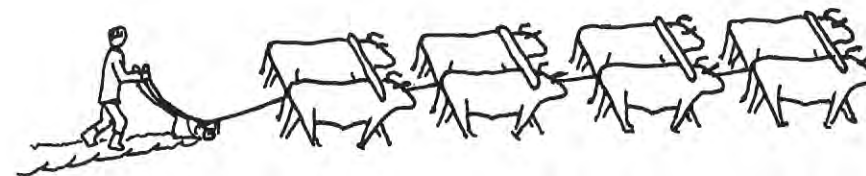


still covers a large area, but it has also lost ground here. Greek no doubt progressed farther up the Balkan Peninsula and formed a distinct language line against Illyrian on the west and Thracian on the east. This fold-back phenomenon had long since engulfed those dialects that formerly were intermediates between Greek and its northern neighbors. Latin was injected into the northern Balkans--as the leading language in Dalmatia-Croatia, and as a lasting phenomenon only along a curving strip around the eastern Carpathians in Romania. Magyar continued as an island of alien speech in the Hungarian Plain. The name "Anatolian" is still used here for all of the Indo-European languages in Asia.

The rest of eastern Europe constituted the remains of the original Indo-European language spread, as yet unaffected by linguistic events elsewhere. Very strong contrasts would have distinguished the speech of different parts of this mesh because of distances and time for dialect development. An eastern version of what still might be called Celtic existed in the Oder River basin and nearby. (Some Germanic may also have penetrated this area.) This was locally separated from Baltic by the ancient dividing line that dates from the initial occupation by farmers. Baltic itself would have coastal and interior halves divided by a similar, but no doubt weaker line. Proto-Slavic is not geographically set apart except for the modest barrier of the Pripet Marshes against interior Baltic. Slavic would grade imperceptibly into the other parts of the remaining Indo-European dialect mesh in all directions from its central location. This continuity would be broken by the next cultural event that goes so far as to replace almost this entire remaining mesh, and more territory as well, with an expansion from that small Slavic area within its center.



CHAPTER SEVEN -- SLAVIC EXPANSION

Background

At about the same time that Roman power was beginning to wane, a new ethnic movement was getting underway in eastern Europe. This was the expansion of Slavic-speaking peoples that has been back-tracked in time and space, by most authorities, to about 200 A.D. somewhere in the middle Carpathian region. Unlike the influence of Rome, this event was not based on higher level of civilization, nor on any particular military capacity.

Sheer numbers are all that can be found to explain this movement that constituted an irresistible flood for many centuries.

Estimates of population density for most of eastern Europe at 200 A.D. center on around two per sq km, a figure far lower than in all regions to the south and west. This is largely a consequence of the smaller fraction of the land that is suitable for plowing. This density must be multiplied by about four times in order to create the kind of population pressure that would have enabled the Slavs to overrun most of their neighbors, many



of whom had equal or higher levels of civilization. Great increases in population are made possible only by corresponding increases in food production. In the 6000 years that farmers had occupied this area, population density had only doubled from the presumed initial figure of one per sq km. A major change in the agricultural base at this time and place could easily have been postulated even if we did not have any direct knowledge to that effect. In this case we do know.

2pin/samer
apay
1 skin
Magyar
acorn
Before this time the simple scratch plow, or aratum, was the only type in use. This plow was pulled by a pair of oxen and just cut a furrow in the ground. It could not be used in deep turf or heavy clay soils. The mold-board plow, also called the caruca or simply the heavy plow, was a much more complicated machine. It begins with a vertical knife supported at the front to cut the turf. This is followed by a horizontal plowshare, set well below the ground surface, to which is attached a curved board that lifts the topsoil and turns it over. It has wheels to support its weight and to set the depth at which it plows. This whole apparatus is then pulled through heavy soil by a team of usually eight oxen. Fields mostly changed in shape from squares to long rectangles so that fewer turns had to be made with this cumbersome affair. (See White 1962.)

An obvious place for such a plow to be developed would be near the edge of the Hungarian Plain where the soil could not be tilled with the light plow. In this area there was a meeting of Roman technology with that of immigrant Celts, as well as that of local forest and steppe peoples. If this innovation was developed along the northeastern margin of Magyar territory, then the subsequent ethnic movements would automatically follow just as recorded.

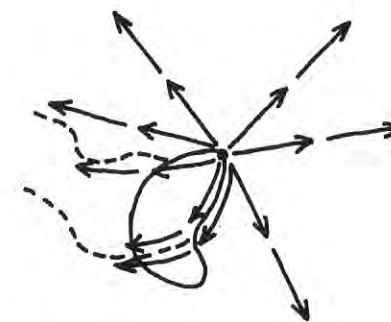
Most of the soil of Europe, outside of the Mediterranean area, was too heavy for the light plow and remained untilled up to this time. Lighter soils in the upland forests, as well as alluvial river valleys, were abundant enough that farmers were previously able to effectively occupy the whole area, but only at a low population density. When the heavy plow became generally

available far more of the land could be tilled--possibly four times as much in most places. This provided the basis for a population explosion that radiated from the source.

Beginning Expansion

The rate of expansion of plow agriculture through the Hungarian Plain itself is a bit difficult to calculate. For the most part, this territory was now being farmed for the first time. Most of the plain was cattle and horse country, but it included some river-valley agriculture, and was surrounded by farmers no more than 100 km from any point within. General farming skills, hired hands, seed, and a planting calendar were easily obtainable, so the advance was probably much faster than the original expansion of simple farming. My suggestion is that a double speed, equal to that of expanding pastoralists, would be applicable here. At this rate 150 years would see this deep-soil farming spread from its source point through about half of the Hungarian Plain. Another 150 years would take it through the rest of the plain to the south-west, and well out into the surrounding forested lands. Magyar expansion in all other directions would be quite different. (See Figs. 22, 23, and 24 for maps of ethnic spreads caused by the mold-board plow.)

Modern Hungarian speech extends about 40 km beyond the plain to the north and north-east (Fig. 23). This suggests that the heavy plow was developed inside Magyar territory, and that the new farmers expanded in these directions as well. Given the novelty of serious farming, and the proximity of the Slavic frontier, the Magyars would not have built up any significant population pressure in this direction. Adoption of the plow by Slavic farmers would have been rapid--they may have devised much of it already.



The fact that almost all of the terminology relating to the mold-board plow and its parts is of Slavic origin forcibly suggests they are its inventors (White 1962:49). This would seem to place the development on the edge of Slavic territory against the Hungarian Plain. But in this case we are hard-pressed to explain the 40-km advance of the Magyar frontier against the Slavs to the north and north-east. Perhaps this represents a later move that is related to the Magyar penetration to the east into Transylvania. One solution, to which I am inclined, would be that a colony of Slavic farmers just inside the Hungarian Plain were the first to assemble this plow. In this way we can account for the Slavic terminology, along with the Magyars being among the first majors users.

Slavic farmers living around the origin place of the heavy plow would have become involved with its use and spread at almost the same time as would the Magyars, no matter what was the exact spot where the invention actually occurred. Their subsequent rate of expansion can be estimated from historical sources to have been about 200 km per century, with no penalties for winter conditions. It was by extrapolation backward from this information that the time and place of the source was pinpointed. This rapid Slavic expansion was mainly over areas that were already under at least some degree of cultivation with the light plow.

