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Grover S. Krantz

**Geographical Development
of European Languages**



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TABLE OF CONTENTS

LIST OF FIGURES	ix
CHAPTER ONE -- INTRODUCTION	1
Purpose and Method, A Note on Sources, Language Differentiation, Rules of Movement	
CHAPTER TWO -- PERIPHERAL MOVEMENTS	27
Neolithic Origins, Palestinian Farmers, Afro-Asian Spread, Caucasian Sheperds, Indo-Europeans in Asia, Sea Shepherds	
CHAPTER THREE -- NEOLITHIC SPREAD IN EUROPE	55
Balkans, Eastern Europe, Western Europe, Uralic Spread, Language Map	
CHAPTER FOUR -- RACIAL PROPORTIONS	87
Population Mixing, Anatolian-European Mixture, Caucasoid-Mongoloid Mixture	
CHAPTER FIVE -- GERMANIC SHIFT	101
Exodus from Sweden, Occupation of Germany, Celtic Diaspora, Language Map	
CHAPTER SIX -- PATTERN OF LATINIZING	125
The Empire, Language Effects, Language Map	

CHAPTER SEVEN -- SLAVIC EXPANSION	135
Background, Beginning Expansion, Western Slavs, Magyar Moves, Southern Slavs, Romania, Turks, Eastern Slavs, Language Map	
CHAPTER EIGHT -- FINAL ADJUSTMENT	165
3-Field System, German Reflux, Iberia, Other Places, Language Map, Recent Racial Changes	
CHAPTER NINE -- CONCLUSIONS	181
Major Innovations, Problems Remaining	
BIBLIOGRAPHY	197
INDEX	203

LIST OF FIGURES

Fig. 1. Language map of recent Europe	4
Fig. 2. Pattern of frontier advance	20
Fig. 3. Penalty increments	22
Fig. 4. Climatic factors	24
Fig. 5. Geographic factors	26
Fig. 6. Neolithic origin locations	30
Fig. 7. Neolithic expansion from Palestine	33
Fig. 8. Neolithic expansion from the Caucasus	38
Fig. 9. Spread of the Sea Shepherds	48
Fig. 10. Neolithic expansion from Anatolia	57
Fig. 11. Rate of Neolithic expansion	70
Fig. 12. Uralic expansion	76, 77
Fig. 13. Language map at first stabilization	83
Fig. 14. Non-European genes	96

Fig. 15. Caucasoid genes in Asia	98
Fig. 16. Germanic Shift	104
Fig. 17. Celtic Diaspora	118
Fig. 18. Language map in the year one	121
Fig. 19. Mediterranean Empire	126
Fig. 20. Levels of Latin influence	129
Fig. 21. Language map in 300 A.D.	133
Fig. 22. Slavic expansion	139
Fig. 23. Non-Slavic expansions, Group I	142
Fig. 24. Non-Slavic expansions, Group II	143
Fig. 25. Finnic expansion	158
Fig. 26. Language map in 1100 A.D.	161
Fig. 27. Effects of the Feudal system	168
Fig. 28. Language map in 1500 A.D.	173
Fig. 29. Non-European genes, recent distribution	177
Fig. 30. Caucasoid genes in Asia, recent distribution	179



CHAPTER ONE -- INTRODUCTION

Purpose and Method

This work presents a new approach for reconstructing the geography of prehistoric language differentiations and distributions. It is made explicit in the form of a complete reconstruction of the origin and distribution of all present European languages, and many extinct ones as well. Both the method itself and the results of its application to Europe are offered for critical evaluation by scholars in the appropriate fields.



History has usually concentrated on such things as battles, rulers, and political boundaries. It can also be said that ethnic history, as measured by language groupings, is an equally important aspect that is often ignored or given only perfunctory treatment. Prior to written records, the usual subject material of history is missing, by definition, and informed speculations are then made about ethnic distributions over time and space. I think that many of these speculations are at least ill-founded, and are

often incorrect. It has proven notoriously difficult to correlate archeology with language history.

What is needed is a rigorous approach to reconstructing linguistic behavior in a geographical setting--one that recognizes the biology and economy of the human carriers of these languages. Such an approach should be founded on principles of human ecology, as well as linguistics, that are applicable to both the prehistoric and historic eras as well. This would take the form of a set of explicit rules of movement that are consistent with known human behavior, and which are universally applied. Such a set of rules would be set in motion at some remote time in the past and then consistently followed through to end up with the actual modern language distribution (Fig. 1). This kind of reconstruction must also show reasonable agreement with the known facts of archeology, history, and linguistics, though it doesn't have to agree with the current speculations in these fields.

A reconstruction of this type is a model that may be tested against other kinds of reconstructions, most of which are not criticized here in any detail. Some archeological and historic data were used to set the times and locations of major events, but otherwise this model was developed to stand on its own merits and internal consistency. This approach is explicitly not a compilation of all available knowledge, from all fields, in order to create such a reconstruction. Instead, it is an essentially independent method whose results should be compared with reconstructions based on other methods.

The first of two principles of human movement to establish here is that people and their languages generally do not move. All peoples will tend to occupy their own territory until some compelling force is brought to bear to make them change their location (or their ethnic identity). When a group expands into new territory, this is normally accomplished by a relocation of only the population surplus. There is no tendency to evacuate most of the residents from their original homeland as long as they can still live there. It is normally in the best short-term

survival interest of all ethnic groups to maintain their locations and languages as tenaciously as possible. Any suggestion of an instance of contrary behavior should be accompanied by a sufficient explanation for it. I first argued this point in print in 1976, it was also stated by Brues (1977:250-51), and it has been elaborated on by others since then.

This means we cannot simply suppose that a group of barbarians was able to spread out and impose its language over large areas of both civilized and noncivilized peoples. Further, great migrations of nonliterate peasants cannot be postulated at will to account for more recent distributions. We cannot just move people all over the map solely to accommodate proposed linguistic connections. Anthropologically speaking, any migration proposal must include answers the following questions:

1. Why did the people move at all rather than simply remain where they were?
2. Why did they move where they did rather than to some other location?
3. Why did they move when they did rather than at some other time?
4. Why was it they who moved, there and then, rather than some other people?
5. How was the move accomplished over the presumed resistance of the people already occupying the location?

If any of these questions are unanswered, by statement or implication, the proposal is correspondingly weak. If none of them are answered, then it is hardly a proposal at all. To postulate a migration without giving answers to these questions is only to restate a linguistic distribution in other terms, as though such a restatement somehow explained something.

In 1977 I applied this principle of stability to a reconstruction of the immigration of the first humans into

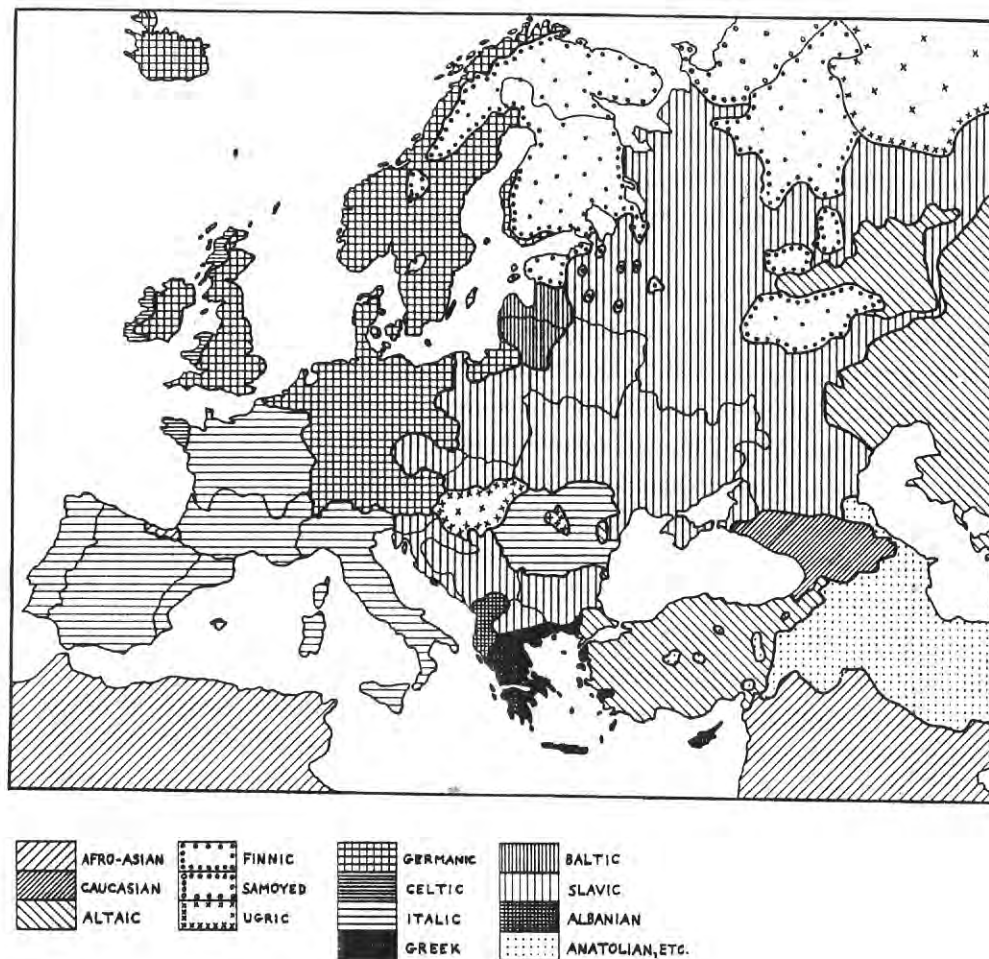


Fig. 1. Language map of recent Europe. All family distributions are shown prior to World War II. Many boundaries are simplified, and some small enclaves are combined and enlarged to make them more visible. Spotty distributions in eastern Russia are so expanded as to approximate the conditions of over a century ago. Major subdivisions are indicated with thin lines within some family areas, while Anatolian and Iranian are not separated. This map represents the goal to be achieved by this and any other reconstruction.

western North America. In that article my typical answers to the above migration questions were:

1. They did not actually move, but instead relocated their surplus population as an expansion of their territory.
2. They expanded where the land was available, where it was either unpopulated or vulnerable to penetration.
3. They expanded when the land was available, or when they acquired the means of penetration.
4. They had better access, or means, than any other people.
5. They prevailed because either the land was empty or they had much greater numbers.

It was thereby shown that at least 95% of the affiliations of the languages and their distributions in western North America could be exactly accounted for by using this, and one other, basic principle of human movements. Most particularly, the concept of a series of "waves" of immigration into the continent had to be ruled out as being inconsistent with the principle of stability. The few discrepancies between my reconstruction and some standard linguistic opinions were emphasized in four comments by Baumhoff, Elsasser, Fleisher, and Leonhardy--all 1978.

The second principle used in the North American reconstruction was that a technological innovation could so increase the numbers, power, and/or prestige of one group that they could overwhelm their neighbors. This provides specific answers to point 5, how they prevailed if the land was inhabited.

Individuals, families, and small groups will cross ethnic borders; this is a normal process at all times. The usual result is that these migrants soon adopt the language of their new neighbors and linguistically disappear. A great differential in population densities will mean there is a correspondingly greater flow in one direction. If this one-way excess in flow is great enough and fast enough for them to maintain regular contact with

other immigrants, then they will keep their language and can instead turn the natives into a minority that is eventually absorbed. As long as the advantage of one group over the other is maintained, the linguistic frontier will continue to move in the direction of lower population density.

With most innovations the neighboring peoples will eventually adopt the new item, increase their own influence, and then resist further encroachment by matching numbers, power, and/or prestige. These people will then press on their neighbors in turn, still farther from the source of the innovation. In this manner a series of linguistic boundary shifts, all in the same direction, were systematically described and explained for western North America.

In reconstructing the linguistic development of Europe one encounters a few innovations that moved ethnic boundaries in this manner. The most outstanding of these was clearly the initial appearance of agriculture, which swept over the continent with such force that the local natives were rarely able to adopt it. This Neolithic revolution would have caused so nearly total an ethnic replacement that this event is taken here as the effective base-line for all subsequent linguistic events. That this also represents the introduction of Indo-European languages into the continent is the most obvious hypothesis to consider first.

