. Should we be surprised that the tribute said to have been brought by the Jiaoyao Pygmies to the sage emperor Yao consisted of feathers? (Granet: 222 n. 1). By the way, the Jiaoyao—just as the Xiaoren—fight the cranes during the sowing period, but they live in caverns which, as we have seen, are associated with the wind (Chavannes 1905b: 314).

In the Greek and Chinese traditions, the whereabouts of the Pygmies are not clearly stated. In the North Eurasian myths, the location of this gate and of the land where the birds shed their feathers is clearly and logically situated in the **south** where, as the long arctic winter approaches, the migratory birds seek asylum. Many of these elements—the geese, the cranes, and the swans—thus become symbols of the sun or are even identified with it.[14] Migratory birds and the sun go south in the autumn and return in the spring. Their return as harbingers of nature's rejuvenation is celebrated widely in Siberia.[15] Apollo, sometimes identified with the sun, arrives in Delphi carried by a swan, symbol of the sun. Apollo has the epithet "Hyperborean" because he is linked with the Far North where he has a sanctuary constructed of feathers.[16] But, in the Greek context, the Spring arrival of the sun coming from the **north** makes no sense. Transplanted into the south, the northern myth lost its relevance but kept trace of its origin in the appellation "Hyperborean".

Within the framework of the autochthonous mythical geography of North Eurasia, in a region where the local population is used to seeing migratory birds leave for the winter, the seemingly incongruous meeting and battling of Pygmies and cranes becomes, as it were, rational. All the motifs are woven into one, coherent tapestry representing a view of the world which is not our own.

The tale of the "Pygmies and cranes" is not the only North Eurasian story involving migratory birds. A. T. Hatto (1961) has

[14]Half a century ago (Sinor 1946: 48) I stumbled upon a quite surprising, late trace of this belief. In the London copy of the Sino-Turkic vocabulary of the Bureau of Translators of the Ming, the Turkic equivalent of *tian'e* 天鵝 is given (transcribed in Chinese characters) as *kün tängri qaz* ("goose of the sun god"), instead of, as could be expected, "heavenly goose".

[15]See Hamayon (1990: 313-16).

[16]Kothe (1970), while advocating a different origin of the Apollo cult, contains much useful reference to the Hyperborean character of the god. Déchelette (1928, particularly pp. 418-44) presents interesting objects and thoughts about the role of the swan in the religion of Bronze Age Europe.

followed the folk-tale of the Swan Maiden from Europe through Siberia and Japan into America and concluded that "the story was really at home to subarctic Eurasia and America." (p. 349). "In tales collected over an area ranging from the Chukchi to the Tlingit and including the whole Eskimo region"—writes Hatto (p. 335)—"the husband pursues his wife [the Swan Maiden] to 'Bird-land' or 'Bird-heaven'... to the southern habitat of the birds of passage."

A comparison of Chinese and Altaic names of birds of passage comes to strengthen the connections between the concepts just examined. The Chinese word for crane is *hao* 鶴 (<**yâk*, Japanese *kaku*), the name of the swan (applied also to the the "Hyperborean goose") is *gu* 鵠 (<**kuok*), probably an etymological dublet of *hao.* I have suggested (Sinor 1946: 48-49) that both words are to be connected, probably through borrowing, with Turkic words such as *qoγu*, Tunguz correspondents such as *kuku*, *gage*, etc. , all of them meaning either "swan", or "hyperborean goose", or "crane". There is no accepted etymology for Greek κύκνος; it may or may not be connected with the words just indicated.

In the very limited space at my disposal I can but evoke a lost, mythical world-view now sunk in the deep ocean of time. What we can perceive are but mountain-tops, still emerging from the waters and forming the seemingly disconnected islands of an archipelago. The principal element in the picture I propose would be the flat earth over which hangs the umbrella-shaped sky. In importance it is followed by the yearly migration of the birds who must go to some faraway place, outside the known world. They get there through an opening, possibly a gate, perhaps simply the space between the rim of the sky and the earth. Their meeting with the Pygmies who happen to live there is accidental to the main scheme and so are the floating feathers. Not so the wind which is usually thought of as blowing from a hole, a cavern. The connection between wind and one-eyed creatures (such as the Arimasps) is real and well-documented, and the linkage may involve metallurgy practiced by one-eyed smiths (e. g. the Cyclops) whose art is dependent on creating wind.[17]

Several aspects of early Greek civilization can be traced to North Eurasia. Some of these were discovered and examined in the pioneering works of Karl Meuli (1935, 1960). It is known that Greek contains only a relatively small number of words of Indo-European

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[17]If we move away from the **most** archaic myth, closer to our time there are other indications of wide connections which antedate the framework of our chronologies. I have in mind the custom of scalping, now attested to the third millennium BCE in the Lungshanoid culture (Chang 1980: 339). Scalping is well-documented from the Scythians, all through North Asia to North America. For the North Asian data see Sinor (1992).

origin, or to put it more strikingly, most of the Greek vocabulary is of unknown origin. The amazing Greek civilization is just a veneer covering a solid core of unknown substance. Things are different in the case of what we know as the Chinese culture which, on the whole, rests on the Neolithic foundation of the same area. It would be idle to speculate over when the cluster of myths I have evoked reached China. Since it is found also in North America, I would not exclude a very early date. In fact it may well be an archaic remnant from a time when the real differentiation between North Eurasian cultures had not yet been completed. So I have no quarrel with Pulleyblank's suggestion that (1966: 15) "...we should have the easternmost extension of the Indo-Europeans on or within the present boundaries of China already in the third millennium." Going one step further, Průšek (1971: 72) wrote "...there was no Indo-European invasion on the western frontiers of China in the early years of the first millennium B.C ...for the simple reason that the Indo-Europeans had been settled there since time immemorial." The relevance of my approach to the subject of Europoid bodies discovered in Xinjiang lies, at least so I hope, in that it reveals the existence of an archaic mythical continuum covering the whole of Eurasia and at least part of North America. Myths have a longer life than humans or their artifacts.

An important by-product of the increased awareness of Europoid populations all across Eurasia may be the overdue bursting of the bubble usually referred to as the Indo-European Homeland. The prevailing view among the majority of scholars, dead or alive, would locate that homeland somewhere in Eastern Europe, preferably north of the Black and Caspian Seas. I would be ready to accept this hypothesis as long as it is understood that by homeland (*Urheimat*) we understand a hypothetical territory where lived a hypothetical people (*Urvolk*) using one and the same hypothetical language (*Ursprache*). Unless we believe in spontaneous generation, we are bound to wonder what the antecedents of these three *Ur*-entities were. A territory such as the homeland may have been uninhabited, but individuals of any *Urvolk* must have gotten there from somewhere, they must have had parents, and must have spoken a language which (and this is an important point) was not necessarily that of their biological ancestors.

As I see it, there were three arguments why the Indo-European homeland was placed into Europe. Two of them are reasonable, the third decisive. 1. Most of the Indo-European languages—even those showing considerable discrepancies, such as, e. g., the Germanic, Slavic and Romance languages and Latvian—are spoken in Europe. 2. It can be shown that the speakers of Indo-European languages now, or in the past, used in Asia (i. e., practically speaking in the Middle East and South Asia) came to these regions in more-or-less historical times. It is generally accepted that Indo-Aryans reached the subcontinent at the beginning of the second millennium BCE. 3. But the most powerful reason which has kept this theory alive is that the vast majority of the scholars interested in the subject were Europeans, and the idea that their ancestors could have come from another region simply did not occur to them. It needed the Georgian Gamkrelidze to come up with a different theory and Colin Renfrew has now also followed a non-conventional path, though both of these scholars maintain the traditional hypothesis of a "homeland". Perhaps the time has come to wrench "Indo-European" prehistory out of the century-old scholarly ruts. A. K. Narain—who did not attend the Philadelphia Conference—expressed a similar view in the abstract he had submitted: "The paper makes a plea to put an end now to the futile search for the homeland of the 'first' Indo-Europeans.... Let us bury the phantom of the so-called 'Indo-European' people. There never was such a race."

David W. Anthony has done some exellent work in identifying, on the basis of prehistoric "dental records," those horses that must have been ridden. He suggests (1994: 193) "that horses were first domesticated and that riding began in the western Eurasian steppes about 4000 CE." Possibly. I would also accept his suggestion that there is a common Indo-European vocabulary for wheeled vehicles. But he is definitely mistaken when he states (1995: 562) that "the expansion of the Indo-European languages eastward into the steppes was linked to innovations in transport."

Over countless millennia the speed of travel was constant: that of a walking man; it increased first with the use of horses and then, in the nineteenth century, by the invention of mechanical devices. The rate of travel might have increased from a few miles a day to longer distances, but the desire and the possibility to move is certainly perennial. If the Upper Palaeolithic Aurignacian culture could cover an area ranging from Western Europe all through Siberia and farther, through the Bering land bridge to America, there is no need to be surprised to find evidence of wide-ranging human wanderings some ten thousand years later. In Central Eurasia there is no justification to assume genetic or cultural isolation.

Let me conclude. There is no reason to believe that the admixture of genetically different populations (miscegenation) is a modern phenomenon. Victor Mair's "fondest hope" that direct comparisons in divers fields of enquiry "if undertaken on an unrestricted scale, will reveal convincing interconnections among virtually all of the early population groups of Eurasia" (1995: 287-88) may be close to fulfilment. The paramount importance of the Chinese archeological discoveries the Philadelphia Conference was called upon to discuss lies in the massive, new proof they bring to the freedom of movement all across Eurasia. For people not in a hurry, the Eurasian Continent was a small world indeed.

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Were Some of the Xinjiang Mummies "Epi-Scythians"? An Excursus in Trans-Eurasian Folklore and Mythology

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It should be emphasized at the outset of this paper that I concur wholeheartedly with Pulleyblank (1995:415), Mair (1995a:299), Xu (1995:364), Adams (1995:410), and others who suspect that the majority of the Xinjiang mummies—especially the ones that date from the second millennium BCE or earlier (cf. Mair 1995a, 1995b)—were most likely Indo-European-speaking Tocharians of one sort or another. The evidence adduced in support of this identification, although still largely circumstantial, is extremely convincing.

At the same time, my own research (Littleton 1983, 1985, 1995), together with that of several Japanese colleagues, leads me to suspect that at least *some* of these Central Asian Europoids were what I have chosen to call "Epi-Scythians," that is, eastern ethnic cousins of the ancient Scythians who, ca. 400 BCE, under a variety of ethnonyms—Alans, Sarmatians (or "Sauromatians"[1]), Massagetae, Thyssagetae, Saka, etc.[2]—stretched from the lower Volga to the upper Yenisei (Sulimirski 1970; Bachrach 1973). In the latter part of the first millennium BCE (or possibly as early as 800 BCE; see below), several of these Northeast-Iranian-speaking tribes appear to have migrated to the Tarim Basin and perhaps even farther east. Indeed, I also suspect that these same Epi-Scythians, whose western counterparts had such a significant impact on Europe in the early centuries of the Common

[1]The confusion between "Sauromatian" and "Sarmatian" began in antiquity. Herodotus refers to the immediate eastern neighbors of the Scythians as Σαυρμάται, perhaps because of their lizard-like scale armor and propensity for carrying dragon banners (Herodotus 4, passim; see de Sélincourt 1972: 271-340). Later Greek scholars (e.g., Strabo 11.6.2; see Jones 1924: 245) distinguished the Σαυρομάται from another steppe tribe they called the Σαρμάται, whose name may derive from an ethnonym meaning "free people" (cf. Ossetian *særmae læg*, "free man," plural form *-tae*; Colarusso [personal communication]). I suspect that these two tribes–the "Sauromatians" and the "Sarmatians"–were in fact one in the same ethnic group. For a more extensive discussion of this matter, as well as the later tendency to confuse Sarmatians and Alans, see Littleton and Malcor (1994:13-16, 46).

[2]In the North Pontic steppes and adjacent regions, several of these eastern tribes took over territory previously occupied by Scythians (cf. Phillips 1965; Sulimirski 1970). Hence the umbrella label "Epi-Scythians."

Era (Bachrach 1973), had an equally strong impact on parts of East Asia, and that this impact can be detected in Japanese, Korean, and Chinese folklore and mythology, as well as in some aspects of ancient Japanese and Korean social organization and weaponry.

The "Horse-rider" Thesis

Thanks to the pioneering research of Namio Egami (1964, 1967) and his disciples (e.g., Ledyard 1975), it is now fairly certain that both Japan and Korea were conquered by mounted nomads from Central Asia in the fourth century CE. Although the bulk of this "*kiba minzoku kokka*," or "horse-rider nation," as Egami calls it, was probably composed of Altaic speakers (Huns, Puyo, etc.),[3] these steppe horsemen seem to have had sustained contact with Indo-Europeans somewhere en route to East Asia.[4] Yoshida (1962, 1974, 1977, 1979) and Obayashi (1977) have demonstrated the presence of the tripartite Indo-European ideology, as identified by the late Georges Dumézil (e.g., 1958; see also Littleton 1982a), in the *Kojiki* (712 CE) and *Nihonshoki* (720 CE), the oldest repositories of Japanese mythology and folklore. This ideology is especially evident in the three objects symbolic of sovereignty—a mirror, a sacred sword, and a *magatama*, or fertility jewel—brought down from heaven by Honinigi, grandson of the Sun Goddess Amaterasu Omikami when she decided to extend her hegemony over the "Reed Plain" (i.e., the mortal world). From that point on, every *tennō-heika* (emperor) had to possess replicas of these three objects in order to justify his right to the throne. According to Yoshida, the objects represent, respectively, the three canonical Indo-European "functions," that is, overall magico-religious and juridical sovereignty (first function), the exercise of physical prowess (second function), and plant, animal, and human fertility, prosperity, health, wealth, the mass of society, etc. (third function).[5]

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[3]Both Japanese and Korean exhibit a significant number of Altaic features (e.g., vowel harmony in Old Japanese, agglutination, lexical features such as *kur-* "black" [cf. Turkish *kara*]). A great many linguists still classify Japanese and Korean as distantly-related members of the Altaic language family (Befu 1981:17). I suspect, however, that the Altaic features just noted are overlays, analogous to the French impact on the development of English after 1066, and that the ultimate affinities of these two languages lie elsewhere, perhaps in Austronesian.

[4]The invaders seem to have brought with them the ancient Scythian preference for reddish-brown horses (Rolle 1989:109). Red chargers figure prominently in the *Nihonshoki* (see below) and the *haniwa* horse figurines that were set up at gave sites were typically reddish-brown (Smith 1964:28).

[5]The best overview of the tripartite ideology remains Dumézil's *L'idéologie tripartite des Indo-Européens* (1958); for a comprehensive discussion of this functional paradigm see Littleton (1982).

Plate 1: The "Golden Man" of Issyk (courtesy of the Institute of History, Archeology, and Ethnography, Alma-ata, Kazakhstan, cf. Rolle 1989:49; see also Littleton and Malcor 1994:ii).

However, the so-called Imperial Regalia are not simply Indo-European. They specifically reflect the well-known Scythian origin myth, as reported by Herodotus (4.5-6; see Littleton 1982a:10), in which three analogous symbols of sovereignty—a cup, a battle ax, and a yoked plow—fell from the sky and were gathered in by Kolaxaïs, youngest son of the primordial being Targitaos and reputed ancestor of the Royal Scyths. It is, of course, extremely doubtful whether any Epi-Scythians per se were directly involved in the conquest of Korea and Japan in the fourth century CE, or that the Japanese emperor has a Northeast Iranian-speaking warrior at the base of his family tree. But the mythology associated with the Altaic-speaking horsemen who crossed the Yalu River shortly after 300 CE and eventually established themselves as ruling elites in Korea and Japan gives every indication that they had had sustained contact not only with Indo-Europeans per se, but with a Northeast-Iranian-speaking tribe (or tribes), perhaps in the general vicinity of the Tarim Basin. This assessment is reinforced by the myth of the founding of the Kingdom of Silla, as expressed in the *Samguk-yusa*, which also tells how three sacred talismans symbolic of sovereignty were brought down from heaven, in this case by a figure called Hwan'ung (Obayashi 1984:172-173; Littleton 1985:159).[6]

[6]Hwan'ung's son Tangun, who, like Kolaxaïs, managed to gather all three talismans, is said to have ruled Korea for 1,500 years.

Figure 1: A "Finno-Scythian" warrior as depicted on an Ananyino tombstone, ca. 400 BCE. (Phillips 1965:50)

Swords and Sword-Heroes

Another important reflex of the Epi-Scythian impact on East Asia—indirect though it may have been—can be seen in the presence of distinct, Indo-Iranian-type warrior classes, that is, the Japanese *samurai* (or *bushi*) and their ancient Korean equivalent, whose members typically carried two swords, one long (e.g., the Japanese *tachi*, later called the *katana*) and the other short (e.g., the Japanese *tantō or wakizashi*). This practice mirrors the two swords of unequal length carried by Scythians, Sarmatians, Saka, and other ancient Northeast Iranian-speaking warriors, as well as by the Huns (Phillips 1965:92). A typological image of such a two-sworded steppe warrior (most likely a Saka) can be seen in the famous "Golden Man" of Issyk (see Plate 1). Indeed, a number of steppe images—e.g., that of a "Finno-Scythian" warrior from Ananyino, ca. 500 BCE, wearing a body-hugging tunic (or armor), a conical hat, trousers, and a dagger (Phillips 1965:50, Jettmar 1964:52; see *Figure 1*)—closely parallel the Haniwa warrior figurines associated with fifth and sixth century CE Japanese *kofun*, or tumuli (see Figure 2).[7] And the striking similarities

[7]I am indebted to Professor Gunar Freibergs for calling this parallel to my attention. [Editor's note: The "Finno-Scythian" warrior also appears to be bearded and is wearing what seems to be a large torque around his neck.]

between an ancient Korean sword hilt and one found in an Epi-Scythian grave at Borovoje in Kazakhstan (see Figure 3) serve to underscore the Northeast Iranian impact on East Asian weaponry.

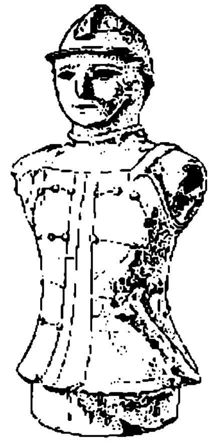

Figure 2: A Haniwa warrior figure, sixth century CE, from the Negishi Collection (Swann 1966:28).

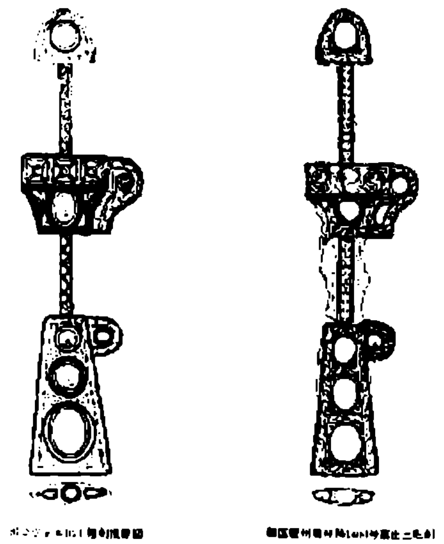

Figure 3: Left, a sword hilt from Borovoje, Kazakhstan (the Hermitage, St. Petersburg); right, an ancient Korean sword hilt. From the catalog of the "Cultural Contacts between East and West in Antiquity and Middle Ages from USSR" exhibition, Tokyo National Museum, 13 August-25 September, 1985. I thank Professor Mair for calling this parallel to my attention.

However, not only do we find Northeast Iranian-type costumes and swords in East Asia, we also find Epi-Scythian-type sword-heroes in both Chinese and Japanese legendry. In order to understand the full implications of these legends and what they tell us about trans-Eurasian cultural connections in the early centuries of the Common Era, as well as about the provenance of some of the Xinjiang mummies, before proceeding any further I need to summarize the results of extensive research by Helmut Nickel (1973-74, 1975), Linda Malcor (Peterson 1985, 1986) and myself (Littleton 1979, 1982b, 1983, 1995; Littleton and Thomas 1978; Littleton and Malcor 1994) into the extent to which Alans and Sarmatians were responsible for the spread of what I call, for convenience's sake, the "Arthurian tradition" from one end of the Eurasian landmass to the other.

This project began over two decades ago. It was stimulated by Grisward's (1969, 1973) discovery of a parallel between the legend of the death of King Arthur, as found in Sir Thomas Malory's *Le Morte d'Arthur* (Vinaver 1947, 1:280-281), the anonymous *Stanzaic Morte Arthur* (lines 3446-3493; Benson 1974:96-98),[8] and other medieval European texts, and the oral traditions in the northern Caucasus about the death of Batraz,[9] leader of a band of legendary heroes known as the Narts (e.g., Dumézil 1930:69).[10] These latter traditions survive to this day, especially among the Ossetians, who are descended from the ancient Alans.[11] In both death scenes, the mortally wounded (or doomed) hero's magical sword must be thrown into a body of water before he can pass on to his reward. After several attempts at deception, one or more of the hero's companions finally manages to consign the weapon to the water, whereupon a prodigious event occurs: In the Arthurian tradition, the Lady of the Lake's hand rises from the sea (or lake), grasps the sword, flourishes it, and then pulls the weapon into the water; in the Ossetic tradition, the sea turns blood-red and becomes extremely turbulent as Batraz's wondrous blade sinks beneath the surface.

The parallels between these two death scenes are extraordinary

[8]The *Stanzaic Morte Arthur* was compiled in the late fourteenth century, about a hundred years before Malory's *Le Morte d'Arthur* (Benson 1974:xii).

[9]The name Batraz reflects the Altaic word *ba(a)tyr*, "hero" (cf. Slavic *bogatyr*) and is therefore relatively recent. However, as Dumézil (1978:21) points out, it is almost certainly "le rajeunissement d'un synonyme plus ancient." The Ossetic hero is believed to descend from the Scythian water-god Donbettyr through his daughter, who married Batraz's father Xæmyc, became pregnant by him, and then, just before disappearing, passed the fetus to her husband. Batraz was eventually born from a lump that formed on Xæmyc's back (Dumézil 1978:215-216).

[10]The Nart sagas have been collected and translated in the course of the last century or so by Miller (1881), Hübschmann (1887), Dirr (1925), and, most extensively, Dumézil (e.g., 1930, 1965, 1978). Although Ossetic in origin, these legends are widely known in the Caucasus; for example, my colleague John Colarusso (in press) has recently translated a large corpus of Circassian Nart sagas.

[11]In 1979, the Ossetians numbered approximately 550,000 (Wixman 1984:152). For discussions of the Ossetic language, see Comrie (1981:164), Benveniste (1959), and Abaev (1964). Modern Ossetia is currently split between the Republic of Georgia (South Ossetia) and the Russian Federated Republic (North Ossetia). For modern Ossetic history, see Rothstein (1954).

and much too specific to be explained by either independent invention or sheer chance. In 1975, thanks to a chance comment by James P. Mallory (Littleton and Malcor 1994:xxiii), I became aware of a possible link between the Ossetic Nart sagas and the Arthurian legends. According to the Roman historian Dio Cassius (71.11), in 175 CE a contingent of 5,500 Sarmatian *cataphracti*, ancient cousins of the Ossetians, were posted to Britain to garrison Hadrian's Wall. Few if any of these heavily armed auxiliaries, who belonged to a tribe known to the Romans as the Iazyges (or Jazyges), seem to have made it back to their homeland east of the Danube. When their period of service was up, the majority of them were settled in a *vicus* at Bremetennacum Veteranorum, a Roman Cavalry fort near the modern village of Ribchester in western Lancashire (Richmond 1945; Sulimirski 1970:175-176); Edwards and Webster 1985-87; Littleton and Malcor 1994:18-26). This site, which has yielded a number of Sarmatian grave stelae, remained intact at least until the middle of the fourth century, and probably until the final Roman withdrawal from Britain in 410 CE.

A host of other parallels between the Arthurian and Ossetic epic traditions soon came to light. For example, both Arthur and Batraz receive their magical swords from supernaturally gifted women, respectively, the Lady of the Lake and Satana, a seeress whose name means "Mother of a Hundred Sons."[12] Moreover, each leader presides over a band of sometimes fractious heroes—respectively, the knights of the Round Table (Lancelot, Bedivere, Gawain, et al.) and Batraz's fellow Narts (Sosryko, Soslan, Uryzmæg, et al.)—whose exploits are recorded in a host of independent, albeit interconnected legends and sagas.[13]

In the 1980s, Linda Malcor (Peterson 1985) discovered both an

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[12]I.e., the Boratæ, the dominant family of Narts, to which Batraz belongs. Her name derives from Iranian **sata-* ("[one] hundred") plus a Northwest Caucasian form *na* ("mother") and the attributive suffix *-ya* (or *-a*); for a discussion of this etymology, see Colarusso (1989:4).

[13]A substantial number of these legends concern the quest for access to (or control over) a magical vessel, respectively, the Holy Grail and the Nartæmonga, or the "Divinatory Cup of the Narts." Like the Grail, the Cup of the Narts can only be attained by a hero who exhibits no flaws whatsoever (Dumézil 1930:136-137; Littleton and Malcor 1994:209-232). For reasons not yet clear, this aspect of the Epi-Scythian tradition did *not* diffuse as far east as Japan. However, the ancient Chinese myth of the Divine Tripod (i.e., a cauldron with legs), which ". . . knows the auspicious and the inauspicious and what continues and what perishes" (quoted by Wu 1989:95), and which legitimizes the ruler–and, by extension, the dynasty–that manages to possess it, is curiously similar to the stories surrounding the Nartæmonga and may ultimately derive from the same Epi-Scythian source. For an image of this Chinese vessel, see Wu (1989:236, Fig. 89). Once again, I am indebted to Victor Mair for pointing out this important parallel.

etymological and thematic connection between the legends of Lancelot, whose provenance is clearly Continental, and the Alanic invasions of southern Gaul in the early fifth century. Not only does Lancelot exhibit a great many specific "Alanic" traits, such as extreme generosity and a penchant for riding in carts,[14] even his name seems to reflect his Alan heritage: it is most likely derived from *(*A*)*lanus-à-Lot*, or "the Alan of Lot" (Peterson 1985; Littleton and Malcor 1994:94-101). This etymology is supported by the presence of a substantial number of Alanic toponyms in the vicinity of the Lot River (Sabarthés 1907:302, 312), many of which, like Lanet and Langais, have lost an initial *a* (Bachrach 1973:140; Littleton and Malcor 1995:98). The name "Arthur," on the other hand, most likely derives from the gentilic name of the first Roman commander to whom the Iazyges auxiliaries were assigned when they arrived in Britain in 175: Lucius Artorius Castus, Prefect of the VIth Legion Victrix (Malone 1925; Littleton and Malcor 1994:62-63). The leader of the Sarmatian veterans' community seems to have assumed the title "Artorius," perhaps inspired by the use of the name "Caesar" as a title by the emperors.[15]

In any case, two things eventually became clear: (1) that an ancient Northeast Iranian epic tradition about a hero who obtains a magical sword from a female seeress (Lancelot receives his from his foster-mother, the Dame du Lac) diffused to Europe by two separate routes between 175 and ca. 450 CE, and (2) that the British and Continental versions of this Epi-Scythian tradition eventually conflated to produce the medieval Arthurian and Grail traditions.

Meanwhile, as I perused the ancient Japanese tradition, I was struck by the similarities between Kusanagi, the divine sword brought to earth by Honinigi, and the second Excalibur[16], which was given to

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[14]Cf. Chrétien de Troyes' *Le conte de la charette* [=*Lancelot: The Knight of the Cart*] (1984) and Ammianus Marcellinus's trenchant observations (31.2.18) about the importance of carts in the life of the ancient Alans:

> In the wagons the men have intercourse with the women, and in the wagons their babies are born and reared; wagons form their permanent dwellings. . .

See also Littleton and Malcor (1994:26, 118).

[15]The "historic Arthur," who supposedly defeated the Saxons at the quasi-legendary Battle of Badon Hill (late fifth, early sixth century), was most likely a charismatic "Artorius" of the Sarmatian veterans community who later became entangled in popular memory with his own people's heroic tradition (i.e., the prototype of the Batraz legend).

[16]The first Excalibur, which the young Arthur withdrew from a stone and thereby validated his right to the kingship, is a wholly different weapon. That the act of withdrawing it reflects a possible Alano-Sarmatian rite of passage has been suggested (Littleton 1982b:58-59; see also Littleton and Malcor

Arthur by the Lady of the Lake (cf. Yoshida 1962:29-35, 1979:116-129). This realization, in turn, led to a discovery of Northeast Iranian/"Arthurian" motifs in the account of Japan's most important legendary sword-hero: Yamato-takeru.

The Legend of Yamato-takeru

The Japanese hero who would later earn the epithet *Yamato-takeru*, or the "Brave of Yamato," was the younger of twin sons fathered by the legendary tenth Emperor Keikō (for the relevant texts, see *Kojiki* 2.78-88; *Nihonshoki* VII.2, 18-32). After displaying his prowess in several youthful adventures, in which he used a small sword given to him by his aunt, Yamato-hime, the high priestess of Amaterasu at Ise, he was ordered by his father to pacify the Emeshi, or "Northern Barbarians" (almost certainly the Ainu). Before leaving Yamato, the hero once again visited his aunt, who this time bestowed upon him the previously mentioned Kusanagi sword[17]. Then, accompanied by a small band of lesser heroes, he set out on his great adventure.

It would be impossible here to recount all of Yamato-takeru's adventures as he marched eastward toward what is today the Kanto, that is, the region now occupied by Greater Tokyo (see Littleton 1995). Rather, I will concentrate on those episodes that link him to the Northeast Iranian heroic tradition. In the course of his journey, while passing through the land of Owari, Yamato-takeru fell in love with a princess, Miyazu-hime, and vowed to marry her after completing his mission. When he returned to Owari, after crossing the Strait of Uraga to defeat the Emeshi in what is now Chiba Prefecture, he decided to set out on one final adventure. Leaving Kusanagi in Miyazu-hime's care, he attempted to subdue a rebellious mountain deity with his bare hands. This proved to be a fatal mistake. The demon transformed himself into a white boar and managed to inflict the hero with a fatal illness.

1994:181-194). As Ammianus Marcellinus (31.4.22; Rolfe 1939, 3:391) observes: "[the Alans'] only idea of religion was to plunge a naked sword into the earth with barbaric ceremonies." This may have been but the first phase of a more complex ritual, one in which young men withdrew embedded swords and thereby validated their status as newly-initiated warriors.

[17]At one point during Yamato-takeru's march of conquest, the wondrous, Excalibur-like blade wielded itself and cut down some obstructing grass, thereby earning the name it has borne ever since, which can be translated as "Grass Mower" (*Kojiki* 2.83.4; *Nihonshoki* VII.24). To this day, a sacred replica of Kusanagi is presented to every new emperor as soon as he succeeds to the throne.

Motif	Arthur	Lancelot	Batraz	Yamato-takeru
Possesses (or has access to) magical sword	+	+	+	+
Receives two successive swords	+	+	-	+
Receives at least one sword from a seeress/ priestess	+	+	+	+
Sword bestower is a close kinswoman	-	+	+	+
She and/or hero is associated with water	+	+	+	-
Leads war band	+	+	+	+
Crosses a body of water	+	+	+	+
Seeks out combat with a monster atop a sacred mountain	+	-	+	+
Suffers mortal wound (or illness) in key episode	+	-	+	+
Kills own people	+	+	+	+
Sword hidden by comrade(s)	+	-	+	-
Dies by the sea	+	-	+	+
Dies after giving (or ordering companion[s] to give) a sword to a female	+	-	+	+
Sword consigned to water	+	-	+	-
Physical remains miraculously transported to another realm	+	-	-	+

Table 1: The principal parallels among Arthur, Lancelot, Batraz, and Yamato-takeru (after Littleton 1995:267).

Carried to the seashore near Otsu, where he had left another sword under a pine tree, Yamato-Takeru soon breathed his last. His father, the Emperor, ordered that he be buried under a large tumulus. But the dead hero's remains, in the shape of a giant white bird, escaped from the tomb and flew first to Yamato and then up to heaven. When his followers opened his grave to see what had happened, they found it empty.

The Common Epi-Scythian Sword-Hero

The principal parallels among Yamato-Takeru Arthur, Lancelot, and Batraz are summarized in Table 1.

Even a casual perusal of this table will reveal that there are significantly more pluses (47) than minuses (13). All four heroes are mentored by and receive swords from magically-gifted females who, save for the Lady of the Lake, are also close kinswomen; in the case of both Batraz and Yamato-takeru, the sword bestower is the hero's paternal aunt![18] Moreover, Arthur, Lancelot, and Yamato-takeru all possesses *two* successive swords: the first validates the hero's birth-right and/or physical prowess, and the second serves as his principal weapon until the end of his career.[19] In the course of their adventures, all four heroes cross bodies of water, respectively, the English Channel, a pair of lakes(?) in the Caucasus, and the Strait of Uraga.[20] Both Arthur and Batraz, acting alone, seek out and confront a demon atop a sacred mountain.[21] All four kill their own people in

[18]Satana, whose mother's corpse was impregnated by Wastyrji (St. George), is the half-sister of Batraz's father Xæmyc.