The expectable difference between the advance rates inside eastern Hungary and outside it, would automatically lead to some interesting border adjustments. (The Magyar basic advance rate is assumed to be 75 years, plus 25 for 9-hour days, and 50 for -2° winters, for a total of 150 years per 200 km.) Along the northern edge of the plain, the Magyar and Slavic advances to the west may be compared first. After a slight starting delay of about 30 years, the heavy plow in Slavic hands would move 200 km in the same time as would its use by the Magyars. At this point the deep soil along the Magyar path ends, and they too should now expand at 200 km per century. At equal advance rates from here on, Magyars would move westward up the Danube River while Slavs

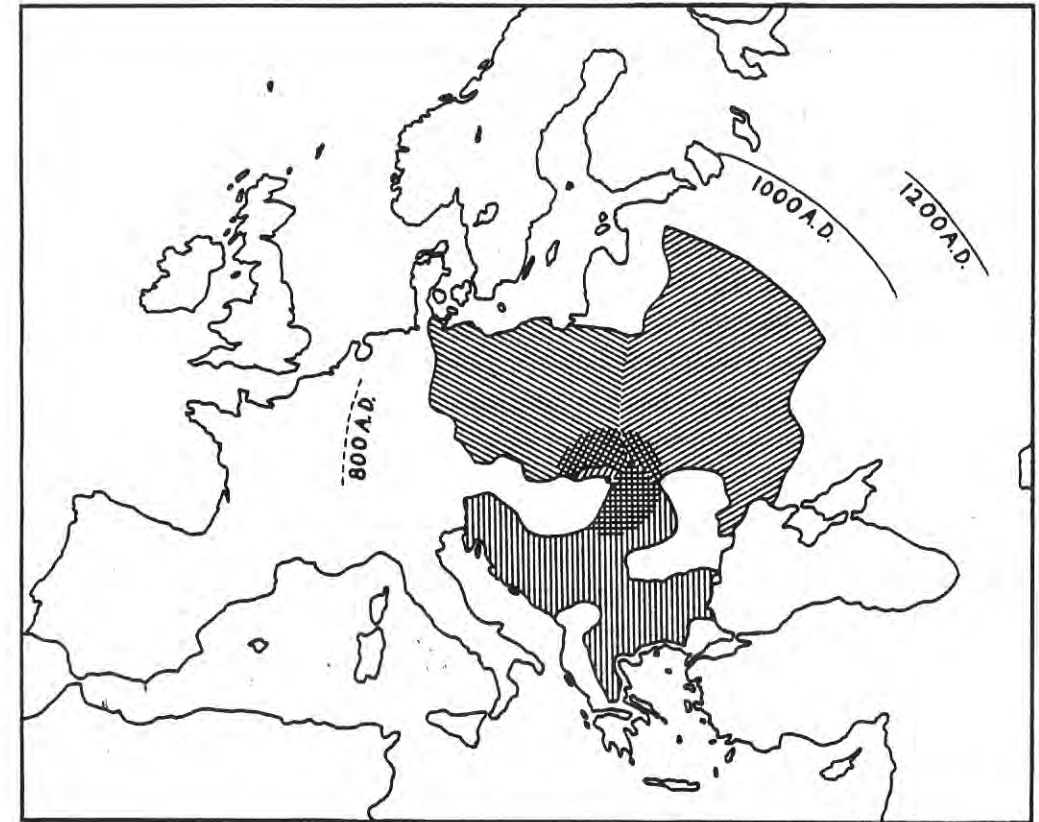


Fig. 22. Slavic expansion. This is the first of four maps showing ethnic shifts that followed from the development of the mold-board plow. The original Slavic area is the unbordered circle of cross-hatching around the dark spot that marks the plow's origin. Slavic expansion is shown by groups of parallel lines radiating in three directions for the western, southern, and eastern branches. A small area near the center was lost to expanding Magyars. The date is 800 A.D. when the western and southern advances have halted, but the eastern is still progressing. Eastern limits at 1000 and 1200 A.D. are also indicated. The 800 A.D. line in the west marks the probable position of heavy plow technology among the local, non-Slavic peoples.

continued through Czechoslovakia.

Along the eastern border of the plain both ethnic groups would likewise be advancing the use of the heavy plow in a southward direction (Figs. 22 and 23). Allowing the same 30-year delay in the Slavic start, Slavs are actually slightly ahead at 200 km. At this point the Magyars are still in their own deep-soil area as novice farmers, while the Slavs are moving the plow faster outside of it. The Slavic lead would be increasing as they turn more westward, paralleling the curved border of the main part of the plain. About 50 years after the 200-km mark, the Slavs would enter the southern extension of the deep-soil area, automatically heading due west by that time, and comfortably ahead of the Magyars. From here on, equal progress by both groups would result in the Slavs taking over this southern part of the plain, and continuing their advance directly to the west. This again conforms to the recent boundary of Magyar vs Slavic speech areas.

A general picture now emerges for the initial stages of the advance of the users of the mold-board plow. At a 300-km radius, a circle can be drawn around the probable point of origin of the plow just inside the northeastern corner of the Hungarian Plain. At this point the Magyars hold 20% of the circumference and almost 30% of the enclosed area, but are open for further expansion only directly to the west. The Slavs hold 80% of the circumference and are open to further expansion in all other directions. In spite of their probable slight delay in starting, the Slavs are so positioned as to be the overwhelmingly dominant force in all subsequent developments (Fig. 22).

The further advance of the heavy plow and its users can now be detailed along a series of paths, beginning with due north and progressing counterclockwise. Maps of its effect on various ethnic groups other than Slavic are found in Figs. 23 and 24. In order to separate the movements of various groups from their neighbors, each map shows just half of them, spaced alternately around the "clock."

Western Slavs

Slavic expansion to the north (Figs. 22 and 23), as in all other directions, would involve overrunning and incorporating other farming populations whose speech only gradually diverges from core Slavic as the distance from there increases. The right flank of this northern move may well be the old meeting boundary that dates from the time when the first incoming farmers were divided by the eastern Carpathians. (If so, this line still exists after some 8000 years and today separates the western from the eastern branch of modern Slavic.) The advance to the north would continue and eventually overrun the southern part of what was by then differentiated as Baltic speech. The remaining Baltics would adopt the heavy plow and thereby increase their own population density to the point where the Slavic expansion loses its advantage and stops at 550 A.D. The exact location of this line of transfer cannot be predicted, but it could not be beyond the southern border of modern Lithuania, which is the core area of Baltic speech today. The present border of Poland with the U.S.S.R. is the most probable line.



These Baltics, in turn, would naturally continue this advance to the north and overrun some of their Finnic neighbors in the same manner. Thus Latvia was added as a new area where Baltic speech was overlain on a Finnic base--a linguistic description that is well known. The Baltic advance was similarly stopped at the border of Estonia near 800 A.D. when these Finnic peoples adopted the plow. They increased their population, took the new technology around through the Leningrad area and into Finland, and eventually up to the northern limit of farming. Just how much movement this caused among the Finnic-speaking populations is not clear. This two-time transfer of the mold-board plow along the east coast of the Baltic Sea suggests that