My North American reconstruction also included a major episode of depopulation and subsequent repopulation of large areas that resulted in major shifts of some language boundaries. A comparable climatic event is identified in this European reconstruction, but its effect on farmers turns out to be quite different from its effect on hunters.

When a climatic change makes an area uninhabitable to hunters they simply decline in numbers in that place, with no more than stragglers moving elsewhere. When it becomes obvious that the change is not just a minor episode, they might want to shift their tribal territory somewhere else. But all adjacent livable spaces are already occupied by other tribes who may also be suffering, yet who are not so weak as those desiring to move

in. Without large quantities of transportable food supplies, the afflicted population has no recourse but to gradually fade out of existence.

With an agricultural population under similar pressure, there is at least the option of taking in their last crop, gathering together in large numbers, and moving against some small part of their neighbors. Lacking some advantageous technological innovation, such true migrations are normally doomed to eventual linguistic extinction. In the European reconstruction there is one major exception of this kind that survived and flourished because of special geographical circumstances. This is the one I like to call the Germanic Shift.

In many previous studies of European linguistic prehistory the authors have proposed substantial migrations of large bodies of people. These are sometimes pictured as nation-sized populations that shift their locations as units, making and/or breaking linguistic contacts. Individual tribes under stress, even groups of a few thousand people, are able to make this kind of move where the rear echelon is in contact with, and deliberately following, the leading edge. Some reflection shows that a peaceful, settled, farming population, numbering in the hundreds of thousands, cannot possibly move like this as a unit.

Suppose, for example, that a peasant group inhabits an area of 500-km diameter, and is going to shift its location 50 km in one direction. One method would be that all of the included farmers simultaneously load up their possessions and move their homes 50 km in the same direction. (We may ignore how this would be timed to avoid interfering with their farming operations and with each other.) Those at the lead of this move might welcome the new lands, but we must inquire why this should be so, and how they prevailed. Those at the rear might welcome the relief from some natural or human pressure, but we would like to know exactly what this was. For the great mass in the center this would just be a 50-km move from one farming site to another equivalent, but unfamiliar one, and to no apparent gain. Who or what could

compel them all to make this move?

Alternatively, the great mass could be left in place, while those in the rear abandon their lands and move through the others to take up new positions in the front. An extraordinary set of circumstances could facilitate a move like this, but those circumstances must be clearly spelled out.

If one proposes that a large ethnic group shifts its collective location, this should be described in terms of two processes. There must be some force that is physically or ethnically eating them up from behind, while the other front is advancing successfully for some other reason. These factors may or may not operate at the same time, and the main body of people in the center is probably little affected by events at either frontier.

In recent years some detailed archeological investigations and reinterpretations have indicated that many previously supposed migrations might not actually represent ethnic replacements (Dennel 1983). While there may have been major changes in the civilized superstructures, the arts and crafts of the basic producers (workers and peasants) mostly continued unchanged. Even well-known periods of major destruction, as in Greece in the 2nd Millennium B.C., do not necessarily represent ethnic changes (Xirotiris 1980).

The above considerations may appear to put insurmountable restrictions on any attempt to reconstruct linguistic prehistory, and especially to extend such a reconstruction up through historical times. But there are also three considerations that allow for some flexibility that might have been unexpected.

First, there are the time depths usually ascribed to the differentiation of the various European languages. These are extrapolated from more recent, known rates of linguistic change. But there is actually no compelling reason to assume that the languages of preliterate peoples changed at the same rate. In fact, there is evidence that suggests a slower change in earlier times (Pulleyblank 1981). This at least opens the possibility of more time depth in which to encompass the necessary movements,

and a greater range of archeological events that might be included to explain these movements. (I return to this subject in the concluding chapter.)

Second is the question of when these languages began their major divergence. Most current reconstructions of Indo-European languages begin with a dialect mesh in a limited area that began its spread and subdividing as much as 6400 year ago, at about 4400 B.C. (Gimbutas 1977). However, I find compelling reasons to think that Indo-European began to spread more than 3000 years earlier, at 8000 B.C. On the other hand, it may have retained its integrity as a dialect mesh at least as recently as is commonly supposed, though over an enormous area. In fact, I find no clear argument for a break in that diverging mesh until much later--easily up to 2000 B.C., maybe further. (It should be noted that a dialect mesh, as in recent India, can have fully distinct languages in its widely distant parts.)

Third is the proper identification of certain prehistoric languages. Scraps of linguistic evidence like a few monuments, some place names, and personal names of leaders, may in some cases be the products only of an elite group that has taken control of an area. It must be remembered throughout that the linguistic picture being reconstructed here is that of the real people, not just their leaders. A glance through any historical atlas of Europe will show how little relationship there usually has been between the political units and the known linguistic boundaries of the people at those times. Historically impressive movements and conquests have had major impacts on the lives of those who wrote the history, but often without having had any comparable effect on the basic population.

In a preliminary paper on reconstructing the linguistic picture of Europe (1981) I made the case that the original spread of the Indo-European languages could have been accomplished only by the first Neolithic farmers. Quite simply, no other human cultural force since the origin of modern man could have had the power and persistence to cause a language spread of this magnitude. The origin place of these Indo-Europeans accordingly

would be in the area of southern Anatolia.

The currently popular Kurgan hypothesis especially fails for lack of the ability of these marauders to change the languages of entrenched peasantry over so much of the world. There is no possible resource base in the preagricultural Ukraine that could have sustained a dense population, let alone fed them out in such numbers as to linguistically convert almost all the people from Ireland to Bangladesh. That such a conversion was based on conquests with the use of horsedrawn chariots is easily dismissed. Indic and Latin have common terminology for their use, yet they were invented (2000 B.C.) well after the separation of these two languages. Thus "...references to the horsedrawn chariot in IE ritual and mythology are probably later accretions and not derived from a common IE myth." (Mallory 1981: 216, 217.)

Moving on into the detailed distribution of Indo-European subdivisions one finds even further support for the Anatolian source of this family, as well as for the antiquity indicated here. Any attempt to draw Indo-European speech from the Ukraine at 4400 B.C. would make it tend to show natural divisions that in no way resemble the actual distributions, ancient or modern. On the other hand, the substance of this study shows that all of the Indo-European subdivisions, relationships, and locations follow automatically from a Near Eastern origin at the beginning of the Neolithic, some 10,000 years ago. Further, even the non-Indo-European languages of Europe are shown to be distributed in their correct ways as part of this same rigorous reconstruction.

The following picture of linguistic geography does not challenge any conventional classifications of known languages, as my North American reconstruction did in a few instances. The unexpected conclusions here are mainly in the area of increased antiquity ascribed to the original Indo-European dispersion itself, and in the longer residence indicated for some of its subdivisions in their present locations. This would include, for example, developing Greek in its present area since 6500 B.C., and Celtic in Ireland since 3500 B.C. The antiquity of Magyar in

Hungary may be equally surprising; I find it to be a Mesolithic speech that predates the Neolithic entry.

The linguistic affiliations of many prehistoric populations are clearly predicted in this reconstruction, as indicated above, including the non-Indo-Europeans. The most interesting of these are the archeologically famous Kurgans of southern Russia, who turn out necessarily to be Altaic speakers, and specifically of the western, or Turkic branch. Perhaps less surprising is the proposed affiliation of the original Iberian farmers with the Afro-Asian language family.

In at least one major instance the commonly assumed direction of migration of a population is reversed here. It is usually stated that the Uralic Magyars moved into Hungary from an eastern source in the 9th Century A.D. I find instead that all the other Uralic speakers expanded out of Hungary in the opposite direction, and at a much earlier date.

Particular details in this reconstruction, like those mentioned above, may not prove to be a major source of objection. These details are predictive, and many will be tested in the near future. Instead, I expect that the method itself may prove to be the most uncomfortable aspect to some readers. The problem is that so little room is left for "historical" explanations--great leaders, important decisions, ambitions, accidents, apathy, luck, and all the rest of what people believe in. Yet, the absence of this "human element" in the study of ethnic history should be no more disturbing than is its absence in such personal things as disease and heredity.

A Note on Sources

The vast majority of the information given here is common knowledge within the various fields of anthropology, linguistics, history, and geography. The juxtaposition of these well-known facts is what is new. It may be considered



improper, even insulting to the reader, to cite sources for what can be found in basic text books. It is impossible to cite sources for what is original. For these two reasons there are fewer specific references used here than might be expected.

Because many readers will be well-versed in only two or three of the basic fields involved here, mention should be made of my major sources of information. Some of these are drawn upon heavily throughout the text, along with other general works, but are referenced only for particularly unusual, unexpected, or critical points. Many of these are not cited beyond their mention here.

For most of the geographic data I have used the 2nd, 11th, and 15th editions of Goode's Atlas (Goode 1943, Espenshade 1960 and 1978), and the Oxford Regional Economic Atlas of the U.S.S.R. (Economic... 1956). Modern language distributions are drawn from Zaborski (1960), and certain boundaries for my base line of 1939 are drawn from Jastrow (1943). Basic data and comparisons among the Indo-European languages are largely from Lockwood (1969 and 1972).

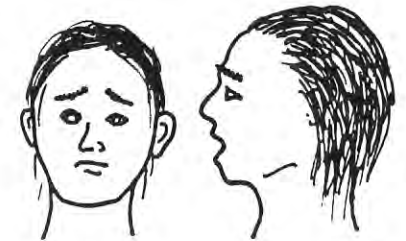
Conventional theories about the origin of the Indo-European peoples come from a diversity of sources ranging from the works of V.G. Childe (1926) through M. Gimbutas (1973 and 1977). Interesting maps, as well as some speculations on prehistory, are found in Kinder and Hilgemann (1964) and in Barraclough (1978). For early technology and demography I found Forbes (1958), White (1962 and 1967), and Pounds (1973) to be the most useful on a topic that is rarely touched on by others.

Archeological interpretations, especially as relating to migrations, are dealt with by Deniel (1983), but he goes even further than I would in denying them. Human reproductive rates and early population densities are discussed by Hassan (1981). Some ideas on Neolithic migrations and their rates are found in Ammerman (1977). The basic idea that Indo-European languages were spread by food producers was at least suggested by Smith (1976) in a brilliant work on the significance of the Neolithic. Other sources are mentioned as pertinent.

Many of these works also give information with which I am in total disagreement. Such information is all in the form of interpretations and/or speculations that have often unwittingly become elevated to the level of "factual" knowledge. In a few instances I am only offering alternative possibilities to the commonly held presumptions. In all such cases I have attempted to indicate the differences of opinion, as well as the degree of speculation being indulged in here.

Language Differentiation

A dialect mesh is a network of tribal speech communities that are mutually intelligible adjacently, but which become increasingly divergent with distance. Hunting tribes of typically 500 persons, at a density of 0.1 per sq km, would



occupy areas averaging 5000 sq km, with diameters of 80 km. At 400 km, five tribal boundaries are crossed and the cumulative effect of five dialects is a different language in a mature dialect mesh. At 800 km, and ten dialects removed, no discernable relationship is likely to be evident from direct comparison without considering the intermediaries.

This description applies to dialect meshes of great antiquity and stability, like the Australian aboriginal languages. Such a mesh will change gradually over time as a unit, with each of its parts maintaining their degree of distinction from every other. A new dialect mesh develops when a language spreads over a new territory of great size. Distinctions between tribal dialects will be small at first, but after thousands of years they increase to the levels of contrast noted above. At 10,000 years ago I would assume that all of Europe and the Near East constituted a single dialect mesh. This may have been continuous with the speech of most of the rest of the inhabited world as well.

With pastoralists, and even more so with farmers, the area occupied by a 500-person tribal unit necessarily decreases as population density increases. This would shorten the geographic distances between unintelligible and unrelatable dialects within a mesh. However, these Neolithic economies are so recent in appearance that there has not been enough time for their dialects to diverge over space even as much as those of hunters. In still more recent times, especially in Europe, ease of communication and transportation has stopped dialect divergence altogether.

Linguistic innovations may appear anywhere in the mesh, and will spread in varying directions at various speeds. At any one time the dialect mesh is thoroughly and almost randomly criss-crossed by hundreds of isoglosses, each of which separates two areas in terms of a single linguistic trait. An innovation that appears at one place is capable of eventually spreading to any and all other places in the mesh. This is analogous to a widespread biological species with genetic continuity throughout its range, but with gradually increasing morphological differences over distance.