[19]In Lancelot's case, the second sword, which he plucks from a stone altar in the Chapel Perilous (or Nigramous; see Vinaver 1947, 3:1238-1240; see also Littleton and Malcor 1994:183, 189), is the one that validates his right to rule his deceased father's kingdom (Benoich, or Benwick). Lancelot's first sword, while magical in that it is given to him by the Dame du Lac, is primarily a useful weapon. In Arthur's case, the situation is reversed: it is the *first* Excalibur, the one he draws from the stone, that validates his right to the kingship. Yamato-takeru's first sword serves an analogous function; the Japanese hero uses it to kill the rebellious Kumaso brothers, an act which earns him the right to be called "The Brave of Yamato" (*Kojiki* 2.80.14-15). Kusanagi is thus functionally equivalent to the second Excalibur.

Batraz possesses but a single magical sword which serves both functions.

Several Arthurian figures, most notably the recalcitrant hero Balin, are noteworthy for carrying two swords simultaneously. Consistently described as "the knight with the two swords" (Gross 1984:257), Balin receives his second sword, which is magical, from Lady Lyle of Avalon, a counterpart of the Lady of the Lake. He then uses it to commit a variety of outrages, not the least of them being the beheading of the Lady of the Lake! (See Gross 1984:253.) Ironically, the same weapon, outfitted with a new pommel, eventually finds its way to Galahad, the saintly Grail Knight.

[20]In an as yet unpublished Circassian Nart story entitled "Khimishuquo Pataraz" ("Khimish's Son Pataraz"; Colarusso *in press*), Batraz (here called Pataraz) crosses a narrow, bridge-like strip of land between two "seas" to attack an enemy. Both Arthur and Lancelot cross the English Channel for analogous reasons, albeit in opposite directions: the former invades Gaul to fight the Romans, while the latter travels to Britain to become a knight of the Round Table, fight at Arthur's side, have an affair with Guinivere, etc. (I am indebted to Professor Colarusso for his willingness to share the Circassian text with me prior to publication.)

[21]According to Geoffrey of Monmouth in the *Historia Regum Britanniae* (Thorpe 1966:237-240), Arthur ascends Mont-Saint-Michel to confront the resident demon (in this case, a giant), who has killed the niece of his ally, King Hoël of Brittany. The consequences, however, are very different. The British hero suffers no ill-effects from this encounter, and his death occurs at

internecine conflicts.[22] Three of the four heroes (Lancelot is the exception) die near bodies of water after giving up (or ordering companion[s] to give up) their magical swords to a female figure. And all but Lancelot suffer a mortal wound or illness in a key episode; moreover, in the case of Arthur and Yamato-takeru, their physical remains are miraculously transported to another realm, respectively, the Isle of Avalon and Heaven.

In short, what emerges is the high probability that the four figures in question are reflexes of a common, Epi-Scythian sword-hero whose mythology took shape somewhere in the South Russian steppes before the beginning of the Common Era. The relationships among them are summarized in Table 2:

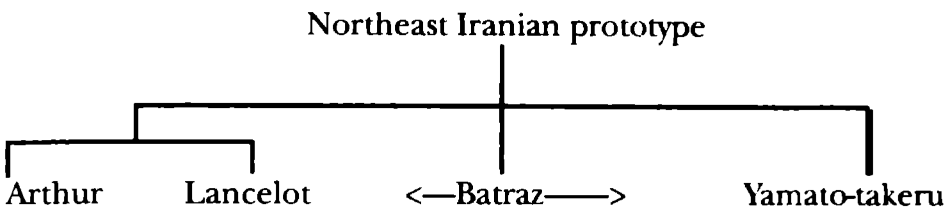

Table 2: Relationships among the four Epi-Scythian Sword-heroes (after Littleton 1995:268).

The extent of this Epi-Scythian impact on East Asian folklore is underscored by the presence of an "Arthurian" motif in ancient Chinese legendry. Professor Mair has recently called my attention to an eighth-century popular tale in which an ancient hero called Wu Tzu-hsü throws his sword into the Yangtze. As the sword entered the water,

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a much later point in the narrative.

[22]This is especially evident in an account of Batraz's death collected by Dirr (1925:189-190):

> As he [Batraz] journeyed he met the seven Uàtsillas [Holy Men]. "I was looking for you," he said, aimed at them, and four of them were dead; the other three went to God and complained to Him of Batràs. But God would not listen to them. Then Batràs left heaven again to look for the Uàstrydji [enemies of thieves, villains, and perjurers]. He met them on the way, shot at them, killed three of them, and the other four went to God to make their complaint.

In this Ossetic variant, God finally kills the recalcitrant Batraz by sending Barsag's Wheel, a divine agent, to run over him.

Another recalcitrant figure in the Arthurian tradition, in addition to Arthur and Lancelot, is Balin, who not only beheads the Lady of the Lake (see note 19), but also kills the knight sent by Arthur to punish him and inflicts the famous "Dolorous Stroke" on Pellam. The latter figure subsequently becomes the wounded Fisher King in the Holy Grail legend (Littleton and Malcor 1994:255).

> the god of the river . . . roiled the waters in a great and frothing frenzy. The fish and turtles were thrown into a panic and burrowed into the mud. Dragons raced along the waves and leaped out of the water. The river god held up the sword in his hand (Mair 1983:141).

Although the rest of the Wu Tzu-hsü story does not conform to the "Arthurian" model, what happens when the Chinese hero's sword hits the river is a curious amalgam of the events that occur when Excalibur and Batraz's magical sword are consigned to the water: not only does it become extremely turbulent, but a supernatural figure that lives in the water reaches up and grasps the weapon!

Did some ancient Northeast-Iranian-speaking kinfolk of the Iazyges and the ancestors of the Ossetians manage to diffuse these themes and motifs, directly or indirectly, to East Asia? And, if so, is there any evidence for their presence in the region upon which this conference is focusing?

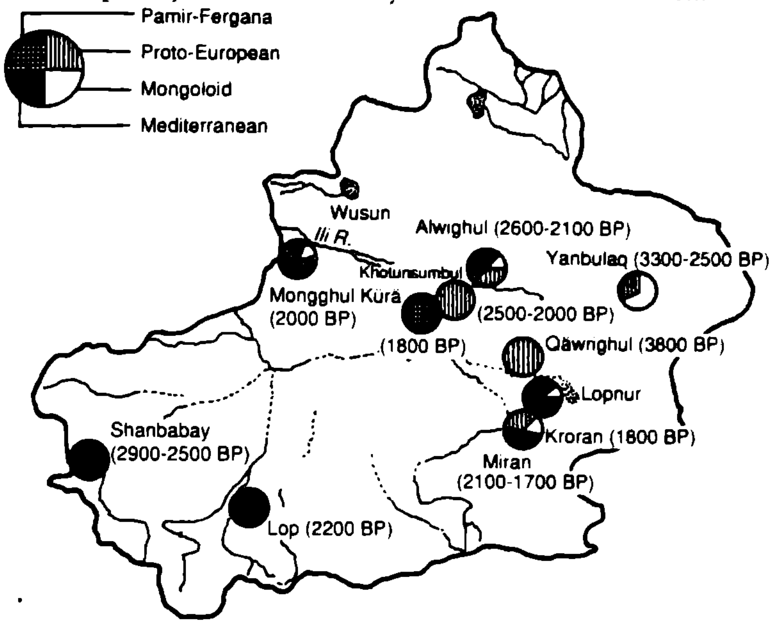
An Epi-Scythian Presence in Ancient Xinjiang?

At the end of the first millennium BCE, the easternmost outpost of Northeast Iranian culture appears to have been an Epi-Scythian tribe known to the Han as the *Wusun* (烏孫). As Vernadsky (1943:182-184) long ago suggested, this word is most likely a Chinese approximation of the widespread Epi-Scythian ethnonym *Os* (or As/Az; e.g., the Ossetians and their immediate ancestors, the Sea of Azov ["Sea of the Az," i.e., Alans]). To be sure, Vernadsky's interpretation is by no means universally accepted. Sulimirski (1970:112), following Pulleyblank (1967:35; see also 1995:425-427), observes that both the Wusun and their neighbors, the Yuezhi, were "most probably Tocharian-speaking peoples." More recently, Adams (1995:403) has concluded that the Wusun are "a group which we know nothing about linguistically."

Nevertheless, the phonological similarity between *Wusun* and *Os* is too close to be ignored. Yes, the Yuezhi and other nomadic Tocharians shared a common life-style with the Wusun, and there must have been a significant amount of cultural interchange between these two Indo-European-speaking communities that found themselves in the Tarim Basin at the beginning of the Common Era; indeed, as Pulleyblank (1995:426) notes, both the Wusun and Yuezhi came to call their chiefs by the same title: *xihou*.[23] But in the absence

[23]Phillips (1965:112) suggests that the Yuezhi may have been a "composite horde, in which a royal tribe of Iranians ruled over subject tribes of Tocharians and perhaps over some Turks." Although there is no hard evidence to support this speculation, he is probably correct in assuming that there were Northeast Iranians as well as Tocharians in the Tarim Basin at the end of the first millennium BCE.

of attested mythological evidence for the Tocharians in general and the Yuezhi in particular, it is to these far-flung Epi-Scythians, whose ethnonym indicates that they were in all probability a tribe of Alans,[24] that we must look to find the source of the Northeast Iranian folkloric motifs and weaponry that eventually surfaced in East Asia.



Map 1: Xinjiang, showing the site of Mongghul Kürä (near the Ili [Yili] River), the approximate Wusun territory ca. 2000 BP, and other sites where Europoid remains have been found. (after Mair [1995])

Although the exact boundaries of the Wusun territory at the end of the first millennium BCE are unclear, it almost certainly included Mongghul Kürä (Zhaosu), a site in western Xinjiang near the Kazakhstan border (see Map 1) that has yielded human remains dating from the beginning of the Common Era (Mair 1995: 291-292). What is more, these remains are consistent with both the ancient Chinese sources, which describe the Wusun as bluish-green-eyed and red-haired, and Ammianus Marcellinus's account (31.2.2; see Rolfe 1939, 3:391) of the blue-eyed, blond-haired Alans who threatened the eastern flank of the Roman Empire in the fourth century CE.[25]

[24]Adrienne Mayor (personal communication) suggests that the Wusun were most probably identical to the Issedonians, an Epi-Scythian tribe whose territory, as described by Aristeas and other ancient Greek authors, generally coincides with that of the people in question (see Map 1); see Mayor and Heaney (1993:42). That the Greek label "Issedonian," like the Chinese label Wusun, ultimately derived from the indigenous, Northeast Iranian/Alan ethnonym "Os" seems probable, especially in light of the common geography and explicit identification of the Issedonians as "Scythians" by Aristeas, Herodotus, Pliny, Pausanias, et al.

[25]The Alans, Ammianus writes, were "tall and handsome [and] their hair inclines to be blond" (31.2.2; see Rolfe 1939, 3:391).

Thus, the immediate (if not original) homeland of the Northeast Iranians who impacted China proper, Korea, and Japan ca. 300-400 CE seems to have been western Xinjiang, in the vicinity of the Yili (Ili) River (see Map 1), and I submit that at least some of the later Europoid mummies found there are the remains of these peripatetic steppe nomads. I suspect that they began to penetrate this region shortly after 200 BCE (cf. Chen and Hiebert (1995:281),[26] at approximately the same time that their western cousins were beginning to penetrate the former Scythian domain north of the Black Sea.

In sum, I suggest that an Epi-Scythian cultural tide—most likely Alan and/or Sarmatian in immediate provenance—rolled across both East Asia and Europe in the early centuries of the Common Era,[27] and

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[26]Chen and Hiebert (1995:281-283) point out that the Wusun were preceded in the Yili (Ili) River valley region by the Saka, who may have arrived there as early as 800 BCE. The extent to which these earlier Northeast Iranians impacted East Asia is still unclear. However, Mair's (1990) convincing demonstration that Old Sinitic **m^y^ag* (>*wu*), or "mage," derives from Old Persian *maguš* (cf. Latin *magus*, Modern English "magic") implies that the Iranian impact on ancient China must have been *far* greater and more extensive than has heretofore been suspected. This assumption is reinforced by the presence of what Csorba (1996:564) calls "Northern" artifacts in three Bronze Age (ca. 1000 BCE) burials at Baifu, just north of Beijing in Hebei Province. Among them are objects decorated in the "Animal Style" so characteristic of Epi-Scythian sites (cf. Roztovzeff 1929) and a sword pommel on which is carved "the full-face image of a Caucasoid male whose Europoid features are augmented by bushy eyebrows and handlebar mustache" (Csorba 1996:564, 567 [Figure 3]). The Baifu face (Csorba 1996:567 [Figure 3]) closely resembles the mustachioed male faces on a well-known Siberian plaque (Hermitage Si 1727, 1/161) depicting a recumbent warrior, his head in a woman's lap and his legs lying across those of a seated servant holding a pair of horses (reproduced by Csorba 1996:568; see also Metropolitan Museum of Art 1973:72-73 [Plate 21]). Although its exact date and provenance are unknown, this plaque is almost certainly Epi-Scythian.

[27]Yet another link between the Epi-Scythian tradition and East Asia, one that does not have any specific Arthurian parallels, can be seen in the Japanese legends about Tetsujin, or "Iron Man." As Ōbayashi (1975) has demonstrated, Japanese folklore is replete with stories about a figure who is encased in iron and thereby, save for a single spot (usually an eye), rendered invulnerable. Batraz, too, is an "iron man." As a youth, he implores the divine smith Kurdalægon to encase him in steel (Dumézil 1930:54). It is this invulnerability that allows him to slaughter his fellow Narts with impunity and accounts for the fact that God alone can cause his death. Yamato-takeru does not share this trait, but the fact that both Ossetic and Japanese folklore know such a figure reinforces the argument advanced in this paper (see Littleton 1983:75-76; 1995:271). The similarities here to both the Achilles and Siegfried legends are obvious and raise some important questions about other, possibly much earlier links between Europe and the ancient steppe cultures.

that its presence can be detected in both the legends of the "Once and Future King" and those of the "Brave of Yamato." This trans-Eurasian folkloric linkage, to say nothing of the social and technological diffusion that accompanied it,[28] is yet another reason to follow Victor Mair's lead (in press) and adopt a truly global perspective when it comes to our attempts to make sense out of the nature and varieties of the human condition.

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[28]Nickel (1975) makes a persuasive case for the probability that the basic medieval European style of fighting with lances and long, slashing swords, as well as an Indo-Iranian-type mounted war-band, was introduced by Alans and Sarmatians at the end of the Roman period. Thus the Epi-Scythian military technology reflected in the Korean sword depicted in *Figure 1* also managed to span Eurasia, to say nothing of the social context (i.e., a well-defined warrior stratum) in which such weapons were wielded. In the West, however, the second, shorter sword ultimately evolved into a dagger (e.g., the rapier-and-dagger fencing technique perfected in Italy in the sixteenth century CE).

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Further Studies on the Racial, Cultural, and Ethnic Affinities of the Yuezhi 月氏

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1. Introduction

In studies on the Yuezhi, the question of their racial identity is still unresolved. Generally, three theories of Caucasoid or Europoid, Turk, and Qiang 羌 (or Proto-Tibetan) identity are most influential. The determination of the racial affinities of the Yuezhi will have a decided significance in establishing the distribution of races in the region of Central Asia in ancient history. If the Yuezhi were Europoids, it implies that the Indo-Europeans in ancient times had expanded eastward to Gansu Province in China and were not restricted to the region of Xinjiang (i.e., Chinese Turkestan); if the Yuezhi were Turkic, this means that in ancient times Turks already inhabited the wide region from Gansu to Xinjiang. On the other hand, if the Yuezhi were really Qiang or proto-Tibetan, this suggests that neither Europoids nor Turks had ever intruded into the above region in ancient history and that contact with Europoids must have occurred only at a later age. For all the above reasons, the racial affinities of the Yuezhi have been a focus of concern for scholars from the West and the East during the past century. Three years ago, this writer briefly discussed the problem of the racial affinities of the Yuezhi (Chen 1993: 111-143); his preliminary conclusion at that time was that the Yuezhi must have been Caucasoid. But that thesis lacked a detailed critique of the other two theories. On the basis of the previous study, the present thesis proceeds with a further study of the details of the problem.

2. Query on the Theory that the Yuezhi Were Turkic

The view that the Yuezhi were Turkic has been a considerably powerful school of thought in the dispute over their racial affinities. After having carefully considered some of the key viewpoints, we discover that there are certain issues which need to be clarified.

2-1. Shiratori Kurakichi 白鳥庫吉 considered that a number of place names in the ancient Tarim Basin may be explained as Turkic (such as, Shule 疏勒, Wensu 温宿, Gumo 姑墨, Yiwulu 伊吾盧, etc.), accordingly the subject inhabitants of the ancient Tarim Basin must have been Turkic (Shiratori 1970: 97-227).

According to currently available data from physical anthropological studies on ancient human remains from the Xinjiang region, it is clear that the earliest known inhabitants of the ancient Tarim Basin were mainly Europoid, and the earliest known racial type in the Xinjiang region were proto-Europeans of the Bronze Age.

As for the name Shule, although it is possible to explain it in Turkic, more explicit proof shows that the etymon originally came from Tumshuqese or "the Sudani language" (Lin 1995: 55-64) of the Indo-European family; As for Wensu, according to the records of "Xiyu zhuan" 西域傳 (Account of the Western Regions) of the *Hanshu;* 漢書 (*History of Han*), "the land and all the species of produce of the state are the same as those of Shanshan 鄯善 (i.e., Kroraina [Loulan 樓蘭])". According to archeological materials, the people of Loulan belonged mainly to the east branch of Mediterranean Caucasoids (Han 1991: 1-13), and it has been discovered in the Kharoṣṭhī documents that the Prakrit administrative language of Loulan contained a substratum of Tokharian (Burrow 1935: 677-675). Accordingly, the people of Loulan (Kroraina) during the Han Dynasty, Three Kingdoms, and Jin Dynasty periods (roughly 2nd c. BCE through 3rd c. CE) might have been a branch of Tokharians (Lin 1989: 72-74). As the conditions of the Wensu state were similar to those of Shanshan, the racial affinities of the state are considered to be Indo-European, not Turkic. As to Gumo, Dr. Shiratori considered that the place name means "sand" in Turkic. *Da Tang Xiyu Ji* 大唐西域記 (*A Record of the Western Regions during the Great Tang*) called the state Balujia 跋祿迦; this is a transcription of the Sanskritic word *baluka* which means "sand dune". According to the account given in this book, the land, climate, popular customs, letters, and laws of this state were the same as those of the state of Kucha 屈支, and the people of Kucha spoke Tokharian B. Although it might be possible that the people of the state adopted Tokharian as their language because they had submitted to the rule of Kucha for a long period, it cannot be excluded that the people of the state were originally Tokharians (Ji 1993: 271). Dr. Shiratori also attempted to prove that the place name Yiwulu (i.e., today's Qumul 哈密 [Hami]) came from Turkic. As for the race of the original inhabitants in the Hami region, reports of recent archeological excavations point out that the skulls excavated in the ancient cemetery at the site of Yanbulaq indicate that the early races of the inhabitants were mostly Mongoloid. However, the Europoid element increased markedly from around 1000 BCE, while the Mongoloid individuals in the cemetery possess features similar to those of the Khams Tibetan type (Han 1990: 371-390). Therefore, if the early inhabitants in the region were really Mongoloid, they should have been more closely related to the Qiang or Tibetan people than to Turkic peoples.

2.2 Gandhara Turkic kings of later generations considered King Kanishka to have been their ancestor. Kalhaṇa stated in his work *Rājataranginī* (1.70) that King Kanishka and other emperors and kings of the Kushan Dynasty were Turushkas, i.e., Turks (cf. Zhang 1936: 20).

As is often seen in world history, the new dynasties of later generations frequently usurped the titles of the emperors or kings of preceding generations. There are also traces in history of non-native regimes calling themselves the descendants of the sacred kings of former generations in order to reinforce the legitimacy of their own regime. The reason that the Turkic kings called King Kanishka their ancestor might have been that the Turks assumed themselves to be the legal heirs of the Kushan Dynasty (Yu 1993: 25), just as in the era of the Sixteen Kingdoms of Chinese history all five Hu 五胡 emperors (most of whom were of Turkic or other Altaic background) claimed to have a blood relationship with the ancient Hua-Xia 華夏 (Chinese) lineage (Cao 1974: 28-31), and after the death of Chinggis Khan, the kings of the Inner Asian steppes made conflicting claims against one another as presumptive descendants of Chinggis Khan. Accordingly, a claim of descent is not sufficient evidence to prove that the Turkic dynasties of later generations had any direct relationship to the original Kushan Dynasty.

2-3. Since most of the images of Kushan kings on later Kushan coins that have been excavated show individuals with high foreheads, prominent noses, thick lips, and beards, some scholars consider these to be Turkic features (Feng 1936: 6)

Generally speaking, the so-called Turkic race itself contains Caucasoid elements (Bahaeddin Ogel, trans. by Chen 1970: 1-13). Consequently, it is not surprising that Turks present the appearance of a prominent nose and beard. In any event, it is difficult to distinguish Turk from Caucasoid on the basis of numismatic evidence.

2-4. Among the Xiongnu 匈奴, Wusun 烏孫 and Yuezhi, there was the official title "Xihou" 翕侯. The graph *xi* 翕 is pronounced *yap* in Cantonese (close to Early Middle Sinitic). Hence, the word may be read as *yaphou;* this is homonymous with the official Turkic title transcribed in Mandarin as Yehu 葉護. Since the Yuezhi established five Xihous in Bactria, some researchers claim that the Yuezhi must have been Turkic (Shiratori 1970: 50).

The form of the title Xihou on Kushan coins is "Yavuga." E. G. Pulleyblank (1966: 28) considered that it originated from Tokharian "land or country" (A *yapoy*, B *ype*). R. N. Frye (1962: 356-358) has suggested that it came from the Iranian root *yam*. H. W. Bailey (1985: 130) also holds this idea and considers that the word *yavuga* was formed from the root *yam* by adding *-uka* as a suffix (Pulleyblank 1966: 28). It would seem that the word had its origin in Iranian and then was used by Turks in a later age.

2-5. Since the eighties, Chinese scholars Pu Chaofu 蒲朝紱 (1989: 1-12) and Dai Chunyang 戴春陽 (1991: 12-20) have strongly asserted that the Shajing archeological culture 沙井文化 (late Zhou period; located at the eastern end of the Gansu Corridor) was a Yuezhi culture. They further claimed that the Yuezhi must have been Turkic since the male representatives of this culture had deep eye sockets and beards.

Shajing culture is relatively complicated and the ethnic origin of its inhabitants is still in dispute (An 1982: 86). According to the recent studies of Li Shuicheng 李水城 (1994: 493-523), the contents of the culture are considered to have distinctive regional characteristics. Li maintains that the inhabitants of the Shajing culture must have been Qiang or Rong people. Archeological materials show that the members of the Shajing culture subsisted mainly through animal husbandry, not nomadic pastroralism, and these scholars considered the Yuezhi and Xiongnu both to be Turkic peoples with "blue eyes plus prominent noses and beards" as mentioned above. Turks have a physical Caucasoid blood relationship, and there are still scholars who hold the idea that "The Xiongnu are close to Caucasoid" (Uchida Gimpu 内田吟風 1988: 149-165; Yu 1992: 242-271). As for whether or not the Shajing culture was a Yuezhi culture, for the time being we shall refrain from pronouncing an opinion.

The above is an outline of the theory that the Yuezhi were Turkic. We may say that although it is a powerful theory, there are quite a few ambiguities concerning the Europoid aspects of the Yuezhi in some of its key points, thus the reliability of the overall argument is doubtful.

3. Critique of the Theory that the Yuezhi were Qiang or Proto-Tibetan

Another powerful theory about the Yuezhi holds that they belonged to the Qiang (Proto-Tibetan) race. There are quite a few scholars who hold this view, especially Chinese scholars. Their argument is based mainly on the following three points:

3-1. According to the records of "Xi Qiang zhuan" 西羌傳 (Account of the Western Qiang) in the *Hou Hanshu* 後漢書 (*History of the Later Han*):

> Regarding the Yuezhi Hu 胡 people in Huangzhong 湟中, their ancestors were a branch of the Greater Yuezhi 大月氏. The king of the Yuezhi was killed by Modu 冒頓, the king of the Xiongnu, whereupon the people dispersed to go westward and crossed over Congling 葱嶺 (Pamir plateau). Part of the aged and weak people moved southward to escape into the mountains, attaching themselves to the Qiang for survival, and then they intermarried... Their clothes, food, drink, and language were somewhat similar to those of the Qiang.

Some scholars consider that the Lesser Yuezhi 小月氏 stayed in Nanshan 南山 to live together with the Qiang and that this means the Yuezhi and the Qiang had a close relationship. According to this view, their language was also roughly the same as that of the Qiang, which proves the close relationship between the two peoples (Yang 1988: 72). If the Yuezhi were not closely related with the Qiang, why would they attach themselves to the Qiang (Ren 1984: 72)?

The scholars who hold this view seem to neglect the fact that the members of the Yuezhi people who chose to move westward, if they really had a close blood relationship with the Qiang, would have found it unnecessary to move westward at all. Furthermore, according to the records of "Xi Qiang zhuan", the Qiang were said "to have better fighting ability in valleys than on level ground". If this were true, the northern part of the Tibetan plateau should have been the ideal place for the displaced Yuezhi to go. Instead, they obviously did not make this choice, but finally decided to move westward to Central Asia. This movement seems to hint at a close relationship with the Eurasian steppe (Chen 1993: 123). Enoki Kazuo 榎一雄 (1959: 231) even considered that the movement of the Yuezhi was not in the nature of a wholesale migration from one place to another. Rather, according to him, the Yuezhi merely withdrew their forces from the eastern and northern parts of Central Asia under their control and removed them to other places where they were already entrenched.

As a matter of fact, the Lesser Yuezhi had not always submitted to the rule of the Qiang only; they had also offered allegiance to the Han Dynasty. In the latter case, the Lesser Yuezhi "were governed by local officials of the Han Dynasty. They blew hot and cold frequently; when following Han troops to fight against the Qiang, they often waited and watched at first, then decided to assist the stronger side" ("Xi Qiang zhuan", *Hou Hanshu*). "Their cavalry had two or three thousand soldiers and all these soldiers were brave and stout warriors; whenever they fought against the Qiang, their warriors often defeated a numerically superior enemy with a small force. Despite frequently submitting to Han and Qiang by turns, the Han received the benefit of their serving on the battlefield" ("Deng Xun zhuan" 鄧訓傳

[Biography of Deng Xun], *Hou Hanshu*). It may be seen that owing to ethnic differences with Han and Qiang, the Lesser Yuezhi were in a marginal position which led to the above conditions; otherwise the weak ethnic group would not have been able to survive continuously. "Xi Qiang zhuan" called these people mostly Hu, not Qiang, whenever it mentioned the Lesser Yuezhi. As for the slight similarity between the language, food, drink, and clothes of the Lesser Yuezhi and those of the Qiang, it was but "the result of mutual merging together in the long course of association between the two people." (Dai 1991: 20)

3-2. *Weishu* 魏書 (*History of Wei*), *Sanguo zhi* 三國志 (*Records of the Three Kingdoms*), quoting the work of Yu Huan 魚豢, *Weilüe* 魏略 (*Outlines of Wei*), states:

> In Nanshan, west of Dunhuang 敦煌, a region several thousand *li* 里 [Editor's note: a *li* ("tricent") is 300 paces (roughly one third of a mile)] from Ruo Qiang 婼羌 to the west to Congling 蔥嶺 (the Pamirs), there were the people left over from the Yuezhi, Congci Qiang 蔥茈羌, Baima 白馬 ("White Horse") and Huangniu Qiang 黄牛羌 ("Yellow Cattle Qiang").

It is thought by those who rely on this passage that the time of Yu Huan was exactly the period when the Greater Yuezhi (the Kushan Empire) were most powerful in Central Asia and the people of the Greater Yuezhi were in frequent contact with China. Accordingly, the records of Yu Huan are held to be believable (Yang 1988: 72). In general, the above quotation has been read as "there were the descendants of the Yuezhi, Congci Qiang, Baima, and Huangniu Qiang," but it may also be read as "there were descendants of Yuezhi, Congci Qiang, Baicong (assuming an orthographic error), and Huangniu Qiang."[1] As a matter of fact, the era of the Three Kingdoms in which Yu Huan lived was already about four hundred years after the westward movement of the Yuezhi. In the course of national evolution, it would not have been strange to call the Yuezhi as Qiang after such a long period of tribal mixing and merging. Accordingly, it is not acceptable to equate the Yuezhi with the Qiang—in terms of racial affiliation—based upon the results of their evolution as ethnic groupings. Moreover, according to the account of the Kushan Empire in *Nanzhou zhi* 南州志 (*Records of Nanzhou*) or *Nanzhou yiwu zhi* 南州异物志 (*Records of Oddities of Nanzhou*), the work of Wan Zhen 萬震 of the same era of the Three Kingdoms, it is stated:

> The cities and palaces were the same as those of Da Qin 大秦 (the

[1] According to the opinion of my friend Yu Taishan.

> Roman Empire), the skin color of the people was reddish white, and they were skilled in shooting arrows and riding horses. (Quotation from a note in "Da Yuan zhuan" 大宛傳 [Account of Fergana], *Shiji* 史記 [*Records of the Grand Historian*].)

According to the above records, we can understand that the people of the Kushan Empire were doubtless Caucasoid, and the records of Wan Zhen may be considered as powerful counterevidence against the statement of Yu Huan.

3-3. Another view is that the Yuezhi were originally Mongoloid but, after having moved to Central Asia, the people mixed with native Indo-Europeans and thus they gradually came to have a Caucasoid appearance (Yao 1981: 158).

We hold that the course of a people's emergence requires time; it cannot be completed in a short period. According to the "Account of Fergana" in the *Records of the Grand Historian,* when Zhang Qian 張騫 arrived among the Greater Yuezhi, the population included "one or two hundred thousand warriors who could fight a war." Based on a conservative estimate, the whole population of the Greater Yuezhi must have been four hundred thousand or so at that time (Chen 1968: 8-32). As for the population of Da Xia 大夏 (Bactria), which was conquered by the Greater Yuezhi, at the time it numbered over one million. Obviously, the *Records of the Grand Historian* did not include the population of Da Xia in that of the Greater Yuezhi. Since the Greater Yuezhi quickly became a ruling power in the region after moving to Central Asia, they must have been able to maintain their population to a certain degree.

The era when the Yuezhi moved westward to the Ili River in Eastern Central Asia was approximately 177-176 BCE, and the time Zhang Qian arrived among the Greater Yuezhi was 129 BCE or so (cf. Yu 1992: 56-57). According to the "Account of Fergana" in the *Records of the Grand Historian,* the conditions of the peoples in Central Asia at the time were as follows:

> In the west of Da Yuan (Fergana) up to Anxi 安息 (Parthia), although the languages in the state are different, their customs are roughly the same; the people in the different states can use their respective languages to communicate with each other, and their appearance is that of having deep eye sockets and beards. They are good at doing business and know how to make a profit. Their customs are to respect women; a husband can only make a decision after consulting with his wife.

The position of the Greater Yuezhi was in "a place two or three thousand *li* to the west of Da Yuan" ("Account of Fergana");

accordingly, the Greater Yuezhi people were at that time dwelling within a region where the indigenous inhabitants would have had deep eye sockets and beards. Under such circumstances, it would have been difficult for a nation with an enormous population of nearly half a million to change from Mongoloid into Europoid in fifty years (cf. Han 1992: 12). Even if we assume that the Greater Yuezhi people were Mongoloid and intermarried with the natives immediately on their arrival, the second generation would have "grown up not to have too strong a resemblance to Hu [West Asian] people but would, on the contrary, still have resembled Chinese" (cf. "Xiyu zhuan" 西域傳 [Account of the Western Regions], *Weishu* 魏書 [*History of Wei*]). This shows that, after the invasion of the Greater Yuezhi in Central Asia with a population of as much as four hundred thousand or more, they did not bring about any significant change in the local population structure. Furthermore, during Zhang Qian's first mission to Xiyu (the Western Regions), which was specifically to make contact with the Greater Yuezhi, if the Greater Yuezhi and Qiang were of the same race, we would expect Zhang Qian to comment upon this singularity. Nor did the "Xi Qiang zhuan" 西羌傳 (Account of the Western Qiang) in the *History of the Later Han* provide any special explanation that the Yuezhi and the Qiang were racially similar, and in mentioning the people of the Lesser Yuezhi, they were called "Hu", not "Qiang". Further, as a ruling nation in Central Asia, it would seem to have been quite impossible for the Yuezhi to have demanded that their population of four hundred thousand meet the requirement of speaking the Indo-European language of the natives instead of their own Qiang language in such a short period.