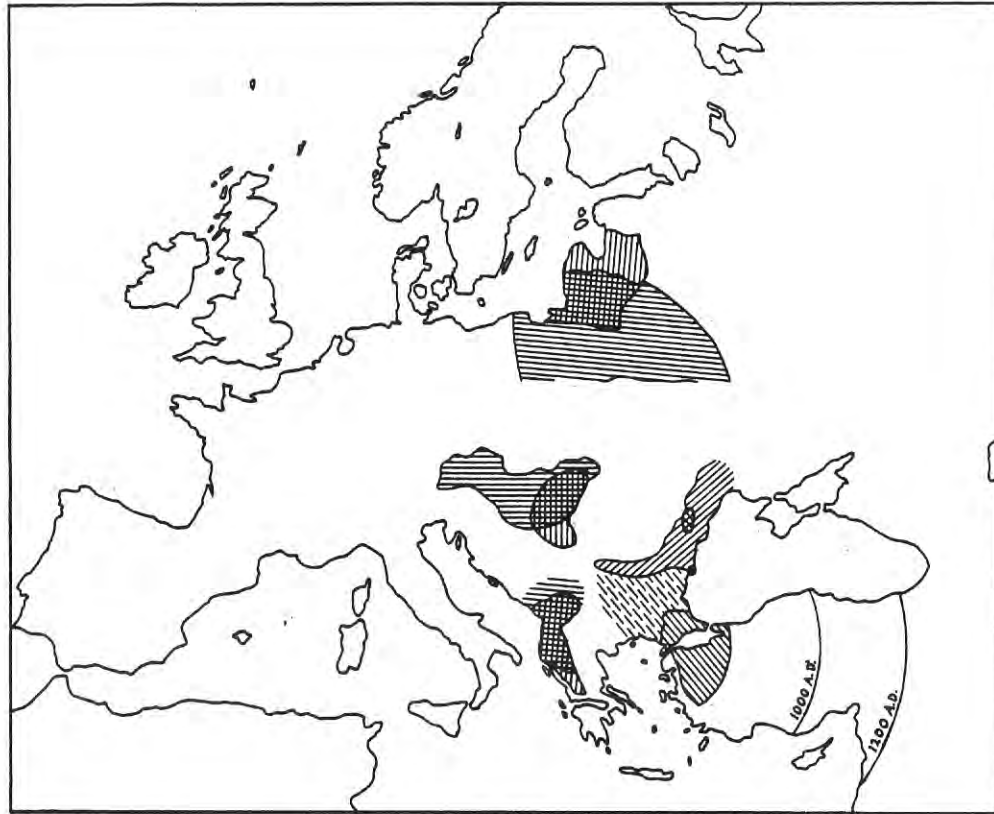


Fig. 23. Non-Slavic expansions, Group I. These four languages show changes that resulted from use of the mold-board plow. Their positions alternate with others (Figs. 22 and 24) to separate their overlapping movements. For each language, lost territory is marked with "defensive" lines perpendicular to the direction of plow advance, retained area is cross-hatched, and gains are lined parallel to the direction of advance. In the north, Baltics lose ground to Slavics, hold Lithuania, and gain Latvia before passing the plow on to the next people. Magyars lose their southern tip and gain much to the west. Albanians lose and gain modest amounts. Turkic loses most of its Balkan holdings, (the northeastern border is left vague here) and expands into Anatolia. These Turks first gain, and then lose, the dashed area of Bulgaria. The map is dated at 800 A.D., and shows lines of 1000 A.D. and 1200 A.D. for the Turks in Anatolia.

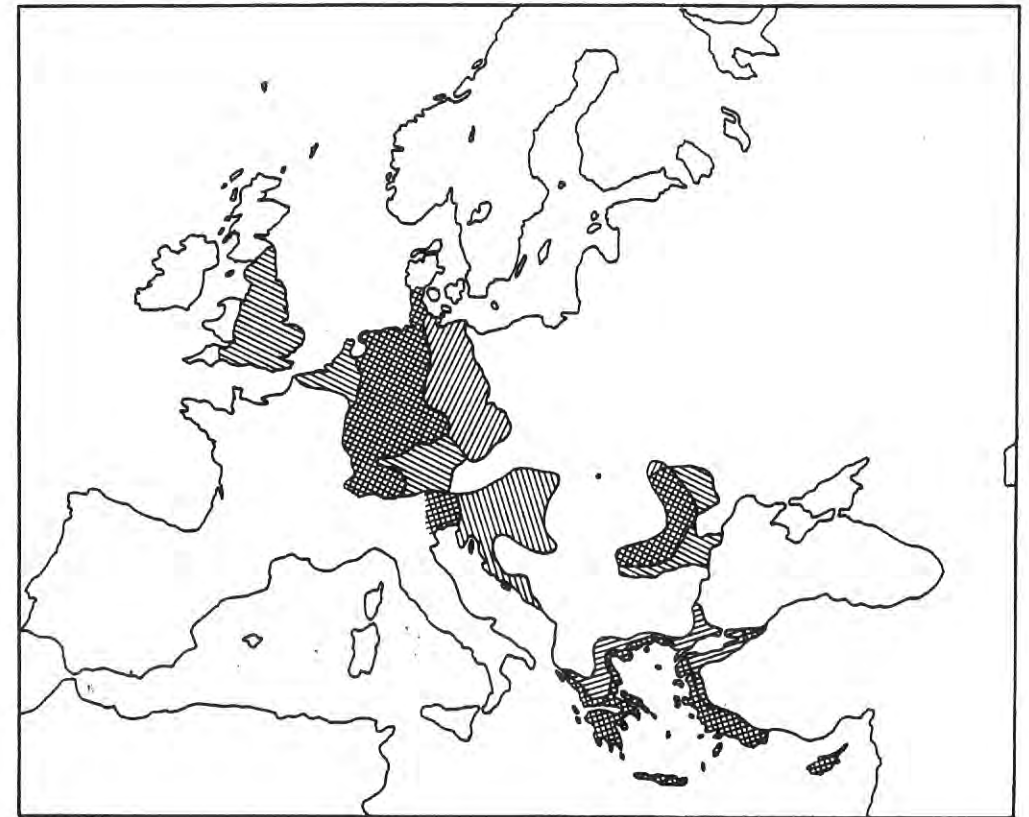


Fig. 24. Non-Slavic expansions, Group II. These four languages show changes that resulted from use of the mold-board plow. Their positions are alternated with others (Figs. 22 and 23) to separate their overlapping movements. Use of the plow spreads in four directions from the origin spot. For each language, lost territory is marked with "defensive" lines perpendicular to the direction of plow advance, retained area is cross-hatched, and gains are lined parallel to the direction of advance. In the west, Germanics lose a wide strip on their east and gain greatly in Bavaria, the Low Countries, and England. Romans lose old Pannonia, Croatia, and Dalmatia, but hold in Italy proper. Greeks lose most of their inland area. Romans in Dacia spread considerably to the east. The map is drawn at maximum expansion of the peoples involved, about 800 A.D.

the area had been well populated before this event. At a lower initial density the natives might not have been able to increase their numbers fast enough ever to be able to oppose the intruding plow users.

More to the north-west (Figs. 22 and 24) the Slavic advance passed over the North European Plain, unimpeded, to the shore of the Baltic Sea all the way west to the base of the Danish peninsula. They stopped by 700 A.D. just short of cutting Denmark off from Germany. The eastern part of this new Slavic territory was the old Celtic-related area, and the western part was Germanic.

North German tribes were in motion toward the west during, and no doubt because of, this advance of the Slavic frontier. Saxon colonies that had been settled on poor lands in Britain in 450 A.D. (or earlier) would have received many over-seas refugees from the east. This led to their rapid conquest of much of Britain in just 50 years between about 550 and 600 A.D.

Eventually these Germanics also brought in the heavy plow that was ideally suited to just those areas in which they had been initially settled. Their inevitable local population increase, plus continuing immigration, led to the final Anglo-Saxon takeover, and the ethnic assimilation of the Britons, by 800 A.D. Not surprisingly this Germanic tide also stopped at Cornwall, Wales, and Scotland, just as the Romans had before them. The mold-board plow was no better suited to effective use of these lands than was the Roman villa system.