When a dialect mesh is broken, its parts become free to evolve in their own independent directions. Through the loss of intermediate and mutually intelligible dialects, two or more parts of the original mesh will begin to diverge by what we call linguistic drift. Again, this is analogous to a biological species that loses genetic continuity between two or more extremes that subsequently cannot exchange genes, even indirectly, and thus become separate species. Bringing together two divergent parts of a mesh (or a species) may produce between them a line of unintelligibility (infertility), but as long as they remain connected through some route of intermediate dialects (populations) they are not truly separate languages (species). A freely drifting and separate language requires a full boundary of mutual unintelligibility from all others. Just as in biology, there are indeterminate situations where innovation flow is just badly restricted, and it is not clear whether the division should be labeled as dialect or language (subspecies or species).

Bounded languages are created from a dialect mesh by moving one speech community out of its natural position and into contact with a contrasting linguistic environment, several dialects or more distant. If this is done without leaving a chain of connecting dialects, then a new language has been set free to diverge (drift) from its former mesh mates. It is not necessary that the actual human speakers must make the indicated move, although they often do. A change in the language spoken by one group may similarly put a barrier of unintelligibility between it and some of its neighbors.

It is argued here that human groups do not change their locations, or their languages, as a common practice. Such changes require compelling reasons. Any well-thought-out reconstruction of such events in the past must indicate these reasons.

The basic method of moving a speech community into another location on the dialect continuum is to expand its area at the expense of its neighbors. Those at the source area can eliminate, absorb, or linguistically convert their immediate neighbors, and thus have their speech come to occupy this new area in addition to their original territory. If this process is extended over a sufficient distance, two unlike speech communities will become juxtaposed, and a language barrier comes to exist between them. Such an expansion may be based on a population increase at the source that enables these people to infiltrate and/or conquer their neighbors and thus spread their own ethnic identity. It may also follow from sufficient cultural prestige at the source, that adjacent communities copy their language in ever-widening circles of imitation. These methods may be combined in various proportions in particular instances.

A roll-up of intermediate dialects may progress along a physical or linguistic peninsula, thus assuring that no connections continue around the edges, and such a language then becomes fully bounded. Alternatively, the roll-up may be radial --spreading out in all directions from its source and thus serving to complete its boundary.

An advancing linguistic frontier can also separate additional languages by breaking their continuity with each other. A dialect chain along a coast line, for instance, might have its central part overrun from an inland source, thus splitting it into two independently drifting parts. Or a peninsula could have its base overrun and become separated from its previous contacts with dialects on the main land mass.

When an advancing language frontier encounters a physical barrier of some size, like a mountain chain or a body of water, it should divide and pass around each side of it. The resulting two arms of the frontier may eventually meet one another on the far side of this barrier. If the separation was of long duration an actual language boundary may exist between them at this meeting. As long as a dialect chain trails back from each arm to their point of initial separation neither side will become a fully bounded language. But if any part of this U-shaped dialect chain is removed, by any process, then the two arms become free-drifting languages.

A very different source of dialect contrasts that often leads to language separations occurs when an intruding language overrides a large area that previously contained some linguistic diversity. The original population might not be eliminated, and sometimes not even greatly outnumbered by the overriding ethnic type. Many of the first speakers of the new language here are natives, and actually grew up speaking one of the original languages of the area. They will continue to use various aspects of their own pronunciation, vocabulary, and grammar--and their children will tend to copy these. The dividing lines between these underlying languages often will automatically surface as subdivisions in the new language of the area. Ideally, this phenomenon should be demonstrated in each instance by documenting the particular linguistic phenomena of the preceding language that appear in the same geographic area in the replacing language. Even without such documentation the phenomenon can safely be inferred in many instances. This has been termed "Mischsprachung," and has received less attention than I think it

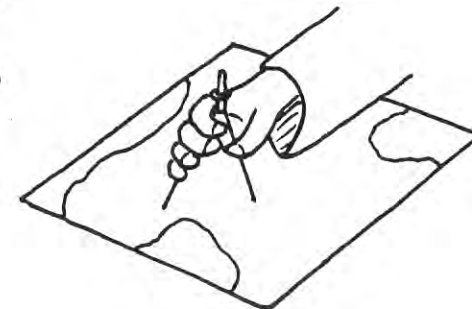
deserves. Several examples appear in this reconstruction.

The history of European languages can be reconstructed in all its essentials by using a surprisingly small number of applications of the principles discussed above:

1. An initial wave of several different immigrant Neolithic populations spread themselves and their languages over a sparse substratum of native hunters throughout Europe and nearby areas. These major groups, in order of significance, are Indo-European, Uralic, Altaic, Afro-Asian, and Caucasian.
2. The Germanic division rolls down from its northern fringe area, breaking the European dialect mesh.
3. From the Latin center in Rome there is a rolling-out.
4. There is a rolling-out from a Slavic center in eastern Europe.
5. Technological advances move the Germanic boundary substantially eastward.

Throughout these developing steps lesser distinctions appeared as a result of breaking dialect chains, from substratum language differences resurfacing, and from the shifting of technological innovations from one advancing group to another.

All of this linguistic history can be shown to be triggered by just a handful of technological and cultural phenomena, and to follow from the uniform application of a set of simple rules of human movement. Detailing this history, as the reader will see, involves lengthy descriptions that relate the above factors to the actual geography of Europe. But throughout, the basic simplicity of the whole process should be evident.



Rules of Movement

The movements of human populations that serve to change the locations of language boundaries must be described in terms of consistently applied rules. Where exceptions are made, these too must follow describable rules of general applicability. These requirements parallel the rules of linguistic changes themselves, and so should come as no surprise. If something as personal as one's own language follows natural laws, then it ought to be expected that the location of one's home might equally follow from natural laws. Individuals are free to vary (within limits) in both speech and location, but human groups are much more predictable under given circumstances.

In order to describe the movements of early European populations I have devised a set of rules that are at least consistent with known human behavior. Within a limited range of possibilities, I have settled on those which generate a pattern of movements that is also consistent with most of the known archeological dates for the spread of Neolithic economies. Variations in these rules of movement have been made to suit different economies and climates. At later times, and within the scope of the historical record, other adjustments are made in these rules to conform with certain changing circumstances.

The basic rule of movement is that a population has the ability to double its numbers in each generation of 25 years. This will be true under the most favorable circumstances and where there is unlimited opportunity to expand its area of occupation. Further, this ability to expand will be applicable only to those small groups on a frontier of advancing occupation. Populations located well behind such a frontier will have neither the opportunity nor the means to expand in that direction, and often would not even be aware that such a frontier existed. Such populations can expand only by finding the means to increase their density of occupation in place.

Since any frontier expansion (in Europe) is always over a territory already occupied by some other population, normally at a much lower density, an additional five years is added to compensate for the losses of personnel in the inevitable minor

conflicts. For all subsequent calculations I simply use the figure of a 30-year generation for the doubling time to allow for this constant factor.

The basic social unit used here is the 500-person tribe that is typical for hunting and gathering peoples, and is applied to all economies initially. Larger units come into play only later. The most probable population densities and their consequent tribal dimensions can be given here:

<u>Economy</u>	<u>Density</u>	<u>Tribal Area</u>	<u>Tribal Diameter</u>
Hunting	0.1/sq km	5000 sq km	80 km
Pastoral	0.25/sq km	2000 sq km	40 km
Farming	1.0/sq km	500 sq km	25 km

The typical pattern for an advancing farming frontier is for the surplus population to move out from filled areas into the most convenient new places to farm. On the frontier this will normally mean moving a short distance ahead into an ideal location rather than continuing to fill less desirable places closer at hand.

It is assumed that on the average only about one-third of the potentially usable land will be occupied, to any significant degree, in the first generation of occupation. Only after the farming frontier has passed on will the less desirable two-thirds of the land be occupied by the expanding population that no longer has access to truly new lands. At such a time the overall density will then reach the typical 1.0 per sq km. (See Fig. 2, upper.)

The gradual filling of the frontier zone can be visualized as a row of squares, 40 km to a side, as shown in Fig. 2, lower. Each of these is occupied by 500 people who farm the best spots, which can be represented by an arbitrary circle in the center with a diameter of 25 km. This circle encloses 500 sq km, and is almost one-third of the area of the whole 40-km square. Over the next generation each of these partially filled squares will generate 500 new people who are looking for new places to farm.

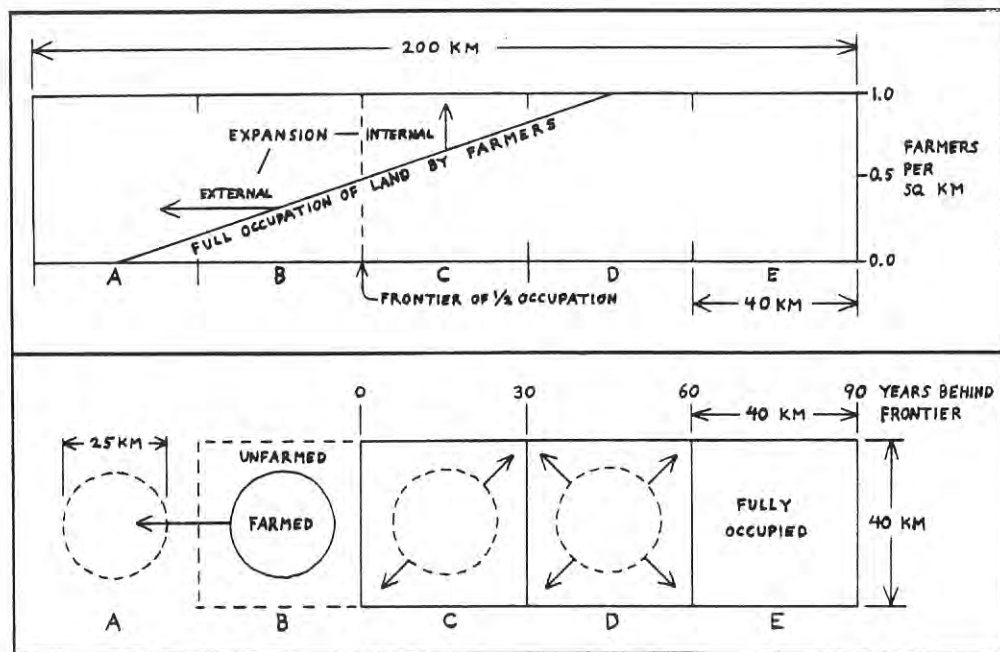


Fig. 2. Pattern of frontier advance. Upper: Farming is shown advancing from right to left (its commonest direction in Europe) in four segments of 40 km each. The rate of land filling is given as a steady increase, and the actual frontier is taken as the line of one-half occupation. This pattern is neither exact nor critical, but it illustrates the process of gradual filling of the land in a frontier zone that may be 120 km deep.

Lower: This idealized pattern shows how farmers fill the same five squares. A is being infiltrated by new immigrants, B has its prime one-third occupied, in C and D the remaining two-thirds are filling, and E is fully settled. Previous inhabitants of squares C and D would find it increasingly difficult to move away from the surrounding farmers. A similar pattern would apply to farmers overrunning pastoralists, and with a different scale, to pastoralists overrunning hunters.

These people will mostly move out into the next row of 40-km squares that have not yet been farmed. It would be more practical to move as far as 40 km to an ideal place rather than to move a lesser distance to a poorer place. This amounts to about 17 people per year, or three small families, making a move of this kind in each square.

At the end of a 30-year generation this new 25-km circle should be filled, and the source group will then continue to expand its population by filling in the less desirable lands immediately at hand. For them to continue moving away and into the best lands from this same source area, this would mean a move of 80 km, and this becomes impractical. New advances are now made from the newly filled 25-km circle discussed above. Actual frontier advancement would not have followed exactly this regular pattern of filling circles and squares, but this diagrams the process in the form of an easily visualized process. For purposes of mapping, this advancing rate is given in terms of 200-km units, thus of five generations, and requiring 150 years to accomplish.