We conclude, therefore, that the three main arguments for the theory that the Yuezhi were Qiang are also untenable.

4. The Yuezhi Must Have Been Indo-Europeans

In the above, we have examined the theories that the Yuezhi were Turkic or Qiang peoples and discovered that there are many doubtful points about these theories which require discussion. In contrast, it is more likely that Yuezhi were Europoids who probably spoke an Indo-European language. The reasoning is given as follows:

4-1. In physique: The "Account of Fergana", as quoted above, states explicitly that the physical characteristics of the Greater Yuezhi people were the same as those of the people of Da Yuan (Fergana) and Anxi (Parthia). These all may be characterized as Europoid with deep eye sockets and bearded faces. Besides, Wan Zhen also mentioned in his *Nanzhou zhi* that the skin color of the Greater Yuezhi people was "reddish white", which demonstrates that the people of the Kushan Empire were Europoid. While there may still be some dispute over whether the Kushan Empire was founded by the descendants of the Greater Yuezhi, it is obvious that even though they invaded Central Asia with a population of four hundred thousand, the Greater Yuezhi could not have changed the entire original population structure of the region.

As for whether the Yuezhi people had mixed with other peoples, the answer seems to be affirmative. Since the Yuezhi had been active in the northwest part of China for a very long time, some admixture with Mongoloid peoples was unavoidable. Archeological excavations of skeletons from an early Kushan cemetery site discovered in Afghanistan also confirm the existence of a certain degree of mixing (Sarianidi 1988: 251). In addition, we think that the Yuezhi had also mixed with Dravidians. C. A. Winters (1988: 171-181) attempted to demonstrate that Tokharians had originated from Dravidians and Mandings, and an earlier study of the present writer also mentioned the hypothesis that the Yuezhi people mixed with Dravidians (Chen 1993: 119-143), but there is still disagreement whether Tokharian actually originated from Dravidian (cf. Winter 1989: 125-130). In fact, the tribal alliance of the Yuezhi doubtless embraced elements of other groups, but the main structure of the Yuezhi was clearly Europoid.

4-2. Concerning language: According to the "Account of Fergana", although dialectal differences existed among the languages of the states in the region of Da Yuan (Fergana), including the areas where the Greater Yuezhi settled west as far as Anxi (Parthia), the languages used allowed the inhabitants to communicate with each other in general. This indicates that the Yuezhi people must have spoken an Indo-European language, as did other nations in the region. Strabo had observed that Sogdians and Bactrians showed little difference from nomads in living habits and customs. He also pointed out that the languages of the Medians, Persians, Bactrians, and Sogdians were quite similar. Thus, the records in Chinese and Western historical sources are basically in agreement (cf. Wang 1986: 27). W. M. McGovern also pointed out, "The inhabitants of both regions (northern and southern Turkestans) belonged to the same stock and remained closely affiliated as regards race and language." "The Persian conquest of southern Turkestan was not the subjection of one 'race' to another. Both the Persians and the inhabitants of southern Turkestan were members of the 'White' race, and both spoke closely related Iranian languages, so that the Persian conquest brought no great racial or linguistic change" (McGovern 1939: 60-64). Given the similarity of the conditions, McGovern's opinion may likewise be said to be applicable to the conquest of the Greater Yuezhi over the region of Bactria.

Regarding theories about the language of the Yuezhi, there are two main schools of thought: one that they spoke an Iranian language and the other that they spoke a Tokharian language. In light of the records of "Account of Fergana", it is quite possible that the Yuezhi spoke Iranian, at least when they were in the region of Fergana, and the "Bactrian Inscription" (cf. Henning 1960: 47-55) excavated in Afghanistan might possibly be written in the language of the ruler of the Kushan Empire; this language was a kind of Iranian. Another school holds that the Yuezhi people spoke Tokharian, one of the most important proofs being that in a document discovered at Dunhuang entitled "Xitian lujing" 西天路竟 (To the Terminus of the Westerly Heaven Road), in which the state between Gaochang 高昌 (Qocho) and Qiuci 龜茲 (Kucha) was called Yuezhi. The position of this Yuezhi was doubtless Yanqi 焉耆 (Qarashähär), exactly the region where the Tokharian A dialect had been popular. Huang Shengzhang 黃盛璋 (1985: 268) holds that Yanqi (Qarashähär) and Qiuci (Kucha) were the states established by the people who stayed behind after the Greater Yuezhi left, hence Tokharian should be called the "Yuezhi language". Two more important achievements have recently been made which further support the theory that Tokharians were indeed Yuezhi. One is Lin Meicun's 林梅村 (1994: 133-116) discovery that both the names *Qilian* 祁連 and *Kunlun* 崑崙 in Chinese might have derived from Tokharian *kilyom(o)* and, before moving westward, the Yuezhi inhabited the area between Dunhuang and the Qilian mountains. The other is Wang Penglin's recent discovery (1995: 165-207) that many regnal titles in Altaic might have originated from Tokharian. Although Wang does not directly assert in his work that the Yuezhi necessarily spoke Tokharian, the evidence that he adduces—when coupled with certain historical evidence—may point to such a conclusion. Namely, before the Xiongnu became powerful and prosperous, the Yuezhi had been the most powerful force west of the Mongolian plateau. After having inherited several regnal titles of the Yuezhi, it is conceivable that the Xiongnu in turn influenced later nations, such as the Särbi 鮮卑, Turks 突厥, Khitans 契丹, Jurchens 女真, and Mongols 蒙古. Wang's studies have contributed much toward advancing the theory that the Tokharians were none other than the Yuezhi.

4-3. Regarding culture: Information concerning the culture and daily life of the Yuezhi is scarcely to be found in the Chinese historical data. "The Account of Fergana" relates that the customs of the Yuezhi people were "to migrate along with their livestock just like the Xiongnu." This shows that both peoples were nomadic pastoralists, and this type of culture is also represented by the lifestyle of the ancient Scythian-Saka tribes. One custom of the states to the west of Fergana (including, of course, the Greater Yuezhi) was to show respect for women. Husbands would accept their wives' opinions in general, and the Massagetae who had close relations with the Saka followed just such customs. The position of women in Scythian-Saka tribes was considerably high; they not only participated in social affairs but also fought together with the men, and they were very brave. The queen of the Massagetae, Tomyris, led a body of troops by herself to defeat the Persian army after the death of her husband, and Cyrus II was killed in battle as a result (Herodotus 1972: 127). Among the Greater Yuezhi it appears that a lady was appointed to be the ruling queen on at least one occasion. "Zhang Qian zhuan" 張騫傳 (Biography of Zhang Qian) in the *History of the Han* records that after the king of the Greater Yuezhi was killed by the Xiongnu, his wife was appointed to be the queen. In "Account of the Western Regions" from the same history, the Greater Yuezhi were described as having the same land, customs, produce, and coins as those of Anxi (Parthia). After moving to Bactria, the reason that the Yuezhi could subdue the natives and establish the powerful Kushan Empire so quickly must have been due in part to their common ethnicity and shared language which enabled the various groups involved to merge without great difficulty (Dai 1988: 42).

What about the conditions of the Lesser Yuezhi who stayed in Nanshan to live together with the Qiang? Although they gradually began to be naturalized by the Qiang, it seems that they still retained the majority of their physical and cultural features. That they did not quickly merge into one organic whole with the Qiang may be deduced from the following:

First, in the "Account of the Western Qiang" the Lesser Yuezhi were often called "Hu" and were scarcely referred to as "Qiang". "Hu" at this time and place indicated the nomadic tribes who moved about in the northern steppes. At first, it mainly denoted Xiongnu, but later the word became a common name for all northern nomadic tribes. In later eras all the peoples who possessed deep eye sockets, prominent noses, and beards—all features markedly different from those of East Asians—were called Hu (cf. Lu: 37-53). The people of the Han Dynasty always called the inhabitants of the states in the Western Regions Hu; for example, in "Account of the Western Regions", the "Xiye" 西夜 (Yul-arik) were recorded as being "different from the Hu; their race was similar to the people of the states of Di 氐 and Qiang" (i.e., Tibeto-Burman peoples). Generally, the people of Han called other peoples Hu if they had deep eye sockets and beards; accordingly the word Hu denotes someone who had such an appearance (cf. Huang 1987: 32-33). In such circumstances, the author of *History of the Han*, Ban Gu 班固, had already taken note of the evident physical differences between Hu and Qiang. Furthermore, while the Qiang engaged in animal husbandry, they also maintained some degree of farming and were thus distinct from the truly nomadic tribes. Consequently, the Qiang and the Hu may be said to have possessed entirely different features (cf. Yu 1985: 180-192). This shows that, up to the end of Han Dynasty, the Lesser Yuezhi had maintained their Caucasian features consisting of deep eye sockets, prominent noses, and beards. They were obviously different from the Qiang who were Mongoloid.

Next, to take a view of the the fragmentary historical data, the customs and habits of the Lesser Yuezhi were considerably similar to those of Scythians. In the "Biography of Deng Xun", some of the habits and customs of the Lesser Yuezhi are recorded:

> According to the customs and habits of the Lesser Yuezhi, it was considered shameful to weep on the death of their parents; they always rode a horse, sang, or shouted aloud instead. When they heard the news that Deng Xun was dead, all the people of the tribe shouted or cut their own bodies with knives, and then they slaughtered their dogs, cows, or sheep, lamenting: "Deng Xun is dead; what use is there for us to go on living?!"

These habits and customs of the Lesser Yuezhi are almost the same as those of the Scythians who did harm to their own bodies and slaughtered horses when their king died (cf. Herodotus 1972: 271-334). The cruelty of the Scythians always caused horror among ancient western peoples. As descendants of the Lesser Yuezhi, the intrepidity of the people of Zhongyun considerably resembled the Scythians. The "Siyi fulu" 四夷附錄 ("Appendix to the 'Account of the Four Barbarians'") in the *Xin Wudai shi* 新五代史 (*New History of the Five Dynasties*) quotes the records of Gao Juhui's 高居誨 "Shi Yutian ji" 使于闐記 ("Record of An Embassy to Khotan"):

> To the west of Shazhou 沙州 (Dunhuang) lived the people of Zhongyun 仲雲. The tent of their chief was located on Hulu (Taushkan) moraine 胡盧磧. The people of Zhongyun were the descendants of the Lesser Yuezhi; they were brave and loved to fight. The people in Guazhou 瓜州 were very much afraid of them.

The people of Zhongyun had obviously inherited the doughty features of the Lesser Yuezhi of the Han Dynasty: "they were all brave and stout" and "they always used a few to defeat many". Perhaps this is why the descendants of the Lesser Yuezhi did not disappear in history but lasted until the eleventh century.

Third, the people of the Lesser Yuezhi moved about not only in the northwest of China; a part of them even went deep down to the southwest frontier of China. From the bronzes discovered at the site of Shizhaishan 石寨山 in Jinning 晋寧, Yunnan 雲南 Province, we can find quite a few instances of very clear animal style. It is obvious that the bronze art of Shizhaishan was influenced by Scythian art (Shiratori Yosirou 白鳥芳郎 1978: 193-214). Besides, there are two sets of bronze images from Shizhaishan which evidently reflect the appearance of Hu people with their prominent noses, deep eye sockets, and beards. Their clothing, furthermore, features an upper outer garment with narrow sleeves and trousers, a type of clothing that was scarcely to be seen among the natives of south China who usually wore skirts and robes. Zhang Zengqi 張增祺 (1984: 88-92) reckons that this set of images displays the appearance of Saka individuals. I suggest that it may be more appropriate to consider that the theme of this set of images might be the people of the Lesser Yuezhi rather than Saka, since the region where the people of the Lesser Yuezhi were active was directly to the north of Yunnan. In any event, the Shizhaishan images of Hu show that Caucasoid groups had not only reached the northwest part of China in the border province of Gansu during the Han Dynasty, but had also gone deeply into the southwest frontier region of Yunnan.

As a result of the above examination of physique, language, and culture, we consider that the Yuezhi tended to be close to Europoids in all three aspects. Although the people certainly had mixed with Mongoloid populations to a certain degree and even with Dravidians, we can consider at least for the time being that the Yuezhi belonged to a branch of the Indo-Europeans who spoke Iranian or Tokharian.

5. Conclusion

No final conclusion has yet been reached on the problem of the racial affinities of the Yuezhi. Nonetheless, after having investigated the theories that they were Turkic or Qiang, we discover that the grounds for these two theories are relatively weak and lack sufficient persuasiveness. The theory that the Yuezhi were Europoid is a relatively reasonable view, and it has gradually come to be recognized and affirmed by academic circles. As for whether the language of the Yuezhi was Iranian or Tokharian, no final conclusion has had been reached at present, although we can be almost sure now that the Yuezhi were a branch of Indo-Europeans possessing primarily Europoid or Caucasoid affinities.

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Discovery of the Täklimakanian Civilization during a Century of Tarim Archeological Exploration (ca. 1886-1996)

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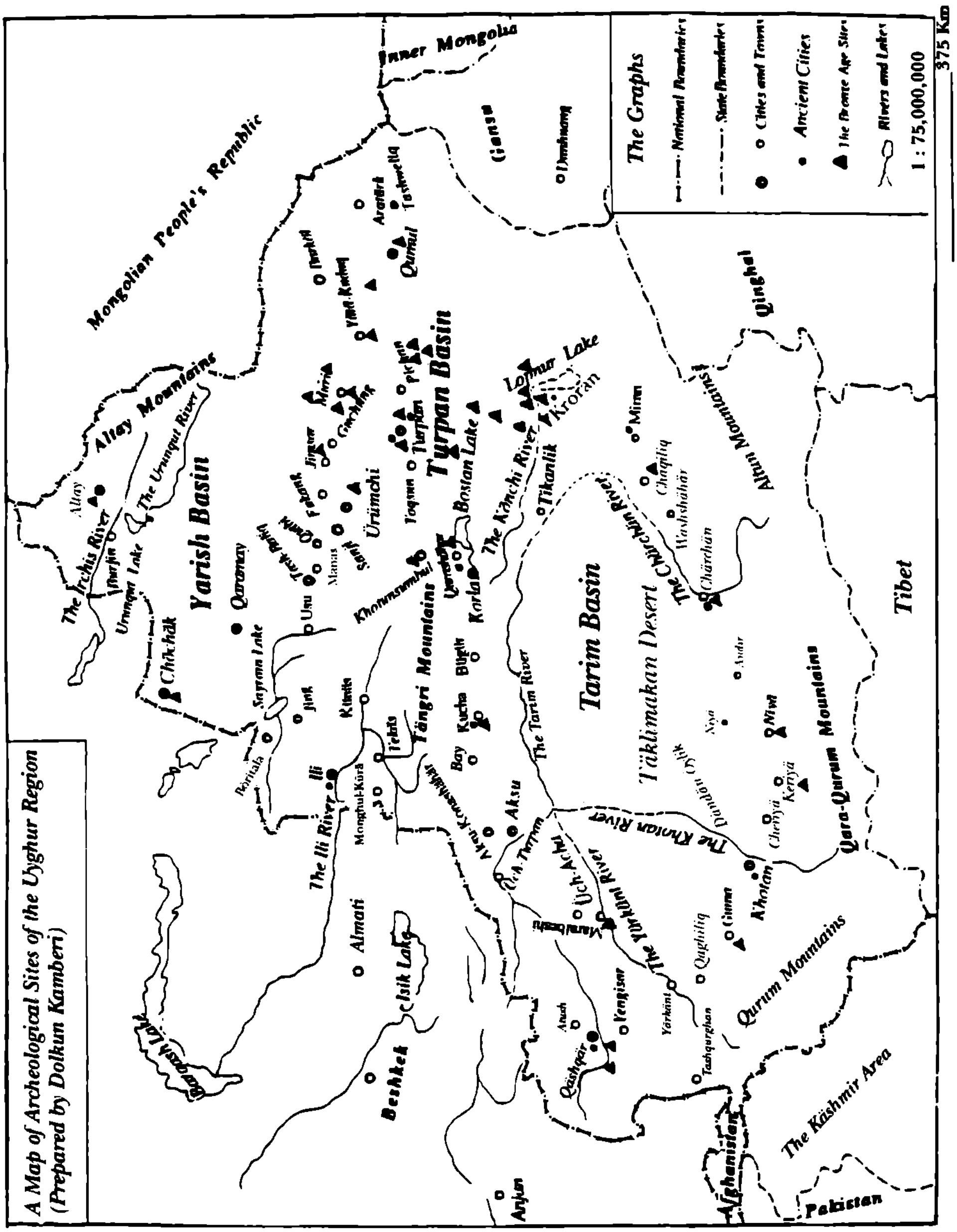
Introduction

Since 1978, the liberalization of Chinese policies has made possible joint archeological projects with other countries, which have in turn led to the discovery of art and artifacts along the ancient Silk Road. As we enter the twenty-first century, international teams will have the opportunity to work together to explore one of the world's greatest archeological treasure-houses in the Tarim and Turpan Basins of the Uyghur Region. More than one and a half million square kilometers occupying one-sixth of China, the Uyghur Region is now China's biggest province. The Tarim Basin lies in the southern part of the Uyghụr Region. It provides ideal conditions for the preservation of sites, artifacts and relics. In the early part of this century, intrepid foreign explorers explored ancient sites along the Silk Road. Their accounts, maps, and the materials they collected have formed the foundation for archeological work after the establishment of the Uyghur Regional Museum in 1953. Until the late seventies, Uyghur and Chinese archeologists focused much of their work on sites that were already known during the early surveys of this century. In the last two decades, however, with the advent of oil exploration and the construction of buildings and irrigation projects, funds and equipment have allowed archeologists to penetrate previously unexplored regions. In this way, new and exciting discoveries are becoming a regular occurrence.

For example, I have personally been involved in recently unearthing dozens of desiccated corpses at sites along the periphery of the Tarim Basin. Based upon radiocarbon analysis, these ancient Täklimakanians lived between 2000 BCE and 600 CE. Many of these corpses are startlingly well-preserved. Often a complete catalog of funerary ware has also been retrieved from the burials. Even the make-up originally painted upon the face of the interred in the form of solar symbols is clearly recognizable. I think that these ancient corpses did not originally undergo any special process of mummification prior to inhumation. Their remarkable condition may be attributed to such factors as the region's aridity, the salinity of its soil, extreme winter cold, and also temperatures which vary greatly between day and night.



A Map of Archeological Sites of the Uyghur Region
(Prepared by Dolkun Kamberi)

The discoveries of the ancient Caucasian mummies in the last few years have stirred excitement around the world. These discoveries have not only captured the popular imagination, they have also challenged the scholarly world by adding fuel to an already heated debate concerning the origins and development of the Täklimakanians who inhabited the Tarim for thousands of years.

Although the puzzle of the Tāklimakanians has been studied for more than a century under the lens of comparative linguists and historians, archeology has played an increasing role in aiding experts to construct a chronology for their occupation of different regions in Eurasia. A good part of this work has been carried out by Chinese and Uyghur archeologists in the Tarim, and Russian archeologists in southern Russia, Kazakhstan, and southern Siberia. Since the recent Tarim discoveries are outside the previously assumed eastern boundary of the Caucasian family, they add a new dimension to this debate.

Who were these people? Were they Saka//Scythians? Sogdians? Tokharians? or Uyghurs? What kinds of languages did they speak? What kind of writing system did they use? What kind of religion did they believe? Where else had they lived in Eurasia? If they immigrated into this region, how, when, and why had they reached this unexpected location? If they were local, what has become of them now? How, when, and why did Buddhism, Manicheism, and Islam expand into this region? By what names did their neighbors to both the east and west identify them in history? How did ancient Täklimakanian bronze metallurgy and textile technology develop and originate? What has been discovered in the last hundred years of archeology in the Tarim Basin and surrounding areas? How do we write these new archeological discoveries into Asian and world history? Why is the history and civilization of sixteen million modern Uyghurs so important to humanistic studies in the coming century? The importance of these questions can not be overstated. They address such issues as immigration, the spread of ancient technological innovation, and cultural exchange throughout history across the Central Eurasian steppe among ancient and medieval Eurasian peoples. With my twenty years of archeological field work, study, analysis, and research on ancient Tarim civilization, I have learned that the early residents of the Tarim Basin were principally Caucasian and also some had mixed features of Caucasoids and Mongoloids. It is clear that the ancient Täklimakanians did not belong to a single homogeneous group, just as the Central Asians who still live there today do not.

Since ancient times, the Tāklimakanians (today known as Uyghurs) have lived in this mysterious, attractive, fruitful oasis corridor along the Tarim Basin and the ancient caravan road. They have enjoyed the pure, sweet spring water and running rivers which originate from the Tängri, Kökart (Pamir), Qurum and Qara-Qurum mountains, and have tilled the land on both sides of the Tarim River. Here they created the unique Tarim civilization, one that scholars are just beginning to truly appreciate. Although archeologists have discovered invaluable cultural relics from these regions, a big gap remains in the field of archeological culture studies in the eastern and southern part of the Tarim Basin. Despite scattered archeological achievements in the eastern part of the Uyghur Region, scholars are still unable to recover all of the cultural treasures which remain deposited under the sands of the Tarim Basin.

The Tarim Basin's unique geographic environment and arid climate have enabled ancient tombs, mummies, petroglyphs, and city sites to survive; they have also permitted Buddhist caves, innumerable cultural relics, underground antiquities, and invaluable treasures to survive. In addition, for scholars, there are scores of manuscripts using seventeen ancient languages, writings which were unearthed along with the Tarim and Turpan Basin oasis cities, well-known to today's world (Kamberi 1984). They constitute one of the richest sources for research by world archeologists and linguists. Similarly, records of philosophy and the arts of Buddhism have remained in this particular area, evidence of the diversity of Uyghur Buddhist cultures that flourished in that remote part of the globe approximately from the second century CE until the thirteenth century CE (Kamberi 1995).

The Ancient Lands at the Center of Eurasia

Five hundred million years ago, there were only the lands of Tarim and Yarish in the center of Eurasia surrounded by sea . After a crustal upheaval in the Palaeozoic Era, the waters of the sea gradually disappeared. Approximately at the end of third period of the Cenozoic Era, what was formerly the sea floor protruded and became the great mountain ranges surrounding the Tarim and Yarish Basins (Liu 1995). According to their legends, the Uyghur people call this event the time when the "three mountain (ranges) gripped the three basins." Today, the Uyghur Region mainly encompasses the Tarim, Yarish (also called Junghar) and Turpan Basins. These basins are surrounded by three great mountain ranges, consisting of the Qurum, Qara-Qurum, and the Altun mountains in the south; the roof of the world—the Pamir mountains—in the southwest; the Altay mountains in the north; and the Tängri mountains in the middle. The Tängri mountains divide the entire Uyghur region into two different natural geographical areas: the Yarish Basin in the north and the Tarim Basin in the south. The Turpan Basin and Qumul district lie to the far east of the Tängri mountain ranges, contiguous to the Buddhist caves of Dunhuang.

The Tarim Basin occupies 0.4 million square kilometers and is one of the driest and most forbidding parts of the world. Most of its vast sandy expanse has never been settled. At the center of the Tarim Basin lies the great Täklimakan Desert. The Täklimakan covers a surface area of 0.32 million square kilometers and is the largest sandy desert in East Asia. It is also the second largest mobile sandy desert in the world. The climate of the Täklimakan heavily impacted on the main geomorphological features of oasis cities in the Tarim Basin. One of the world's oldest civilizations and richest urbiculture of city-kingdoms, such as ancient Niyä, Kroran, Läläik, and Miran, was buried under the Täklimakan sands. The Tarim River, which intersects the Täklimakan Desert, is over 2,000 kilometers long. It is the longest inland river in East Asia. While the Täklimakan's north, west and south are bordered by mountains and highlands, only its eastern extremity connects openly to China's Hexi Corridor through the Lopnur territory. The ancient Täklimakanians went to the west along the natural passageway of the Qurum, Qara-Qurum, and Pamir mountains and went to the east through the Hexi Corridor in order to exchange their goods and culture with neighboring countries. They left a wealthy civilization and many mysteries under the sands of the Täklimakan Desert.

Among the Uyghur people there is the belief that "Täklimakan" refers to a place where, "If you go in, you will never come out." However, the original meaning of "Täklimakan" in ancient Uyghur is "Vineyard," and the meaning of "Tarim" is "cultivated land." The Uyghur region has a typical continental dry climate but, being a vast land, it also has rich natural resources. There are more than 570 rivers in the Uyghur Region, and it also has the large inland fresh water lake called Bostan.

The ancient Uyghur lands at the center of Eurasia gained great importance from early times onward because of their favorable geographic location on the ancient trade routes between East and West, connecting the Greco-Roman civilization with Indian Buddhist culture and with the Central and East Asian traditions. Burgeoning trade and commerce, as well as cultural exchange, therefore made Central Asia very prosperous. Since communication in those early days was considerably slower than today, passing merchants' caravans and warrior parties made stops for extended periods of time. They left part of their wealth, traditional costume, and legend behind. In addition, their presence gave the region a cosmopolitan character marked by linguistic, racial, and religious tolerance.

Explorers and Archeologists in the Uyghur Region

When a young British officer unexpectedly found a piece of writing in an unknown language in the bazaar of Kucha in 1864, it immediately attracted great attention in Europe. The find stirred heated debate among archeologists, historians, and linguists over the origins and identity of the unknown language, which then stimulated and encouraged numerous expeditions of research teams to travel to Central Asia. In the early twentieth century, more than a hundred Western archeologists, explorers, and individual travelers had pushed into Central Asia to seek artifacts of past civilizations. They used various guises, such as those of water resources prospecting teams, geological survey delegations, cartographers, expedition teams, friendship observation groups, archeological excavation and investigation teams, and so on, during the tide of enthusiastic exploration along the Silk Road. They carried out various useful activities such as collecting and buying antiquities, and engaged in a great quantity of archeological field work, particularly in the Uyghur Region, that led to significant discoveries. Among these finds were well preserved ancient texts written in Sanskrit, Sogdian, Karoshti, Khotan-Tumshuqese, Tokharian A, Tokharian B, and medieval Uyghur.

According to the character and features of archeological field work and its achievements, I have divided the hundred years of archeological explorations in the Tarim and surrounding areas into four different periods. During these four periods of time, Western archeologists and explorers carried out numerous archeological excavations and investigations in the Tarim, Turpan, and Yarish Basins and at Dunhuang.

The first period between 1886 and 1935 is very important in the history of Tarim archeology. During this period, a series of daring and ground-breaking expeditions were led by famous explorers such as Albert von Le Coq for Germany, Count Kozui Otani for Japan, Paul Pelliot for France, Aurel Stein for England, and Sven Hedin for Sweden. They conducted their field work all over the Uyghur Region including in the Pamirs, Khotan, Lop, Cheriyä, Keriyä, Niyä, Chärchän, Chaqiliq, Lopnur, Korla, Turpan, Qumul, Dunhuang, Qarashähär, Kucha, Aksu, Maralbeshi, Qäshqär, Yärkänt, Mäkit, and Qaghilik. Their geological survey and archeological investigations led to the discovery of many ancient cities and sites, such as Idiqut, Yarghul, Miran, Kroran, Läläik, Niyä, Aksepil, Yotqan, Khan-Öy, Toqquz-Saray and Buddhist monasteries at Bezeklik, Murtuq, Tuyuq, Singgim, Shikshin, Kizil, Qumtura, Kizil-Qagha, Simsim and the famous Buddhist library at Dunhuang. The ancient tombs, settlements, cities, sites, and monasteries found by those explorers date to approximately the period from 400 BCE to 1700 CE. The result of these expeditions was not only to satisfy the curiosity of each explorer but also to enrich the collections of some of the biggest museums, libraries, and universities in Europe. Their publications became a critical resource for ancient Eurasian studies worldwide.

The second period was from 1935 to 1955; during this period there were only basically treasure hunting and small-scale field work investigations and excavations. There were no exciting discoveries made. The new Chinese government organized only two instances of field work in the Uyghur Region during this period for the purpose of examining the ancient sites that had been discovered during the first period of archeological explorations. The government also established the first Uyghur museum organization in April, 1953. The director of the museum organization was Yūsūf Beg and the associate director was Li Yuchun.

The third period was from 1955 to 1976 when archeologists were engaged in much field work, primarily in the Turpan Basin, but also including Qumul, Kucha, Qara-Shāhär, Toqsun, Pichan, Barkōl, Mongol-Kūrä counties. The archeologists have concentrated their focus on the sites of Idiqut, Yarghul, Qara-Khoja, Astana, the Ili valley, and the area around Ürümchi. They extended the functions of the museum and established the Institute of Archeology, the cultural relics team, and other units within the regional museum. During this period, they also constructed a large new museum building at Ürümchi with the help of the Soviet government and built smaller museums at other places. Several big exhibitions of historical relics were held in Ürümchi, Turpan, and Kucha, while staff members for field work, conservation, exhibitions, the library, and so forth were added. Museum staff members started to publish research articles and catalogs as well. This was also the period when Uyghur archeologists endured the most tragic and disastrous era of contemporary Eurasian history, having to survive the twenty years of the so-called "Cultural Revolution."

The fourth period was from 1976 to 1996 when the archeological teams of the Uyghur Region found various Bronze Age sites in the Tarim Basin and surrounding areas. I was personally involved in the entire fourth period of archeological field work in the Tarim. Between 1976-1978, archeologists discovered sites at Alwighul near Ürümchi and excavated eighty-five ancient tombs. In 1979, they discovered and excavated one of the earliest Bronze Age cemeteries in Qäwrighul in the vicinity of Kroran. On an archeological expedition to Kroran in 1980, the mummified Kroran beauty was unearthed from the Tōwän River valley near the Kōnchi River. In August 1981, with the help of one of my students, I found a human fossil skull in the Boghaz River valley of Atush County near the western border of the region. After carefully examining the fossil skull, we established that it was the remains of an 18 year-old young man and may have dated to approximately 50,000-30,000 years ago. Another Paleolithic site was discovered in April 1983 at 3,700 m. above sea level, in the Pamirs, in the Jirghal village of Tiznap township in Tashqurghan County.

Many high quality bronze artifacts from different sites have been found in the Tarim since 1980. Most of these unearthed cultural relics have been sorted out and studied. We also discovered scores of prehistoric desiccated corpses from Turpan, Qumul, Kroran, Chārchän, and Niyä. Many of these corpses are extraordinarily well preserved, with their skin, flesh, hair, beard, and inner organs all intact. They are also splendidly attired in colorful robes, trousers, boots, stockings, coats, and various types of woolen hats. In terms of exciting discoveries and research, this was the most successful period of the entire hundred years of Tarim archeology. Several full-scale archeological reports, books, and numerous research articles on special topics were published in Uyghur and in Chinese by various academic journals and publishing houses. The Uyghur museum organized and sent on tour several extraordinary exhibitions that featured the archeological finds of the material cultures of the Täklimakanians in several major cities of China and overseas during this fourth period. According to radiocarbon dating and comparative studies, we have tentatively established the dates of the Bronze Age and Iron Age cultures in the Uyghur Region.

The Ancient Kingdom of Kroran

The territory of the ancient Kroran Kingdom covered approximately 900 square kilometers within today's Lopnur, Chärchän and Niyä counties. Numerous ruins, sites, and ancient tombs of the kingdom remain under the sands of the Täklimakan. Today, Lopnur, Charqiliq, Chärchän, and Niyä counties are like lonely and forgotten islands in a sea of sand. They are located in a part of the Tarim Basin which has suffered greatly from the calamity of desert expansion. The eastern part of the Tarim Basin, from Lopnur to Charqiliq, downstream along the Tarim river, was once a beautiful oasis corridor in the past. The environment of the region changed gradually due to natural disasters. But, since 1971, the natural environment has deteriorated more rapidly than ever before as a result of deforestation and the construction of dams upriver making reservoirs. If one travels from the southern part of the Tarim basin, passes through Charqiliq, then heads toward the west and goes past the small town Washshähri, one may go on the only passable desert highway to Chärchän. On the way, travelers may see the facts described above and realize that both sides of the desert highway have become an endless sea of sand.