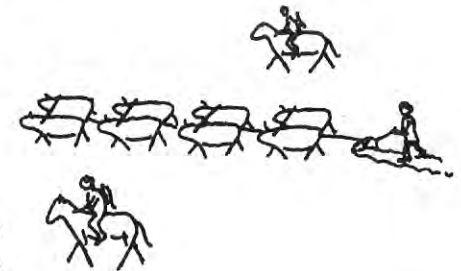
At about this same time, Germanic expansion on the continent engulfed western Netherlands, northern Belgium, and a piece of northern France. Again, these were the low areas of heavy soil to which their new plow was so well suited. Interestingly, this is the western half of the area already noted for its non-Celtic and non-Germanic place names. Apparently neither the original farmers nor the Celtic refugees from Germany were able to settle here very densely until this time. The rest of France was too well populated and civilized to become Germanized, though most of it was overrun and controlled by German-speaking minorities for

many years to come. The Franks are the best known of these invading tribes.

More directly to the west from the source point, Slavic penetration ran through the length of modern Czechoslovakia, stopping finally at the western Carpathian mountain barrier (Fig. 22). Early along this path the natives of the Slovak area were near-relatives of the Slavs. In Bohemia they encountered the recently arrived Germans, whom they surely outnumbered. These early "Bohemians" who evacuated their homeland are the obvious source of the German intrusion into Bavaria at about 500 A.D. (Fig. 24). This was the old Rhaetic province of the upper Danube, whose native speech (whether Rhaetic or Latin) was replaced at this time. The Slavic advance expectably halted here from a combination of the transfer of the heavy plow, denser populations resisting them, and a low mountain barrier.

Magyar Moves

The Magyar advance should have been affected by the fact that most of these people had only recently become serious farmers. Previously their emphasis had been on cattle herding and horse riding. Their later history suggests that they did not ever settle very densely



outside of the Hungarian Plain. What ultimately proved to be their firm boundary to the west was only 200 km removed from their original homeland. They apparently did progress another 300 km to occupy the main body of Austria, but gave it up readily to the German reflux a few centuries later (Fig. 23).

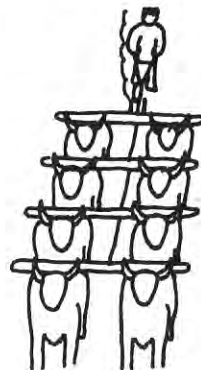
Given their equestrian skills and newly augmented population, Magyar armies periodically raised havoc, especially to the west of their extended homeland. Atilla the "Hun" was merely their current leader when the factors for expansion first developed.

The many supposed ethnic changes within Hungary during this and later times could have been no more than changes in the political control of the nation. The historic waves of conquest out of Asia are without any ecological foundation. A few tens of thousands (at most) of invaders will not change the ethnic composition of half a million entrenched peasants without some mechanism that has yet to be specified.

There is one case that can be made for a degree of ethnic change within Hungary. The original development of the mold-board plow would have increased the population in the northeastern corner by a factor of ten times or more, prior to its spread over the rest of the country. An explosion of numbers, power, and prestige would engulf the rest of the country spreading from this spot. Predictably, the dialect of this northeastern corner would have overrun all other dialects. The significance of this is that the Vogul/Ostiak migration must have started out from this very same corner more than 6000 years earlier. This then explains why modern Magyar resembles (only vocab) Vogul/Ostiak more than either of them resembles the other two branches of Uralic. If a different dialect within Hungary had prevailed over the others, then the relation between Hungarian speech and the three outliers would have been different.

This reconstruction presupposes that the differences between the Uralic dialects of 6000 B.C. were in some ways greater than the amount of contrast that has accumulated since then between Vogul/Ostiak and Magyar. This suggests a slow rate of change in recent millennia, and a two or three times longer period of differentiation among the original dialects in Mesolithic Hungary. These contentions are presently neither supported nor disproven by other data that might pertain to these languages.

Southern Slavs



To the south, Slavic farmers spread over nearly the entire Balkan Peninsula (Fig. 22). A western branch of them overran the southern part of the Hungarian Plain, and advanced to the Adriatic coast and into the Eastern Alps. In this direction the only human population that was numerous enough to resist this tide was just within Italy itself.

Subdivisions of Slavic in this area probably relate to underlying language differences in the previous population. Slovene in the far northwest, as well as the adjacent Friulian language in Italy, may owe their distinctions from their respective neighbors in both directions to the previous Venetic language. Friulian has also been associated with the old Rhaetic of Bavaria and Austria, which may have been Latinized during Roman times. If Venetic was also Latinized, then it was just a distinct dialect that underlay the area of both Friulian and Slovene. (See Fig. 24.)

Croatian on the inland side of Yugoslavia, as well as Dalmatian on the Adriatic coast, are differentiated from their neighbors by their presumed incorporation of preceding Latin speech. Bosnian Slavic exists on what should still have been Illyrian territory at that time.

A central branch of southern Slavs overran most of the Illyrians, leaving only remnants in the mountains of Albania (Fig. 23). They also pressed on into Greece and overwhelmed most of that country except for some coastal areas and cities (Fig. 24). Limited Slavic penetration of Anatolia is also reported. Displaced (or expanding) Albanians participated in the invasion of Greece (Fig. 23). Both Greeks and Albanians also moved in large numbers by sea to settle in small patches of Sicily and southern Italy, adding to earlier Greek inhabitants, where they remain today. This whole southern flood had reached high tide by the year 800 A.D., and then the Hellenizing reflux began immediately to work its way back up the peninsula.

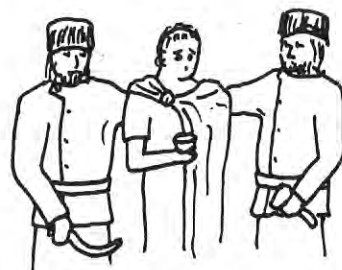
An eastern branch of the southern Slavs swept down the Danube basin to the Black Sea, occupying modern Bulgaria in the process (Fig. 22). This move almost coincided with the Turkic

move that is proposed here, also based on the plow, out of steppeland extension along the lower Danube (Fig. 23). These were the Bulgars of history who were the dominant ethnic group there, given their equestrian military force. They would necessarily be numerically inferior to the Slavs who eventually prevailed. The Turkic Bulgars were no doubt in the area first, and they are the ones who introduced the mold-board plow into Anatolia. One need look no further than northern Bulgaria to find the Bulgar homeland that is usually placed far to the north-east in the Pontic Steppes. Their detailed history is discussed shortly.

This eastern branch of the southern Slavs also constituted the right wing of the two-pronged Slavic sweep around the old Roman province of Dacia. They absorbed the remaining Bulgars and moved slightly north along the Black Sea coast.

Romania

Most of Dacia, now Romania, was probably in the process of being Latinized for the same reasons as in western Europe. The major part, in the west, was overrun by Slavs by 400 A.D. The barrier ring of the eastern Carpathian Mountains would have retarded this advance long enough for the Romans and Turkics on the other side to adopt the heavy plow and begin their own expansions.



The Roman colonies in the foothills extended their arc of occupation from south through east, and naturally overran most of the Turkic people who had bordered them here in the grasslands (Fig. 24). Two small remnant groups of this Turkic population still remain in the area (Fig. 23). The Slavic tide then automatically spread to these Roman colonists from around both sides of the mountains, blocking any further Latin expansion, and absorbing most of the remaining Turkics (Fig. 22). The Slavs had

begun their expansion long before; by comparison, these Latins had built up only a small population impetus for their own move. The Latins occupied the mouth of the Danube, but the Slavs closed in from both directions along the Black Sea and almost cut them off from it.