Following this same reasoning, a frontier of herdsmen advancing over hunters will add successive tribes of 500 people in the circles of ideal territory, this time with a diameter of 40 km each. These will again constitute almost one-third of the potential area of a typical frontier square now measuring 80 km to a side. Given the same 30-year population doubling rate, these pastoralists should advance their frontier 80 km per generation. They will move the standard unit of 200 km in just 75 years, or twice as fast as the farmers. After their frontier has passed on, further population expansion will be into the less desirable areas immediately at hand, and the overall density then brought up to 0.25 per sq km.

A model for the initial advance of a hunting population would follow a similar pattern, but faster for two reasons. They would cover 120 km in each generation because of their sparser distribution. Also, each generation would be only 25 years because there would be no previous human inhabitants to contend

with. (Hunters cannot overrun territory of other hunters at the same density and technological level.) This process is not detailed here because their occupation of the entire continent is assumed from the outset.

Additional delay factors are introduced when the advancing farming frontier enters areas of low winter temperatures and shortened daylight hours. It is assumed here that a January mean temperature will have no appreciable effect until this reaches below the freezing level. At this point winter problems will lead to enough unusual casualties to increase the time for doubling the population from 30 up to 40 years. It must be noted that this ten-year penalty applies only to the earliest people entering the colder winter zone, and that later adaptations would reduce or even eliminate the problems. But the frontier advance rate applies only to those people initially moving in, and later

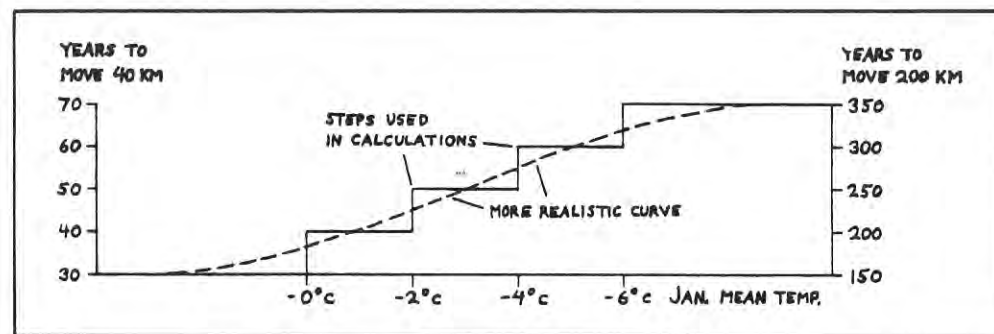


Fig. 3. Penalty increments. Added casualties from colder winters are expressed as additional years to accomplish each 200-km unit of frontier advance. The dashed line approximates the actual increase in this influence. For convenience of calculation this is simplified to four discrete increments of penalty. The figures given here are for the advance rate of farmers; for herders the times would be cut in half. This same graph can be used, with different labels, to illustrate the four increments of delay for progressively shorter winter days of 9, 8, 7, and 6 hours each.

adaptations would have no effect on this.

In terms of the basic 200-km unit of five generations, this winter cold penalty increases the advancement time from 150 up to 200 years. Another 50-year penalty per 200 km is added when the frontier crosses the -2° (Centigrade) January mean temperature line. At -4° another 50 years are added, and again at -6° . It is assumed that by the time this temperature is reached, the frontier peoples will have devised sufficiently good winter adaptations to handle anything more extreme without adding even further penalties. The actual picture of increasing winter cold problems would not follow this neat pattern of steps, but this is at least an approximation (Fig. 3).

In northern latitudes the reduced length of winter daylight time can also be expected to result in added casualties as this begins to become significant. Since temperature and daylight do not decrease together in most places, their effects are calculated separately. When midwinter daylight reduces to less than nine hours the first penalty of ten extra years is added to the 30 years for population doubling. In terms of the basic 200-km unit of advance, this is again an extra 50 years added on to the minimal 150. At eight hours of daylight another 50-year penalty is added, and again at seven and at six hours. After this it is assumed that further daylight lessening need cause no additional penalties, only a continuation of those already assessed. Just as with temperature changes, the actual situation would be a gradually increasing problem, then a leveling off as it is solved. The stepped increments used here only approximate this curve. If one changes temperature to daylight losses, the graph in Fig. 3 should apply equally well to this situation.

With both temperature and daylight variations the penalties may be seen as ten-year increments for each 40-km advance. Since the mapping is all done in 200-km units of five population doublings, these are treated as 50-year penalties. With both factors, there are just four such increments used, so the most extreme case is where 200 years are added to the 200-km advancement time from each cause. Given the basic 150 years,

plus these two delaying factors, the slowest possible advance rate used here is 550 years per 200 km.

It was not exactly ideal to impose these penalties in such large increments at each climate line, but it made calculations of frontier progress much simpler. In following each route of advance I applied the penalty when more than half of the 200-km unit was in the new zone. Occasionally I would balance some nearly equal instances by choosing speed in one case and delay in

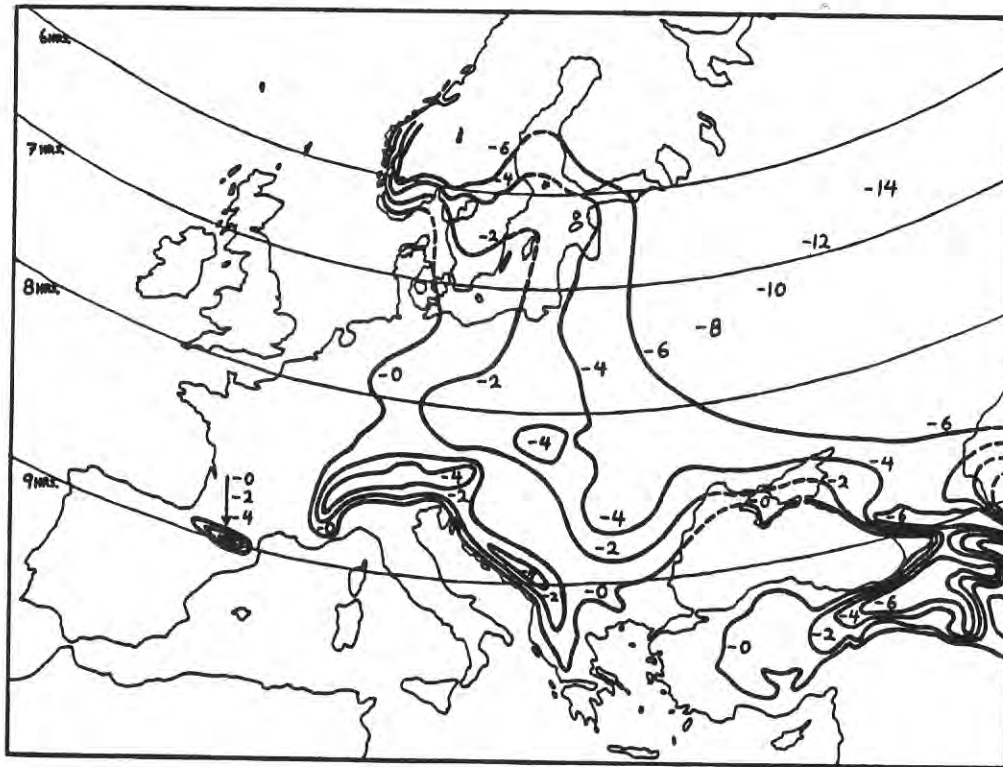


Fig. 4. Climatic factors. Heavy lines are isotherms of four steps of January mean temperatures. It is assumed that any differences in past millennia would at least follow the same pattern. Lighter east-west lines show four steps of reduction in hours of midwinter daylight. Penalties for both factors are applied to the rate of Neolithic immigration.

the other along the same route. Clearly these factors, as applied, are not exact reflections of real conditions, but in the long run they should be at least a close approximation. (See Fig. 4 for the map of temperature and daylight clines used for imposing these delays.)

The basic rates of advance for peoples with other adaptations are calculated using the same kinds of penalties. The same geographic lines of temperature and sunlight are used, the same four increments are assessed and held constant thereafter, and the added increment is always one-third of the basic advance rate under ideal circumstances. Thus with herders, whose basic advance rate is 75 years per 200-km unit, 25 more years are added for each step in each of these two factors, so their slowest advance rate is 275 years per 200 km.

In the following descriptive sections different advance rates for other circumstances are described as they are introduced. They mostly follow this same basic pattern.

No special penalties or delays were introduced for adjustments to new zones of flora and fauna as were used in my North American study. Here it was considered that Neolithic farmers were bringing with them so much of these important items (domesticated) that any changes in the local situation would have had only a trivial effect. Also, no time penalties were assessed for building boats at significant water gaps. As will be seen, there were always other people with shipping available at each such place.

Three more limiting factors of geography may be introduced at this point, as illustrated in Fig. 5. In many places the soil was (and is) too deep and/or heavy to be plowed with the early "scratch plow" that simply cut a furrow. Such soils are mostly randomly distributed, but some major and extensive areas are shown that effectively blocked the entry of large numbers of farmers until new techniques were developed.

A northern farming limit, for most practical purposes, exists along the line of the 120-day growing season. This line would move somewhat during different eras, but it largely marks

the end of the Neolithic advance. Only much later did new species and strains of crops enable farmers to pass this line to some degree.

Mountain barriers would sometimes impede Neolithic progress and significantly retard communications across them. Ethnic boundaries sometimes developed along these, and continued at the meeting lines beyond.

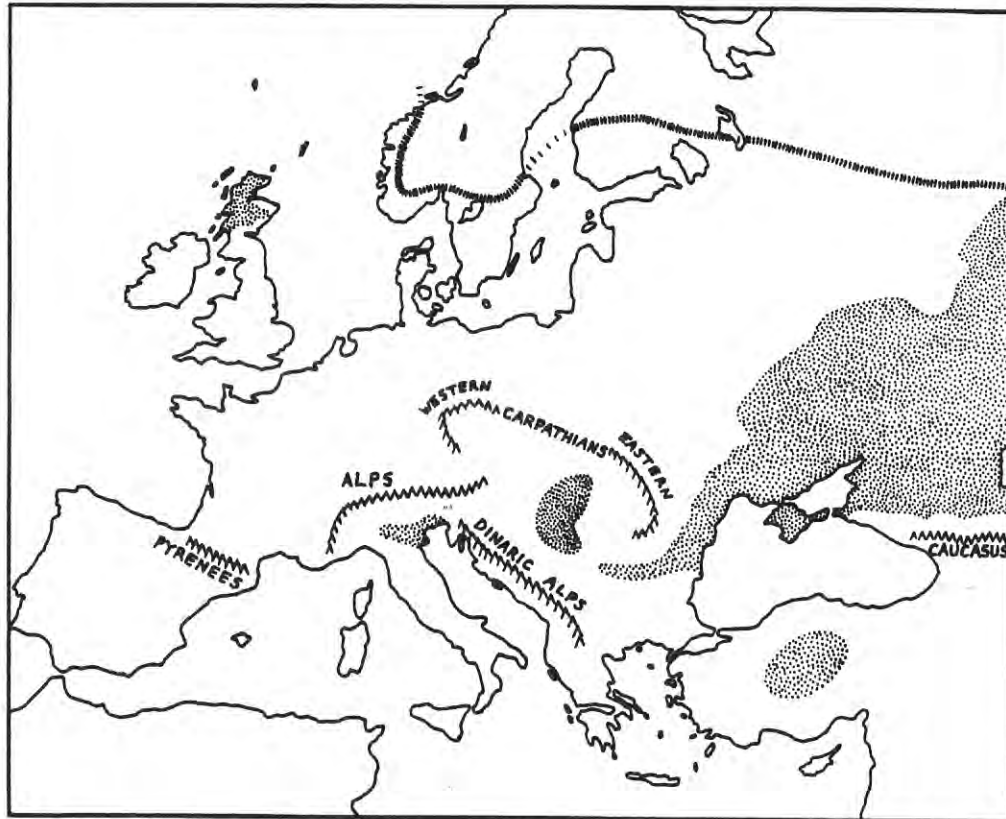
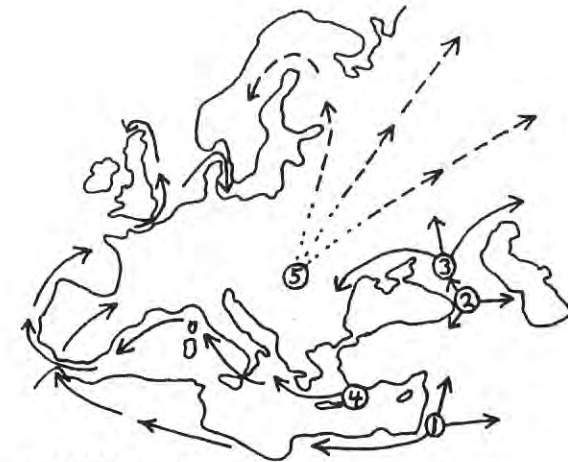


Fig. 5. Geographic factors. Stippled areas in Hungary and Russia are deep soils that could not be plowed by Neolithic farmers. The Moors of Scotland, the Po Valley, and central Anatolia present equivalent situations. To the north is the limit of the 120-day growing season. Some mountains are shown, but only those that affected ethnic movements.