Although the ancient Silk Road through the Uyghur Region witnessed many dynasties and khanates throughout history, gradually shifting southward in the course of time, it remained until quite recently a discernible course through the barren desert. But today the road lies buried under sand at the foot of the Qurum Mountains. Since 1976, we have excavated several hundred ancient tombs which have yielded extraordinarily well-preserved artifacts, including woolen textiles, multi-colored robes, trousers, boots, stockings, coats, various kinds of felt hats, golden ornaments, implements and tools made of wood, bone, and horn, stone arrowheads and wooden arrows, bronze and iron knives, as well as other objects. The relics excavated from the Tarim Bronze Age cemeteries consist mostly of wool, wood, bone, stone, baskets, hampers, and the like. The well-preserved desiccated

Caucasoid human remains unearthed from these tombs had deep-set eyes, pointed noses, thin lips, and light brown hair over their shoulders. These cemeteries have tombs with single-body burials and tombs with two or multi-body burials. The bodies were dried out in a geological formation of combined salt and sandy soil, aided by extremely arid climate and desert heat. The newly-found human remains have been radiocarbon-dated from the second millennium BCE to 200 BCE. Among them, about ten sites belong to the Bronze Age and more than a hundred sites belong to the Iron Age. Three sites where such remains have been uncovered stand out: Qäwrighul, Charwighul, and Zaghunluq cemeteries in the ancient Kingdom of Kroran.

The Qäwrighul cemetery was built upon the second tableland on the north bank of the lower reaches of the Kōnchi River among fixed sandy hills. Two types of burials were found here. In one type, the wood coffin has no bottom and is covered by animal skins or felt blankets. The clothed desiccated corpses in these tombs were generally discovered facing west, lying on their backs on exposed sandy earth with their arms and legs straight, their bodies wrapped in woolen fabrics. The implements unearthed from these tombs include mostly personal clothing, decorative ornaments, and other articles for daily use. Sacrificial items are very few in number.

In the other type of burial, a vertical open grave has a sandy chamber in which whatever wooden encoffining material there once has already decayed. Seven circles of wooden stakes (reminiscent of the rays of the sun) can be seen on the ground around these tombs. The overall appearance of the surface of these tombs is quite solar. The deceased in these tombs are all male. These dried corpses were found lying on their backs with arms and legs straight, their heads pointing eastward (i.e., they were facing toward the west). Unearthed artifacts consisted of mostly personal clothing and other sacrificial items. Although there were two types of tombs at Qäwrighul, they were located in the same cemetery and the accompanying burial objects in them were similar; hence it would seem that they ought to be considered as belonging to the same archeological culture. The difference in their configurations is perhaps due to differing social status or to a difference in the times of their construction (Wang 1993). Radiocarbon analyses of wood, animal skin, and woolen fabrics unearthed from the cemetery indicate that the burial date was approximately 1800 BCE.

Judging from the discoveries at Qäwrighul, we know that the people who inhabited this region had an economy based on animal husbandry. They had domesticated sheep and cattle, kept horses, and hunted deer. They supplemented their diet by fishing and by growing wheat. The primary crafts were leather-working; weaving woolen fabrics; felt-making; jade, wood, and bone-carving; and grass-weaving.

It is possible that they worshipped a sun-god.

The cemeteries of the Charwighul Culture are located in the mountains to the rear of Yürüng Turkin village, Kharmodon township of Khotunsumbul (Hejing) County. The site was discovered in September 1983. Its cemeteries have been assigned the numbers I-VIII. All together, they include nearly two thousand tombs (Chen 1988). The cemeteries contain a great number of tombs crowded together; all are oriented in the same direction (viz., their heads generally point toward the west or the northwest). Nearby is a sacrificial alter built of gravel; it is circular in shape. The altar occupies a higher point in the cemetery, hence it readily attracts one's attention. From 1986 to 1989, a total of 462 tombs were excavated in cemeteries I-VI. The total number of unearthed cultural relics amounts to more than four thousand. The gravel enclosures around the tombs on the surface of the cemetery ground have three basic shapes: in the early period they were shaped like a flatiron, in the middle period they were shaped like a stirrup, and in the late period they were shaped like a circle. Furthermore, the skull and legs of a horse were customarily buried in an associated sacrificial hole located near the tip of the flatiron-shaped tombs. The late circular tombs often have associated with them many sacrificial holes outside the stone enclosure and, in addition, there were also subsidiary tombs for children.

The most characteristic artifacts among implements unearthed from these tombs are pottery vessels with a single handle and a spout. Of these, more than one thousand five hundred have been recovered; this constitutes forty percent of the entire amount of unearthed pottery. This particular type of implement has multiple usages, including serving as different kinds of containers, cooking ware, bowls, and drinking vessels of various sizes. The lineaments of the development and evolution of this type of earthenware are obvious. It lasted for as long as the Charwighul Culture existed. During the excavations, many textile fragments were found in the cemeteries. Some were printed with red designs. All of the textiles are woolen, but they are of various types: plain weave, diagonal weave, coarse, fine, thick, and thin. From the large quantity of bronze, pottery, stone, bone, and wooden spindle whorls that have been unearthed, the level of development of textile industry of the time may be ascertained. Through analysis of the geographical environment and cultural relics that have been discovered, it is evident that Charwighul civilization was based mainly on animal husbandry.

In addition, Balchir cemetery south of the Charwighul cemeteries was excavated. At its north Qaraqatghul cemetery was excavated; and there were another two cemeteries neighboring Qaraqatghul which had more than 1,800 tombs. All materials unearthed from these cemeteries are similar to Charwighul materials.

Toward the east there were Alwighul materials, and toward the west similar materials were excavated in Chong Bagh and Qizil. Although there is little difference between Charwighul materials and the materials from its east and west, one can see the extensive interrelationships among them. The site mainly belongs to the Bronze Age, but the late period of the site had already entered the Iron Age.

Of all my years of field work in this region, the most unforgettable discovery came in the fall of 1985 when the mummified Tāklimakanians from the Zaghunluq village of Chārchān county were unearthed. Chārchān county is located in the southeast of the Tāklimakan, at the foot of two mountain ranges. Our excavation was carried out in a geological formation of combined salt and sandy soil. The site was located within a large cluster of several hundred ancient tombs. The Zaghunluq cemetery is located approximately 6 kilometers southwest of the Chārchān county seat. Between 1985-1996, several hundred tombs have been identified at the site, and our excavations yielded a vast array of artifacts and numerous human remains. Two types of burials were found here. One small tomb contained the mummified corpse of an infant, apparently not yet three months old at the time of death. This corpse was tightly wrapped in deep reddish purple wool, and its head was covered with a hat of blue wool. The eyes were covered with small, flat, uncarved, blue stones. The corpse had been placed on a white felt blanket and its head was resting on a pillow of raw wool wrapped in woolen fabric. Next to the head was a small bovine-horn drinking cup in which a trace of an unidentifiable substance remained. Next to the cup was an ancient "baby bottle" made of a sheep's teat which had been cut and sewn up in such a way as to allow it to contain milk (Kamberi 1994).

The other type of tomb was 5.35 m. in length and 3 m. in breadth at the surface. Below the surface it was 3.1 m. long and 1.55 m. wide. Its maximum depth was 2.4 m. The tomb was covered with a 50 cm. layer of sandy soil, beneath which was a 30 cm. layer of scattered reeds containing a sheep's head and two bovine-horn drinking vessels. In the middle of the tomb at this level was a 0.3 x 0.6 m. opening into the lower level of the tomb, which was blocked with a large brown woolen robe which was in turn covered by a white felt blanket on which sat a leather saddle and a single black pottery jar. Below the 30 cm. layer of scattered reeds were two layers of reed mats measuring 3.8 x 2.4 m. Immediately below these were three animal skins, underneath which were two layers of willow mats, which in turn covered 25 tree limbs laid across the step-rim of the tomb. Willow mats covered the floor, beneath which a gutter ran from the center to drain away moisture from the tomb and the bodies in it.

Two remarkable desiccated human corpses were uncovered from this tomb. One male corpse would have stood two meters tall when living. He was lying on his right side with legs bent and propped up by a small piece of wood (perhaps to promote preservation by means of circulation of air around the corpse). The hair, eyelashes, beard and chest hair were intact and traces of makeup (ochre spiral sun-symbols) could be seen on his face. The male was about 55 years old at the time of death. His hair was yellowish brown half-gone to white; the hair was plaited in two long thick braids, with red wool yarn braided into it. The corpse was dressed in a short jacket and long trousers, all made of deep reddish purple wool. He wore multicolored matted wool socks and knee-high white deerskin boots on his feet.

The female would have stood 1.9 meters tall when living. Traces of make-up similar to the male's were found on her face. Her yellowish-brown hair was dressed in four braids, two of which were her own hair and the other two of which were artificial. The genuine braids showed traces of white; the two artificial braids were also yellowish-brown and were longer. The socks and boots were identical to the male's; the corpse wore a dark reddish purple one-piece, open-necked dress that fell below knee length. A 13-inch-high, pointed felt hat of brown wool reminiscent of headgear seen in Persian bas-reliefs, and, somewhat like a type of hat commonly worn by nomadic tribes in Central Asia, was also found in the tomb. The Scythian, or Saka, people are known in Persian histories as the Saka tigrakhauda, or "Sake, who wear pointed hats." This and twelve other hats of varying style, made of felt and woven or nallbound wool, were unearthed at Zaghunluq in 1985 (Kamberi 1987).

Other items of interest found in this tomb included several pieces of black pottery, all of the same shape; wooden objects such as combs, a milking-pail, some knitting needles; wooden arrows and some ritual yarn, which may have been used as fire symbols; bone objects like combs and drinking-cups; a horn hook that may have been used to hang up clothing; and a wide variety of woolen fabrics. Radiocarbon dating from this tomb, performed by the Bureau of Cultural Relics in Beijing, indicated that the tomb dates from approximately 1000 BCE. The 3,000-year-old mummified human remains may thus be related to the Saka people of that time, or may be thought of as early forerunners of the Uyghur people. Many of the artifacts found in the tomb, such as the clothing and food items are certainly very similar to those used by modern Uyghurs every day. The fabrics especially indicate a surprisingly advanced level of textile technology not often seen in other finds either in Central Asia or in the rest of China.

The Ancient Kingdom of Khotan

The region of Khotan is located on the southwestern periphery of the Tarim Basin just north of the Qurum and Qara-Qurum mountains. It is a rich oasis region fed by the Khotan, Qara-Qash, Yürüng-Qash, Cheriyā, Keriyā, and Niyā rivers which flow out of the mountains. Geographically, the land of Khotan is 670 kilometers long from its east to west and 600 kilometers from north to south at its widest point, making the territory of the kingdom of Khotan encompass a total of 247,800 square kilometers. "Khotan," a name for this region, appears in Saka, Prakrit, and Uyghur; alternately it may be written as "Kustana"/"Kostana" in Sanskrit. According to Chinese records and other unearthed documents, scholars have tried to explain the meaning of the word "Khotan" as follows: 1. "Milk of the Earth," 2. "Land of Cows," 3. "Flower Garden"/"Orchard"/"Vineyard," 4. "Powerful," 5. "City of Jades" (Li 1991).

In ancient times and today, Khotan was a crossroads between different countries. By passing through the Qara-Qurum Pass to its southwest one arrives in Kāshmir, a state between northern India and Pakistan. If one travels southeast one can enter the western reaches of Tibet. To its west lies Afghanistan, to its north and east the great and forbidding Tāklimakan Desert. With its rich agriculture, orchards, silk production, and sources of high quality jade, throughout history the kingdom of Khotan was contested for and conquered by peoples from both the east and west.

I have gathered information from archeological field work and discoveries about the ancient kingdom of Khotan at sites such as Qara-Yantaq, Yantaqliq, Pashayi, North Niyā, Yotqan, Aqsepil, Rawaq, Lop, and along the Niyā and Keriyā rivers which indicates that human occupation of the region around Khotan began at least during the end of Paleolithic period. Unearthed works of art and artifacts from Aqsepil, Rawaq, Sampul and Yotqan lead me to believe that the kingdom of Khotan was established in approximately the 3rd century BCE.

The Sampul site is an ancient cemetery located on an ancient dry river bed approximately 3 kilometers south of the Sampul village in Lop County between eighty-five degrees seven minutes and five seconds east longitude, and thirty-six degrees fifty-nine minutes and fifty-three seconds north latitude. The cemetery spans an area east to west of about 6 kilometers and runs 1 kilometer north to south. During two field sessions in 1984, 52 tombs yielding a wealth of art and artifacts were excavated. Most remarkable are an extremely well-preserved carpet with tree leaf design, selvaged sides, and corner tassels, and a wool tapestry fragment illustrating a human face with a tall nose and blue eyes identical to the Greek god Hermes. Although one can not say for certain if the image on the woolen fabric is actually Hermes or not, artistically the style of this artifact is that of ancient Greece. Another piece of the same fabric shows a red centaur on a blue background, surrounded by eight-petalled flowers. The mythical creature with the lower body of a horse and the torso of a man is holding a pan pipe, seemingly playing it. These images probably originated from the centaur of ancient Greek mythology.

Radiocarbon analysis dates the Sampul cemetery at around the time of the 3rd century BCE. Skeletal analysis indicate that the people interred here were chiefly Mediterranean Caucasoids with a slight admixture of Mongoloid elements. The Khotan Yotqan site covers a surface area of 10 square kilometers. Some scholars believed that it was the location of the first capital of the ancient kingdom of Khotan. A variety of unusual pottery figurines and some gold artifacts, such as one in the form of a duck, were retrieved here in 1957.

The Ancient Kingdom of Qäshqär

Qäshqär is an important cultural and trade center of the ancient Tarim along the southern Silk Road. According to Chinese historical texts, it was known as Shule in the Han Dynasty. That may be a transcription of the ancient Uyghur word *suluq,* which means "rich with water". However, the original meaning of "Qäshqär" in ancient Uyghur is "Beautiful Relief"/"Rich Place"/"Jade Side". The territory of the ancient kingdom of Qäshqär covered approximately 252,900 square kilometers within today's Qäshqär Kona-Shähär, Atush-Shähär, Toqquzsak, Yengisa, Yupugha, Payziwat, Yärkänt, Qaghiliq, Poskam, Mäkit, Maralbeshi, Akhchi, Aqtu, and Tashqurghan counties. The distance from Ürümchi to Qäshqär is more than 1,500 kilometers. The Täklimakan Desert lies to the east of Qäshqär. Ancient Qäshqär connected with the Kirghiz steppe in the north, and led to Tajikistan and Uzbekistan in the west, and Afghanistan, Pakistan, and India in the south.

Because of its important location, the ancient kingdom of Qäshqär was a most prosperous trading city on the Silk Road. In ancient times, the population of Qäshqär was composed of Sogdian, Hun, Qarluq and Uyghur people. Qäshqär is also very proud of having the most famous medieval Uyghur scholars Mäkhmut Qäshqiri and Yüsüf Khas Hajip in the eleventh century CE. Their works have been translated into many other languages and studied all over the world.

Around the city of Qäshqär there are many historical sites, such as ruins of ancient cities, castles, Buddhist temples, petroglyphs, ancient cemeteries, and beacon towers. The remains of the ancient city of Khan-Öy [Royal Palace] are situated about thirty-two kilometers north-east of Qäshqär. The ruins of a Buddhist monastery can be seen within the site of the Royal Palace. The remains of a Buddhist pagoda over thirteen meters high with a high terrace, a three-leveled base, and a big dome at the top still stand there in desert. There are also remains of city walls, houses, Buddhist temples, boundaries of farmland, and an underground irrigation system called *kariz.* There are two gates in the ruins, one on the south-eastern side and another on the north-western side. The unearthed artifacts tell us of historical and geographical changes that took place during the past two thousand years. I believe that the city was originally built sometime in the second century BCE, and was completely ruined after the thirteenth century CE.

Reeling thread off cocoons of silkworms is one of the great inventions of the ancient Khotanese and Qāshqārians. After examining unearthed evidence of advanced weaving technology and colorful textiles from various sites in the Tarim Basin, I firmly believe that wool and silk from this region made an important contribution to the historical development of textiles. The people of the Tarim began to plant mulberry trees for keeping silkworms over two thousand years ago. Evidence of the long history of silkworm-keeping in Qāshqār comes from an ancient city site in Maralbeshi county. Ancient silkworm cocoons at the ruin of Toqquz-Saray were discovered in 1959. They were so well preserved that they still retained their original luster.

After many ups and downs throughout history, the silkworm-raising industry in Qāshqār and Khotan has now been revived and prospers once again. More importantly, some Uyghurs still keep to their traditional way of making silk today in a few villages of Qāshqār and Khotan. Furthermore, according to unearthed archeological materials, handicrafts can be traced back to very ancient times in Qāshqār. Uyghurs are able to make fine artistic objects and are well-known for their skill. They make artifacts of gold, silver, jade, crystal, animal bone, feathers, and eagle wings, including embroidered caps, musical instruments, headgear, trinkets, small leather artifacts, tools, and other products of great variety. In short, the modern Uyghur culture and art of Qāshqār have not only developed on the basis of inheritance and preservation of their traditional culture, but also have been influenced through cultural exchange with the East and West.

The Ancient Kingdom of Kucha

The ancient kingdom of Kucha is located in the center of the South Gate of the Tāngri Mountains, including today's Kucha, Bay, Būgūr, Kara-Shähär, Shaya and Toqsu counties. Kucha oasis occupies a strategically important position on the northern Silk Road. The kingdom was a bridge that linked up the south and north of the Tāngri Mountains in trade and cultural exchange throughout history. The two thousand five hundred years long history of the ancient city-kingdom has endowed Kucha with a brilliant heritage of ancient arts and numerous cultural relics and many archeological sites. Having gone through numerous historical changes, the civilization of the ancient kingdom of Kucha has now taken on even more attraction for historians and archeologists.

The Tāngri mountain valleys of the northern part of Kucha have rich water resources with luxuriant pastures and pleasant weather. Across the Tängri Mountains from Kucha one can reach the Künäs steppe in the Ili region. The southern reaches of Kucha are highly treasured land for the development of irrigated farming. Kucha is well-known for its fruit produce, not only in quality, but also in variety. It is also rich in mineral resources, particularly in petroleum and coal.

Archeological discoveries make clear that, especially at the foot of the Tängri Mountains, on the banks of rivers, and in oases, a large number of historical remains are distributed in the area around Kucha. For instance, in the Kucha River valley, there are Subeshi, the ancient capital of the kingdom of Kucha, Qara-Döng and Mazarbut. In the Kizil River valley, there are the Qarghay-Mali and Kizil sites. Other wonders of the ancient civilization of Kucha include the Buddhist monasteries at Qumtura, Kizil, Kizil-Qagha and Simsim. Many neolithic artifacts from earlier cultural strata have been discovered in the ancient city of Piran in Kucha, such as stone knives, stone sickles, millstones, some bone implements, pottery, and a small number of copper artifacts. From a later cultural stratum of the site, a group of large earthenware jars, lotus-patterned floor bricks, cloud-patterned bricks, sewage pottery pipes, and tube-shaped tiles were excavated.

23 kilometers east of Kucha city lies the famous site of Subeshi. The Subeshi site is composed of two parts, namely, the western temple and the eastern temple, which stand facing each other on the banks of the Kucha River. The eastern temple was built against a precipice; its walls are already dilapidated and the houses and Buddhist pagodas there are in ruins. The houses, pagodas and walls are all built of adobe with some of the walls over ten meters high. The northernmost one of its three great pagodas stands half way up the hill, overlooking the entire scene of the collapsing shrine. The western temple is connected with the cliff behind it by a square enclosure of adobes which has a circumference of 318 meters and a height of over ten meters. The space thus fenced off is crisscrossed with ruined walls, seemingly the remains of residential houses for Buddhist monks. There are a row of Buddhist caves, in which we still can see human images and Tokharian inscriptions carved on the walls. Utensils of copper, iron, pottery, wood, and also some frescoes and clay Buddha statuettes, as well as manuscripts, have been excavated here.

In May, 1978, an ancient tomb was found in the vicinity of the pagoda, and also a mural of human images with Tokharian writings. When we compare the culture of the ancient kingdom of Kucha with those of the neighboring areas, judging from the features of their burial customs, the unearthed implements, arts, and Buddhist painting, it is obvious that there are many similarities. At the same time, there are also significant differences. As a result, many academic problems have not yet been solved, and opinions differ as to the identity of the early people of the kingdom of Kucha.

The Ancient Kingdom of Turpan

The territory of the ancient kingdom of Turpan has historically varied in size. However, no matter how the dimensions of its domain changed throughout history, the oasis cities of the Turpan Basin were always the political and cultural centers of its kingdom. The Turpan Basin is located northeast of Tarim Basin and south of the eastern reaches of the Tāngri Mountains. The Turpan Basin encompasses the city of Turpan, as well as Turpan, Pichan, and Toqsun counties. It is surrounded by the Qumul area to its east, Ürümchi district to its west, and the Bayingholin area to its south. It is 240 kilometers wide from south to north and 300 kilometers long from east to west. Over 72,000 square kilometers large, at its center lies the Ayding Lake which is 154 meters below sea level. This is the lowest point below sea level in Central Asia and the second lowest point in the world (after the Dead Sea).

Turpan is bisected by the Yalqun Mountains which run east to west. In its northern part lies the Pichan oasis, in its south, the Turpan and Toqsun oases. Although the region is extremely arid with less than 16 millimeters annual rainfall, its oases have plentiful water resources for irrigation from rivers that run down into the depression from the surrounding mountains. Since ancient times water has also been accessed by a unique irrigation system of deep interconnected underground channels called *kariz*. Geographically, the Turpan oasis was critical to east-west communications along the ancient Silk Road. Situated as it is in the eastern part of the Uyghur Region, it bordered on the principle gateway to mainland China, the Hexi corridor of Gansu province.

The settlement of Turpan can be traced back to as early as approximately 10,000 BCE, the late Paleolithic and Neolithic periods. There are many stone implements unearthed from west of the Yarghul River, the northwest desert of Astana, and the southern rim of the Turpan Basin. Archeological discoveries confirm ancient records that the Turpan region was settled and developed into a powerful kingdom by the Qangqil peoples in the first millennium BCE. They were followed by many kingdoms that were built in Turpan by the Tōli, Turan, Hun, Jurjan, Turk and Uyghur people. Archeologists have uncovered numerous burials, sites, Buddhist and Manichaean temples, and various manuscripts throughout the Turpan Basin. These burials have yielded unique pottery vessels, sophisticated bronze weaponry and gold ornaments, and advanced woven woolen fabrics. The Qangqil were a forerunner of the Uyghur people who established their capital at Yarghul about 10 kilometers west of today's Turpan city on a narrow plateau that rises some 30 meters above the river beds on either side below. The plateau has a surface area of over 49,000 square meters. The ancient city of Yarghul developed considerably from the third century BCE to the fifteenth century CE. It is now a UNESCO world heritage site.

In the beginning of the fifth century CE, the center of political power in the Turpan area was relocated from Yarghul to the ancient city of Idiqut by the king of the Qüü family. Idiqut is a walled city with outside circumference of over 5 kilometers. Its extant city walls are approximately 12 meters thick at the base and 11 meters high. The city is divided into three sections: the palace city, the inner city, and the outer city. From its beginnings around the time of the second century CE to the tenth century CE, it persisted as a strategically important city and was an international cosmopolitan center with diverse peoples, religions, and a high culture. This is well illustrated by the rich and remarkable finds from graveyard sites near Idiqut. More than 450 graves have been excavated from the famous Astana and Qara-Khoja sites, from which have been unearthed more than ten thousand cultural relics. Among the vast array of extraordinarily well-preserved artifacts from Astana are wooden figurines, paper documents, paintings on silk, a bouquet of funerary flowers made of silk, plaited silk slippers, a variety of dyed or embroidered silks, and even bags of millet and wheat, cotton seed, fruit, a wooden ruler, writing brushes, Persian silver coins, Roman golden coins, the dried remains of boiled dumplings, *nan* (a kind of flat bread), dough patties, and flower shaped cookies. These uncovered objects amount to a museum collection that shows the different aspects of social life and culture of the ancient Idiqut people (Kamberi 1995).

The dry climate and natural conditions of the Turpan Basin have enabled a great number of cultural relics such as paper, silk and woolen clothes, fruits and food items, which would not be preserved at another place in such excellent condition, to be preserved at many historical sites and ancient tombs. From tombs, Buddhist monasteries, and other types of sites at Turpan, manuscripts written in several languages have been unearthed. The scripts on these documents are clear and easy to decipher. Most of the Chinese documents were discovered from Astana. But the main part of the manuscripts unearthed from Bezäklik were written in the old Uyghur language. There are also some manuscripts written in Chinese, Sanskrit, Sogdian, Tanghut, and Tokharian. I have discovered many medieval manuscripts in Turpan. These documents can be classified into handwritten and printed texts. The contents of these documents include contracts, Buddhist sutras, Manichaean scriptures, literature, politics, military, economy, poems, and cultural life that provide scholars with first-hand materials for Uyghur cultural history. Among the manuscripts uncovered in Turpan, there is a Manichaean scripture written in the Sogdian language. The paper size is 268 cm x

26 cm. There are two musical figures painted with colors in the center of the scroll. It is one of the most valuable historiographic treasures of Manicheism in the world (Kamberi 1984).

Woolen and silk textiles that have been unearthed in the Turpan Basin consist of many varieties and have remained bright in color. Artifacts and weaving technology have been traditional handicrafts for a long time period in the Uyghur Region. Beside many later textiles found in the Turpan Astana cemetery, Bronze Age textiles have mainly been uncovered from Subeshi, Qāwrighul, Zaghunluq, Qizilchoqa, Sampul and Niyā sites in the Tarim and surrounding ares. Plain and twill woolen fabrics discovered in these ancient sites are dated approximately from 2000 to 1000 BCE. Most of them are dyed yellow or red and look quite new even now. Colorful woolen braided belts, ribbons, and applique-embroidered-felt show their own characteristic design and beauty. Large quantities of silk fabrics have also been discovered from Turpan, dating from the first century CE to the tenth century CE. These brocades, embroideries, thin silks, silk gauze, and the like are variegated in color and dazzling in beauty. The brocades can be further divided into warp and weft brocade. The embroideries can be classified as plain weave or twill weave, and there are tie-dye, wax-resist dying and printed designs. The fabrics especially indicate a surprisingly advanced level of textile technology not often seen in other finds, whether in Central Asia or in China (Kamberi 1984).

The figurines of these ancient sites in Turpan also have a characteristic difference from those unearthed from the mainland of China. For example, Turpan figurines are not made of pottery, porcelain, or three-color glaze; they are made of wood and clay and wear silk dresses. Such wooden figurines are found in tombs dating back to the third century CE and include wooden tigers, horses, ox-carts, and male and female human figurines made with different appearances and costumes. Some of the human figures carved from a piece of wood have legs that dovetail into the wooden body. Their faces and the clothes are painted in black, red, green or other colors. These artistic presentations show the simplicity and vitality of their antique beauty. However, the figures from the Uyghur Khanate period (605-1250 CE) are mostly made of clay with painted surfaces. The latter include animals like horses, oxen, sheep, camels, and grave-guarding animals in various appearances. There are also different types of human figures, such as painted wooden images of Lokapala, images of officials, warriors, ladies, and gentleman as well as servants, maids, horse riders, and laborers. Many of these figures are characterized by their deep-set eyes and high noses. The silk-clothed wooden figures are even more lovely; their heads are glued directly with laths to their necks and their faces are painted in different colors. Their arms are made of paper by twisting and twining together, their coats or skirts are made of brocade or stiff silk, and their expressions are as animated as if they were alive. The dancing girl figurines wear short coats and skirts trailing on the ground with a gauze shawl covering their shoulders. They give viewers an impression of grace, rhythm, and vividness. Male figurines wear official caps of black gauze, yellow silk coats, white trousers, and black leather boots, with belts round their waists. These silk-clothed figurines represent the refined and graceful arts of dancing and puppet shows. There are also figurines representing lion dancing, horse dancing, pole dancing, and other circus acts.

All these artistic figures show the popular performing arts of the medieval Turpan kingdom. Side by side with these figurines have been unearthed paper-cuts, silk paintings, and artificial silk flowers which were buried in the graves for centuries but still have their original color and beauty. Furthermore, wheat, millet, black soy beans, pastries, dried dumplings, grapes, pears, dates, rape seeds, cotton seeds, and other agricultural products that have been unearthed present us with a picture of the urban economic structure and settled social life of the Turpan people. These uncovered crops are excellent agricultural specimens for the study of the history of natural science.

A number of early (pre-medieval) tombs around Turpan were excavated during the end of 70's and in the 80's at more than 20 different locations. They include Chash Tagh, Ishäk Dõng, the north of Yarghul, Ayding Köl in Turpan county, Kichik Kõl, Alwighul, Yiwirghul, Bostan in Toqsun county, Darasa, Yankhäy, and Subeshi in Pichan county. These tombs are characterized by the large amount of painted pottery and some bronze and iron implements. The surfaces of the tombs are either round or oblong mounds. The tomb types can be divided into two categories. The first type is a rectangular vertical open grave having a sandy coffin chamber with pieces of wood set on the floor of the tomb. The second type is a rectangular vertical open grave with a side chamber. There are single body burials, double body burials, and multi-body burials. Most of the corpses were found lying on their backs with arms and legs straight, their heads were pointed toward the west.

There is a type of tomb at Alwighul consisting of a vertical open grave with a stone coffin chamber covered by pieces of wood or stone and also sometimes wooden planks laid on the floor of the tomb. The implements unearthed from this type of tomb consist mainly of pottery, woodenware, bronze, iron, bone, stone, woolen textiles, leather items, and other articles of daily use. The pottery, all shaped by hand, is mostly made of red clay mixed with sand. Pots, jars, cups and bowls make up the most of the finds. There are also tubs, ewers, and wine vessels of smaller size. They are usually about 10 cm. high and the biggest one is 40 cm. high. Their shape is normally characterized by a round belly and circular bottom, although some of them are flat-bottomed. The pottery vessels have broad belt-shaped or cylinder-shaped handles, most of them single. Many of the jars and cups have a spout. Their shape is unique, while the exterior of most of the pottery vessels and their inside brim are coated in red. There are also black patterns painted on the red coat. Occasionally, the pattern is painted in yellow. Most of the patterns are triangular or rhomboid, but some of them are spiral.

The large quantities of wooden vessels unearthed from Turpan consist of tubs, plates, cups, ladles, boxes, and bowls. Among them, there is a wooden box carved into the shape of a hedgehog; there are also many wooden fire-making contrivances. According to Chinese records, people made fire by drilling wood in the early period of human history, but no specific methods are given. The discovery of fire-making devices in some ancient tombs of the Turpan area give us direct evidence of what those ancient fire-making techniques were like.

Bronze implements are an important part of the finds from the early tombs of the Turpan Basin. Bronze articles unearthed from these tombs consist mainly of knives, spears, daggers, mirrors, arrowheads and decorative ornaments. A considerable amount of the bronze ornaments is carved or engraved. For instance, there is an animal-shaped bronze object unearthed from the Ayding Köl site with two tigers connected at the back facing in opposite directions. There is another animal-shaped bronze object unearthed from a tomb at Yankhäy with a tiger attacking a sheep. The powerful tiger and the terrified sheep with curly fleece form a sharp contrast to each other. Among the unearthed artifacts was found a gilded tiger-shaped bronze object in Subeshi and a circular golden object with tiger decoration on it in Alwighul. Radiocarbon testing indicates that these early period tombs of Turpan Basin date from approximately 3,335 to 2,225 years ago. The cultural relics discovered in these ancient tombs mentioned above have filled a gap in the field of early Qangqil studies. They will contribute significantly to Turpan and Uyghur studies. I firmly believe that in coming years more and more of the history of Qangqil and the Uyghur people will gradually be revealed and made known to world.

Peoples of Ancient Tarim Kingdoms

We know that Central Asia consists of Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan, and the Uyghur Region of China, situated in the center of Asia. Scholars also sometimes refer to the newly independent five republics of the former Soviet Union as Western Central Asia and the Uyghur Region as Eastern Central Asia. Looking at a world map, the Uyghur Region is located between seventy-three degrees thirty minutes and ninety-six degrees thirty minutes east longitude, and thirty-four degrees ten minutes and forty-nine degrees thirty minutes north latitude in a strategic position on a vital communication line in Central Asia among three imperial states, China, India, and Russia. The Uyghur Region measures a maximum of some 2,000 kilometers from east to west and 1,650 kilometers from north to south. The Uyghur Region is bordered on the east by Gansu and Qinghai provinces, and on the south by Tibet. From the northeast to the southwest, it is bordered by Mongolia, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and India. The total length of the Uyghur borders with neighboring countries is more than 5,600 km.