After the Slavic advance ended, the Latins soon re-asserted their ethnic dominance over the original province of Dacia, much like the Greeks did in their own area. A large Slavic component was merged into this new linguistic entity. The only item that remains unexplained here is the Magyar population in Transylvania, near the center of Romania, and some more small colonies between there and Hungary itself. ?

Turks

After the mold-board plow was adopted by the Latins of Transcarpathia they would, in turn, pass it on to their immediate neighbors along the Black Sea coast and lower Danube valley. The breadth of Latin occupation was so little that they could not have augmented



their level of population enough to immediately overrun all of these neighbors. These were the Turkic inhabitants of the steppe region of grass and deep soils that extends to here from the Ukraine. This is the westernmost end of the Eurasian grasslands that must have been inhabited by Altaic herdsmen since the earliest Neolithic. Just like the Magyars, these horse-using pastoralists were in close contact with agriculturalists, and had immediate access to their technology and experienced personnel. As with the Magyars, we would expect them also to adopt the heavy plow and increase their population, but not at first with the same intensity as the more agriculturally oriented Slavs.

This strip of grassland runs for about 500 km along the Black Sea coast, extending inland about 150 km in most places.

On the lower Danube it runs over 400 km inland, but this projection is less than 100 km wide. In terms of subsequent events this Balkan grassland strip can be subdivided into three major parts--the northern part bordering on the Ukraine, a middle section surrounding the Danube delta, and the southern projection running up the lower Danube.

In the northern part, Latins would expand into the deep soils and make the plow available to the local Turkic natives. Most likely the Turkics failed to adopt it here in northeastern Romania. These people were in only partial contact with farmers, and were contiguous with a large area and population of other pastoralists in the Ukraine. If they ever did begin any deep plowing they were probably soon overrun by the Slavic farmers from the north. The Turkics of this area were absorbed by Latins and Slavs.

From the middle section there was no available space into which Turkic horsemen-turned-plowmen could expand. While they would take up farming, they were trapped against the Black Sea by expanding Latins who had most of the advantages. The present Gagauz enclave in eastern Romania is best explained as remnant of this Turkic population.

Along the southern strip these Turkics would naturally adopt the plow from the oncoming Latins. (See Fig. 23 to follow this whole Turkic move.) In this case there was open territory to the south into which they could expand over the local Thracian farmers who did not yet have the heavy plow. These Turkic peoples would have the same combination of horse-based mobility and a new-found farming technique that characterized the Magyars to the north-west. Their rapid, but still relatively sparse, expansion over all of modern Bulgaria and beyond would be the automatic result.

Very shortly behind this Bulgar expansion a dense population of Slavic farmers would naturally spread over the same area, entering from the north-west. They would have the same plow and with more experience in its use, but would be without the use of horses. Given the greater mobility of the Turkics, and the

greater numbers of the Slavs, they would more easily mingle than form a boundary between each other. The more horse-oriented group would be militarily, and hence politically, dominant over the other. This, then, is the quite natural origin of the Bulgarian state.

Greek coastal strips and cities (including Constantinople) mostly held their ground against the wave of Albanian, Slavic, and Turkic intruders. As far as the Balkans are concerned, this was about the limit of these movements. But across the straits in Anatolia there occurred an important extension of this historical process.

Turkic horsemen/plowmen would have had first access to cross into Anatolia, and to expand there with the new agricultural techniques. Their major crossing can be put at the Dardanelles, rather than at the Bosphorus where Constantinople is located. By this time the Turks (as they may now be correctly called) had advanced 400 km with the use of the mold-board plow, taking maybe 200 years to accomplish this move. With even half this much experience, it might be expected that their agricultural abilities should have improved considerably. If their density of settlement had increased enough they would be able to form an ethnic frontier that could resist further infiltration and incorporation by the advancing Slavs. A stable Turkish frontier ought to form in the southeastern corner of the Balkans. The present Turkish ethnic border is at this appropriate location. This frontier does not pass across southern Bulgaria at a constant 200 km from the Turkic starting line, but includes only the eastern end of that potential zone. This may result from the fact that the Turkic source area on the eastern end was much larger than its projecting western tip. If their migration was primarily southward (as would be natural), the eastern end would have included the greatest numbers of them.

Within Anatolia these Turkish farmers would spread automatically over the entire central area, engulfing the mostly sparse local inhabitants. They would leave only the coastal strips and cities in the hands of the Greeks and other Indo-

European nationalities. Except for the strong hold of Greek on the western fringes against the Aegean, these non-Turkish enclaves were eventually absorbed by the new dominant ethnic group.

Farther to the east in Anatolia the major part of the Turkish-speaking frontier today ends along an arc that centers on the Dardanelles, and that would mark their advance line at 1170 A.D. by the schedule used for this movement. On the south, Turkish stops short of this arc, roughly on the old Semitic frontier at the Syrian border. On the north it extends another 350 km for no obvious reason into what should have been Caucasian territory.

The intrusion of the Seljuk Turks from the east in the 11th Century brought Islam and a higher degree of political organization. This would have been a significant factor in later absorbing the coastal enclaves, but it could hardly account for the major spread of Turkish in the main part of Anatolia. I suspect that extant records of the Seljuks might indicate whether they found linguistic relatives already occupying the area.

The total Turkish advance indicated here is 1300 km from their source area, and it should have taken them almost 700 years to accomplish. Eventually the heavy-plow technology would have passed on to other peoples in eastern Anatolia--Kurds, Armenians, and Caucasians. As long as the plow continued to be useful these people would have made their own geographical adjustments. Such further movements go too far afield to be dealt with here.

A major significance of this Turkish expansion, other than explaining it for its own sake, is that it marks the first physical separation of the Indo-European languages into European and Asian geographical divisions. The dialect mesh had been broken much earlier, allowing the two halves to drift freely from one another. By 500 B.C. Greek probably had spread far enough to effect a language break between the Balkan and Anatolian dialects. It is even possible that the Hittite Empire or other events had created such a break even earlier. But until this Turkish intrusion, the Indo-European family of languages had

occupied a contiguous territory.

Eastern Slavs

The eastern Slavs constitute what ultimately became the largest division of this language group. Their expansion was generally to the north-east, and it nowhere encountered any major groups of densely settled or highly civilized peoples who could seriously impede their progress. (See Figs. 22 and 25.) Their farming was effectively blocked by the 120-day growing season on the north and by the semidesert region on the south. This long eastern advance, overrunning previously farming peoples, appears to have progressed at a regular rate of 200 km per century all the way to its natural limits.



The dividing line between eastern and western Slavs (now Russia vs Poland) lies approximately at the meeting of the original farmers who had first passed around the two sides of the eastern Carpathians. To the east of this line the Slavs overran remnants of the original Indo-European dialect mesh. These were first the Slavic-related people who lived south of the Pripyet Marshes, and who extended considerably to the east. Their area of incorporation is within the modern Ukraine, as is their subsequent area of further extension into the steppes. The basic language for the source of the eastern Slavic expansion is thus identified as proto-Ukrainian.

North of these marshes the native people who were being incorporated by the Slavic expansion were the interior Baltics. By 650 A.D. their original area would have been overrun, and they do not exist today. Its boundaries coincide so nearly with Belorussia that the source of the distinction of this modern language seems to be clearly identified.

The remainder of the eastern Slavic advance was over the

Uralic tribes that are here divided into Samoyed and Vogul/Ostiak sections. Some Finnic soon got into this area as well. Those Slavs who overran a base of Uralic peoples are known today as Great Russians.