CHAPTER TWO -- PERIPHERAL MOVEMENTS

Neolithic Origins

The exact course of events leading to the development of the Neolithic farming economy is not a critical issue here. It is enough just to set the probable times and places of its beginning in order to chart its subsequent spread with some degree of accuracy, or predictability. Still, a brief summary helps to explain these times and places. This summation is somewhat original, but it is built only from well-known facts.



Farming is simply a logical extension of a way of life that developed in a series of quite natural steps. Within the scope of a hunting-and-gathering economy an extreme specialization on a limited range of food sources is reasonable and practical--if such foods occur in great abundance. One example of this is the Natufian cereal-grain harvesters known from about 11,000 years ago in the Near East (which has popularly come to be known as the "Middle East" in recent years). In dense natural stands of grain a year's food supply can be gathered in just three weeks. The

required technology for harvesting, threshing, storing, and grinding would easily be developed in a short time when their need becomes evident.

More important is the fact that a tribal society of 500 people, more or less, can now find sufficient food in as little as 500 sq km instead of the more usual ten times that area. On the one hand this promotes the ease of sedentary life, and on the other hand it severely restricts wide-ranging hunting practices. Cereals do not provide a satisfactory range of amino acids, so a dependable source of animal protein must be found to make up for diminishing hunting possibilities. Capture and control of some native animals is the obvious solution. Sheep and goats are available in the Near East, and are ideal herd animals for this purpose. Their domestication appears to coincide with intensive cereal harvesting, and logically precedes the earliest actual farming.

This combination provides a way of life that, at first glance, would seem to be ideal and potentially lasting. It has the advantages of little need for movement, allowing permanent living structures with accumulation of property, and a dense population to resist inroads by other people. Actually it is unstable, and a new factor soon appears to upset the equilibrium. The labor requirements for tending animals and for the rapid harvest now make children for the first time an economic asset rather than a liability. Abnormal population pressure is an automatic result.

When the natural stands of grains are fully exploited, any expansion of the population, and extension of this way of life, is possible only by deliberately cultivating these grains in new places. The idea that seeds grew into plants would have been common knowledge to all hunting and gathering peoples. What was needed was a reason to encourage such growth artificially. The development of farming was not something new in itself, but rather it was a method of continuing a familiar way of life (harvesting) in the face of changed circumstances (overpopulation). It is also true that minor climatic changes

may have shifted natural grains out of the territory of a given tribe, thus forcing them to cultivate in order to continue their way of life. Moving with the grains was not an option because other tribes would have occupied the desired territory. Both factors, overpopulation and shifting vegetation zones, would lead people into cultivation simply in order to continue the way they had been living. This is a cultural application of Romer's Rule from paleontology, where an innovation is initially conservative and only later is developed into something truly revolutionary.

The natural distribution of wild emmer wheat can be used for the most reasonable indication of where the commitment to cereal-grain farming began, as shown in Fig. 6 (from Zohary 1969, cited by Dannel 1983). Farming would begin within an area of natural grain where the stands are sparse, or in patches where it is missing. Around the periphery of such stands is the major place where deliberate farming would serve to artificially extend the otherwise natural harvest. Emmer wheat is probably the best food source, and is one of those most consistently found in early Neolithic sites. One might presume it was possession of this grain that tipped the balance between continued foraging and a commitment to farming. This presumption is well supported by the natural distribution of this grain. It occurs in two major locations in the Near East that correspond exactly with my postulated sources for the two major language families that originated in this area. These are thus the original homelands of the Afro-Asian and Indo-European peoples (locations P and A in Fig. 6).

Archeological evidence today shows the earliest Neolithic to be within and around these two locations. The earliest of all appears to be in the southern, or Palestinian, location (Wenke 1980). Exact timing of each small advance in farming technology for the area is not now possible. Still, it would be quite acceptable to postulate the spread of farming from the periphery of the Palestine location at just 150 years before it spread out from the Anatolian location. (This last-named area is actually half inside modern Iraq, but its significance to the present

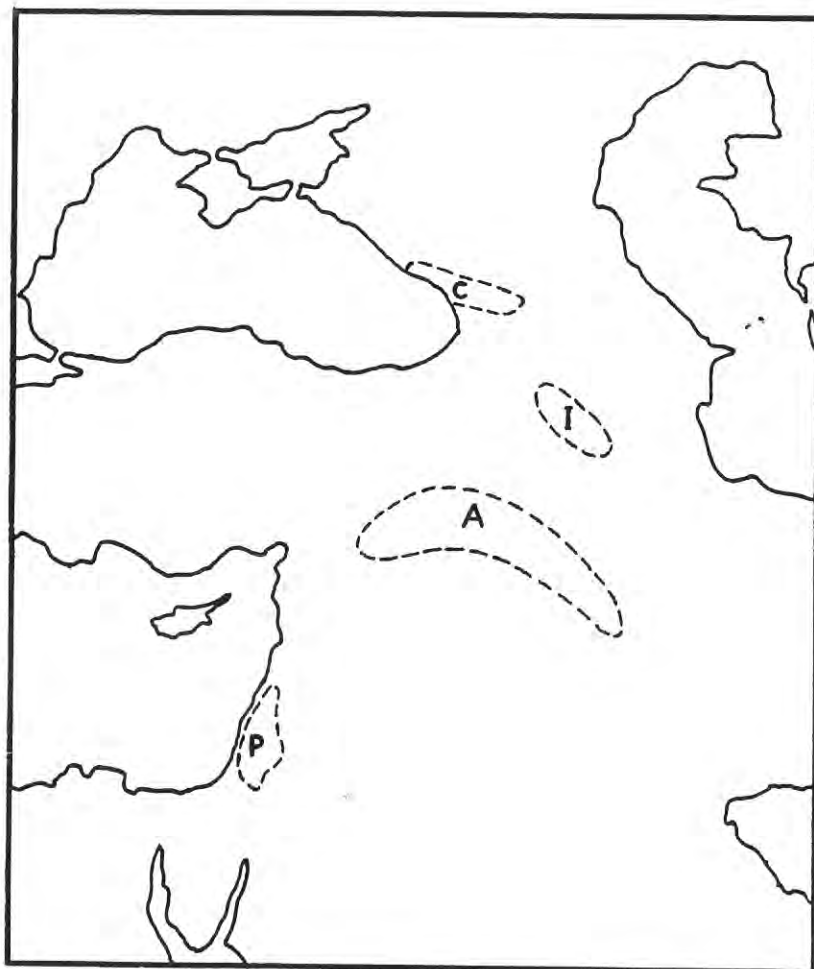


Fig. 6. Neolithic origin locations. Recent areas of wild emmer wheat are shown, with the presumption that they were similarly distributed 10,000 years ago. These are labeled by the initial letters of Palestine, Anatolia, Iran, and Caucasus (uncertain).

study is concentrated more in its Turkish part.)

This timing, if correct, suggests a south-to-north spread of the basic idea by cultural or stimulus diffusion at the rate of 400 km in those 150 years. This is twice as fast as farming itself should have spread. It is also possible that the process developed independently in each place at these slightly different times. It is their close proximity in time and space that suggests a connection.

It is not immediately evident exactly what essential "idea" spread from Palestine to Anatolia. Certainly there was no discovery that seeds grow into plants--if hunters know that copulation leads to babies, then understanding plant reproduction would be child's play. It is not likely that any equipment was critical, as most of this should have been available, or at least easy to develop. The required herd animals were abundant in both areas some time earlier. Possibly the essential discovery was the calendar--knowledge of how to determine the exact time of year that the seeds should be planted in order to achieve the maximum harvest. (I wish to thank Diane Horton for this thought.)

The scenario postulated here is that the correct sowing times, procedures, and equipment were developed first in the Palestinian emmer wheat location. The timing would be that farming began its spread from here at 8150 B.C. This is not to be taken as a definite date--it could have varied by a few centuries either way. It is chosen in part for its consistency with all other dates used in this reconstruction. If this date of 8150 B.C. is changed, then all other dates for the initial Neolithic spread must be correspondingly shifted.

By the date of 8000 B.C. the farmers out of the Palestine location should have spread their settlements 200 km in all directions beyond the core area of emmer wheat. Also at 8000 B.C. the knowledge of when to plant (or some other critical item) is presumed to have reached the western edge of the Anatolian emmer wheat location. At this time the people on this edge would likewise begin their own expansion at the same basic rate of 200

km every 150 years. The calendrical knowledge probably spread out from the Palestine location faster than the expansion of the people themselves--perhaps at twice their rate. Alternatively, this knowledge may have reached the edge of the Anatolian location directly ahead of the spreading farmers--always 200 km ahead of the actual settlement frontier. This knowledge of the planting calendar would be of use only to those harvesters inhabiting the edge of a natural emmer wheat stand who are in a position to expand outward under population pressure. In other circumstances foragers normally show little interest in copying the way of life of neighboring farmers.

Selecting 150 years as the lead time for Palestinian farming was not just based on archeological suggestions. This difference is just the amount of time that automatically results in the formation of a subsequent boundary between Palestinian and Anatolian farmers that corresponds to the later language line between Afro-Asians and Indo-Europeans. It also turns out that this same lead time ultimately results in a much later meeting between North African and European farmers at the other end of the Mediterranean, in the Pyrenees Mountains, which is also linguistically critical. The archeological data are not precise enough to say that this gap was just 150 years, but it could not have been much different. This may eventually be determined exactly.

Palestinian Farmers

The spread of farming out of the Palestine location, beginning at 8150 B.C., is followed here only in those details that are of significance to the development of European languages (Fig. 7).

It is assumed from the outset that this expansion was by the original Afro-Asian speakers. This assignment was not arbitrarily made, but it became evident from observing the



automatic distribution of farmers from this source, and how this distribution compares with that of the recent Afro-Asian language family.

The northern edge of the Palestine location is just 400 km from the western tip of the Anatolian emmer wheat location. At 8000 B.C. Afro-Asian farmers would have covered half this distance, just at the time the presumed Indo-Europeans would have begun their spread from here. In 75 more years they would meet--Afro-Asians at 300 km from their source and Indo-Europeans at 100 km from their source. This meeting line would then trend to the north-west and reach the Mediterranean in 7800 B.C. at its northeastern corner. This effectively ends the spread of Afro-Asian farmers at this point, and gives farmers from the Anatolian location free access through the rest of Anatolia. This leads ultimately to their unimpeded entry into Europe, hence the first specific reason to think these are the original Indo-Europeans.