The Uyghurs and their forebears are an ancient group of people who have been living in Central Asia since the second millennium BCE. Their forerunners can be traced in historical sources to the "Die," "Chidie," "Hu," "Saka/Scythian," "Hun," "Uysun," "Dingling," "Qangqil," "Sogdian" and "Tokharian" peoples. Ancient Chinese texts record that these peoples played an important role in Tarim history. According to historical texts, the Sogdian people, who spoke a Middle Iranian language, played a major role in political leadership circles and had a tremendous impact on the economy and culture of the Tarim people, but never founded an independent state in Central Asia. Until the late 1970's, many of these groups were known from textual accounts alone. Since that time, archeological excavations in the Tarim Basin and surrounding areas have discovered rich burial sites of some of these peoples. Although they were primarily described as nomadic barbarians in history, excavated evidence indicates that they practiced agriculture and lived in fixed settlements. Studies of the cranial and skeletal remains from their burials demonstrate that the Bronze Age and the Iron Age people of Tarim Basin were Caucasoid.

The principal locus of these burials is in the Ili valley at the western reaches of the Tängri mountain. The Ili River valley is a rich and fertile area fed from east to west by the Ili River and its main tributaries, the Tekäs and Künäs rivers. Over a hundred Saka and Uysun burials have been uncovered in eight separate areas in the Ili River valley, including Mongghul-Kürä, Qara-Töpä of Nilqa, Tömirlik of Künäs County, as well as the banks and pastures along the Künäs River, the pastures of Tekäs County, and Döng Bulaq of Chapchal County. Saka/Scythian, Uysun, Tokharian, and Sogdian burials can also be found widely in the Turpan region. The burials were mostly constructed of round tumult and often contained inner burial chambers made of wooden posts. One of the largest of these is a tumulus in the Künäs pastures. It rises 20 meters above ground level and has a circumference of almost 350 meters at the base. The Saka and Uysun tombs are rich in burial goods and in some cases show evidence that the interred was wrapped in a wool felt blanket. Among the artifacts retrieved are pottery vessels, stone and bone tools, wooden bows and arrows, woolen and silk fabrics, traces of lacquerware, bronze and iron knives, mirrors, and ornaments.

The most startling of such finds are bronze statues, vessels, and ritual ornamental ware retrieved by surface collection near disturbed tombs at the Künäs riverbank site. From the discovery of a copper mine and bronze foundry dating to approximately 500 BCE at Nursay Mountain, Nilqa County in the Ili River valley, it is clear that the Saka and Uysun had advanced metallurgical skills. One other set of remarkable Qangqil, Saka/Scythian, or Uysun burials was excavated between 1976-1978 at Alwighul in the South Mountain area of Ürümchi. Over 85 tombs were excavated in two separate groups which yielded a great variety of implements, including high quality gold objects, bronze, iron textiles, and pottery. After the seventh century CE the main inhabitants of the entire Tarim Basin and surrounding areas were identified as Uyghurs. The basic meaning of the word "Uyghur" is "unity," "union," "coalition," or "federation" (Kamberi 1995).

The Uyghurs have a long history of integrating with ancient Saka/Scythian, Sogdian, Hun and Tokharian peoples. They possess a colorful and outstanding heritage in music, song, dance, and arts. The Uyghurs have made outstanding achievements in their ancient literature and formed a design system and decorative style of their own unique cultural flavor in arts and crafts, especially in their clothing, hats, jewelry, boots and shoes, scarves, bed sheets, tablecloths, carpets, bed felts, blankets, wall hangings, pillows, bags, riding bags, knives, musical instruments, as well as cupboards, horsegear, doors, window and building designs, and household decorations. These designs are composed of different plants, animals, landscapes, shapes, and geometric figures. The designs are unique in form, compact in organization, and rich in subject and color. The discoveries of ancient petroglyphic arts in the Qurum, Qara-Qurum, and Tängri mountain ranges, of the dress of the Bronze Age Tarim people, of Buddhist and Manichaean temple wall-paintings, as well as of other artifacts recovered during a hundred years of archeological expeditions in the Uyghur Region, all show the origins of modern Uyghur art designs and clothing styles. Indeed, there are only a few places in the world that can claim the religious, linguistic, cultural, and artistic diversity and longevity that the Uyghur Region can; Shamanism, Buddhism, Manichaeaism and Nestorianism and Islam flourished there side by side and one after another, along with the tradition of early original ethnic cults. The region is the most important repository of Uyghur and other historical, cultural, linguistic, and economic treasures of Central Asia. Much archeological evidence and the new discovery of the ancient Tarim mummies show that the Tarim Basin has unique geographic features and rich natural resources, and was home to one of the world's oldest civilizations.

Conclusion

The concept of a Bronze Age and Iron Age of Täklimakanian Civilization is a new one which has been proposed only within the last ten years. Before the 80s, many scholars thought that there were Neolithic and Chalcolithic cultures but no Bronze or Iron Age cultures in the Tarim Basin and surrounding areas. Recent studies have shown that many remains formerly supposed to be Neolithic or Chalcolithic should actually be identified as belonging to Bronze or Iron Age cultures. According to these updated archeological materials, there are still not too many Bronze Age remains which exist in the Uyghur Region. There were about ten or more localities in all, which were mainly distributed in the Turpan Basin and along the northern edge of the Tarim Basin. According to the features of the archeological remains, radiocarbon dates of the cemeteries and ancient sites, as well as the comparison of Bronze Age culture with unearthed materials from surrounding areas, the absolute date of the Bronze Age in the Uyghur Region was from about 2000 BCE to 1000 BCE.

From approximately the first millennium BCE to about the fourth century CE was the Early Iron Age in the Uyghur Region. Judging from updated materials, there were about 100 sites belonging to this period, and they were distributed throughout the Tarim and Turpan basins. All of them used iron tools, bronze weapons, bronze ornaments, and bronze ritual vessels. Pottery mainly consisted of household utensils, and many vessels were painted. People during the Iron Age had permanent settlements, and were mainly farmers who also practiced some animal husbandry. Animal husbandry was probably independent from agriculture by that time. According to radiocarbon dating, the Iron Age in the Uyghur Region began around 1000 BCE, which is about 400 years earlier than the Iron Age in mainland China.

Studies of the Bronze Age and Early Iron Age corpses in conjunction with data concerning skull and skeletal remains from numerous finds in the Tarim Basin and surrounding areas point mainly to Caucasian features, like those of most Uyghur Region residents today. These corpses exhibit Caucasian features such as blond hair, long noses, and deep-set eyes. At the beginning of this century, Aurel Stein and other explorers also discovered several corpses and numerous skull and skeletal remains in the Uyghur Region dating from the third century BCE to the sixth century CE that show mixed Mongoloid and Caucasoid features. The Tarim Basin exhibits many cultural factors that were the same as or similar to those found in surrounding areas; this should be the result of cultural exchange with neighboring peoples. But this does not mean that the Bronze and Iron Age cultures in the Tarim Basin originated from the outside or under the dominant influence of other cultures. In fact, the Bronze and Iron Age cultures in the Tarim Basin and surrounding areas possessed distinctly native features.

After carefully examining all the archeological discoveries around the Tarim and Turpan Basins that have been unearthed during the past hundred years, I feel that even before the Han dynasty government officer Zhang Qian appeared there in BCE 138, the ancient caravan road of Central Asia (known as the Silk Road in much later days) had already provided not only an immigration and trade path, but also a route for cultural exchange between East and West. The Uyghur area was the main region through which the ancient road had to pass. Discoveries like the Tarim Basin tombs provide a great deal of information regarding the early history, religion, ethnology, culture, and technology of the region and the ancient Täklimakanian people.

In conclusion, I staunchly believe that, culturally, Central Asia will become the dream-field of archeologists once again in the twenty-first century. Economically, Tarim oil production will have a serious impact on the world economy. Politically, Chinese ethnic minority policy and nuclear weapons testing in the Kroran area will become very serious issues. Finally, I deeply believe that without Uyghur history there can be no Central Asian history; without Central Asian history there can be no Asian history; and without Asian history there can be no world history.

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Ethnogenesis and Ethnic Identity in China: Considering the Uygurs and Kazaks

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When Owen Lattimore (1950, 1951) carried out his extensive surveys and travels in Chinese Central Asia in the first part of this century, he never encountered the people today known as the Uygur. Instead, he recorded countless conversations with people who identified themselves generally in terms of place of origin, or simply as one who was a "Turki." "I am a Kashgarlik," is the general statement Lattimore would have heard, "from the oasis of Kashgar." Other ethnonyms included: Turfanlik, Khotanlik, Aksulik, or other native terms indicating the oasis towns surrounding the Tarim basin and the Täklamakan desert. Today, many who hail from the region simply declare they are from Turkestan, or identify themselves as Eastern Turkestanis (*dogu turkestanli*).

At the same time, statistics published by population bureaus make explicit reference to a well-defined people referred to as the Uygur, numbering 7.2 million in 1990 (Department of Population Statistics, 1994). The Uygur are listed as the second largest of ten Muslim peoples in China, primarily inhabiting the Xinjiang Uygur Autonomous Region (see Table 1).

Many Uygur with whom I have spoken in Turfan and Kashgar argue persuasively that they are the autochthonous people of the Xinjiang region. In addition, chapters in this volume continue to refer to the Uygur as if they have lived discontinuously as the Uygur in the Inner Asian region now known as Xinjiang. As the following brief history will show, this could not be further from the truth. Moreover, as we shall see, the case of the Uygur is not unlike that of many other Inner Asian peoples who have a similar history of ethnogenesis and evolution. The fact that over 99.8 percent of the Uygur population are located in Xinjiang, whereas the other Muslim peoples of China have significant populations in other provinces and outside the country, contributes to this important sense of belonging to the land. The Uygur continue to conceive of their ancestors as originating in Xinjiang, claiming even to foreign journalists that "it is our land, our territory" (Mann 1985:10), despite the fact that the early Uygur kingdom was based in what is now Outer Mongolia and the present region of Xinjiang is under the control of the Chinese state.

In this chapter I argue that the identities of the Inner Asian peoples of China and Central Asia as traditionally conceived, whether

Table 1
Muslim Nationality Populations in China, 1982-1990

Minority	*Location*	*Languages*	*1982 Census*	*1990 Census*	*Percent Growth*
Hui	All China, esp. Ningxia, Gansu, Henan, Xinjiang, Qinghai, Yunnan, Hebei, Shandong	Sino-Tibetan	7,219,352	8,602,978	19 %
Uygur	Xinjiang	Altaic (Turkic)	5,957,112	7,214,431	21 %
Kazakh	Xinjiang, Gansu, Qinghai	Altaic (Turkic)	907,582	1,111,718	24 %
Dongxiang	Gansu, Xinjiang	Altaic (Turkic)	279,397	373,872	34 %
Kyrgyz	Xinjiang, Heilongjiang	Altaic (Turkic)	113,999	141,549	24 %
Salar	Qinghai, Gansu	Altaic (Turkic)	69,102	87,697	27 %
Tadjik	Xinjiang	Indo-European	26,503	33,538	27 %
Uzbek	Xinjiang	Altaic (Turkic)	12,453	14,502	16 %
Bonan	Gansu	Altaic (Mongolian)	9,027	12,212	35 %
Tatar	Xinjiang	Altaic (Turkic)	4,127	4,873	18 %
Total Muslim Minority Populations			14,598,654	17,597,370	26 %
Total Minority Populations			67,295,217	91,200,314	35 %
Total Han Majority Populations			940,880,121	1,075,470,555	10 %

Note: Name(s) of group based on most commonly used and Chinese *pinyin* transliterations.
Sources: *Renmin Ribao* 1991:3; Gladney (1996 : 21). Note that Muslim population estimates in China are based on the official census nationality categories, which do not include religion. Non-Muslim nationalities, such as the Han, may include believers in Islam, just as the so-called "Muslim Nationalities" may include those who do not believe in or practice Islam.

they be cultural, historical, religious, geographic, or linguistic, rely on notions of ethnicity and identity that are inadequate to account for their contemporary ethnogeneses, evolutions, and convoluted histories. Contemporary ethnic and racial studies often take the present ethnic nationality and project it back into history, constructing "national histories" that Prasenjit Duara (1995) has recently noted re-write and re-construct the histories of present peoples in service to the nation-state. These approaches to ethnicity generally fail to take into account the most important development throughout the course of ethnic change in Inner Asia: the interactions of the state with the nomadic steppe peoples and the changing oppositions they entail. As we trace the evolution of the Uygur and Kazakh peoples, from steppe nomad tribal confederation, to settled semi-nomadic kingdoms, and finally, to nationalities within the People's Republic of China, or within their own nation-state of Kazakhstan, we find a story of ethnogenesis that reveals much about minority-state relations and ethnic identity in the modern nation-state. This story is important as we consider the evolution of the people uncovered in the Bronze and Iron Age remains as contemporary citizens of China and Central Asia. A related sub-text of this chapter is the attempt to inject social theoretical issues into the current writing on Xinjiang and Central Asia. Long closed to non-Soviet scholars and non-Russian speakers, the region is now open to a wide range of travellers, writers, developers, and investigators who are beginning to have a better idea of what is going on, but have rarely seriously theorized or problematized why we see Central Asia in certain ways, and how Central Asians might see each other. Too often these writers have taken at face value current labels of ethnicity and nationality, even projecting them onto earlier categories of race and tribe, without understanding them in their historical and political contexts (see Dikötter 1992).

Ethnogenesis and the Nation-State

Ethnogenesis refers to the rise of higher-order ethnic collectivities where once there were disparate peoples or dispersed populations (Bentley 1983:7-9; Gladney 1991). Past discussions of ethnic change and identity have tended to polarize around positions that argue for a cultural-primordial identity and those advocating a purely circumstantial, situational or politically motivated basis for ethnic identity.[1] Most theorists now conclude that ethnicity cannot be reduced to purely interest-based or primordial action, but must involve a combination or dialectical interaction of the two main aspects of ethnicity: culturally defined notions of descent and sociopolitical circumstance (see Keyes 1981:28). Generally absent

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[1]For an informative summary of this earlier debate, see Bentley 1983; Nagata 1981; Despres 1984.

from these discussions of ethnic change is the important role of the state in determining the context and content of modern ethnic identity. For our understanding of the transition from Buddhist steppe empire to minority nationality, the influence of the Chinese and Soviet states in Central Asia on Uygur identity is most important.

E. K. Francis (1976:114), in his lengthy and profound analysis entitled *Interethnic Relations*, was one of the first to argue that the rise of ethnic identities and interethnic conflict was a phenomenon of the modern nation-state—before the rise of the nation-state, ethnic identity was not as salient for social interaction and discourse (see also Horowitz 1987:291-93). Other modern ethnicity theorists have elaborated on the important role of the state, which often supersedes local or cultural interests in defining ethnic groups. Charles F. Keyes (1984:45), in his seminal discussion of ethnic group relations in modern nation-states, argued that in the modern era nation-states legislate and shape the ethnogenesis of contemporary ethnic groups. Benedict Anderson (1991) has led the way for a host of theorists in suggesting that ethnic and national identity is best understood as historically contextualized, a socially constituted and constitutive process of imbuing "imagined communities" with the belief that they are somehow naturally linked by common identities. Post-structuralist approaches conceptualize identities as highly contested, multiple, constructed and negotiated within and between the power relations of the nation-state, rather than naturalized and primordial (Gupta and Ferguson 1992; Malkki 1992). Nationalist ideologies become cultural productions (Befu 1993; Fox 1990), legitimized as inventions of tradition and narrated as social histories (Hobsbawm 1983).

The vast majority of ethnogeneses arise from undefined and loosely affiliated groups that later became fully fledged ethnic collectivities occuring in the context of incorporation into and identity within a larger nation-state, often dominated by another ethnic group. These ethnic identities form and reform according to articulated hierarchies of interaction with the particular oppositional power in question (Gladney 1996b). While the Uygur and Kazakh peoples have at lengthy moments in their history been unified for particular sociopolitical purposes, just as often the people now known as such were divided against themselves among disparate oases and tribal confederations. Out of opposition to other tribal confederations, and most notably the Chinese and Russian states, the peoples now recognized as Uygur and Kazakh emerged.

This chapter places the contemporary national identities of peoples like the Uygur and Kazakh in a field of modern and historical social relations, particularly with regard to certain interacting social groups and newly invented nations in Central Asia, Russia, and China. Given the long history of interactions with powerful others and colonizing empires on the Eurasian steppe, a purely relativist or, at the other extreme, a de-historicized essentialized position with regard to identity formation is particularly questionable. Both extremes ignore issues of power, hegemony, "internal" colonialism, and cultural economy which have long dominated the region. These ideas are particularly troubling when projected onto essentialized 19th-century ideologies of race and ethnicity.

The spate of what might be termed "Soviet nostalgia" in *Foreign Affairs* and other policy manuals which complain of the re-emergence of "tribalisms" in Central Asia and Eastern Europe, now that the "peace-keeping" hand of the Soviets has been withdrawn, is misplaced, if not dangerously wrong. These peoples were profoundly different than they had been before their domination by the centralizing states of Soviet and Chinese Central Asia, and their multi-faceted identities are anything but tribal. Those suggesting pan-Turkism and pan-Islamism as an explanatory panacea for recent events in these regions have equally failed to note that expressions of Turkic or Islamic solidarity are often only one aspect of these complex identities in certain circumstances. In fact, the outcome of the desiccation of post-Soviet Central Asia has been most profoundly disappointing to the pan-Turkists and pan-Islamicists. The welcome recent translation of Olivier Roy's (1994) *The Failure of Political Islam* demonstrates that for Afghanistan, as well as for much of Central Asia, the "perception of Islam and Muslim societies as one timeless cultural system" does violence to both contemporary social movements sweeping these regions, as well as to the nature of Islam itself. This chapter attempts to suggest why these pan-ideologies may be even less compelling in the post-Soviet era than in the pre-Soviet period when they arose. The examples of ethnogeneses among the Uygur and the Kazakh will attempt to illustrate some of the issues developed in this chapter.

The Ethnogenesis of the Uygur

The following statement was made to me by a Uygur CITS (China International Travel Service) tour guide at the ancient Astana underground tombs outside of Turpan:

> The Uygur people are the descendants of a high civilization of Central Asian nomadic people who had a kingdom based here in Turfan. The elegant paintings and wrapping in this tomb date to the Han Dynasty (206 BCE - 220 CE) and are comparable in beauty and sophistication to those of the Chinese at that time. A mummy in the Xinjiang Regional Museum also found in this area dates over 6000 years old and proves the Uygur people are even older than the Han Chinese [Personal Interview, March 1985].

Chinese histories notwithstanding, many Uygurs firmly believe that their ancestors were the indigenous people of the Tarim Basin, now known as Xinjiang. This land was "their" land. Nevertheless, I have argued elsewhere for the constructed "ethnogenesis" of the

Uygur (Gladney 1990). In his popular history of Xinjiang, Jack Chen (1977: 100) noted the re-introduction of the term Uygur to describe the Turkic inhabitants of Chinese Turkestan. While a collection of nomadic steppe peoples known as the "Uygur" have existed since before the 8th century, this identity was lost from the 15th to 20th centuries. It is not until the fall of the Turkish Khanate (552-744 CE) to a people reported by the Chinese historians as Hui-he or Hui-hu that we find the beginnings of the Uygur Empire described by Mackerras (1972). At this time the Uygur were but one collection of nine nomadic tribes who initially, in confederation with other Basmil and Karlukh nomads, defeated the Second Turkish Khanate and then dominated the federation under the leadership of Koli Beile in 742 (Sinor 1969:113).

Gradual sedentarization of the Uygur, and their defeat of the Turkish Khanate, occurred precisely as trade with the unified Tang state became especially lucrative. Samolin (1964:74-5) argues that the stability of rule, trade with the Tang and ties to the imperial court, as well as the growing importance of establishing fixed Manichaean ritual centers, all contributed to a settled way of life for the Uygur tribes. Sedentarization and interaction with the Chinese state was accompanied by socioreligious change: the traditional shamanistic Turkic-speaking Uygur came increasingly under the influence of Persian Manichaeanism, Buddhism, and eventually, Nestorian Christianity (Sinor 1969:114-15). Extensive trade and military alliances along the old Silk Road with the Chinese state developed to the extent that the Uygur gradually adopted cultural, dress and even agricultural practices of the Chinese (Mackerras 1972:37). Conquest of the Uygur capital of Karabalghasun in Mongolia by the nomadic Kyrgyz in 840, without rescue from the Tang who may have by then become intimidated by the wealthy Uygur empire, led to further sedentarization and crystallization of Uygur identity.

Indeed, it is the Yugur nationality of Gansu today, not the Uygur, who fled the Kyrgyz to Central China and who are thought to preserve much of the original Karakhorum Uygur history in their contemporary religious, linguistic, and cultural expression.[2] One branch that ended up in what is now Turpan took advantage of the unique socioecology of the glacier-fed oases surrounding the Täklimakan and were able to preserve their merchant and limited agrarian practices, gradually establishing Khocho or Gaochang, the great Uygur city-state based in Turfan for four centuries (850-1250).

[2]Sabira Ståhlberg (1995), a graduate student who completed extensive fieldwork among the Yugur in Gansu, recently argued that they in fact are not directly descended from the 9th Century Karakhoram Uygur kingdom, but represent a hybrid group formed after the fall of Western Xia (12th Century), combining Tibetan, Mongolian, Turkic, and Chinese influences in the "ethnic melting pot" of the Gansu corridor.

The gradual Islamicization of the Uygur from the 10th to as late as the 17th centuries (Barat, personal communication), while displacing their Buddhist religion, did little to bridge these oases-based loyalties. From that time on, the people of Uyguristan (centered in the Turfan depression), who resisted Islamic conversion until the 17th century, were the last to be known as Uygur. The others were known only by their oasis or by the generic term of Muslims (Haneda 1978:7). With the arrival of Islam, the ethnonym "Uygur" fades from the historical record. Instead, we find the proliferation of such localisms as *yerlik* (persons of the land), *sart* (caravaneer), *taranchi* (agriculturalists from the Tarim basin transplanted to Yili under the Qianlong emperor [1736–1785]), and other oasis-based localisms.

During the Republican period (1912–1945), Uygur identity was again marked by factionalism along local, religious, and political lines. Forbes (1986), in his detailed analysis of the complex warlord politics of Republican Xinjiang, finds important continuing distinctions among the three macro-regions of Xinjiang: the northwestern Zungaria, southern Tarim basin, and eastern Kumul-Turfan ("Uyguristan") areas. Rudelson's (1992) dissertation confirms this persistent regional diversity among these three areas, and he insightfully proposes that there are four macro-regions, dividing the southern Tarim into two distinct socio-ecological regions. The Uygur were recognized as a nationality in the 1930s in Xinjiang under a Soviet-influenced policy of nationality recognition. This policy contributed to a widespread acceptance today of continuity with the ancient Uygur kingdom and their eventual "ethnogenesis" as a *bona fide* nationality (see Gladney 1990; Rudleson 1988). This nationality designation not only masks tremendous regional and linguistic diversity, it also includes groups such as the Loplyk and Dolans who had very little to do with the oasis-based Turkic Muslims that became known as the Uygur (see Svanberg 1989b; Hoppe 1995). Most importantly, the beginning of this century marked the enormous influx of Han Chinese from the east, a process that has continued apace, and with government encouragement, since 1949 (see Table 2).[3]

As noted very early on by the foremost Japanese Inner Asian historian, Professor Saguchi Toru, the term "Uygur" was not used publicly to refer to the present people under discussion until 1935 (Saguchi 1984:62). This left a 500-year gap in the use of the term Uygur to denote a people whom most have assumed to have existed for at least 1200 years of Inner Asian history. Even in his popular

[3]It must be stressed that pre-1982 population figures in minority areas rely heavily on speculation and must be regarded as rough estimates. For a discussion of the high degree of accuracy for the 1982 Chinese national census, see Banister 1987:322-3, Department of Population Statistics, 1994.

Table 2
Muslim Population Growth in Xinjiang, 1940-82

Ethnic Group	1940-41	1953	1982	—Population Increase— 1940-53	1953-82	1940-82	Approx. Annual Ave. Growth (Percent) 1940-82
Uygur	2,941,000	3,640,000	5,950,000	1.24	1.63	2.02	1.7%
Kazakh	319,000	492,000	904,000	1.54	1.84	2.83	2.5%
Hui	92,000	150,000	571,000	1.63	3.81	6.21	4.5%
Kirgiz	65,000	68,000	113,000	1.05	1.66	1.74	1.3%
Tajik	9,000	14,000	26,000	1.56	1.86	2.89	1.0%
Uzbek	5,000	14,000	12,000	2.8	0.86	2.4	2.1%
Tatar	6,900	6,900	4,100	1.0	0.59	0.59	-1.0%
Han	202,000		5,287,000			26.17	8.1%
Total Population		4,874,000	13,082,000		2.68		

Sources: Forbes 1986:7; 1987:2; Banister 1987:322-3; *Minzu Tuanjie* 1984(2):38. [Note: Military figures are not given, estimated at 275,000 soldiers and 500,000 military construction corp in 1985 (Mann 1985:10)].

history of Xinjiang, Jack Chen noted this Soviet-influenced redefinition and resuscitation of Uygur identity:

> At a conference of emigrants from the Tarim Basin held in Tashkent in 1921 after the Russian October Revolution, it was proposed that the name "Uighur" be taken to denominate all the groups of these people who had been known hitherto by the names of the localities where they lived—Kashgarlikhs, Aksulikhs, Lobniks, etc. This name was generally adopted in 1934 by the then Sinkiang provincial government. So for the future as we follow their fortunes over the next thousand years we shall refer to them by their new modern name—Uighurs (Chen 1977:100).

It is the argument of this chapter that diversity and factionalism within the Uygur reflect a segmentary hierarchy of relations common among all social groupings. Uygur are divided from within by religious conflicts, in this case competing Sufi and non-Sufi factions, territorial loyalties (whether they be oases or places of origin), linguistic discrepancies, commoner-elite alienation, and conflicting political loyalties. It is also important to note that Islam was only one of several unifying markers for Uygur identity, depending on those with whom they were in significant opposition at the time. For example, to the Dungan (Hui), the Uygur distinguish themselves as the legitimate autochthonous minority, since both share a belief in Sunni Islam. In contrast to the nomadic Muslim peoples (Kazakh or Kyrgyz), Uygur might stress their attachment to the land and oasis of origin. In opposition to the Han Chinese, the Uygur will generally emphasize their long history in the region.

The Kazakh: Nomadism and State Ethnogenesis

> When two Kazakhs who do not know each other meet, they make their acquaintance by giving the lineage to which they belong and their closest patrilineal relatives. In East Berlin Kazakhs from Turkey established contact with Kazakh guest students from the Mongolian People's Republic studying in the German Democratic Republic. As the Xinjiang Kazakhs the Kazakhs from Mongolia belonged to *Orta Jüz* and generally also to the same lineages that are found in Turkey. In some cases they have found common kinship relations which even led to organized meetings in East Berlin between relatives coming from Turkey and visitors from Mongolia [Svanberg 1989a: 116].

For most Kazakhs in Kazakhstan, nomadism is only a distant memory to which they look in ethnic nostalgia. Robert B. Ekvall concluded his classic ethnography of Tibetan nomadic pastoralism, *Fields on the Hoof*, with the following dire prediction: "In the framework of communist doctrine and experience...there is no logical and acceptable place for the nomad" (Ekvall 1968:94). He was completely accurate with regard to the former Soviet Union, where among the entire population of over 7 million Kazakhs there are now only a few semi-nomadic pastoralists remaining in the most remote desert regions. His predictions for China, though not unreasonable at the time, were proven false. Indeed, the last few years have witnessed a resurgence of nomadic pastoralism in some grassland areas to the extent that the ecological balance of these zones has become threatened through over-grazing. Yang Li and Hsin-i Wu of the Gansu Grassland Ecological Research Institute recently reported that the privatization of land-use and herd stocks in China came at the same time that the "free-market system was instituted in China and the government decreased the price control measures. Since then, the cost of animal products has soared; this has resulted in the overgrazing of China's grasslands *far beyond carrying-capacity*" (Li and Wu 1990:1, emphasis in original).

While it has yet to be demonstrated that Kazakh pastoralists in the Altai mountains have posed any threat to the grasslands of the alpine meadows or valley floors, Svanberg and Benson (1988:200-205) have documented a resurgence of traditional nomadic pastoralism with the implementation of free market reforms. As descendants of the Turkish Khanate that dominated the Mongolian Steppe in the 6th century CE, the Kazakhs are pursuing a style of nomadic pastoralism derived from these Turkish ancestors, who, according to the late Joseph Fletcher (1979:24), "developed steppe nomadism in its final form, the form in which the Mongols later adopted it." Even as Kazakh nomadism disappears from the Central Asian steppe, debate has raged in the former Soviet Union over the role of religion and Turkism in defining Kazakh national identity. While some intellectuals argue for the role of Islam in defining Kazakh identity, others maintain that it is only pan-Turkism that can unite the peoples of the steppe (see Saray 1993: 16-17). These endless debates have marred the important role of nomadism for Kazakh national identity, the idea of a nomadic past that unites Kazakhs transnationally from China to Central Asia to Turkey, among a people for whom, according to Martha Olcott's study, "traditional Kazakh culture defined a man through the animals he owned, making private ownership of livestock almost the definition of what it was to be Kazakh" (Olcott 1987:248). While Russian-speaking urban Kazakhs in modern Almaty certainly do not wish to become nomads, I argue that a kind of "nomadic nostalgia" nevertheless characterizes much current discourse regarding the re-discovery of their pastoralist past. This is evident in the resumed interest in pre-Islamic Kazakh belief systems, the urge to preserve and discover "pure" Kazakh nomadic traditions in the Altai Mountains of China, and the continued lament over the tragedy of Stalinist sedentarization. This discourse impedes, to some extent, the construction of a contemporary "Kazakhstani" identity that includes non-Kazakhs.

In the Altai Mountains of China, with the pervasiveness of market economies in China and the former Soviet Union, and the increasing contacts of the Kazakhs who live there with the large immigrant community in Turkey, the role of animal husbandry and Kazakh identity is resurfacing as an important factor in changes in their socioecological nexus (Kazakh 1987). During interviews with Kazakh immigrants in the Zeytin Burnu district of Istanbul (see Gladney 1996b; Svanberg 1989a), I found a population that largely defined itself in terms of its burgeoning leather and tanning industry, with leather fashion boutiques run by extended Kazakh networks in Istanbul, Paris, London, Berlin, Stockholm, and New York. Now that more unrestricted travel has been taking place between Turkey, Kazakhstan, and China (there are direct flights from Istanbul to Urumqi, Istanbul to Almaty, and Almaty to Urumqi, which I flew in May and June of 1993, as well as the Eurasian rail connection between Urumqi and Almaty which I traveled in October 1995), Kazakhs once separated by artificial political boundaries are beginning to trade and exchange ideas and products to an unprecedented extent.

The continued salience of "nomadic nostalgia" to contemporary Kazakh identity in Kazakhstan is clearly demonstrated by their recently selected national stigmata: the flag of Kazakhstan, which shows the famous flying horses beneath the interior dome of the yurt on a field of blue sky.

In my interviews with Kazakh pastoralists in the Southern Pastures in 1987, 1992, and 1995, I found that whereas a traditional Kazakh *auyl* had the mutual participation of all members in a wide-range of tasks, each household of the clan in the post-collectivist period divided up the various tasks of nomadic pastoralism: herding, marketing, leather processing, and rug-making. This lifestyle was almost completely abolished during the Chinese collectivization campaigns of the 1960s and 1970s and the de-privatization of the herds, just as under Stalin in the 1920s and 1930s. There was no inherent incentive to care for the animals when the state controlled the profits, and traditional shared work roles were reassigned to specific collective enterprise tasks. The traditional household and *auyl* economies were dismantled. Now that there has been a return to traditional nomadic pastoralism in China and the private ownership of animals, one would expect a resurgence of traditional household and *auyl* economic organization. However, unlike the traditional Kazakh social structure as outlined by Alfred Hudson (1938) and Lawrence Krader (1963), one now finds that often each *yurt* will perform specialized tasks for the entire clan or *auyl:* one household will be responsible for herding, another for marketing, and another for production of certain leather goods, crafts, or rugs. While this may not be the rule for all Kazakh *auyls* of the Altai, it represents a new form of household economy and social organization that is perhaps due to the collectivized experience of the 1960s and 1970s. These households are also becoming tied into the local and transnational economies through the marketing of their products. This reorganization of traditional household economies may be one factor in the increased herd sizes reported in the Altai and will be an important aspect in the changing socioecology of the region.