During the first half of its advance to the north-east, the Slavic left flank continued to parallel the Baltic coast at about 200-250 km inland. This flank ran along the ancient dividing line between the paths of the original Finnic and Samoyed pastoralists (Uralic groups II and III). The coastal zone received its heavy plow from the western Slavs and was probably well populated even before this. The inland area was more thinly populated, and the native Uralics here evidently were not able to adopt the plow readily enough to hold their ground at any point.

After the eastern Slavic advance passed the original Indo-European occupation area, a new geographic situation arose that caused two major advancing fronts to intermingle. When the eastern Slavs pass the Gulf of Riga, their left flank turns from north-east to due north as it continues to parallel the coast. In other words, the Great Russian advance fans out somewhat to their own left. This then comes into conflict with the advance along the Finnic path near the coast. (See Fig. 25 for this and further Finnic moves in Russia.)

As heavy-plow agriculturalists advance into deep-soil locations, some of the local farmers can be expected to retreat in order to avoid being surrounded and incorporated. This kind of retreat is possible only into lands that are not already densely settled. Interior Baltics probably did just this and moved their frontier 60 km beyond the Dvina River before they were finally overwhelmed. The denser population of Finnic farmers in modern Latvia faced a different situation and had the numbers to do something about it. The western half of this country (Courland) was a cul-de-sac in the north, and its people were probably well aware of this. Accordingly, large numbers of farmers, especially from western Latvia, would be expected to gather all their belongings and shift to the east to avoid being engulfed by Lithuanian plow farmers. This move puts these Finnic

farmers directly into the path of advance of the eastern Slavic plow farmers instead.

In the region immediately to the east of Latvia, Slavic farmers were fanning out to their left (due north), and Finnic were spreading directly into them with their own turn to the right (due east). The original natives here were so sparse that the intruding Finnic would be second only to the Slavs in numbers. This is just the condition that is known to have occurred in the Novgorod area in 850 A.D. at the founding of the first Russian state. The Slavs had the better equipment and would soon have the numbers to dominate the society. The original Finnic farmers who remained would occupy islands of lighter soils, or they would adopt the heavy plow. Many such enclaves exist in this area today. Other Finnic farmers would have moved on to the east, eventually to become the Mordovinians. More on them later.

A similar shift to the east by Finnic farmers would again occur at the Gulf of Finland. This time the refugees pressed into a narrow corridor through the Leningrad area, while some continued to the east to become the Komi. The adoption of the heavy plow by Finnic at the Estonian border would relieve at least the ethnic basis for further pressure, and the spread of the plow would assure Finnic identity in this corridor up to modern times. (The later Russification of Leningrad itself follows automatically from geographical considerations of modern state policy.)

Finns and Slavs would have passed around their respective sides of Lake Ladoga and met again on its northern side. The advance of both groups was halted here by 1100 A.D. along the 120-day growing season line until more recent times.

The Finnic farmers out of Latvia and Estonia evidently had a continuing history of some interest. Large numbers of them could have avoided being engulfed by the Slavs simply by continuing their move to the east. Even without the heavy plow, their farming skills plus their numbers should have been sufficient for them to pass through the sparsely settled interior of Russia--

given sufficient motivation. By moving just 1.6 times as fast as the Slavic frontier, these Finnic could slip to the east and avoid encirclement. This means taking a crop or two, then moving, and repeating this many times without leaving significant numbers behind. This was an actual migration, not a frontier extension which is unable to advance at that speed anyway.

There are still many Finnic enclaves just to the east of Latvia where the first intermingling with Slavs occurred. Beyond this there is a long gap with none of them for the next 500 km across central Russia. Then Mordovinians are encountered in great numbers. Evidently these Finnic farmers out of Latvia reached and filled-in the last corner of arable land in the east, where it tapered down and pinched out between the growing season to the north and the deep soil to the south. The oncoming Russian advance would have reached them at 950 A.D., to judge from the location of the westernmost surviving examples.

The Mordovinians (and related peoples) now occupy only about one-tenth of their "natural" area in this corner. Displacement by Russians would have been abrupt in this first contact with people using the heavy plow, but Finnic speakers have lost ground in recent times as well. It can be seen that the Mordovinians also managed to adopt the mold-board plow, because their area extends about 300 km into the deep-soil region at their eastern extreme. Here they are again dissected by Russian speech, which demonstrates recent absorptions.

Mordovinian distribution shows yet another peculiarity at its extreme eastern end. They do not occupy the very last piece of the cul-de-sac between short seasons and desert; this spot is held by Turkic pastoralists with ethnic connections still farther to the east. Mordovinian occupation ends some 250 km south of the present 120-day growing-season line, while cattlemen occupy much of the potential farmland north of the Mordovinians and up to the crop-growing line. This seeming malpositioning of the two is almost the reverse of what might be expected at first glance. (See Figs. 1 and 25.)

Actually, if one assumes the growing-season line was shifted

250 km to the south after the year 1050 A.D., then the Mordovinians would have exactly filled the last existing farming space at the eastern tip. (This suggested lowering of the farming limit may correspond to the deteriorating climate in the North Atlantic at a slightly later date, which terminated the Norse colonies in Greenland.) If the original use of cattle spread across the steppes slightly faster than it did in the forests, then a considerable area of tillable eastern forests could have been held by Altaic cattlemen. This area would later be lost to the Finnic, and then to the Slavic farmers, but only up to the limit of the growing season that was displaced southward at that time.

Another part of the Finnic retreat was out of Estonia and across Russia to the Komi area. This is mostly to the north of the normal limit of farming, but where oats, barley, and rye are grown today. Here they are pressed up against and between the Samoyeds and Vogul/Ostiaks, where they overran some of these peoples and even spilled over the Ural Mountains. They had to abandon much of their usual farming and crops to inhabit this area. The area of occupation follows no obvious pattern except as another effort to avoid Slavic encroachment. Since many Russians have made similar moves into the north, it is best left unexplained except to say that it is a recent, civilized phenomena. (See the north-east corner of Figs. 26, 28, and 25, in that order.)

While the eastern Slavs advanced rapidly across Russia, they also moved into the deep soils of the southern steppe region with the essential aid of the mold-board plow. These Pontic Steppes were then occupied by Turkic pastoralists, with little or no agriculture, who would have harassed the intruding farmers. On the other hand, improved communication and transportation of the time would have meant a much deeper frontier-feeding zone that could provide large numbers of pioneers. To the local ruling nomads, whether Sarmatians, Mongols, or Turks at various times, the ethnic identity of these farmers would make little difference so long as they could tax the wealth that was being created.