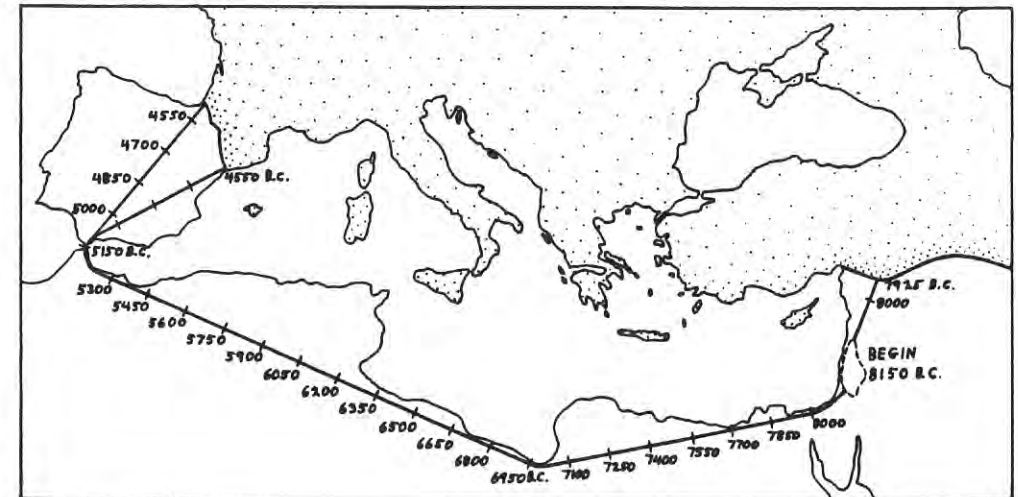
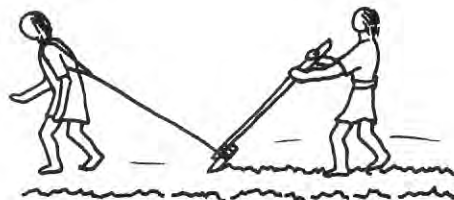


Fig. 7. Neolithic expansion from Palestine. Heavy lines trace the two routes of Afro-Asian spread that are stopped where they meet expanding Indo-Europeans--in Syria and the Pyrenees. Dates are given at each 200-km unit of progress. Afro-Asian territory is left blank, while other speech areas are stippled.

Moving to the east, it may be expected that farming would have extended progressively outward from along the southern edge of the Anatolian location. The calendrical knowledge would not have spread so easily over the Syrian Desert where native cereals were not common. In that case the Afro-Asian frontier would soon move close to the southern edge of the Anatolian emmer wheat location and continue to the head of the Persian Gulf. This automatically results in a language line that runs very nearly along the present Afro-Asian boundary. There is no obvious reason why this language line should have moved greatly in the last 10,000 years. (Compare the line as shown in Figs. 1 and 7.)

Afro-Asian Spread

Further expansion of the Afro-Asian farmers would be into all accessible places to the south and west of their initial area of occupation. Their move into Arabia and the main body of Africa has no relevance to the present study. To the west, in the most direct line across



northern Africa, these farmers would have advanced to Gibraltar and beyond (Fig. 7). At a steady rate of 200 km in every 150 years they would cover the 4000 km to Gibraltar in 3000 years, arriving there at 5150 B.C.

The practice of pastoralism with sheep and goats, but without farming, is viable by itself. It should also have spread out from the Palestinian location into the drier areas that could not be tilled. It is quite likely that a different language group was involved in this economy, but it doesn't matter here. These shepherds should have spread just twice as fast as the farmers, possibly reaching Gibraltar 1500 years earlier, at 6650 B.C. There is no reason to suppose they ever developed seaworthy craft, and so did not transport themselves or their stock into Europe. These people would ethnically disappear, at least in

northern Africa, when the tide of farmers eventually rolled over and incorporated them.

A similar group of shepherds would also be at Gibraltar when the farmers arrived from northern Africa. These are the Sea Shepherds or Boat People who developed in Europe and who spread along the northern Mediterranean and Atlantic coasts. (These are not to be confused with the "Sea People" of 1200 B.C. in the eastern Mediterranean, who do not appear in this reconstruction.) Unlike their African counterparts, these European pastoralists had seaworthy craft. While the African shepherds could not enter Europe for lack of boats, the European shepherds could not enter Africa because all the suitable environments would already be occupied. The Sea Shepherds are described in a later chapter; their importance at this point is that they were in a position, since 5915 B.C., to transport the African farmers and their equipment into Iberia.

These Afro-Asians would be the first serious agriculturalists in Iberia--the Sea Shepherds appear not to have engaged in any significant farming. The farmers' expansion over Iberia would be an extension of their spread across northern Africa, and which continued at the same rate. Here they no doubt overran and absorbed the Sea Shepherds in their coastal locations.

Across Iberia to the north-east the farmers would progress four units of 200 km each in the next 600 years. In 4550 B.C. they would reach the lower Ebro River and meet an incoming wave of farmers from the opposite direction. These new farmers ultimately stemmed from the Anatolian location, and are here identified as Indo-Europeans. The two groups would have had essentially the same economic base of crops, domestic animals, and technology. Their methods of land utilization and consequent population density would have been the same. Neither group would have any significant advantage over the other, and each was living on familiar home territory. Their meeting line becomes the second place where people of Palestinian and Anatolian origins encountered one another. This time it was 4800 km from

the Afro-Asian starting point. A stable language boundary would exist here until some other factor forces a change.

Over the next 50 years this meeting line between two farming peoples would arc around to the north-west and end against the Pyrenees. This leaves a triangular area in northeastern Iberia in Indo-European hands. This site ultimately correlates with the origin place of Catalan, the recent language of Catalonia.

Along a different path through Iberia, somewhat to the west of the one just described, the Afro-Asian farmers would advance to the western end of the Pyrenees. The Indo-Europeans reach this area measurably later, so the farmers from Iberia cross the mountains. Their predictable meeting line is about 50 km up the modern French coast, and arcs inland about 100 km to where it reaches the northern flank of the Pyrenees. This meeting line of 4450 B.C. so accurately follows the recent Basque language boundary that its identification appears unavoidable. It has been suggested that Basques once occupied much more territory in the past--the Gaulic province of Aquitaine. It is also possible that this larger area was only controlled by Basque speakers long enough to establish some place names.

This identification of Basque with Afro-Asian is based on geography rather than on any good linguistic evidence. Tovar (1970) and others would distantly associate Basque with Hamitic, and most authorities tentatively include Hamitic in Afro-Asian. These tenuous connections conform well with this reconstruction. Basques are known to have been in their present location since at least 3000 B.C. according to Wilbur (1980); there is no evidence against extending this back another 1500 years.

A short segment of the Afro-Asian frontier would also follow the mountain divide in its west-central part. By 4500 B.C. all of Iberia (except for its northeastern corner) would be occupied by these farmers of presumed Afro-Asian affiliation. They would naturally subdivide into a dialect mesh over the next few thousand years. They would also have included large areas that had been thinly populated by the much earlier Sea Shepherds. More recently their incorporation into the Empire of Carthage

would likely introduce Phoenician in many places. Finally, an influx of Celtic settlers in the last few centuries B.C. would be added to help create a very complex linguistic picture for the peninsula. Almost all of this becomes irrelevant somewhat later when Latin became the nearly universal language of the area. These and still later events are discussed in other parts of this study. The major point established here is the exact course of the first meeting line between Afro-Asian and Indo-European farmers in Europe. Any other accounting for this language line seems to involve far more speculation than is offered here.

Caucasian Farmers

It is calculated here that farming began to spread out from the western edge of the Anatolian location at 8000 B.C., just 150 years after it began from the Palestinian location. From the Anatolian source the Neolithic spread would have been mainly to the west and east, and only to a lesser degree to the north and south. Before detailing the major Indo-European expansion it is necessary to deal with the northern flank. Here there appears to have been a third source for the Neolithic that must be pinned down.

To the north-east of the Anatolian location there is another known stand of wild emmer wheat. It is in a large valley that surrounds the northwestern corner of modern Iran (Fig. 6, location I). An obvious idea would be to associate this location with the origin of the Caucasian language family. While this might be true, there are some good reasons to doubt this, and instead to place the Caucasian origin well to the north, at location C in Fig. 6. (The reader is reminded not to confuse Caucasian languages with Caucasoid race.)

The Iranian location, marked I in Fig. 6, is entirely occupied by an Indo-European speech (Armenian) today, rather than



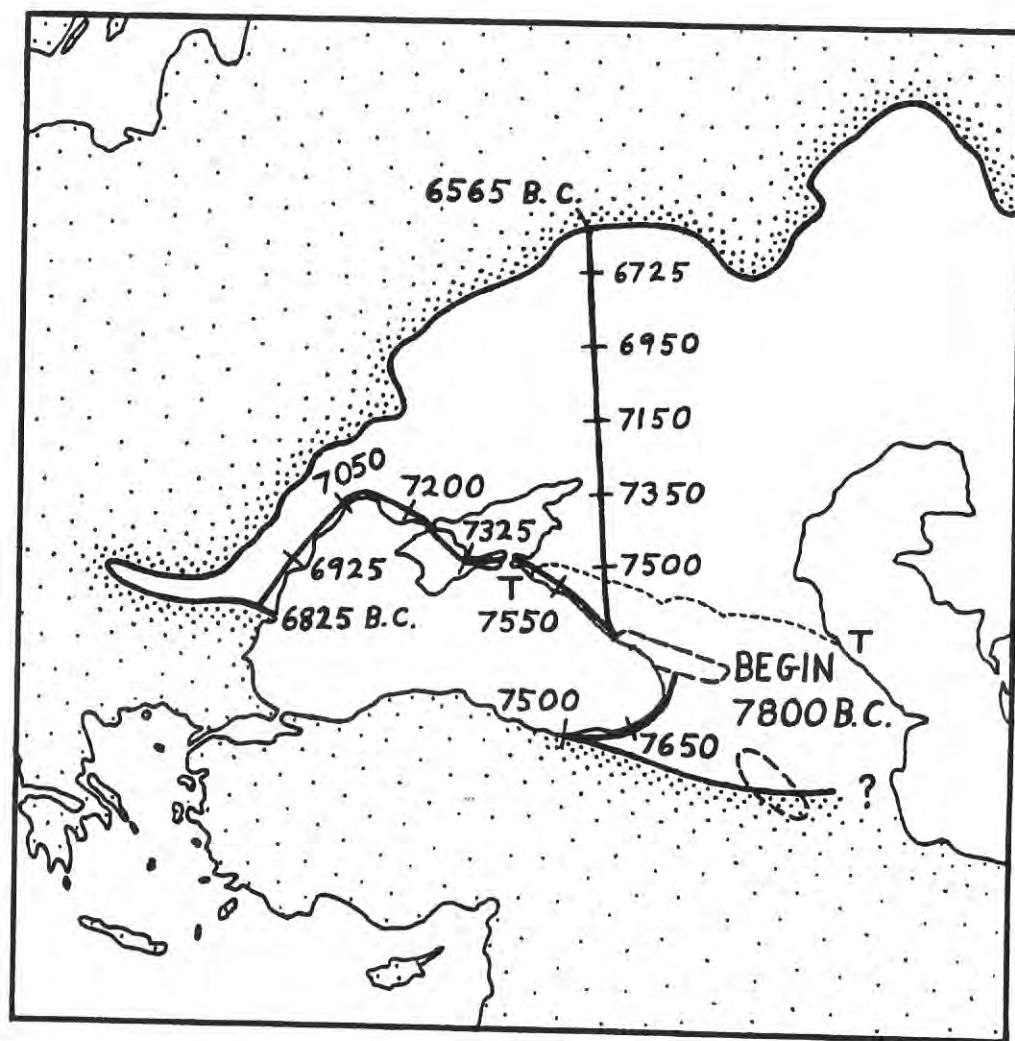


Fig. 8. Neolithic expansion from the Caucasus. Heavy lines trace the routes of Caucasian and Altaic spread from their proposed sources. The transfer of pastoralism to Altaic speakers is indicated by the letter T at the end of the dashed line where deep soils begin. Dates are given at each 200-km unit of progress. Caucasian and Altaic territory is left blank, while other speech areas are stippled.

Caucasian--a difficult though not impossible problem to get around. A language that spread from this location would also tend to put its speakers much more to the east than is the present Caucasian distribution. More likely, the expanding Neolithic wave from the Anatolian location simply overran most of this area before its occupants had time to build up a significant farming population. Also, it is a closed valley that would be entered by the presumed Indo-Europeans from its open end, thus making egress difficult.

The present Caucasian languages are found on the north and south sides of the Caucasus Mountains throughout all but the eastern end of the range. The simplest accounting for this would be to postulate yet another stand of wild emmer wheat, or its functional equivalent, to be found on the south side of the mountains, toward their western end (location C in Fig. 6). Except for heavier rainfall, ecological conditions here are similar to those at the other wheat locations. According to Chard (1975:224) there is wild emmer wheat within this general area of the Soviet Union, but he gave no map. If deliberate cultivation appeared and spread out from here just 200 years later than from the presumed Anatolian source, then all of the major language distributions work out correctly. This delay of 200 years is otherwise unsupported by any direct data that I am aware of. It also appears to imply an independent development of the planting calendar because the distance involved is too great for the transmission speed suggested above.