The Kazakhs of Kazakhstan and Turkey look to the nomads of the Altai as their living cultural ancestors. An understanding of this nomadic way of life will assist in determining the evolving nature of Kazakh national identity. It is a way of life that is resurgent, albeit in a somewhat altered form, in China, while passing away elsewhere. It is clear that in reciting the oft-memorized genealogies among the Kazakhs, nomadism and its cultural by-products loom large as an important factor in their representation of Kazakh identity. For the Kazakhs, the tracing of genealogy is a much more powerful force in their identity construction than we have found it to be for the Uygur; the identity of the Kazakhs is represented as segmentary in principle. For the Uygur, knowledge of genealogy seems to be important only as it relates to the land, presumably as proof of early Uygur settlement in the Tarim oases, prior to the Chinese or other nomadic Turks. The keeping of detailed genealogies, according to my Uygur informants in Xinjiang and Turkey, is something the Chinese like to do, not they. Settlement of the land is much more important for the Uygur, which is perhaps why the discovery and study of the Tarim basin mummies is so critical to their contemporary identities. Indeed, it is Kazakh preoccupation with genealogical minutiae that not only influences mate-selection and nomadic nostalgia, but may also contribute to an increased awareness of identity.

A typical Kazakh genealogy among members of the Saqabay sub-lineage with whom I interacted in Istanbul is several levels deep. At the highest level, most Kazakhs among the Saqabay knew they were descendants of the *Orta Jüz* (middle) (mistranlated "Horde" or in Turkish, "orda", which refers to the original tribal military formations). At the level Kazakhs refer to as *tayipa* (from the Arabic, *tayifa*), which Svanberg (1989a:115) translates as "tribe" and Hudson (1938: 19) as *uru* (Krader 1963 as *ru*) they identified with the Kerey. At the next level of *ru*, or "lineage" (Svanberg 1989a: 115), they traced their lineage to the Zantekey. Yet many Kazakhs call all of these levels *juz* or *ru*, and there is no real consistency. At the base is the emphasis upon migration groups known as *auyl* (or *awl* Hudson 1938:19), which would have been comprised of different households, related by these complicated descent lines. It was clear, however, that a Saqabay would rarely marry a Barzarkul or Tasbike, and would only with great reluctance marry outside of the Zantekey line. As Svanberg notes, beyond the Kerey, there was not much knowledge of specific connections to other Orta lineages. This knowledge is increasing, however, with frequent travel to Western Central Asia, where Kazakh members of the Ulu (or "Great") Orda are primarily concentrated. Interactions traditionally would move up the scale from household to *auyl* to lineage. Now, there is specific interest only at the level of lineage and above, since migration groups have changed dramatically as noted above. Kazakh preoccupation with genealogy has done much to preserve, transport, and transform contemporary identity.[4]

Genealogies travel well. Kazakh notions of transhumance based on the *auyl* that trace to the roots of nomadic descent lines also extend far beyond any contemporary configurations of the nation-state. It allows for Kazakh networks that extend throughout Central Asia, China, Turkey, and Europe. It finds its representation on the Kazakh and Kyrgyz flags. As Charles Scott has argued:

> Genealogies are ways of allowing differences, discontinuities, and the priority of exteriority and spatial imagery while one comes to know various ordered regions of human life [Scott 1990: 57].

Ethnic Identity and the Chinese Nation-State

Past studies of the peoples of Xinjiang have generally been marred by over-attention to geopolitical machinations on the Inner Asian frontiers, to the neglect of the complex identities of the multi-ethnic players in that game, often accepting the labels ascribed to them by the dominant powers. Minority nationality studies have generally examined ethnic change in terms of Han cultural assimilation, or "sinification" as it has often been termed (Dreyer 1976:264-5; Lal 1970).[5] Yet, despite over one hundred years of varying degrees of political incorporation, not only have these people retained much of their ethnoreligious identities, but new expressions of identity have evolved in interaction with nationality policy and socioeconomic change. The peoples of Inner Asia have been particularly resistant to Han cultural assimilation, while Xinjiang itself has been brought fully into the Chinese nation-state.[6] I would argue

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[4]In an interesting recent paper on "Ethnic Composition in Xinjiang", Thomas Hoppe (1995) has presented a strikingly similar hierarchy of opposition among the Kyrgyz pastoralists of southwestern Xinjiang. It is interesting that while Kyrgyz and Kazakh preserve a fascination for lineage and genealogy as former nomadic pastoralists, this is not the case for the Uygur groupings and Hui groupings discussed in this paper. In a fascinating parallel, Uradyn Erden Bulag (1993: 47) demonstrates in his groundbreaking thesis that contemporary Mongols in Mongolia are reviving their genealogy and clan names (*obog*) which had been lost under Soviet influence.

[5]This idea derives from Ch'en Yüan's (1966) classic work that argued all minority peoples which came into long-term contact with the Chinese empire gradually sinicized to Han customs.

[6]Lucien Pye (1975:497) makes the astute observation that administrative integration of Xinjiang was the goal of the early communists, while

that it is not "Han-ification" (*Hanhua*) that is at issue for ethnic identity, it is "Chinese nationalization" (*Zhongguohua*). To be sure, when Han culture and the Chinese state become merged as one and the same (known as *da Han zhuyi*, "great Han chauvinism"), especially during periods of a weakened central state, such as the Cultural Revolution, then ethnic and religious differences are challenged.[7] "Local Nationalism" (*difang minzu zhuyi*), the resurgent expression of local ethnic identities, is then portrayed as feudalistic, and education is seen as assimilation into the "higher" Han culture. While there have been periods when this approach has dominated the nationality program in China, it has been officially rejected by the current governement under Deng Xiaoping. Ethnic pluralism under the Chinese nation is the official goal of the present government; whether or not it will be fully achieved is yet to be seen.

Ethnicity models which seek to define Uygur and Kazakh identity according to purely cultural markers, such as religion or language, do not take into account the wide diversity within these groups as well as their complex ethnohistory. Instrumentalist approaches to ethnicity which might portray the Uygurs and Kazakhs as interest-motivated actors seeking benefits under the present favorable policies fail to account for the resilient continuity of Uygur and Kazakh identity in the face of periods of oppression and political instability. We have seen that any adequate understanding of modern ethnic identity must take into account not only ethnohistory and political motivation, but also incorporation into and interaction with the Chinese and Russian nation-states. To a certain extent, the Uygur are who they are because the Chinese state has labeled them as such. In response to that ascription, the present Uygur identity has evolved and interacted in dialectical fashion. The rise of Kazakhstan as a modern nation-state also has as much to do with Russian colonization, as does the identity and political importance of the Kazakhs in Xinjiang.

Ethnogenesis and Contemporary Ethnic Identities

Recent maps of the Central Asian region have begun to delineate clearly the composition of the so-called major ethnic groups and to divide them into majorities and minorities (e.g., Kazakhstan: 40% Kazakh, 38% Russian). This contrasts with former maps of Inner Asia that generally blended these groups all together, since former

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assimilation was regarded as unrealizable.

[7]Though Islam was regarded with other religions as feudal superstition during the Cultural Revolution, it is protected under the constitution. While Islam is officially regarded as extraneous to the cultural and linguistic heritage of the Muslim peoples who in the census were not registered by religion but by "nationality" (see Gladney 1996a), John Voll (1985:143) makes the important point that recognition of the "special character of their national life" gives tacit recognition to the importance of Islam.

Marxist/Stalinist and modernization paradigms stressed the disappearance of these Central Asian identities, as either Russified, Sinicized, or secularized. Yet even the ethnic maps show their overlapping natures, and geographic maps indicate that there are no natural boundaries between these regions divided geopolitically during the period known as the "Great Game." The game of ethnopolitics is still being played across the steppes of Inner Asia, though no longer on a scale so "great."

This chapter has attempted to provide an approach to ethnogenesis that seeks to understand different configurations of identity across transnational boundaries among the peoples now known as the Uygur and Kazakh. This approach has attempted to describe the context of "both/and" identities: how it is, say, a person who calls himself a "Turkestani" can be both Kashgari and Uygur, Muslim and Turk, Chinese and Central Asian. In China, all of these groups are Chinese citizens, and travel on a Chinese passport, whether they like it or not. The study then becomes not any essentialized attempt at a final definition of the meanings of these representations (i.e., ***what*** is a Uygur, ***is there*** a Uygur race), but an examination of the conditions of ethnogenesis (i.e., ***when*** is a Uygur a Uygur, and ***why*** is that important). As this chapter has argued, being Uygur was not as meaningful between the 15th and early 20th centuries as it is today, but it certainly has become relevant for the 8-9 million Oasis-dwelling Turkic people who have been labeled "Uygur" since 1934 as a result of nation-state incorporation, great game rivalries, and Sino-Soviet nationality policies. For Kazakhs today who now have their own nation-state, the issue becomes one of defining an identity, such as "Kazakhstani", that can incorporate non-Kazakhs as well.

These identities are particularly called into question once people move across national borders and become members of the transnational diaspora (see Chow 1994: 99-105). The project then becomes not any essentialized attempt at a final definition of the meanings of these representations, but an examination of *when* they come to the fore, and with whom they are asserted. The post-Cold War period has led to a downward alignment of policital relations: it is no longer a U.S.-Soviet-Chinese trilateral configuration, but a much more particularized, multi-polar, and multi-valent world. Without the Russian and U.S. threat to China's sovereignty, lower-level identities may increasingly come into play, evidenced by increasing "southern nationalisms" among the Cantonese, Fujianese, Hakka, and others empowered by new-found economic wealth.

This project also calls into question the nature of majority national identities in the former Soviet Union and China. Recent studies of the Marxist influence on national identity construction in these regions have often ignored the process by which majority groups are constructed: the Turk, the Russian, and the Han Chinese. The "Turk" in Ottoman history was the tent-dwelling nomad, and not held up as the admirable essence of Turkish nationhood until the rush from empire to nation associated with Atatürk. A similar transition from empire to nation led the early Chinese nationalists to appropriate a Japanese-derived term for nation (*minzoku*) and label initially 5 (under the nationalists) and later 56 groups (under the communists) as "nations" (*minzu*). The notion of the Han as a *minzu* (nationality) is a quite recent phenomenon, popularized by Sun Yat-sen in opposition to Tibetans, Mongols, Manchu, and Hui, in his Five Peoples policy, and more importantly, to the foreign imperialists, all of whom were perceived as "nations" (Gladney 1994). The category of "Han" as a people was actually bequeathed to China by the Mongols, who described all northern peoples as Han (including the Koreans), as distinguished from southerners (*nan ren*), Central Asians (*semu ren*), and Mongols. China may now find itself moving down the scale into serious sub-Han ethnic and national rivalries, particularly with the economic rise of the south—for example, the expression of Tang Person nationalism among Cantonese vis-à-vis the northern Hans. These rivalries may account for strenuous government efforts to promote "Chinese nationalism," often at the expense of peoples such as the Uygurs, Kazakhs, and Tibetans.

It is clear that we must attend to the nature of shifting national identities in these regions, and the impact of changing international geo-politics. But geo-politics alone are not enough, as these processes of identity ethnogenesis, formation, and re-formation cannot be understood without attention to historiography and cultural studies. It is even more apparent that relations between Central Asia, Russia, and China will hinge on the shifting identities of the mainly Turkic, mainly Muslim peoples in the region—identities, as this chapter has sought to demonstrate, not easily united across pan-Turkic or pan-Islamic lines.

In China, recognition of official national identities has empowered these groups in their claims against the nation, particularly for the Kazakh and Uygur, and has led to a crystallization and ethnogenesis of identities — identities that have now moved above and beyond the bounds of the Chinese nation-state, encouraging other unrecognized groups to push for recognition and political power. Identities shift as individuals move across these many borders, and as one Bedouin proverb reminds us, these identities are formed in relation to others across the field of social and political interactions. They are never static or unchanged throughout history.

I against my brother, my brother and I against our cousin, and we and our cousins together against you!
— Arab Bedouin Proverb

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Die Sprachamöbe: An Archeolinguistic Parable

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There are many objections that have been put forward against the search for the Indo-Europeans and their homeland. Among those I have encountered are the following: 1. The Indo-Europeans never existed. 2. The Indo-Europeans always existed. 3. Such a search offends the sensibilities of those who do not speak Indo-European languages or who might find themselves located outside of the homeland. 4. It invites the participation of or co-optation by extremists, chauvinists, and other types of deranged—and possibly dangerous—persons (e.g., those who locate the Indo-European homeland in such highly improbable, if not utterly impossible, places as the Arctic, along the Indus Valley, in the Tarim Basin, in China; nationalists and racists of various stripes; kooks and crazies who attribute the rise of the Indo-Europeans to extraterrestrial visitations; etc.). 5. The data are too complex to be controlled and understood. 6. It is a waste of time (i.e., it doesn't matter).

I could easily write an entire book about how I have become involved in the search for the Indo-Europeans and why I continue to pursue it with enthusiasm. This small essay is not that book. Hence, for the present I shall respond to those who are opposed to the search for the Indo-Europeans and their homeland simply by stating that I perceive such an inquiry to be: 1. intrinsically compelling, 2. innately worthwhile, 3. historically significant, 4. humanistically important, 5. devoid of political content, 6. scientifically solvable, 7. intellectually satisfying. If other people want to distort or pervert the search for their own purposes, that is **their problem**.

During the past two centuries, the monumental labors of hundreds of talented and dedicated scholars have taught us an enormous amount about the nature of Indo-European languages, their development, and their intricate interrelationships. The same is true of the archeology of Eurasia, where it is certain that the Indo-Europeans arose and throve. The combination of the linguistic and archeological data alone tell us much about who the Indo-Europeans were, where and how they lived, and with whom they interacted. Within the past few decades, other types of evidence have also been brought to bear on the captivating question of the Indo-Europeans and their homeland. These new avenues of inquiry include disciplines from the hard sciences such as genetics. So long as we are patient and diligent, an honest scrutiny of all the available evidence from all relevant fields will gradually approach an intelligible solution to the Indo-European problem. It may, of course, take a very long time to achieve a satisfactory explanation; that is precisely why we must be steadfast.

Except for Proto-Indo-European (PIE) itself, all currently existing and all extinct Indo-European languages derived from other Indo-European languages. We may trace the derivation of Indo-European languages back through generation after generation until we reach a point when there was a single, undifferentiated ancestral language. How that primal PIE parent language originated is another question altogether. Some would hold that it simply split off from another, earlier protolanguage—and so forth and so on, back to **the** Mother Tongue of all mother tongues. However, I have come increasingly to believe that ancestral languages, more often than not, are the products of interaction spheres. In other words, the core of a language family may initially arise as a sort of *Mischsprache.* The very hybridity of this new entity is what differentiates it from being merely another daughter language of some preexistent parent language.

Sinitic languages are a case in point. Sinitic (i.e., Hanic) may well constitute an emerging family all to itself. It obviously shares some recurrent correspondence with Tibeto-Burman, but it also displays features of kinship with Austronesian and has been profoundly influenced by Austro-Asiatic and "Altaic" languages during the past two millennia, not to mention IE during an even longer period of time. In this sense, PIE may have arisen as the result of a concatenation or convergence of elements from Uralic, Old European, Caucasian, Semitic, and other languages. No matter what, PIE was certainly not generated *ex nihilo* but evolved out of an earlier antecedent or antecedents. With the occurence of a major innovation, or when the core of the interaction sphere acquired a sufficient mass to assume a coherent, corporate identity and life of its own, the new language was born.

Since all languages of the historical and prehistorical past (even protolanguages) were not merely abstractions, but were real entities spoken by groups of living human beings, I believe that we are obliged to locate the ancient languages we reconstruct in time and space, if only approximately, to the best of our ability. We should not postulate ancient languages and language families with utter disregard for (pre)historic geographical and chronological reality. Still less should we make the unwarranted assumption that ancient languages drifted about randomly without any secure relationship to communities of flesh-and-blood speakers. Consequently, I have drawn the series of maps (Maps I-IX) entitled "Indo-European Expansions" which follows this essay.

These maps may appear to be deceptively simple, but they are intended isochronously to take into account the following types of evidence: linguistic, historical, archeological, technological, cultural, ethnological, geographical, climatological, chronological, and genetic-morphometric—roughly in the order of precision with which I am able to control the data, from greatest to least. I have also endeavored to take into consideration types of data which subsume or bridge two or more basic categories of evidence (e.g., glottochronology, dendrochronology, and linguistic paleontology).

There is a correlation between genes and language, but it is not one-for-one. Similarly, there is a correlation between archeology and language, but neither is it one-for-one. Ditto for all of the other types of evidence mentioned in the preceding paragraph. **Any explanation of the development of Indo-European based only on one or two categories of evidence is unlikely to be correct. Conversely, a satisfactory solution to the Indo-European homeland question must simultaneously satisfy all of these categories of evidence.** Furthermore, we must bear in mind that a convincing solution to the spatio-temporal origins of any group or branch of the IE family must at the same time be compatible with the spatio-temporal origins of all other groups and branches of the family. Despite the incredible web of complexities uniting all the members of IE, we must take each and every one of the developing daughter languages into account throughout the entire history of the family. An explanation of the homeland problem that ignores any of the members or focuses only on one of the members cannot be sustained.

If the view the maps present of the Indo-European homeland and the development of the family after its breakup is more or less valid, I would expect it to be confirmed by genetic-morphometric (for which I presently have minimal data) and other types of scientific research in due course. In the final analysis, however, because IE is a **language** family, the search for its origins will perforce be determined primarily (though far from exclusively) by linguistic factors.

These maps are designed to indicate the major expansions (which I view as being slow and incremental) of the Indo-European language family. They do not explicitly take into account sudden migrations (whether large or small), invasions, occupations, incursions, encampments, outposts, long distance trade (except for amber), and the like. Nor do they overtly indicate interaction with other language families or isolates (Ket, Burushaski, Munda, etc.) which might border on or even occasionally be surrounded in pockets by IE. It is entirely possible that some of the spreads and expansions shown on the maps may have been wholly or partly initiated by environmental distress (negative impetus; cf. Hsü, this volume) or technological breakouts (positive impetus; cf. Nigel Calder, *Timescale: An Atlas of the Fourth Dimension* [New York: Viking, 1983]). One thesis of the map series as a whole, however, is that the "birth," growth, expansion, contraction, and "death" of languages constitute a natural and inevitable process. That is to say, it is impossible for languages to remain static. By their very nature, they are bound ceaselessly to alter their outlines on the face of the earth and either to increase or decrease the numbers of their speakers.

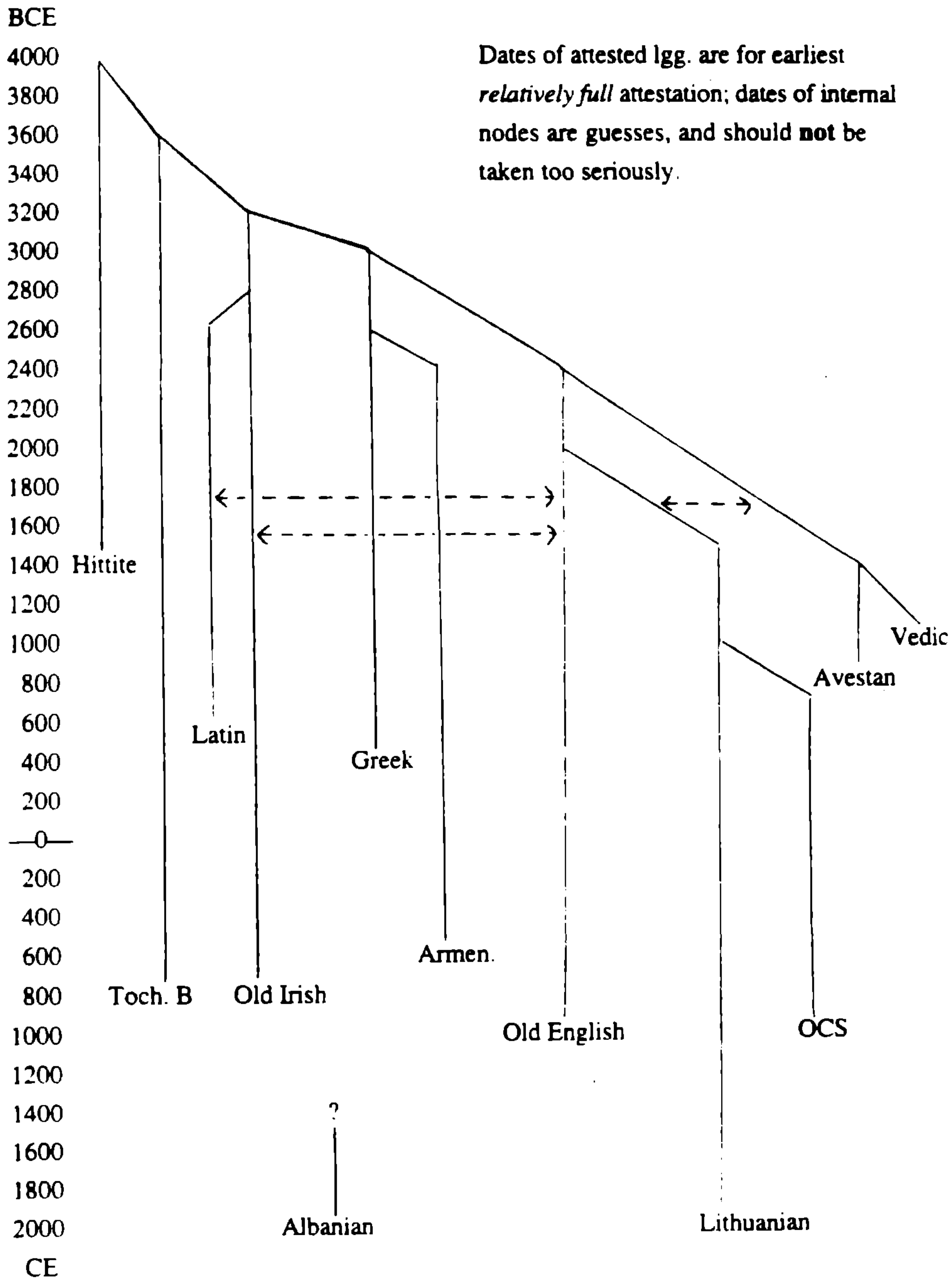


Figure 1: A **speculative** timeline for the "speciation" events in the diversification of the IE family.

The rationale of the maps is conceptual and heuristic. As such, they are essentially schematic, their primary aim being to clarify the relative positions of the various daughter languages at a succession of points in time. No claim is made for geographical exactitude. This is a first attempt to combine data from linguistics, archeology, history, and biology within a spatial and temporal framework so that we can visualize where and when the evolution of IE was occurring in the real world. (N.B.: The maps are *not* based solely on linguistic criteria.)

The initial motivation for designing these maps was so that I could comprehend more precisely how the Tocharians got where they were. Such simplistic explanations as "They were always there", which are unwarranted by the linguistic and archeological evidence, were unacceptable to me. In addition, I needed something more concrete and palpable than masses of phonological and morphological data in order to envisage the means whereby Tocharian—with all of its idiosyncracies and peculiarities—came to be located in the Tarim Basin at a certain moment in history.

The chronological component of the maps is premised mainly on the "speciation tree" in Fig. 1. While the dates of the speciation events indicated by the tree should by no means be considered as definite, if we posit a time-depth of approximately 6,200 years for PIE (a reasonable estimate and one which is close to the consensus of historical linguists), they should not be off by more than about 500 years for any given split. Given, however, that "[August] Schleicher's tree has no trunk," we need not emphasize priority between differentiating languages.

The basic principles of the maps are simple. A population occupying a given territory can only have one native language at a time—a truism that is tantamount to a tautology. For various reasons, a population that originally spoke a single language may divide into two populations speaking two separate languages. When a language divides, the daughter languages which break away earliest are liable to preserve the most archaic features, cut off as they are from the "hothouse" effects of the growing, innovating center. This is not to assert that peripheral languages undergo no transformation; when subject to interference or drift, they may actually change fairly fast and are apt to pidginize to varying degrees (e.g., the striking Finno-Ugric substratal features of Tocharian. We may say, then, that "expanding languages hybridize, at least on their 'membrane.'"

Why do languages break away from the mother tongue? Because they are too far away from the center and lose contact with it or become isolated for other reasons (prolonged state of war, geographical barriers that interfere with communication, and so forth). Or because technological and intellectual innovations of one group within a language enable it to grow and differentiate at a much faster rate than the rest of the population who speak the language. There are so many reasons why languages divide that it would be folly to try to enumerate them.

All other constraints being equal, a language will expand outward from the center at a steady rate in all directions. Thus, an expanding language would normally tend to assume the proportions of a growing circle. The picture is complicated by the fact that, as languages spread, they are bound to encounter all sorts of obstacles, such as mountains, rivers, seas, oceans, swamps, marshes, deserts, and other languages.

On the basis of all the above considerations, I hypothesize that the core of Indo-European, the nucleus (see below) of Pre-Proto-Indo-European, as it were, lay approximately in the Pontic-Caspian steppes. This is the area where the Indo-Europeans first gained mastery over the horse, enabling them to expand outward in all directions with unprecedented rapidity. Other factors contributing to the explosive expansion of the Indo-Europeans were wheeled vehicles and metallurgy.

Inspired by J. P. Mallory's redoubtable *Kulturkugel* (this volume), I wished to conceive a comparable device to represent language that could expand or collapse as necessary, be shot at by the "culture bullet" and close up its wounds after the projectile passed through, could multiply and split off into new units, and do all the other things that real languages do, but in a readily comprehensible and schematic fashion. At first I thought of the *Sprachfungus*, but it had a tendency to crumble before its expansions were complete; the *Kulturkugel* simply blew it to bits. Then, recalling my high school physics, I imagined the *Sprachblase* ("language bubble"). This device worked pretty well since it could burble up new offspring joyfully around the trail of the mean *Kulturkugel*, even though the original parent globule would always burst as soon as the tip of the bullet penetrated its surface. I even drew several maps to illustrate how it grew, but sadly had to abandon the *Sprachblase* when I realized that the language globs I envisioned did not really look like bubbles. As a matter of fact, they looked like nothing more than amoebae! No matter how hard I tried to make them act like bubbles, the language schemata kept behaving like amoebae. So I let them have their way. With glee, I dredged up all of my old college biology and invented the perky little *Sprachamöbe* (Fig. 2). It functions rather well as a metaphor for languages which have to grow, consume, move about, divide, and sometimes die.

The *Sprachamöbe* is a macroscopic unicellular protolingua of the rhizopodan order Amoebidae. *Sprachamöben* are identified by their ability to form temporary verboplasmic extensions called pseudopodia ("false feet"), by means of which they move around. This type of movement, called amoeboid movement, is considered to be the most primitive form of locomotion.

Movement is essential to the continued existence of the *Sprachamöbe*, for movement itself is a kind of foraging process. By putting out one or more pseudopods, the *Sprachamöbe* is able to surround and absorb new territories of sustenance. If the *Sprachamöbe*

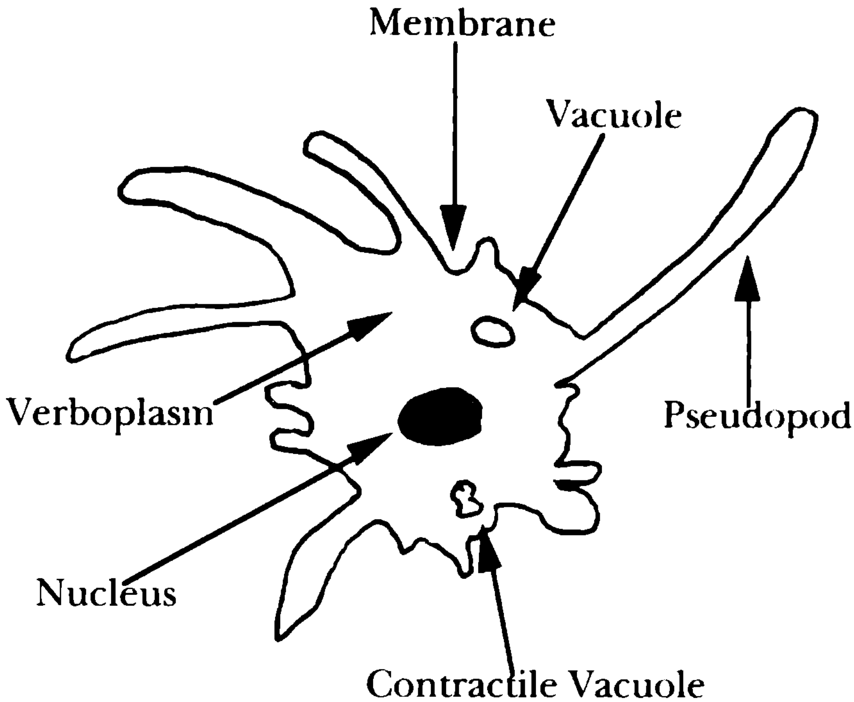


Figure 2: *Die Sprachamöbe* (vastly reduced in size). [VHMair 1996]

remains immobile for an extended period of time, it will die. This is why a vital, living *Sprachamöbe* is constantly moving and changing shape.

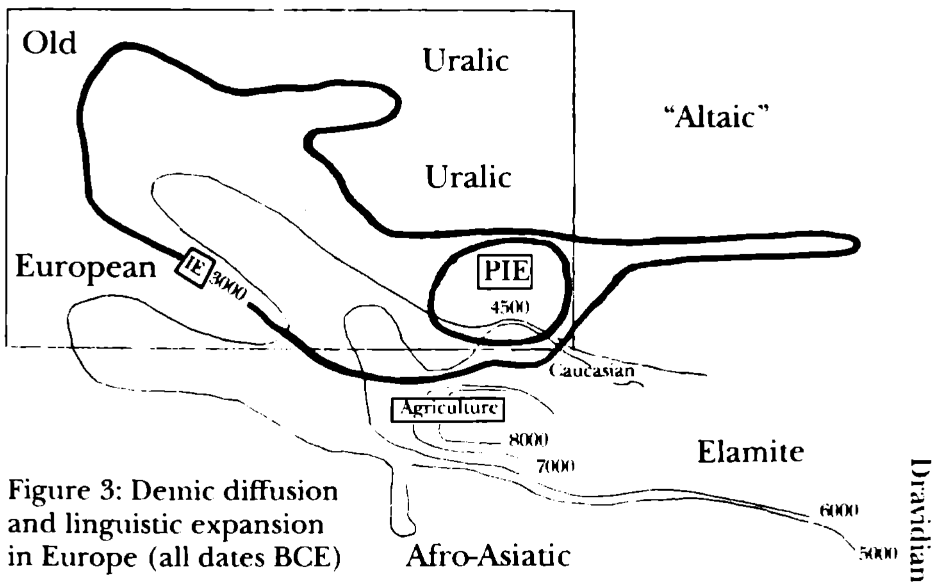


Figure 3: Demic diffusion and linguistic expansion in Europe (all dates BCE)

There are different species and subspecies of *Sprachamöben*. The species having by far the widest distribution in the world is clearly *Amoeba linguistica indo-europaea* (with numerous subspecies and sub-subspecies such as *Amoeba linguistica indo-europaea romanica*, some of which—e.g., *Amoeba linguistica indo-europaea iranica* var. *sogdica*—are extinct), while the species arguably having the most numerous population (though more localized than *Amoeba linguistica indo-europaea*) is *Amoeba linguistica tibeto-burmanica*, the subspecies *Amoeba linguistica tibeto-burmanica sinensis* and its numerous sub-subspecies being particularly prolific.

Sprachamöben not only gobble up other *Sprachamöben*. They themselves sometimes get gobbled up. This may be a sort of internecine cannibalism, as when *Amoeba linguistica indo-europaea romanica* assimilated large numbers of *celtica* in France and Spain, while *germanica* var. *anglia* did the same in Britain. Or the consumption may be directed against other species, as when *Amoeba linguistica altaica(?) turcensis*—Pac-man-like—voraciously munched a swath across nearly the whole of Asia in a mere half-dozen centuries beginning around the second half of the first millennium CE. As we shall read in the touching tale below, it would appear that one of *altaica (?) turcensis*'s early victims was our dear friend *Amoeba linguistica indo-europaea tocarica*, who had already lost much of her verboplasm to a distant cousin, *iranica*.

In their constant quest for nutrients, the pseudopods cannot help but probe in every possible direction, yet they are actually soft and tender, so they will always take the path of least resistance. This describes exactly what drove Tocarica far to the east. Given the circumstances in which she found herself, Tocarica had no choice but to go exactly where she did. The steppes were like a carpet of fuel for her ever-hungry, ever-flowing pseudopods. She went as far as she could without meeting any insurmountable obstacles, stopping only to rest for a spell in several especially favorable settings. Between the 80th and 88th meridians, however, she could effectively go eastward no more, and had already begun to put out pseudopodial feelers to the south. But our story has gotten ahead of itself; we shall return to the fate of little Tocarica momentarily.

If a *Kulturkugel* shoots through a *Sprachamöbe*, the latter simply flows around the path of the bullet and regroups—so long as the *Kulturkugel* does not destroy the nucleus. If the nucleus is permanently damaged, the *Sprachamöbe* dies.