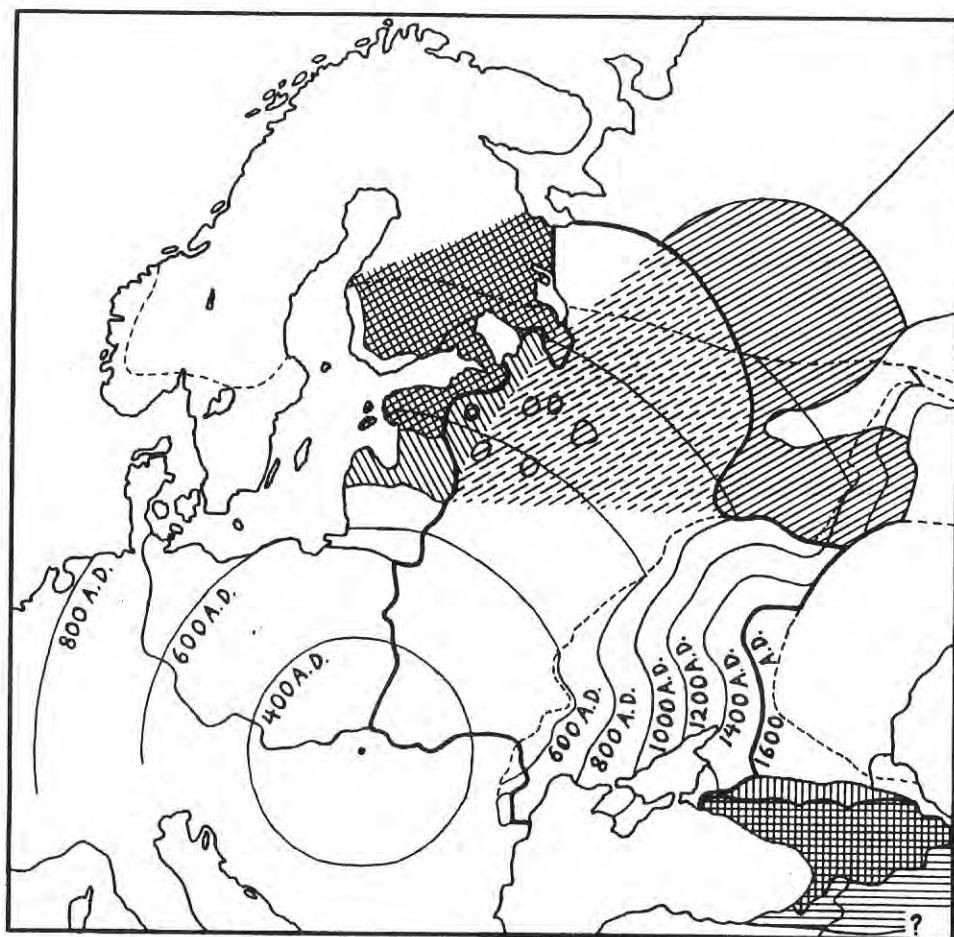


Fig. 25. Finnic expansion. Changes are shown for Finnic, Caucasians, and Slavics far from the origin of the heavy plow. Finnic lose Latvia and part of western Russia. They moved east ahead of the advancing Slavics, lost much of this new land, but held some enclaves and a large area in the east. They also joined in the plow-based penetration of the Steppes. Caucasians lost ground in the south and advanced a bit northward. Eastern Slavics are shown in heavy outline as of 1600 A.D. They are the major source of immigrants into the Pontic Steppes, with dates indicated. In the north a dashed line marks the 120-day growing season; dashes in the center-east show the deep-soil margin; and dashes farther to the south-east mark the desert edge.

I have found that political maps of southern Russia do not reflect linguistic groupings of the real people any more than similar maps do in the rest of Europe at that time.

The advance of eastern Slavs into the steppes was certainly faster than the rates used for the first Neolithic farmers in other areas. After mapping the area with several different rates, I found that a base rate of 120 years (four generations instead of five) per 200 km, plus the usual penalties, seemed to fit best with both logical expectations and historical data.

The early advance of the heavy plow out of its source area was at least retarded, and probably stopped, by the barrier of the eastern Carpathians. It had reached the Latins of Dacia on the far side of these mountains by passing around both ends at nearly the same time. From these two ends, the use of the plow would move through Latin territory toward the mouth of the Danube. As already noted, the Latins then spread out into the grasslands where the Turkics were also picking up this new agricultural technology. At the same time Slavic farmers were making parallel sweeps around these mountains, but farther out to each side, well to the south and to the north-east of the Latin speakers.

The Slavs had both temporal priority over, and a deeper frontier-feeding zone than the Latins. At about 500 A.D. both Latins and Slavs entered the steppes to the south and the north-east of Romania, but the Slavs expectably blocked the slower Latin advance. Both arms of the Slavic advance curved around the Romanian effort, reached the coast of the Black Sea, and came just short of cutting them off at the mouth of the Danube.

The left arm of this sweep, the one to the north-east of Romania, represents the first entry of the Slavs into the great Eurasian grasslands. At their presumed rate of advance, these farmers reached the Black Sea at 700 A.D., and Rostov-on-the-Don at 1400 (Fig. 25). Continuing this schedule to the year 1900 would have them only partway into the Kuban and first contacting the Caucasians, and not yet on the far side of the Urals. Since these last events are in fact badly misdated, it is clear that

recent centuries have seen a great increase in their rate of advance. Political unification and railroads have made the entire country a feeding zone for the frontier.

Within the steppes a contrast between Ukrainian and Great Russian speech persists. Ukrainian coincides with those pioneers whose last forest contacts were with Slavic-related Indo-Europeans. Russian coincides with those pioneers whose last forest contacts were with Uralics. Until the year 650 A.D. the only Slavs in the steppes were of the Ukrainian type. After that time all new immigrants, passing from forest to steppe, were Russian. By extending from this division at their point of entry, a line is generated that runs close to the present language frontier. If the Ukrainians are granted a slightly deeper frontier-feeding zone this would serve to spread their advance 15° to their left at the expense of the Russians; then the dividing line is on the actual frontier. Sometime after 1500 A.D. the political control by Russians mostly blocked the Ukrainian advance at their current line.

Language Map

The year 1100 A.D. is chosen from a range of possible dates to represent the stable condition as far as most of Europe is concerned (Fig. 26). It is selected mainly because it immediately precedes the German reflux to the east, which is the major item in the next event. It also catches the Slavic move to the east well short of its maximum extent, but that cannot be helped--this move was not completed until even well after the following German action had run its course. In fact, it is continuing even today.

Distributions in southeastern Europe at 1100 A.D. reflect a rolling back of the Slavic frontier from its maximum extent of about 800 A.D. (Compare Figs. 22 and 26.) Exactly where some of