Given this presumed starting time of 7800 B.C., Caucasian-speaking farmers would have spread out in all directions until they encountered barriers of geography or other farmers. They would expand their frontier to the south and then west along the southern shore of the Black Sea for a distance of 400 km in 300 years. Farmers from the Anatolian location presumably started 200 years earlier and expanded their holdings directly north (among other directions). With the standard delays imposed for cold winters here, they would reach the same point on the Black Sea coast in 500 years. They meet at 7500 B.C., with the

presumed Indo-Europeans being in the process of occupying most of Anatolia, and covering all access to the west. The Caucasians would occupy just the northeastern corner of modern Turkey along the Black Sea, much as they do today (Fig. 8).

The timing difference of just 200 years is critical here, and might someday be directly determined. If the Indo-European lead time were any less, the Caucasian farmers would have had access to western Anatolia and eventually into Europe proper. Clearly this did not happen. If the Indo-European lead time were any greater, then the next-described result of the Caucasian spread would not have been completed. In the following section it is shown that this result did occur.

Altaic Shepherds

The only other direction of Caucasian expansion that is of any concern here is that to the north-west along the eastern shore of the Black Sea. After advancing some 280 km along this route, and using 350 years, they would enter the deep steppe soils that could not be farmed with the simple plow in use at that time. (This area would remain largely unfarmed for another 8000 years.) At 7450 B.C. these farmers must halt their advance, but their practice of animal husbandry would automatically be picked up by the local Mesolithic peoples. These would be the natives of the Kuban region, just to the east of the Sea of Azov (Fig. 8).



This is the first part of the Eurasian Steppe land that would be reached by people with domestic sheep and goats. From here, people with sheep herding and other Neolithic traits, except for serious farming, were able to spread over the entire grassland and semidesert area from the Ukraine to Manchuria. Almost the whole area is today inhabited by speakers of the Altaic language family, so-named from the Altai Mountains located

near its center. It is usually assumed that their languages originated here, on the border between the Turkic (western) and Mongolic (eastern) branches of the family. There is no obvious mechanism whereby the original language type of this entire area could have been replaced by another single type at any time after the introduction of this pastoral economy. The obvious conclusion is that the Altaic family actually originated with the Mesolithic inhabitants of the Kuban.

Altaic expansion to the east is of no concern here. To the north and west the sheep-herding economy would be very successful throughout the relatively open country. Their progress would halt at the fully forested lands where sheep are not suited. Sheep occur in most of Europe today only in association with farmers; previously there were no wild forms in these forests.

Altaic expansion within Europe would be at the rate of 75 years, plus temperature and daylight penalties, for every 200 km. At this speed they reach the fully forested zone in modern Russia long before any Neolithic farmers enter these forests. Traveling due north out of the Caucasian source, these shepherds would reach the border of the forest zone at 6565 B.C.; this is some 2500 years before the European farmers reach that point, coming from the west with their own sheep.

If these Altaics had long ago abandoned all serious farming, which is most likely, they would be unable to penetrate these forests. They did not even have the option of reverting to a hunting and gathering economy because this niche was already filled here by the native inhabitants. If there had been any significant spread of Altaic speech into these forests there should be clear indication of this in recent linguistic distributions, but there is none.

The most important route of Altaic expansion is that which follows the most direct line around the Black Sea, through the Crimea, and into the eastern Balkans, on to where the grasslands and deep soils end. At pastoralist advance rates, these shepherds would reach the border of this zone, just inside the northeastern corner of modern Bulgaria, at 6825 B.C. Indo-

European farmers, following standard calculations, should arrive at this same line from the opposite direction (from the south) at 6830 B.C. The two meetings with Indo-Europeans, first by the Caucasians in northeastern Turkey, then by the Altaics in Bulgaria, are exactly timed and serve to determine the gap of 200 years between their beginnings. (See Fig. 8.)

The precise timing of the Indo-European and Caucasian meeting in Anatolia has already been described, and this allows for no significant leeway in either direction. The same is true for the Altaic encounter in the Balkans. If the pastoralists had arrived earlier in northeastern Bulgaria, the less-than-dense forest there would have allowed some further advance of an archaic Turkic language. Just such a language, Gagauz, is found today in two Balkan enclaves--in eastern Romania and just inside northeastern Bulgaria, but not beyond. They probably date from this time. (Gagauz is usually assumed to be a recent import from Turkey, but its deviant nature and location fit much better with the interpretation given here.)

If the Altaic shepherds had arrived in Bulgaria much later, then the Indo-European farmers would have transferred their pastoralism to the local Mesolithics. These would necessarily expand northward to meet the incoming Altaics at some point. This would then create an unknown ethnic group of which no trace remains. It would also make the Gagauz difficult to explain. (In my earlier study in 1981 I did not consider the possibility of a Caucasian origin of the Neolithic at all, and assumed that the Altaics arose from this Balkan source. This was clearly incorrect even though the results are largely the same.)

The importance of this part of the geographic reconstruction lies in determining the ethnic identity of the early inhabitants of the Pontic Steppes. From the earliest Neolithic, until the area was largely overrun by Slavic farmers in the Christian Era, these nomads were necessarily Altaics. From Kurgans through Scythians to Sarmatians the great bulk of the population would have spoken Altaic (Turkic) languages. The fact that Iranian personal names have been identified among Scythian leaders

(Crossland 1967) is no proof of what the popular speech may have been. (If personal names were used as our only guide, we would conclude that much of Europe today is Hebrew speaking.)

This reasoning effectively removes the archeologically well-known Kurgans of southern Russia from being a possible source of Indo-European speech. Leaving aside the problems of how the Kurgans could have spread their language, and the fact that the initial spread of farming is the only reasonable mechanism for a change of this magnitude, we would still have the problem of explaining what happened to the Kurgans themselves. If they had been the source of Indo-European speech they would doubtless have spread it over the entire Eurasian grasslands as well. (The existence of Tocharian might be used to argue in favor of this.) Then some natural mechanism must be found to replace this supposed Kurgan speech with Altaic throughout its range. Nothing of the kind seems to be available, especially after the development of horse-based military procedures in this area.

Indo-Europeans in Asia

The next major non-Indo-European language group to deal with is the one I call Aegean. This is the speech that was apparently spread by the Sea Shepherds that have already been mentioned. (Again I apologize to the reader for using a name similar to the later "Sea

People," with whom there is no connection.) Before these Sea Shepherds can be described it is necessary to review their background and origin. This stems from the Neolithic farmers who first advanced their frontier toward Europe from a Near Eastern source. These would be the early Indo-Europeans who transferred their sheep-raising technology to some local natives in the Aegean area, much like the Caucasian farmers did to their Altaic neighbors.



Three sources for the origin of Neolithic farming have been tentatively located in the Near East. The starting times for their expansions and their initial contacts with one another have also been laid out in the geographically most probable pattern. The spreads from two of these sources, Palestine and the Caucasus, have already been followed through as far as they should have affected the languages of Europe.

From the perspective of the overall Neolithic invasion of Europe, the Palestinian source of presumed Afro-Asians produced something like a left flank of this invasion. The Sea Shepherds may almost be viewed as an adjunct to this left flank. The Caucasus source, with its Altaic off-shoot, forms something of a right flank of this invasion. Still another group, the yet-to-be-described Uralics, are an adjunct to this right flank. These two flanks almost surround the core of Europe. The main weight of the central invasion, by direct reasoning and by elimination, must have been the Indo-Europeans themselves.

The spread of farmers from the Anatolian location has been reconstructed in terms of its meeting lines with those farmers stemming from Palestine to the south and from the Caucasus to the north. These lines are in reasonable agreement with the recent distributions of the language families that are involved. The central group of presumed Indo-Europeans would have access to all areas both east and west of its source, and between the areas occupied by people from the other two sources on the north and south. This Indo-European spread may now be followed through its initial stages to just short of the actual invasion of Europe.

Indo-Europeans would have unimpeded access to the east over all of modern Iran and into the Indian subcontinent. Their identification with the first farmers in that area would appear to be unavoidable. The writings of the Harappan civilization accordingly would have to be an early form of Indo-European; their decipherment could be an important test of my ideas. The supposed introduction of this speech into India from invasions around 1800 B.C. is unsupported by any direct evidence. Most indirect evidence, including the present study, argues against

the likelihood of a total language replacement being effected by a relatively small number of primitive invaders at this time. (The brief appearance of Indic writings in Mesopotamia in 1800 B.C. may represent a late military incursion, rather than a record of these people on their way to India.)

The Indo-European spread that is of more concern here is the west through Anatolia, where they also had unimpeded access. The most direct route to Europe would first be straight west in order to skirt the central highlands where winter temperatures would cause delays. Then in western Anatolia a northwesterly course would bring these farmers into Europe just short of 7100 B.C. Within that time frame most of the rest of Anatolia would also be settled.

One important result of this proposed initial occupation by Indo-European farmers is that we need not look elsewhere for the origin of the old Anatolian languages. Hittite, Palaic, and Luwian were all based here since the arrival of the first Neolithic farmers. Later Anatolian languages like Lycian, Phrygian, and Armenian are probably also equally native to the region. The ultimate fate of the Anatolian languages with the introduction of Turkish is covered in a later chapter.

A large area of grassland in central Anatolia was probably not easily plowed, and local Mesolithic people here should have adopted sheep herding. Indo-European farmers then would have spread around both sides of this area, meeting each other again to the north-west of it. The ethnic identity in this grassland area is almost certainly Hattic. A short digression into some later historic events is necessary at this point.

Singer (1981) has established the Hattic homeland to be exactly here in the Halys River basin (now Kizil Irmak), which in turn happens to be the core area of the ancient Hittite Empire. This odd contrast of an Indo-European empire based on a non-Indo-European homeland has been neatly solved. Steiner (1981) showed that the Hittite Empire was in fact Hattic-speaking in terms of its rulers, religion, and core population. The Indo-European Hittite (more properly "Nesite") was merely the diplomatic and

commercial language of central Anatolia from earlier times that continued to be used by the Hattic rulers. Once horses came into use in Asia Minor, this pastureland of central Anatolia would automatically become the basis of a major military power. It would be of non-Indo-European speech only if the Indo-Europeans were the farmers who could not have settled this particular area.

Sea Shepherds

The next event of importance is the presumed transfer of some Neolithic traits from the Indo-Europeans to some of the local Mesolithic inhabitants off the southwestern coast of Anatolia. This is the most reasonable starting place for the Sea Shepherds or Boat People, as I variously call them. This is an archeologically well-known group who spread early Neolithic traits around much of the European coastal areas.



The development of seaworthy craft may be expected among any Mesolithic peoples living where there are numerous islands within sight of the coast and of each other. These invite exploration and exploitation, and the boats themselves can also support fishing. Boats could have been devised anywhere that bodies of water occur, but any degree of sophistication depends on their usefulness. The Aegean is one of the most ideal locations for such a development, and there is archeological information that supports this as far back as 6500 B.C., and possibly farther (Dennell 1983:116). This is the first such maritime zone that would be encountered by early Neolithic farmers.

The advancing front of Indo-Europeans along the Mediterranean coast of Anatolia would reach the first significant Aegean island, Rhodes, in 7300 B.C. Most of these islands are not well suited to cereal-grain farming on a large scale, but would be excellent for sheep herding. It would appear natural

that the farmers would be delayed here, and that the Mesolithic natives would adopt their domestic sheep keeping. This would involve a transfer of mainly the pastoral aspect of the Neolithic economy, just as in the Caucasian-Altaic transfer and the others that are indicated here.

These new Sea Shepherds would have the opportunity to spread around the coasts and all accessible islands, which means the entire Aegean Sea, ahead of the advance of Neolithic farming. They would occupy any and all places along the coasts that offered good sheep pasturage. They would not tend to move far inland because of the forests, and also so as not to lose the other major aspect of their economy--fishing.