If, by chance, a *Sprachamöbe* is severed, it instantaneously forms a new membrane (a border) over the cut surfaces. The part containing the nucleus usually survives, but the other part cannot digest the nutrients it encounters and eventually dies. The nucleus also plays an important role in reproduction, which is asexual. The nucleus pinches into two parts; the two halves pull apart at the middle of the nucleus (not necessarily the exact middle of the *Sprachamöbe*!); each half of the nucleus takes with it a portion of the verboplasm to sustain it until new foraging can begin, and—*voilà*!—one *Sprachamöbe* has become two. This process, called fission, happens very quickly, usually requiring less than a century. For example, there was originally a

Germano-Balto-Slavic *Sprachamöbe*. When the Germanic *Sprachamöbe* split off from the Balto-Slavic *Sprachamöbe* around 2500-2000 BCE, it took a healthy share of the verboplasm and almost exactly half of the nucleus, enabling it to thrive in spite of the cold, dark environment in which it found itself. For companionship, it associated closely with the Celtic *Sprachamöbe* which was its neighbor to the southwest. The Germanic *Sprachamöbe*, in search of warmth and wealth, frequently stretched out its southerly pseudopod to trade its precious nodules of amber in exchange for Romantic charms offered by the Italic *Sprachamöbe* who lived on the margins of the Mediterranean.

After a couple of thousand years, the Germanic *Sprachamöbe* became restless from having been cooped up in Scandinavia for so long and extended its Gothic pseudopod following the ancient southeasterly, Danubian route all the way down to the Pontic Steppes where it encountered for the first time several varieties of Iranian *Sprachamöben*. As the Gothic pseudopod nudged forward, it gently pushed aside the easterly pseudopods of the Celtic *Sprachamöbe* which, after having coexisted in such close proximity for over two millennia, were by now sometimes hard to distinguish in certain respects from the Germanic *Sprachamöbe*'s own southeasterly extremities. Along its path, it also had to push aside Thracians, Dacians, and other nondescript aunts and uncles. The Gothic pseudopod eventually so overextended itself that it became separated from the main body of the Germanic *Sprachamöbe*. Probably because it neglected to bring along a portion of the nucleus, it fell into a dying frenzy and went on a crazed and "barbarous" death march toward Rome.

Although the outcome (extinction) was similar, the process which led to cousin Tocarica's demise was quite different from what happened to the Gothic pseudopod. Cousin Tocarica's inchoate stirrings were in the central northwest of the mother PIE cell-body, but her rudimentary verboplasm gradually shifted eastward. This happened because she found herself in the uncomfortable circumstance of being boxed up in the center of her more powerful kin. After being pushed and pulled about for more than half a millennium, Cousin Tocarica was unceremoniously prodded by vigorous Celtic toward the only direction in which there was any hope of finding *Lebensraum*, the east.

By 2500 BCE, Tocarica's trajectory was already determined. There was no turning back. Either she would keep inching her way toward Central Asia, or she would expire in the ruthless amoeba-eat-amoeba competition of Europe. Clearly, she was no match for big, burly Germano-Balto-Slavic to the northwest and august, aggressive Armeno-Aryan to the southwest. Frail Tocarica's destiny was to be found in the Orient.

Once she had gotten beyond the confines of Balto-Slavic, around 2300 BCE, Tocarica began to breathe a little bit more easily. She might then have headed northward, but her delicate constitution could not stand the cold and, besides, she kept bumping into Finno-Ugric *Sprachamöben* in that direction. South was totally out of the question because Indo-Iranian was just beginning to flex its muscles and soon would be galloping across the steppes all the way to South Asia and East Asia. Indeed, Tocarica was catapulted along on the crest of the Indo-Iranian wave all the way to the vicinity of the Altai which she reached around the middle of the second millennium BCE. The ride was exhilarating, and Tocarica even came to enjoy exploring the new regions through which she passed. In the Altai, however, she encountered a congeries of awesome opponents who had preceded her in the march across the steppes.

Once again caught in a pincers movement, this time with mighty Indo-Iranian breathing hotly down her neck from behind and seasoned nomads glaring at her balefully from the front, Tocarica was desperate. She had no choice but to dash through the passes and mountain valleys between the Tängri Tagh and the Altai. Frantic, she ran as fast as her little pseudopods could carry her down the only available path of escape.

Miraculously, Tocarica sneaked out of the way just as the irresistible Iranian amoeboid tide washed all the way across the steppes and down into the heartland of China, its potent pseudopods even probing as far as Southeast Asia. Gasping to catch her breath, Little Tocarica gradually collected her wits and took stock of the situation in which she found herself. The first thing she realized is that the place seemed to be destitute of human presence. When she looked more closely, she realized why: this was desert country, not at all like the grassy steppes which she had been travelling for the last thousand years. Although it was bleak and inhospitable, at least she would not have to compete with others for this land; no one else wanted it just then. Furthermore, she had brought her livestock, extraordinary weaving skills, and metalworking talent with her. Thus, Tocarica's precipitous flight to the desolate Tarim Basin turned out to be fortuitous. She was saved—for the time being.

Day after day, Tocarica eked out a living from the dry, sandy soil that she learned how to irrigate with water flowing down from the surrounding mountain glaciers. She carved out a space for herself around the northern edges of the formidable Täklimakan Desert, and may even have sent out a pseudopod across the barren wilderness of the Qumtagh Desert to plunge deep into the Gansu Corridor. Eventually, Tocarica (along with later arrivals like the Scythians, Khotanese, Sogdians, and various Turkic peoples) would develop the Tarim Basin into one of the most strategically important regions of Central Asia.

Despite her chronic weakness, Tocarica prospered sufficiently to multiply into three separate *Sprachamöben*, or perhaps she split up because she was so feeble that she could no longer remain unified. Too depleted to think of anything more imaginative, she named her children A (the oldest), B, and runt C. (She had never really chosen a proper name for herself either, Tocarica apparently being her nickname, although some say that her real name was Ārśi and others say that it was Kuśi.)

Finally, little Tocarica's brood were overwhelmed by the rigors of the environment and a host of implacable enemies. First came the Hun *Sprachamöbe* who forced the most easterly Tocharian descendant to beat a hurried retreat all the way to Bactria and Ferghana where he encountered some Iranian *Sprachamöben* (third cousins twice removed). Although he still had enough of his senses left about him to organize them into what became the mighty Kushan Empire, he had made the same mistake as the Gothic pseudopod would several centuries later. He had forgotten to take his nucleus with him or even to devise some means to keep up communication with it. Once ensconced in Bactria and Ferghana and cut off from his nucleus, he was simply absorbed by the Iranian *Sprachamöben.*

If the Huns had delivered the first blow that left the descendants of Tocarica reeling, the Turks finished them off. By around the beginning of the second millennium CE, Tocarica and all of her offspring had perished.

It is a tragic tale, but one not without deep emotion and ardent passion. From her very first excursions toward the distant east, Tocarica displayed an admirable curiosity about places unexplored and things unknown. In spite of her congenital frailty, she survived for thousands of years in remote wildernesses, separated from her kith and kin. She was a true pioneer, a genuine heroine, one for whom we may shed tears of sorrow and shout forth cries of exultation. It is in no small measure due to her epic journey, her insatiable *Wanderlust,* and the relics she left for posterity that we are now able to piece together the history of her entire family. *Requiescat in pace,* O *Sprachamöbe* Tocarica!

FINIS

With apologies to *Compton's* and *Britannica,* and thanks to Elfriede and Georg Knauer, Asko Parpola, Douglas Q. Adams, Elizabeth J. W. Barber, W. South Coblin, John Colarusso, James P. Mallory, Henry Hoenigswald, Donald Ringe, and Edgar C. Polomé.

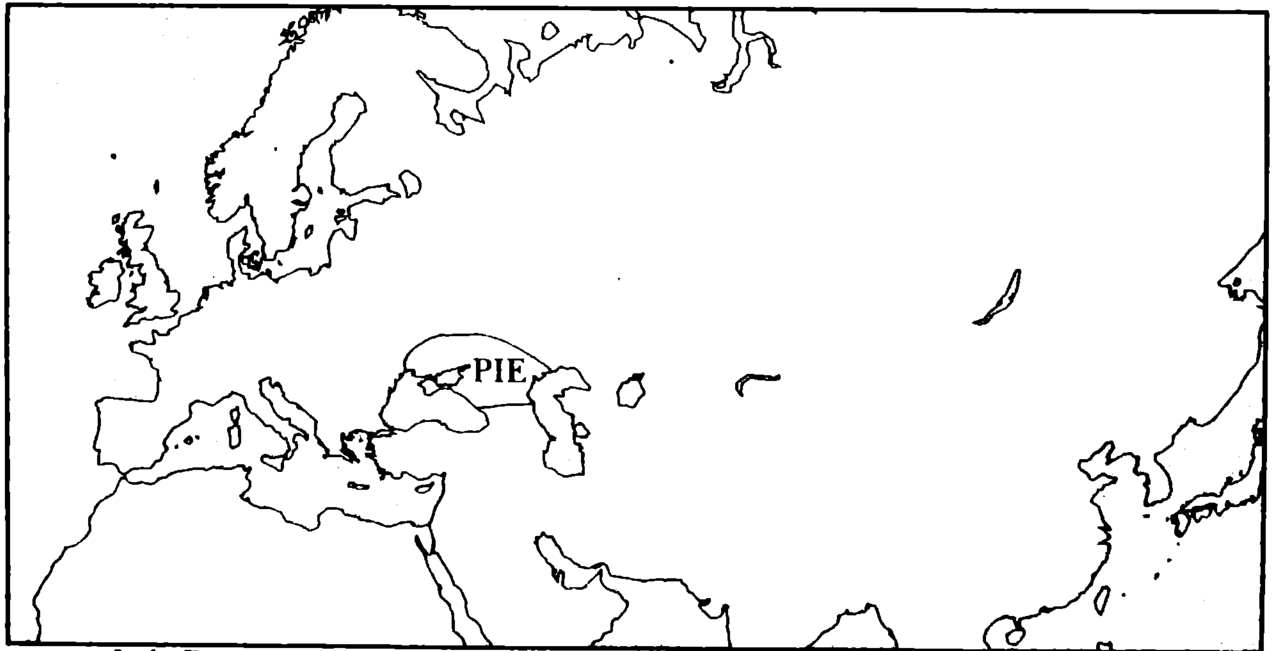
Afterword

The first version of this parable placed the PIE homeland in a wide band stretching from the northwest shore of the Black Sea to

Jutland; the core of this homeland lay in southern Germany, northern Austria, and the western part of what is now the Czech Republic. I was prompted to choose such a hypothetical homeland chiefly on archeological (Corded Ware Culture + Balkan-Danubian Complex) and genetic (demic diffusion from the southwest intersecting the core at 4500 BCE) grounds. Unfortunately, such a homeland was not well suited to the overall linguistic evidence. Inasmuch as the problem of the Indo-European homeland is first and foremost a matter of language, I decided in this second version to give precedence to linguistic criteria. In general, the results are much more satisfying, not just for language *per se*, but for virtually all other aspects of the problem.

Many friends offered helpful criticism after reading the first draft of the parable and maps. I am profoundly grateful to each of them for pointing out areas where they had reservations concerning both the text and the maps. Although it would have been impossible for me to incorporate all of their suggestions (because some of them were in conflict with each other), I have done my best to accommodate their concerns while retaining the integrity of my conception which strives to take into account all of the types of data enumerated in the seventh paragraph of the text. Therefore, I deeply appreciate all of the sage advice so generously proffered, yet I alone must take full responsibility for the totality of the parable, diagrams, and maps. The primary intent of this exercise, from its very inception, was to stimulate discussion. Judging from the excellent and abundant feedback that I have already received, it has amply served its purpose.

Victor H. Mair, editor



Map I. Indo-European Expansions, 4200 BCE. This map does not represent the very earliest beginning of PIE. For that, cf. the schematic map in Fig. 3, which shows PIE at around 4500 BCE (already expanded from a still smaller nuclear center which coalesced at about 5000 BCE). PIE in Map I is still largely undifferentiated, although incipient Pre-Proto-Anatolian is beginning to emerge in the southwest quadrant of the homeland and northwest of that lies incipient Pre-Proto-Tocharian at an even more inchoate stage.

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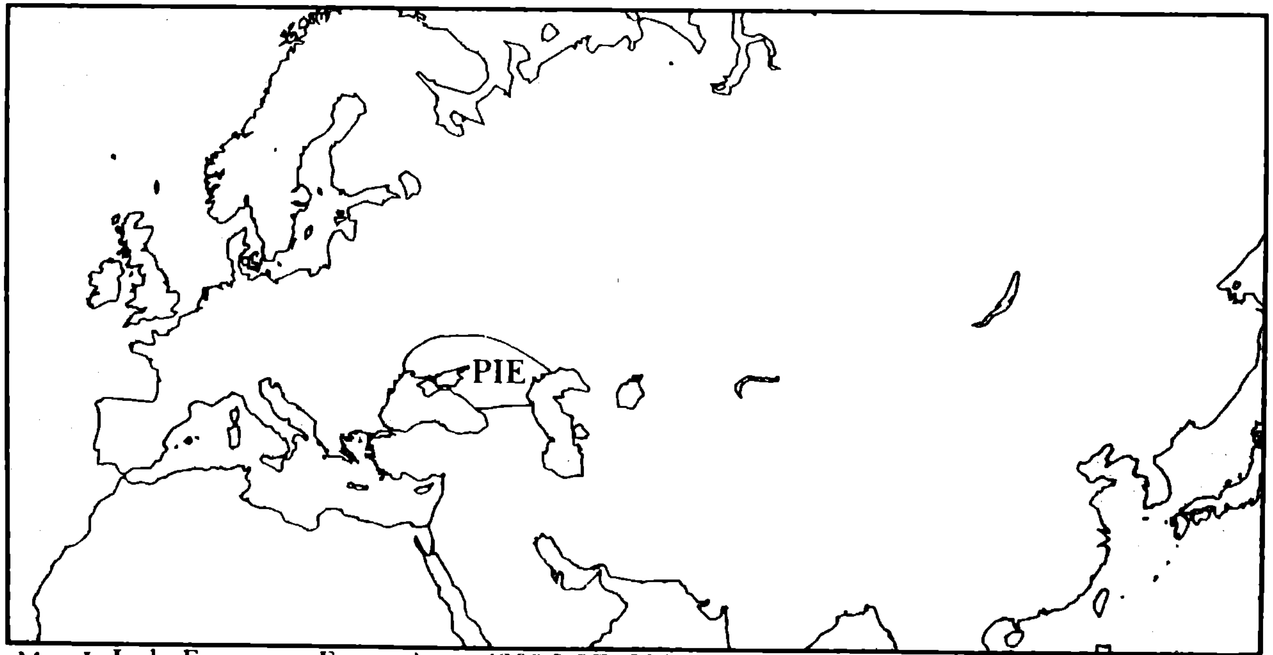

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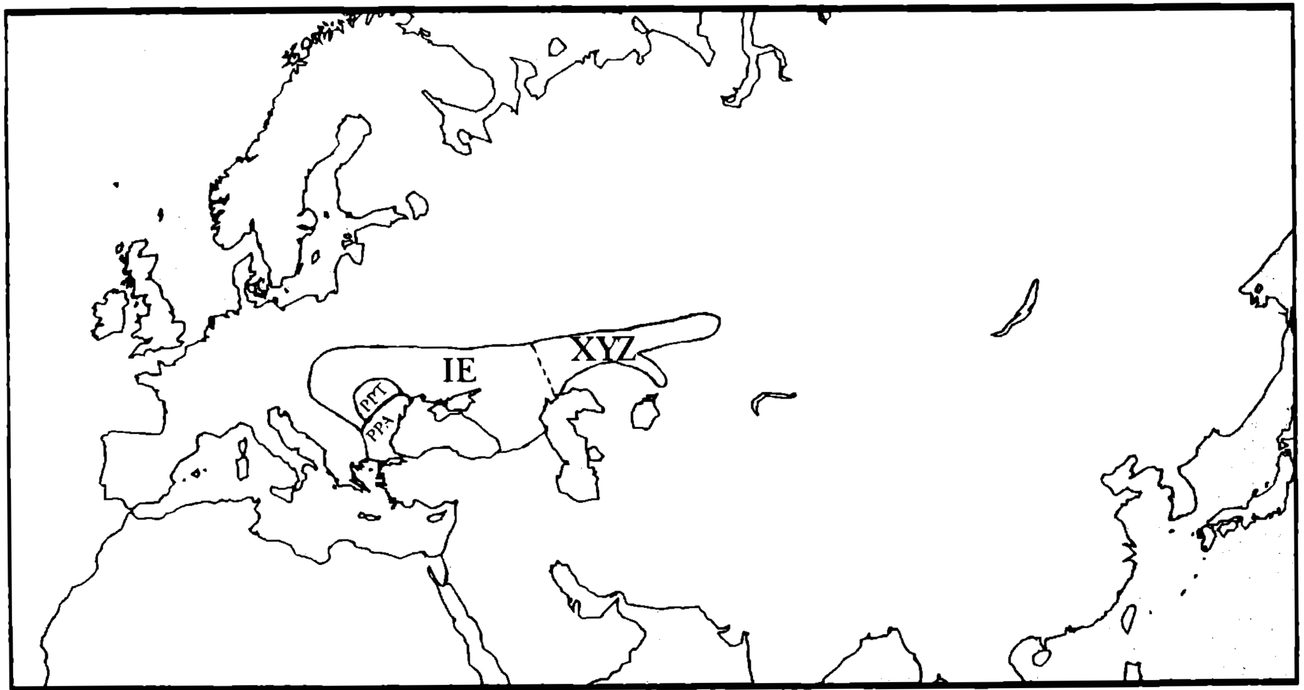

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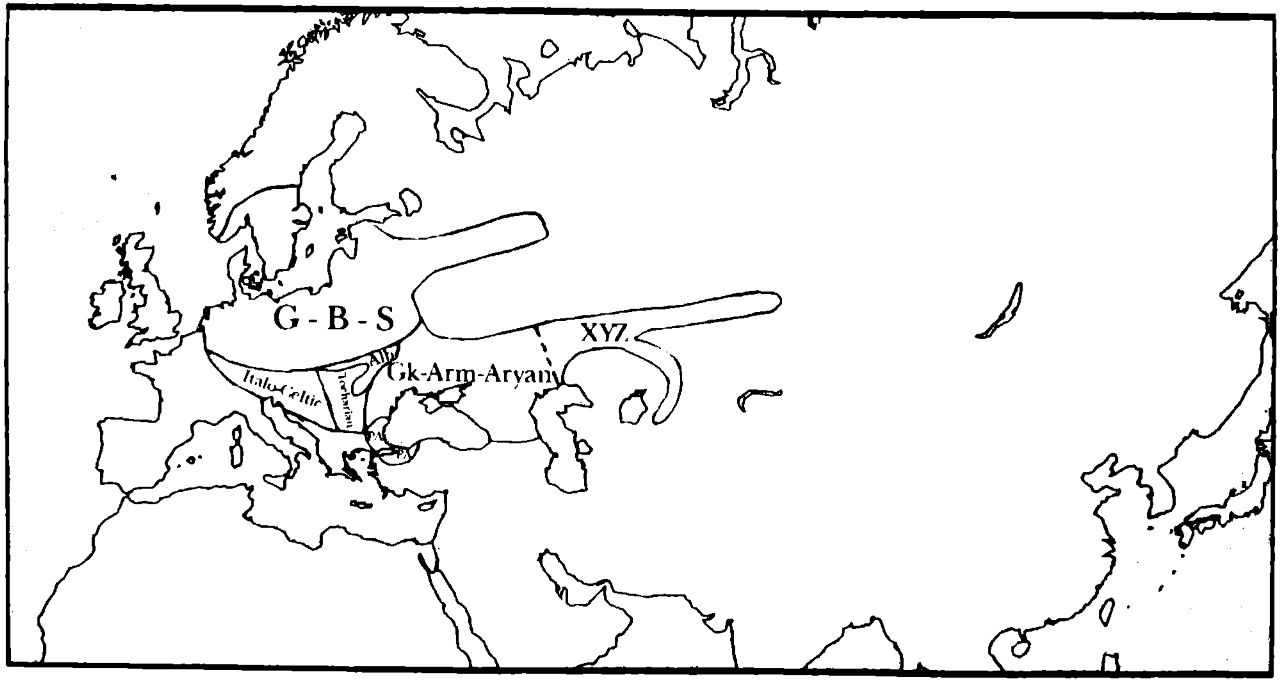
Map II. 3700 BCE. PPA=Pre-Proto-Anatolian. PPT= Pre-Proto-Tocharian. X, Y, and Z signify a series of cultures such as Andronovo and Afanasievo whose languages cannot readily be determined. It is conceivable that they might have been non-Indo-European-speaking Europoids, but that is highly unlikely because these were nomadic steppe cultures in which the horse (first bitted and ridden by Indo-Europeans) played a central role and because they bear resemblances (metal implements, pottery, burial practices, etc.) to Iranian and other IE groups emanating from the west. The boundary between XYZ and the rest of the IE family, represented on the map by a dotted line, is indefinite.



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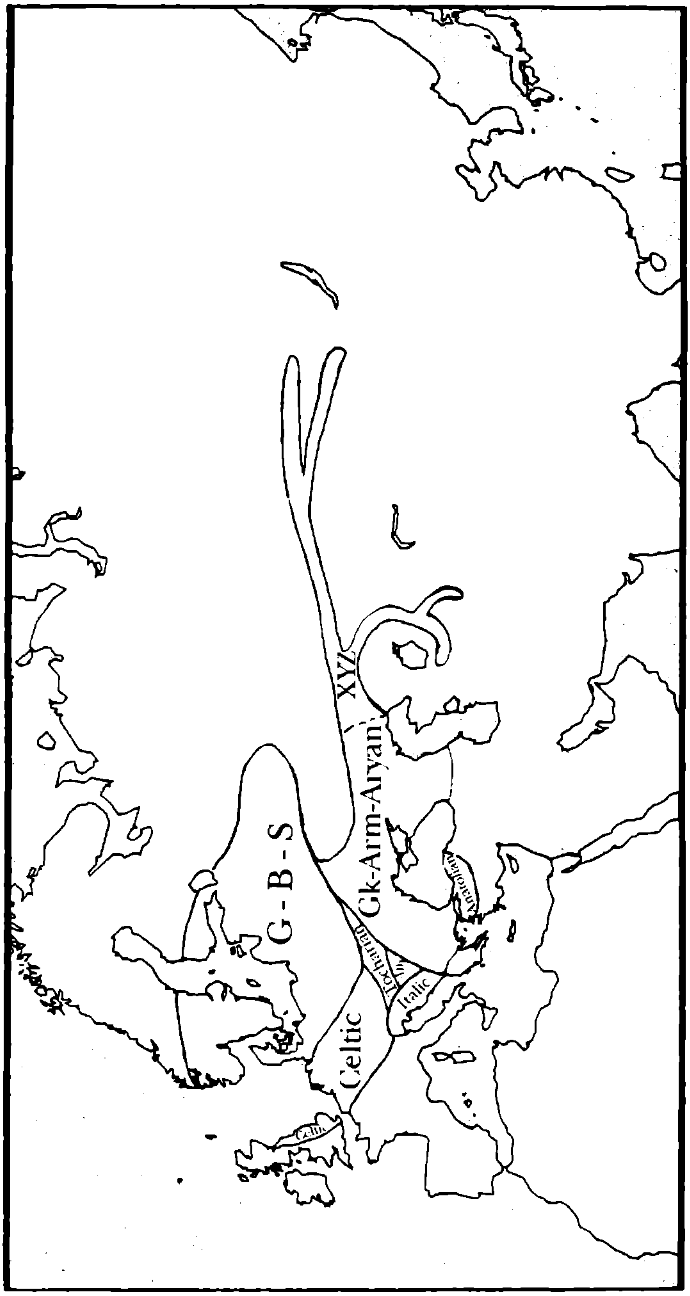
Map III. 3200 BCE. PA=Proto-Anatolian. G-B-S=Germano-Balto-Slavic. Alb=Albanian. Gk-Arm-Aryan=Greco-Armeno-Aryan. At this stage, Albanian and Greco-Armeno-Aryan, especially the latter, are still in their pre-proto-forms and have not yet fully evolved as discrete linguistic entities. The contorted boundary between Tocharian and nascent Albanian is the result of pressure from the west in the form of Italo-Celtic, pressure from the east in the form of Greco-Armeno-Aryan, a massive Germano-Balto-Slavic block to the north, and uninviting mountains to the south.



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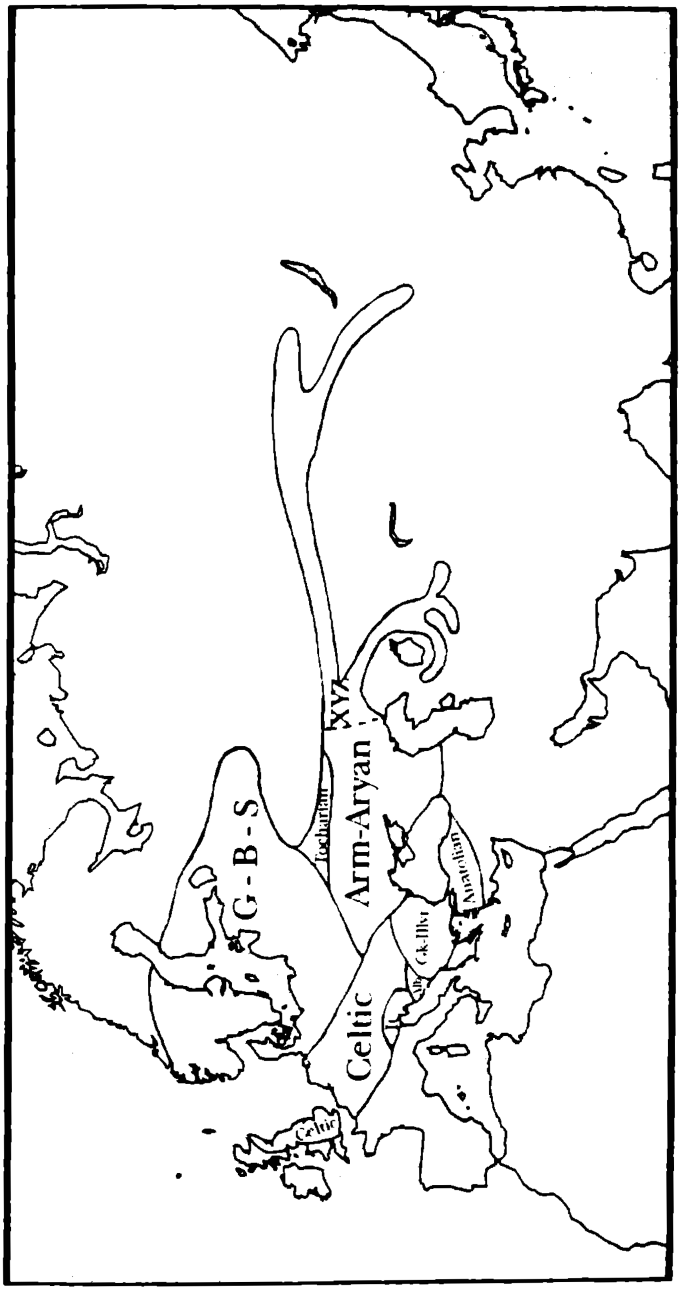
Map IV. 3000 BCE



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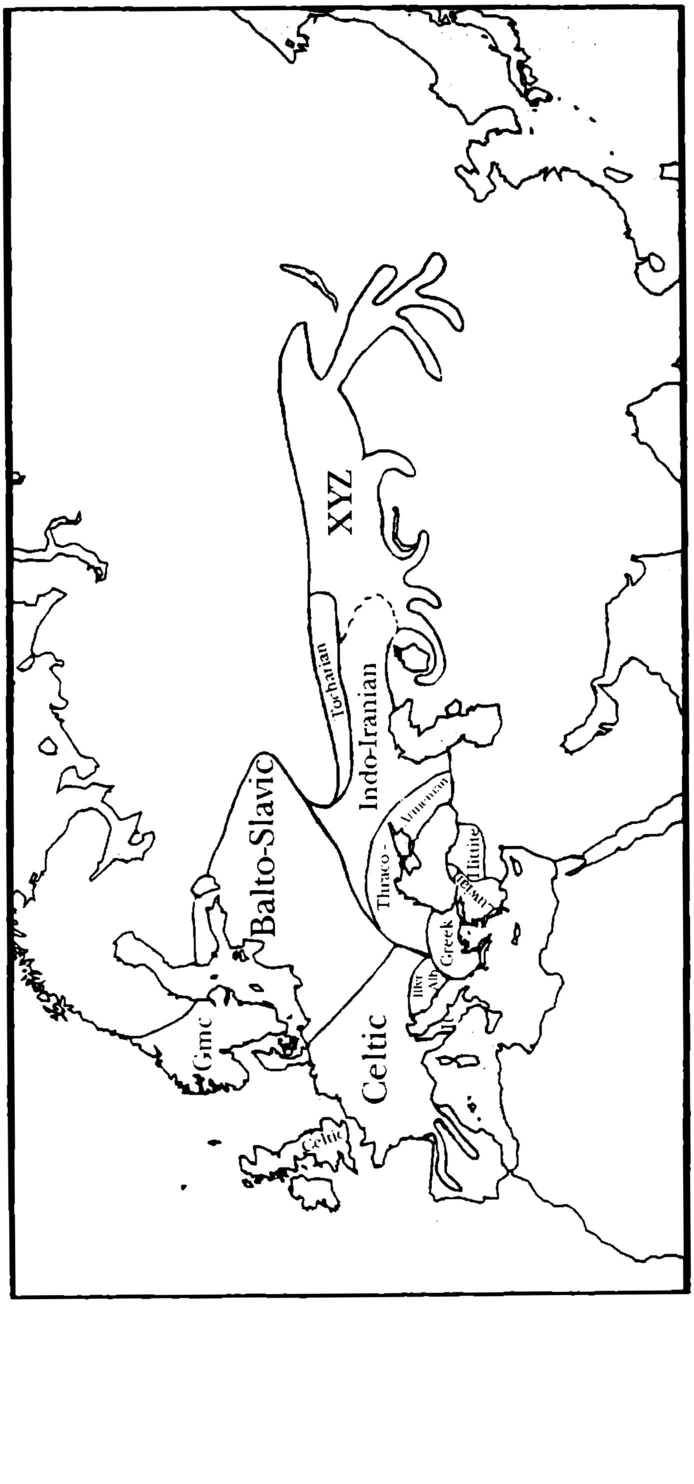
Map V. 2500 BCE. Gk-Illyr=Greco-Illyrian. "Illyrian" stands for a mixed, indeterminate group of nascent languages.