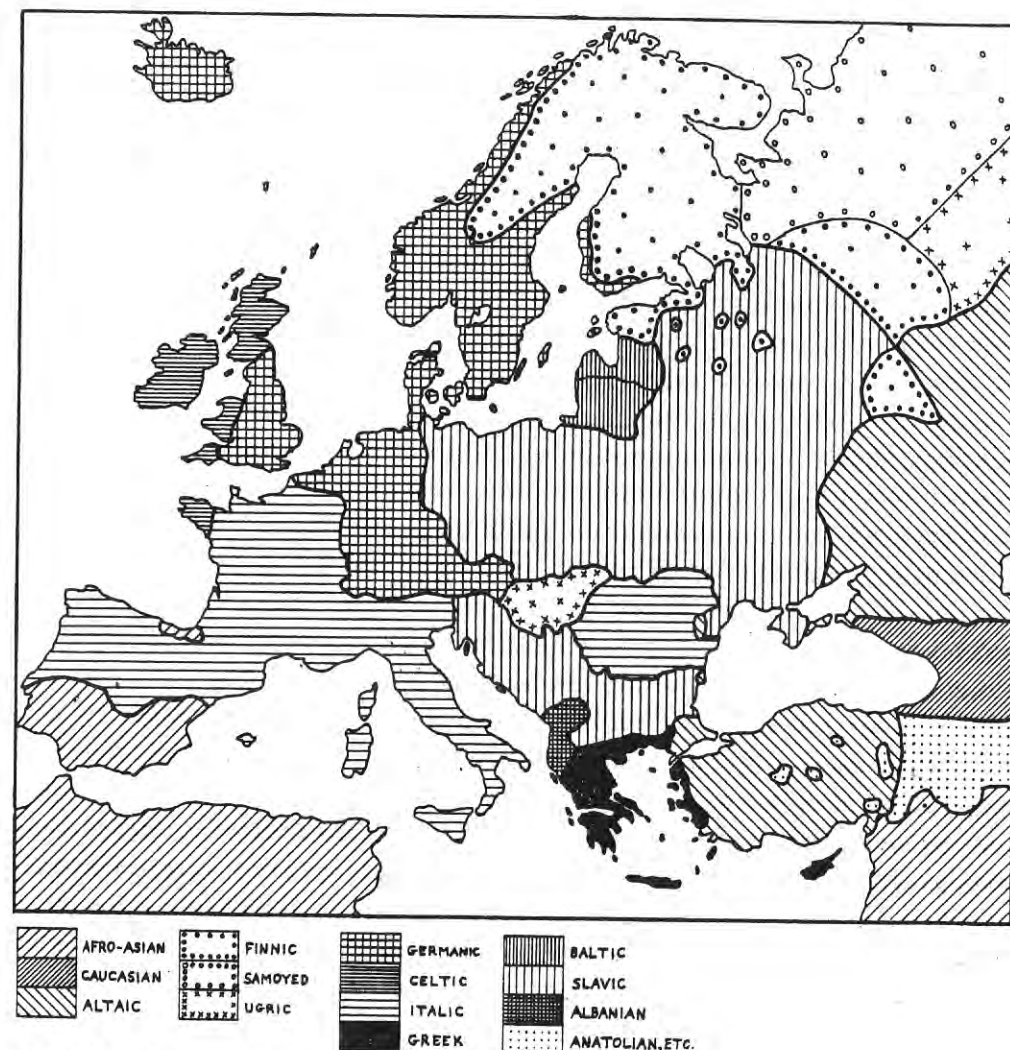


Fig. 26. Language map in 1100 A.D. The Slavic explosion to the west, south, and east is the major feature. Other languages had considerable areas lost and gained from the use of the heavy plow. Pictish is lost (according to historical sources), and Afro-Asian has reinvaded Iberia. Some "civilized" refluxes occur in Greece, Romania, and the German occupation of Austria. Uralic is the biggest loser of ground. The Caucasian shift is not shown because it happened after 1100 A.D. The Anatolian-Semitic boundary is now arbitrarily adjusted to its modern position.

these frontiers had moved by this time had to be estimated. The Magyars of Transylvania, in the middle of Romania, are not indicated because I don't know how or when that move occurred. Turkish is stopped on its presumed line of 1170 A.D. without showing its penetration of Caucasian territory that should have occurred later.

It was the Uralic family that had lost the most ground to the Slavic explosion as of this date, and these losses would continue over the next few centuries. The eastward shift of much of its Finnic part somewhat moderated this loss to the family as a whole. The Altaic family similarly lost much ground to the eastern Slavs, and has continued to do so until modern times. Again, one of its subdivisions made progress elsewhere--here in the form of the Turkish spread over Anatolia.

Many language groups went through a two-step process of losing ground to the Slavs on one side, then after acquiring the mold-board plow, gaining new territory in the other direction. (These are shown in the before and after maps of Figs. 23 and 24.) Clear examples of this process are seen in Germanic, Baltic, Romanian, and Albanian. If one ignores the fact that Magyars participated in the origin of this move, they can also be seen in terms of lost, held, and gained territory. Some groups lost ground to the Slavs and gained nothing, like Samoyed, Vogul/Ostiak, Greek, and Latin in the west. In other cases ground was lost to non-Slavics who had acquired the heavy plow.

Two special cases of plow-induced shifts show losses and gains, but without a full middle ground that was held throughout the process. A large gap exists in the Turkic distribution where they had gained new territory with the plow to the south of their homeland, then later lost some of this (Bulgaria) to expansions by denser Slavic populations. The Finnic distributions show an even larger gap between their homeland in the Baltic area and their penetration of the steppes in eastern Russia. Again, it was Slavic farmers who were able to overrun the territory that was occupied only temporarily by the eastern Finnic.

Perhaps the most significant aspect of this whole episode

was the loss of the last remnant of the original Indo-European dialect mesh that had persisted in eastern Europe. At this point all of it is subdivided into new dialect meshes, within recently formed boundaries, that are evolving independently of each other. The previous contact between the European and Asian halves of this family are also now irrevocably separated by the deep interjection of the Turks.

Latin-derived speech remains dominant in the west, though they now should more properly be referred to as Italic (or Romance) because of the many subdivisions that have become separate languages. Italic lost ground directly to Slavic in the western Balkans, and indirectly in northernmost Gaul where Germanics overran that area with the aid of the Slavic plow. The Rhaetic area of Bavaria and Austria, as well as all of England, were Germanized by this time. But it is not clear whether either area should have been classed as truly Latinized before this. I labeled Rhaetic as original and England as Latin in an earlier map (Fig. 21), but this was arbitrary and might even have been correct the other way around.

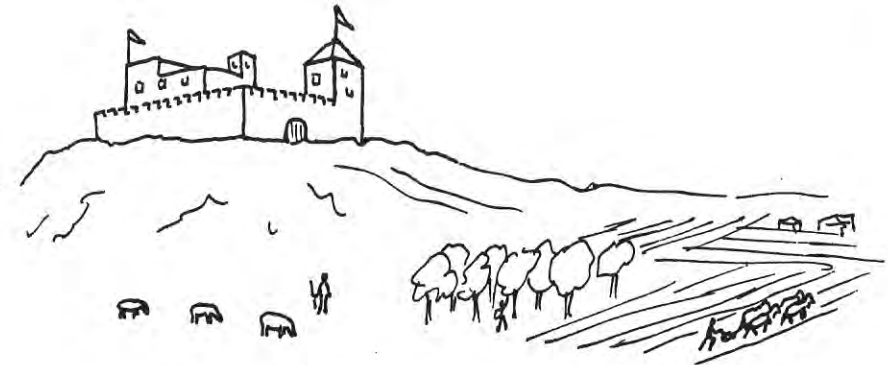
Latin also lost whatever it may have held in North Africa to the Semites after 675 A.D., in an action totally unrelated to the mold-board plow phenomenon. This returned the area to the Afro-Asian language family that had evidently occupied it in the initial Neolithic spread. Semitic Arabs also gained control of most of Iberia and were in the process of Arabicizing the population. Their limit is drawn rather arbitrarily near the middle to include the area that was under their domination for the longest time. They do not appear to have made significant or long-lasting contact with the Basque hold-over from the earlier Afro-Asian incursion.

Western Celtic continued in Brittany, Ireland, Cornwall, Wales, and Scotland. The last three of these are at this time separated from each other by the Anglo-Saxon intrusion, but they had already been separated by the Roman occupation of just the same area.

Pictish has disappeared from Scotland by this time, having

been replaced by the Celtic speech of Ireland. One can visualize the Picts as a small ethnic group, under pressure from the Anglo-Saxons and Vikings, voluntarily merging their cultural identity with the only significant rivals to these Germanic threats.

The Lapps would have lost significant ground to northward-expanding Scandinavians, but the line drawn here is no more than an educated guess.



CHAPTER EIGHT -- FINAL ADJUSTMENT

The last significant step in the development of the linguistic geography of Europe consisted of a number of changes in locations of language boundaries. This did not involve the separating out, or elimination of, any major language. The greater part of this adjustment resulted from the development of a new pattern of farming that stemmed from a particular source area, and which again increased the peasant population base. Another part of this adjustment was the continuing Slavic advance to the east that has not yet run its course. There should be few surprises here, though the economic basis of these movements is rarely noted in most history books.



3-Field System

By 800 A.D. the Germanic advance to the west on the continent had ended, and language boundaries there had begun to stabilize. The area between the