The ethnic identity of the Sea Shepherds is not that of any recognized linguistic group of today. It would most likely relate to the Pelasgian language of Greece which is known from geographic place names that are not Greek. It may well be recorded in the Minoan hieroglyphs, and just possibly in Linear A. This Aegean language would be carried by the Sea Shepherds in the course of their expansion, changing over time, and be distributed sporadically around the seacoasts of much of Europe. The fishing aspect of their economy would be lost whenever they spread inland. Their sheep herding, without farming, was only sporadically viable in mostly forested Europe. Eventually they would be met by the Indo-European and Afro-Asian farmers, and were overrun and easily incorporated. They would probably have no more than minor linguistic impact except for one location near the end of their range. (See Fig. 9 for their distribution.)

The starting time for the Sea Shepherd economy would be at 7300 B.C. when Indo-European farmers first reached this area of developed boats. I would allow 200 years for the integration of this way of life and for its spread throughout the Aegean. This interval is arbitrary, and its actual length would have no critical bearing on subsequent events.

Indo-European farmers should be at the Dardanelles about 7050 B.C., presumably just 50 years before the Sea Shepherds reached that point. They can cross into Europe with the aid of

other Mesolithic boat people who would have lived there. With this timing, a new group of Sea Shepherds might have spread briefly over part of the northern Aegean.

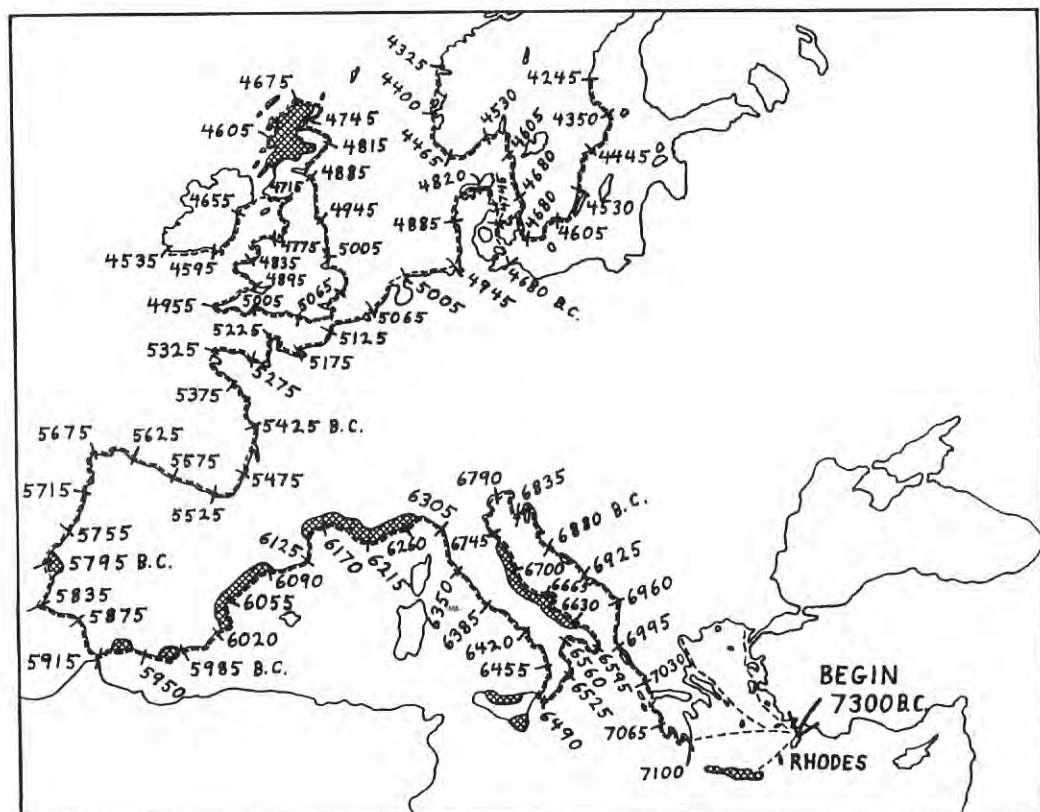


Fig. 9. Spread of the Sea Shepherds. The dashed line traces the progress of Aegean Boat People, from the Island of Rhodes around the Mediterranean and Atlantic coasts of Europe, and ending in the Baltic. Suggested dates are given at each 200-km unit of advance. Cross-hatching indicates areas that were occupied well after the initial wave had passed through.

With slightly different timing, the developed Sea Shepherds could have been at the Dardanelles first and helped transport the Indo-European farmers across that water barrier. In this case they would have had access into the Black Sea, finding sufficient grazing lands up to this point. Within this sea they could make no further progress as sheep herders. All of its coasts already would be occupied either by farmers or by land-based shepherds. Their ethnic identity would not persist long with their economy reduced to just fishing and commerce. Similarly, any spread of Boat People clockwise around the Mediterranean would be confined to the maritime aspect because the sheep-herding niche was also filled long before.

From the southern tip of Greece the Sea Shepherds had an open ecological niche in just one direction--to the west along the northern Mediterranean shore, and ultimately up the Atlantic coast of Europe as well. Their starting time is here set at 7100 B.C., just 200 years after their origin across the Aegean. Their arrival at the English Channel at or before the time of the inland farmers is archeologically known; they would be available to assist in this crossing too. Still farther along the coast it would be convenient if these Boat People had reached the Danish Islands in time to assist farmers in crossing into Sweden. Local Mesolithics should have had boats, but they probably could not easily handle cargoes that by then included cattle as well as sheep.

It is a safe presumption that the earliest advancing wave of Boat People would have hugged the coasts and made no attempts at sea crossings beyond visual contact. Later developments improved their range, but this would have had no effect on the initial wave of shore settlers. Given this limitation, their entire route of 11,000 km from the Adriatic to Denmark can be laid out in 55 units of 200 km each. Between their starting date of 7100 B.C. and their arrival in Denmark by 4650 B.C. (the same time as for farmers), there are 2450 years available. This gives an average of just under 45 years for each 200-km unit of advance. Considering that these Sea Shepherds were very mobile and

initially could settle only small coastal areas, this rate of spread appears to be at least reasonable.

A more exact schedule for their progress can be constructed by following the model used elsewhere in this study. A basic rate of one generation per 200 km can be assumed, and it would take the same 30 years as in other cases. The same penalty of one-third of this is added for each hour of reduced winter sunlight. (No freezing temperatures occur along this route.) Another penalty of five years is arbitrarily added to each 30-year generation for expected losses at sea, and this is doubled to ten years for all travel along Atlantic coasts. These factors give an internally consistent set of variations that should at least approximate the real situation. For a 200 km unit the fastest advance would have them make it in 35 years, and at their slowest along this route it would take them 65 years.

The first significant point reached by the Sea Shepherds is Gibraltar at 5915 B.C. North African land-based shepherds may have been there as early as 6650 B.C., but would not likely have crossed this water gap. The Sea Shepherds would find no available pasturage remaining on the African coasts, so there would be a standoff between them. When Afro-Asian farmers arrive at 5150 B.C. their crossing into Iberia, along with their new economy, would be facilitated. Without this transportation these farmers might have been substantially delayed here while developing their own craft, if they ever would. The 765-year difference in arrival times would allow for considerable improvement in the shipping that was available here. The frontier of the Sea Shepherds by this time had already progressed to the English Channel.

The next significant item is the arrival of the first Sea Shepherds at Dover in 5095 B.C. Indo-European farmers from the continent would not reach Calais for almost another 600 years, at 4500 B.C. Again, well-developed water craft thus should be available to transport the farmers and their stock into a new location with no expected delay. This amount of lead time of boats over farmers was not essential, but the presence of some

kind of good water craft was. Here, though not at Gibraltar, the boats had to be large and strong enough to carry cattle. The crossing into Ireland would follow the same pattern somewhat later.

The third meeting of Sea Shepherds with the advancing front of farmers on the continent would be at the area of the Danish Islands. The schedule used here puts the Aegean Boat People in the proper place at 4700 B.C., and the first farmers at 4625 B.C. (This is actually more than a century earlier than the crossing at Calais-Dover, but these events are here given in the order of arrival of the boats, not the farmers.) In this case the calculated lead time is only three generations, but the probable availability of local water craft makes this close timing less critical. In any case, their overall timing was calculated just so that this meeting would take place.

Following out this schedule, the Sea Shepherds would reach the coast of modern East Germany at 4700 B.C., and the Indo-European farmers would arrive there at the same time. All possible areas to the east would have been occupied by farmers even earlier. Thus the center point of the East German Baltic coast should mark the Sea Shepherds' maximum advance around the continent. They would have had access to all of Scandinavia just before this, and may well have settled parts of Denmark and southern Sweden. It is not likely that they went much farther to the north--even today few sheep are raised in Scandinavia.

The Scandinavian farmers probably incorporated a disproportionate amount of ship building as a regular part of their culture. This would follow from their abundance of coasts, lakes, islands, and rivers where shipping would have continuing use. The Sea Shepherds' ethnic component in this may already have faded out before the next major water gap was reached in this area. This was the crossing of the Baltic Sea from eastern Sweden, through Aaland, to the southwestern coast of Finland. This crossing would occur at 3300 B.C.

The Sea Shepherds may have first rounded the northern-most corner of Scotland at 4675 B.C., and been in the middle of its

western islands 70 years later. They would complete their coverage of the Irish coast at 4505 B.C. Given the dense forests over most of the British Isles, shepherd penetration would have been minor. Only in the Moors of western Scotland would they find a large area to occupy that was at all comparable to the places they held in the Mediterranean.

The crossing from Scotland to Ireland by the earliest farmers would have occurred at 3725 B.C. Again, the Sea Shepherds had long been there (since 4685 B.C.) and would have provided the shipping facilities at whatever cost may have been appropriate at the time and place.

Since there are no recent European languages that have been identified, even in part, with these Sea Shepherds, the reasons for this lengthy account should be reviewed. In terms of the mechanics of the rest of this reconstruction, their significance lies in their predictable availability for transporting the advancing frontier of farmers across all significant water barriers. Without the Boat People it might have been reasonable to impose a long time penalty for the development of such shipping by the farmers themselves, at least at some key locations like Gibraltar and Dover. It is not obvious how long this would have taken, and thus it might have had a major effect on the timing of some farmers' advances. Fortunately for this reconstruction, no such considerations were necessary.

These Sea Shepherds are well known archeologically, especially along the Mediterranean coast. They are often credited with being a major factor in the initial spread of the Neolithic in southern Europe. Considering their ethnic fate this importance could well be questioned. Yet the fact of their existence must be recognized. Actual farming might have reached as far as Italy along their established coastal routes, though well behind the Sea Shepherds' initial frontier. Such a farming intrusion from the coasts must have been minimal, considering the absence of clear linguistic evidence to this effect. The known diversity and complex relationships of early Italic languages may argue for some influence from this source.

The parts of western Europe that are noted for the megalithic monuments correspond somewhat with the Sea Shepherds' distribution. This is especially true for the abrupt stopping of both at the same place just inside the Baltic area. It is tempting to look for some connection. However, these monuments occur much farther inland than we have any reason to believe these people could ever have reached. Also, the dating of the megaliths is only after the farmers arrive, and not during the time of the Sea Shepherds only. Finally, many of these monuments were for astronomical calculations--an art that only the farmers really needed. Descendants of the Sea Shepherds, with their maritime orientation, may have figured prominently in spreading some cultural items like these, but that is about as far as one can go on this line of speculation.

Linguistic influences may not be entirely out of the picture, so I offer the following speculations. The pre-Hellenic, or Pelasgian, place names in Greece must be pre-Neolithic, as figured here. They would then be from the exact time and general area from which the Sea Shepherds originated, and thus could represent a related language. Similar traces may occur elsewhere. A well-known section of northwestern Germany and the Low Countries, and running as far west as the Somme River has many place names that are neither Celtic or Germanic. These may trace back either to the local Mesolithics or to the Sea Shepherds. The Etruscan language is still unsettled, and these Boat People are the only viable candidates other than the Indo-European farmers themselves. Ligurian remains problematical, and a Sea Shepherd element may well be involved. Probably the best case can be made for the extinct Pictish language of Scotland that occurred in just the area where they most likely would have survived in some numbers. Beyond this, they were ephemeral and they do not appear on the last maps.