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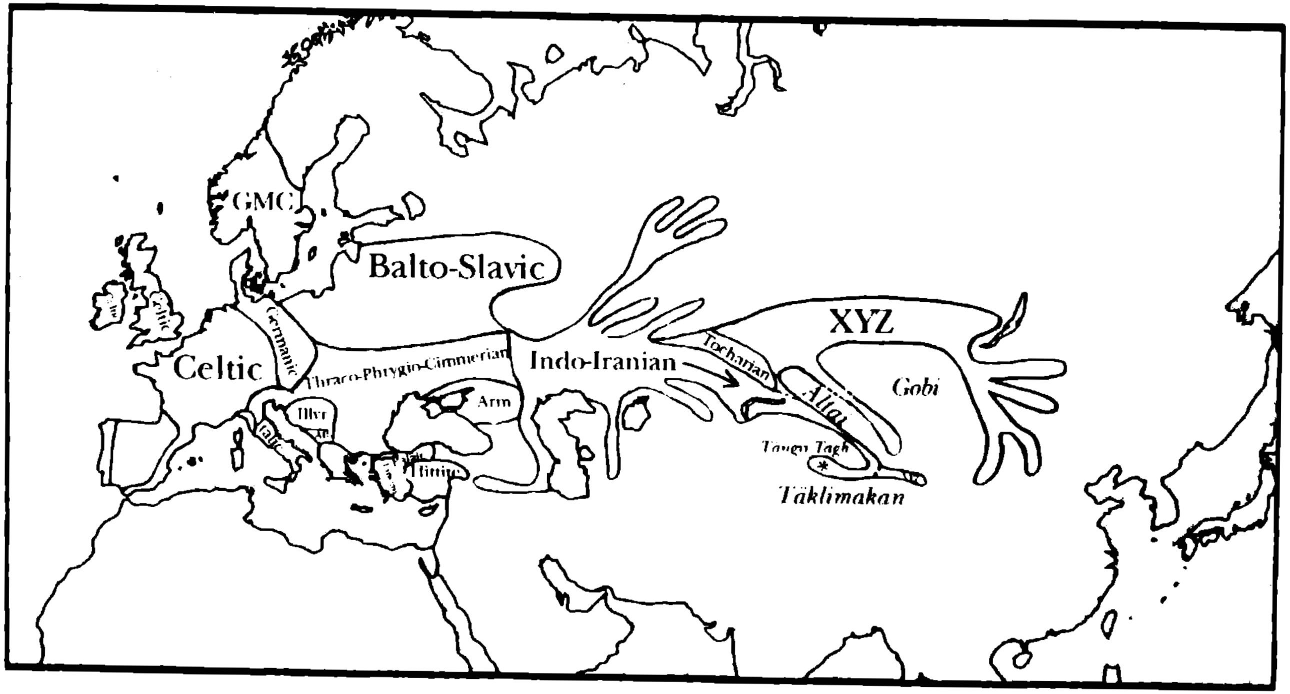
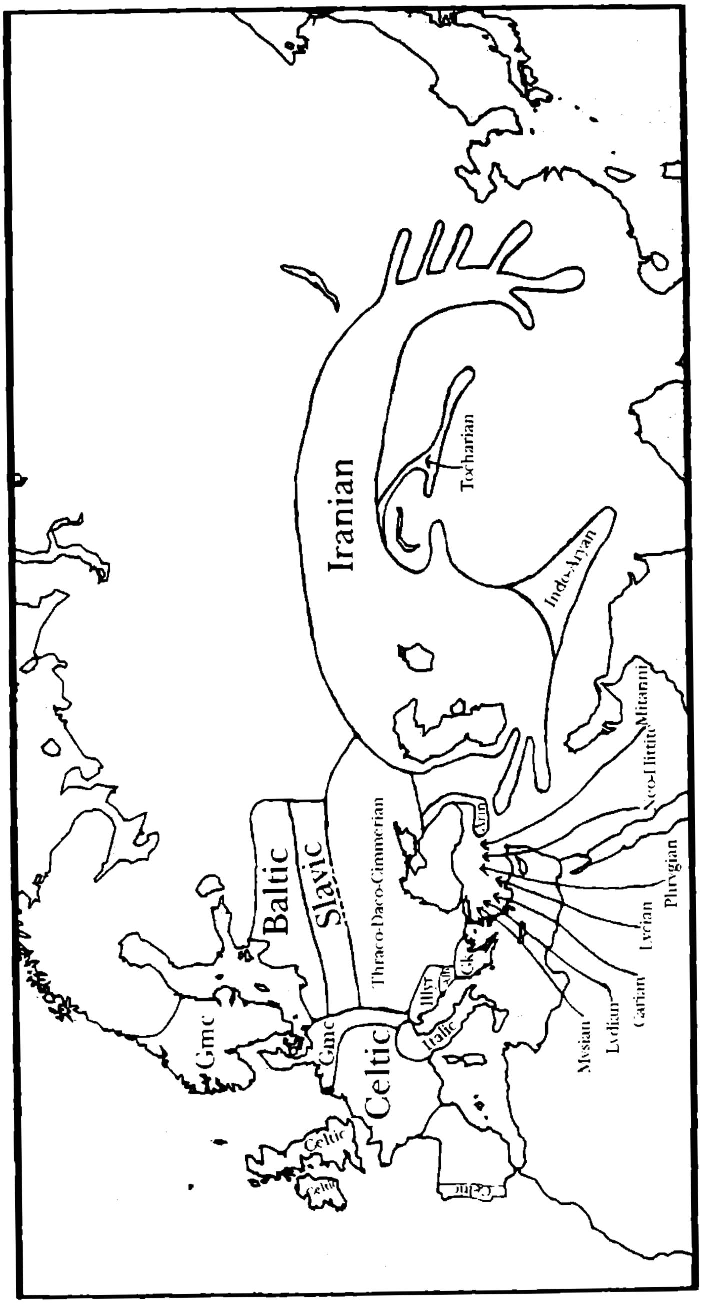
Map VI: 2000 BCE.



Map VII. 1500 BCE. The names of important geographical features (mountains and deserts) in Central Asia are written in italic letters. The asterisk indicates the first outliers of Tocharian in the Tarim Basin.



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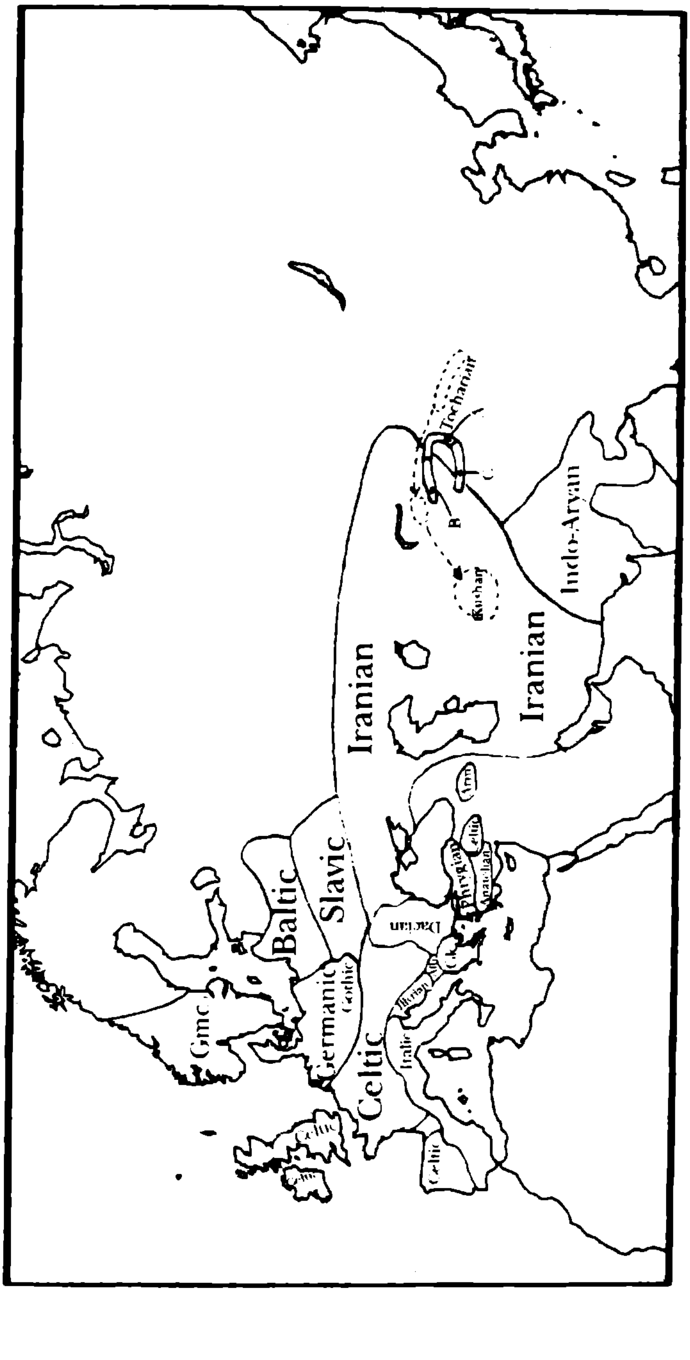
Map VIII. 1000 BCE



Map IX. Circa 100 BCE. A, B, and C are the various "dialects" of Tocharian. The Kushans were Iranized Tocharians or XYZ-type remnants displaced from the western reaches of China. The dotted lines and arrows indicate their locations and movements which began before the time indicated on the map.

Appendix

Place, People, and Site Names of the Uyghur Region
Pertinent to the Archeology of the Bronze Age and Iron Age

Compiled by: Victor H. Mair & Dolkun Kamberi
Philadelphia

Because of the proliferation of variant transcriptions and transliterations for proper nouns pertaining to the history, ethnography, and archeology of Eastern Central Asia, it is essential that certain terminological standards be established. Therefore, we have drawn up this list of place, people, and site names. Our suggested standards are given in the third column. Occasionally, well-known traditional spellings are also given after a semi-colon. The first spelling is always the preferred one.

The transliteration system for Uyghur and other non-Sinitic scripts in this list follows Edward Allworth's *Nationalities of the Soviet East: Publications and Writing Systems* (New York and London: Columbia University Press, 1971) with slight modifications (e.g., ž → zh). For Chinese characters, this list adopts the "Chinese Phonetic Alphabet System" (Pinyin) used in Mainland China at present. Entries are listed in strict alphabetical order. **Corrections, comments, and additions are welcome.**

Pinyin System	Chinese Characters	Original/Common Usage
Abulale Shan	阿布拉勒山	Abral Mountain
Adongquelu	阿冬雀鲁	Altun Chor
A'erbalike	阿尔巴里克	Arbaliq
A'erjin Shan	阿尔金山	Altun Mountains
A'erkate	阿尔卡特	Arkat
A'erxiate	阿尔夏特	Arshat
Aga'ersen	阿尕尔森	Agharsin
Aheqi Xian	阿合奇县	Aqchi County
Aidinghu	艾丁湖	Ayding Lake
Aisentuoleha	艾森托勒哈	Asinturakh
Ajinlale Shan (?) (see Abulale Shan)		
Akereke	阿克热克	Aqerek
Akesebole Gucheng	阿克色伯勒古城	Ancient Aqsepil City
Akesu Diqu	阿克苏地区	Aqsu District
Akesu Shi	阿克苏市	Aqsu City; Aksu
Aketala	阿克塔拉	Aqtala
Aketao Xian	阿克陶县	Aqtu County
Alagou	阿拉沟	Alwighul; Alghuy; Alghu

Aletai	阿勒泰	Altay; Altai
Aletai Diqu	阿勒泰地区	Altay District
Aletai Shi	阿勒泰市	Altay City
Alimali Gucheng	阿力玛力古城	Ancient Almalik City
Anxi	安西	An-hsi
Asitana	阿斯塔那	Astana
Atushi Shi	阿图什市	Atush City; Artush
Awati Xian	阿瓦提县	Awat County
Bachu Xian	巴楚县	Maralbeshi County
Baicheng Xian	拜城县	Bay County
Baishan	白山	Aq Tagh; White Mountain
Balikun Xian	巴里坤县	Barkōl County
Banjiegou	半截沟	Penjighul
Banshan Wenhuaxiang	半山文化相	Yartagh Phase
Baozidun	包孜墩	Bozdōng
Bashixia'er	巴什夏尔	Washshāhär
Bayandai Xiang	巴彦岱乡	Bayanday Village
Bayinguoleng Diqu	巴音郭楞地区	Bayingholin District
Beiting Gucheng	北庭古城	Ancient Beshbalik City
Beiyugou	北峪沟	Beyirghul
Bo'ertala Diqu	博尔塔拉地区	Bōrtala District
Bogedaqin	博格达沁	Bughdachin
Bogeda Shan	博格达山	Bughda Mountain; Bogda
Bohu Xian	博湖县	Baghrash County
Bole Shi	博乐市	Bōrtala City
Boma (?)	波马 (?)	(?)
Bozikelike Qianfodong	伯孜克里克千佛洞	Bezäklik Buddhist Caves; Bäzäklik; Bezeklik
Bu'erjin	布尔津	Burjin
Cele Xian	策勒县	Chira County; Cheriyā
Chabucha'er Xian	察布查尔县	Chapchal County
Chabugan	查布干	Chapqan
Chaiwopu	柴窝堡	Otanliq
Changji Shi	昌吉市	Sanji City
Changji Xian	昌吉县	Sanji County
Chaqimale (see Qiaqimale)		
Chawuhugoukou	察吾呼沟口	Charwighul Pass
Che'erchen He	车尔臣河	Chärchān River
Dabancheng	大板城	Dawanching
Dacaotan	大草滩	Chong Yaylaq
Dalang Kan'er	大浪坎尔	Dalan Kariz
Dawo'er	达斡尔	Daghur
Dawo'er Ren	达斡尔人	Daghur People
Dawo'er Zu	达斡尔族	Daghur Nationality
Dishui	地水	Tamchā
Dongcheng Zhen	东城镇	Ulanbay Township
Dongfeng Cheng	东风城	Shamal Känt; (Shärq) Shamal; East Wind City
Duhu Cheng	都护城	Tutuq Shāhär
E'erjisi He	额尔济斯河	Kara Irtish River
Emin Xian	额敏县	Dōrbiljin County

Fuhai Xian	福海县	Burultoqay County
Fukang Xian	阜康县	Fukang County
Fuwen Xian	富蕴县	Kõktoqay County
Gansu	甘肃	Kangsu; Gānsu; Kansu
Gaochang	高昌	Īdiqut; Īdiqut Shāhār; Kocho; Qocho; Qočo
Gaochang Gucheng	高昌古城	Ancient Īdiqut City
Gaochang Ren	高昌人	Īdiqut People
Gongliu Xian	巩留县	Toquztara County
Gongnaisi He	巩乃斯河	Kūnās River
Gumugou	古墓沟	Qāwrighul
Haba He	哈巴河	Haba River
Haba He Xian	哈巴河县	Haba County
Haiyang (see Yanghai)		
Haladun	哈拉敦	Qaradõng; Karadong
Halahezhuo	哈拉/喇和卓	Qarakhoja
Halamodun	哈拉莫墩	Qaramut; Karamut
Halatubai	哈拉图拜	Qaratõpā
Halayu(er)gong	哈拉玉(尔)公	Qarayulghun
Hami Diqu	哈密地区	Qumul District
Hami Shi	哈密市	Qumul City; Komul; Kumul
Hasake	哈萨克	Kazakh; Kazak, Kazaq
Hasake Ren	哈萨克人	Kazakh People
Hasake Zu	哈萨克族	Kazakh Nationality
Hebukesai'er Xian	和布克赛尔县	Qobuqsar County
Heishantou	黑山头	Qara Mountain
Hejing Xian	和静县	Khotunsumbul County
Heshuo Xian	和硕县	Khoshut County
Hetian Diqu	和田地区	Khotan District; Hotan
Hetian Shi	和田市	Khotan City; Hotan
Hetian Xian	和田县	Khotan County
Hongqi Jixiechang	红旗机械厂	Qizil Bayraq Factory; Red Flag Factory
Hongqiu	红丘	Qizilchoqa; Red Hillock
Huayuanzi	花园子	Gūl Bagh; Flower Garden
Huihe	回纥	Uyghur; Uygur
Huihu	回鹘	Uyghur; Uighur; Uigur
Huocheng Xian	霍城县	Qorghas County; Korgas; Horgas
Hutubi Xian	呼图壁县	Qutubi County
Jiaohe	交河	Yarghul; Yarkhoto
Jiaohe Gucheng	交河古城	Ancient Yarghul City
Jiashi Xian	伽师县	Pāyzawat County
Jimunai Xian	吉木乃县	Jemināy County
Jimusa'er Xian	吉木萨尔县	Jimsar County
Jingbulake (see Qingbulake)		
Jinghe Xian	精河县	Jing County
Ka'er (see Xi Kan'er Cun)		
Ka'erdun Xiang	喀尔墩乡	Qaradõng Village
Ka'ersang	喀尔桑	Qaraūzhmā
Ka'erzi (see Kan'erzi)		

Kageqiake	喀格恰克	Qaghichaq; Qaghachaq
Kaidu He	开都河	Qutuq River
Kalakunlun	喀拉昆仑	Qaraqurum
Kalama	喀拉麻	Qarama
Kan'erzi	坎儿子	Kariz; Karez
Kashi Diqu	喀什地区	Qāshqār District
Kashika'er He	喀什喀尔河	Qāshqār River
Kashi Shi	喀什市	Qāshqār City; Kashgar
Kebokeyuzi Xiang	克伯克圩孜乡	Kipākyüzi Village
Ke'erjisi	克尔济斯	Kirchis
Ke'erkezi	柯尔克孜	Kirghiz; Kyrgyz
Ke'erkezi Ren	柯尔克孜人	Kirghiz People
Ke'erkezi Zu	柯尔克孜族	Kirghiz Nationality
Ke'ermuqi	克尔木齐	Keremchi
Kekenaike (see Kageqiake)		
Kekezibeixi	科克孜贝希	Qiriqqiz Beshi
Kelamayi Shi	克拉玛依市	Qaramay City
Keping Xian	柯坪县	Kālpin County
Keyoukeqin	克尤克沁	Kuyukchi
Kezi'erkaha/ga Qianfodong	克孜尔喀哈/尕千佛洞	Qizilqagha Buddhist Caves
Kezi'er Qianfodong	克孜尔千佛洞	Qizil Buddhist Caves; Kyzil; Kizil
Kezi'erqueqia	克孜尔确恰	Qizilchoqa
Kezilesu Diqu	克孜勒苏地区	Qizilsu District
Kongque He	孔雀河	Kōnchi River; Peacock River (N.B.: The real meaning of Uyghur *könchi* is "leather worker".)
Koumenzi	口门子	Qowuq; Namdawan
Kuche	库车	Kucha; Kuchar, Kuqar; Kusān (Uyghur pronunciation of the ancient name of this city); Qiuci
Kuche Xian	库车县	Kucha County; Kuqar
Kuerle	库尔勒	Korla
Kuerle Shi	库尔勒市	Korla City
Kuisu	奎苏	Küysu; Kirsu
Kuitun Shi	奎屯市	Küytun City
Kuluke	库鲁克	Quruk
Kumutula Qianfodong	库木吐拉千佛洞	Qumtura Buddhist Caves; Kumtura
Kunlun	昆仑	Qurum
Lafuqiaoke	拉甫乔克	Lapchuq
Lafuqiaoke Gucheng	拉甫乔克古城	Ancient Lapchuq City
Lanzhouwanzi	兰州湾子	Kök-turaq
Lianmuqin	连木沁	Lāmjin
Linchang	林场	Ormanlik Māydan; Tree Farm
Loulan	楼兰	Krorān (Kir'uran); Kroraina; Kroran
Lukeqin Zhen	鲁克沁镇	Lükchün Township

Luntai Xian	轮台县	Būgūr County
Luobubo	罗布泊	Lopnur; Lopnor
Luopu Xian	洛浦县	Lop County
Machang Leixing	马厂类型	Machang Type
Maigaiti Xian	麦盖提县	Mākit County
Majiayao Wenhua	马家窑文化	Majiayao Culture
Malikewate Gucheng	玛利克瓦特古城	Ancient Mālikā Hawat City
Manasi Xian	玛纳斯县	Manas County
Maza'erbaihe Qianfodong	玛扎尔百赫千佛洞	Mazar Beghi Buddhist Caves
Menggu	蒙古	Mongghul; Mongol; Mongolia
Menggu Bao	蒙古包	Yurt
Menggu Ren	蒙古人	Mongolian
Menggu Zu	蒙古族	Mongol Nationality
Milan Gucheng	米兰古城	Ancient Miran City
Minfeng	民丰	Niyā
Minfeng Xian	民丰县	Niyā County
Miquan Xian	米泉县	Mingbulaq County
Moyu Xian	墨玉县	Qaraqash County
Mulei Xian	木垒县	Muri County
Naileleke	乃里勒克	Lālilik
Nanshan Qu	南山区	South Mountain District
Nanwan	南湾	South Bend
Nileke Xian	尼勒克县	Nilqa County
Niya	尼雅	Niyā; Caḍh'ota
Nulasai	努拉赛	Nurasay
Pishan Xian	皮山县	Guma County
Qiaqimale	恰其玛勒	Chaychi Mālā
Qiemo Xian	且末县	Calmad(ana); Chārchān County; Cherchen
Qigeman	奇格曼	Chākmān
Qijia Wenhua	齐家文化	Qijia/Ch'i-chia Culture
Qijiaojing	七角井	Yetā Quduq
Qijiaojing Wenhua	七角井文化	Yetā Kuduq Culture
Qikeman (see Qigeman)		
Qin Cheng	沁城	Tashweliq
Qingbulake	青布拉克	Chin(g)bulaq
Qinghe Xian	清河县	Chinggil County
Qitai Xian	奇台县	Guchung County
Quelu Wen	却卢文	Kharoṣṭhī Script; Kharoshthi; Karoshti
Quhui	曲慧	Chuqu; Chūhui; Ch'ū-hui
Qunbake	群巴克	Chong Bagh
Resikamu	热斯卡木	Risqim
Ruoqiang Xian	若羌县	Charqilik County; Charklik
Ruzhi (often pronounced Rouzhi)	月氏/支	Ju-chih; Yüeh-chih
Sai	塞	Saka
Sai Ren	塞人	Saka People
Sai Zu	塞族	Saka Nationality

Senmusanmu Qianfodong	森木散姆千佛洞	Simsin Buddhist Caves
Shache Xian	莎车县	Yäkän County
(N.B.: Shache is traditionally pronounced Suoju)		
Sha'erdun (?) (see Ka'erdun)		Ancient Weixu (?)
Shajing Wenhua	沙井文化	Qumquduq Culture
Shanpula	山普拉	Sampul
Shanshan Xian	鄯善县	Pichan County
Shaquanzi	沙泉子	Qumbulaq
Shawan Xian	沙湾县	Sawan County
Shaya Xian	沙雅县	Shayar County
Shayibake Qu	沙依巴克区	Saybagh District
Shengjinkou Qianfodong	胜金口千佛洞	Singgim Buddhist Caves; Sängim
Shirenzi	石人子	Sintash
Shirenzi Gou Cun	石人子沟村	Sintash Känti
Shitou Cheng	石头城	Tash Baliq
Shufu Xian	疏附县	Qäshqär-Konashähär County
Shuimo Gou	水磨沟	Shimgu District
Shule Xian	疏勒县	Yengishähär County
Sidaogou	四道沟	Tört Erik
Sijitai Ren	斯基泰人	Scythian
Sipu	四堡	Tört Döng
Subashi	苏巴什	Subeshi
Suiyuan	绥远	Südüng
Suodunbulake/ge	索敦布拉克/格	Sudöngbulaq; Sodunbulaq
Sute	粟特	Soghda; Sogdia
Sute Ren	粟特人	Soghdian; Sogdian
Tacheng Diqu	塔城地区	Tarbaghatay District
Tacheng Ren	塔城人	Chöchäk People
Tacheng Shi	塔城市	Chöchäk City
Taitai'er Qianfodong	台台尔千佛洞	Tatar Buddhist Caves
Tajike	塔吉克	Tajik
Tajike Ren	塔吉克人	Tajik People
Tajike Zu	塔吉克族	Tajik Nationality
Takelamagan	塔克拉马干	Täklimakan; Taklamakan
Takelamagan Ren	塔克拉马干人	Täklimakanian
Takelamagan Shamo	塔克拉马干沙漠	Täklimakan Desert
Talimu	塔里木	Tarim
Talimu He	塔里木河	Tarim River
Talimu Pendi	塔里木盆地	Tarim Basin
Talimu Ren	塔里木人	Tarim People
Tashiku'ergan	塔什库尔干	Tashqurghan
Tashiku'ergan Xian	塔什库尔干县	Tashqurghan County
Tata'er	塔塔尔	Tatar
Tata'er Ren	塔塔尔人	Tatar People
Tata'er Zu	塔塔尔族	Tatar Nationality
Tegelisuman (?) (see Tiekailü Gou)		
Tekesi	特克斯	Tekäs; Tekes
Tekesi Xian	特克斯县	Tekäs County
Tian Chi	天池	Tängri Köl; Heavenly Lake

Tianshan	天山	Tängri Tagh; Heavenly/Celestial Mountains; T'ien-shan; T'ien Shan; Tian Shan
Tianshan Qu	天山区	Tängri Mountain District
Tieban He	铁板河	Töwän (Lower) River; Tö[r]ban River
Tiekailü Gou	铁开吕沟	Tikänghul; Tikänlik Jilghsi
Tiemulike	铁木里克	Tömürlük
Tieresigai	铁热斯盖	Teriskäy
Tu'ergen	图尔根	Turghun
Tuhuoluo	吐火罗	Tokhara; Tocharia
Tuhuoluo Ren	吐火罗人	Tokharian; Tocharian
Tujue	突厥	Türki; Turki[c]
Tulufan	吐鲁番	Turpan; Turfan
Tulufan Diqu	吐鲁番地区	Turpan District
Tulufan Pendi	吐鲁番盆地	Turpan Basin
Tulufan Ren	吐鲁番人	Turpan People
Tulufan Shi	吐鲁番市	Turpan City
Tuokelake Xiang	托克拉克乡	Toghraq Village
Tuokexun Xian	托克逊县	Toqsun County; Toksun
Tuokezake	托克扎克	Toqquzaq (Nine Saka[?])
Tuokuzishalai Gucheng	脱库孜莎来古城	Ancient Tokuz Saray City
Tuoli Xian	托里县	Toli County
Tuyugou Qianfodong	土峪沟千佛洞	Tuyuq Buddhist Caves; Toyuk; Toyok
Weihe	畏纥	Uyghur; Uygur
Weili Xian	尉犁县	Lopnur County
Weisheng Xuexiao	卫生学校	Nursing School
Weiwu'er	畏兀尔	Uyghur
Weiwu'er	维吾尔	Uyghur; Uygur; Uighur
Weiwu'er Ren	维吾尔人	Uyghur People
Weiwu'er Zu	维吾尔族	Uyghur Nationality
Wenbaxi Qianfodong	温巴西千佛洞	Onbeshi Buddhist Caves
Wenquan	温泉	Arshang; Hot Springs
Wenquan Xian	温泉县	Arshang County
Wensu Xian	温宿县	Aqsu-Konashähär County
Wulabo	乌拉泊	Ulanbay
Wulabo Gucheng	乌拉泊古城	Ancient Ulanbay City
Wulumuqi	乌鲁木齐	Ürümchi; Urumchi; Urumtsi; Ürümqi
Wulumuqi Shi	乌鲁木齐市	Ürümchi City
Wulumuqi Xian	乌鲁木齐县	Ürümchi County
Wupa'er	乌帕尔	Upal; Opal
Wupa'er Xiang	乌帕尔乡	Upal Village
Wupu Shuiku	五堡水库	Qaradöwä Reservoir
(N.B.: Wupu is usually mispronounced as Wubao.)		
Wupu Xiang	五堡乡	Qaradöwä Village
Wuqia Xian	乌恰县	Ulughchat County
Wushikate Gucheng	乌什喀特古城	Ancient Üch-Qat City
Wushi Xian	乌什县	Üch-Turpan County

Wusun	乌孙	Uysun; Wu-sun; Wo-sun
Wusu Xian	乌苏县	Shikho County; Usu; Xihu
Wuzibieke	乌孜别克	Uzbek; Özbek
Wuzibieke Ren	乌孜别克人	Uzbek People
Wuzibieke Zu	乌孜别克族	Uzbek Nationality
Xiangbaobao	香宝宝	Shambabay; Shanbabay
Xiatai Gucheng	夏台古城	Ancient Shota City
Xibo Zu	锡伯族	Shiwā Nationality; Sibo
Xi Kan'er Cun	西坎尔村	Ghārbiy Kariz Village
Xikeqin Qianfodong	锡克沁千佛洞	Shikshin Buddhist Caves
Xinhe Xian	新和县	Toqsu County
Xinjiang	新疆	New Territory; Sinkiang
Xin Shiqu	新市区	Yengi Shāhār District
Xintala	新塔拉	Yengidala; Shintala
Xinyuan Xian	新源县	Künās County
Xiongnu	匈奴	Hun; Hsiung-nu
Ya'erhu Qianfodong	雅尔胡千佛洞	Yarghul Buddhist Caves
Yamansu Kuang	雅满苏矿	Yamansu Mine
Yanbulake	焉不拉克	Yanbulaq
Yanghai	洋海	Yankhay
Yanqi	焉耆	Qarashāhār; Karashahr; Argi; Agni
Yanqi Xian	焉耆县	Qarashāhār County; Yanji
Yecheng Xian	叶城县	Qaghiliq County
Yi'erkabake	伊尔卡巴克	Yārqabaq
Yili	伊犁	Ili
Yili Diqu	伊犁地区	Ili District
Yili Zhou	伊犁州	Ili Prefecture
Yi Muchang	一牧场	Number One Pasture
Yinban (?)	因半(?)	(?)
Yingjisha	英吉沙	Yengisar County
Yingyayilake	英亚伊拉克	Yengi Yaylaq
Yining Shi	伊宁市	Ghulja City; Khul[d]ja
Yining Xian	伊宁县	Ghulja County
Yiwu	伊吾	Aratürük
Yiwu Xian	伊吾县	Aratürük County
Yuanhu	袁胡	Uyghur; Uighur
Yuantoushan	圆头山	Tüz Mountain
Yu'er Gou	鱼儿沟	Yewirghul
Yuepuhu Xian	岳普湖县	Yopugha County
Yuezhi	月氏/支	Yüeh-chih; Ju-chih
Yumin Xian	裕民县	Chaghantoghay County
Yutian Xian	于田县	Keriyā County
Zahongluke	扎洪鲁克	Zaghunluq
Zahongluke Mudi	扎洪鲁克墓地	Zaghunluq Cemetery
(N.B. Zahongluke is usually mispronounced as Zhahongluke.)		
Zhaosu Xian	昭苏县	Mongghul Kürā County
Zhongyang Chang	种羊场	Sheep/Goat Stud Farm
Zhunge'er	准葛尔	Jungghar; Dzungaria; Zungaria
Zhunge'er Pendi	准葛尔盆地	Yarish Basin; Jungghar Basin

Postface

Most of the papers in these volumes were initially delivered at the Conference on the Bronze Age and Iron Age Peoples of Eastern Central Asia, held in Philadelphia from April 19-21, 1996. The conference had a considerable impact in many respects. First and foremost, it succeeded in calling widespread attention to the hitherto poorly known peoples of prehistoric Eastern Central Asia and their cultures which are so essential for understanding the development of civilization in Eurasia.

Secondly, the conference brought together specialists from many different disciplines and nations to discuss complex and difficult problems that cannot be solved by a single approach or methodology. The conference not only served as a forum for the presentation of state-of-the-field reports on the archeology, genetics, physical anthropology, language, and other aspects of the ancient peoples of Eastern Central Asia, it also pointed the way to future research. The lively spirit of discussion among the participants has promoted a new spirit of openness toward interdisciplinary inquiry and cross-cultural investigation. The discovery and study of the ancient peoples of the heartland of Eurasia has now made it virtually impossible to view the development of early civilizations in isolation, for it is clear that they were all connected to one degree or another. The mummies of the Tarim Basin and surrounding areas constitute the nexus that ties east and west, north and south together.

Third, by demonstrating that sensitive issues concerning the origins and identities of ancient peoples can be analyzed dispassionately and objectively, the conference helped to improve the relationship of Western scholars with the Chinese authorities who are in charge of all archeological activities in the region. When the latter realized that there were no negative results from open, scientific inquiry concerning the ancient peoples of the far western portions of their country, they became much more receptive to cooperative work on the Bronze Age and Early Iron Age mummies of the region. Since the Philadelphia conference, the level and intensity of joint research permitted by the Chinese government have risen markedly.

A good example of this heightened sense of trust and cooperation is the May-June, 1997 expedition to many key archeological sites when, for the first time, I was able to take a paleopathologist to the region. Dr. Charlotte Roberts (Senior Lecturer in Biological Anthropology in the Calvin Wells Laboratory, Department of Archaeological Sciences, University of Bradford, England) is a noted authority on forensic medicine. By minutely examining the skeletons of Bronze Age and Early Iron Age inhabitants of Eastern Central Asia, she was able to glean valuable information concerning their diet, lifestyle, occupations, and health. Also accompanying us was Dr. Jeannine Davis-Kimball, an archeologist from Berkeley, California who specializes on the nomads of the Eurasian steppe. Still more remarkable was the fact that Union Pictures of London was allowed to make a film of our expedition for NOVA (the premier educational science program from WGBH [Boston]) and for Channel 4 (England).

Now that the archeology of Eastern Central Asia has become an integral component of research on the evolution of Eurasian civilization and, indeed, is playing a pivotal role in linking up previously disconnected ancient cultures of the megacontinent, the tempo of investigations has quickened. After many years, site reports are finally being published, qualified archeologists and other relevant experts from abroad are making applications to undertake investigations in the region, and more Chinese collaborators, such as the geneticist Mo Xinquan of the Institute of Developmental Biology (Chinese Academy of Sciences) and Chen Ge, one of the most highly experienced archeologists specializing on Xinjiang, are joining our research team.

Nonetheless, a vast amount of work remains to be done. The division and chronology of the ancient cultures of the region still must be clarified (e.g., the commongly cited dates for Yanbulaq, Zaghunluq, and Qaradöwä are all too high and need to be lowered by several centuries or more). Furthermore, there is urgent need for protection and conservation (human remains and priceless artifacts are strewn across cemeteries by grave despoilers; excavated mummies gather dust and decay in the uncontrolled climates of storerooms). The archeologists and museologists responsible for exploring and preserving the ancient cultures of Eastern Central Asia do their best with limited resources. It is my sincere wish that, with the publication of this volume, the importance of the archeology of Eastern Central Asia will be further underscored and our colleagues in Xinjiang will receive additional assistance in carrying out the urgent tasks with which they have been entrusted.

Victor H. Mair
July 20, 1997

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