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# A LEXICOSTATISTICAL APPRAISAL OF THE ALTAIC THEORY

*by*  
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In a recent article in *Kratylos* (X, 2, 1965), entitled "Verwandtschaft, Entlehnung, Zufall" my old friend Professor Pentti Aalto of Helsinki gave a brief account of the origin and development of the Altaic theory, that is the theory that the Turkish, Mongolian and Tungus languages are all descended from a common ancestor \*Proto-Altaic, and of the recent objections to that theory by Professor Doerfer of Göttingen and myself. He urged that an impartial expert in comparative philology should examine the arguments on both sides and try to determine whether the theory is valid or not.

I am sure that he is right in saying that it is high time that this was settled one way or the other. At present the controversy, like so many others, is assuming the form of an argument between the generations, and neither side seems able to convince the other. Apart from scholars now deceased, the main supporters of the theory are all older scholars like Professor Poppe of the University of Washington and Professor Menges of Columbia University, who have spent a lifetime in the study of these languages; the opponents are mainly younger scholars like Professor Doerfer and A. M. Shcherbak of Leningrad. As I am older than any of these scholars it is perhaps anomalous that I am among the opponents, but I am at any rate fairly new to the subject. I did not begin to examine it until 1953, and then did so unprejudiced by any previous knowledge of it but on the general assumption that the distinguished supporters of the theory were unlikely to be mistaken.

I cannot therefore put myself forward as an impartial expert, but I can suggest that the validity of the theory should be tested by the use of a recently devised technique which is by its very nature impartial and produces its results by purely mathematical means with very little intervention by the human operator.

Although phonetic and grammatical resemblances are sometimes adduced as evidence that two or more languages are descended from a common ancestor, the proof that they are so descended must, in the last resort, be based squarely on the fact that they have in common at least a reasonable number of basic words, since these are the kind of words which, as experience shows, are habitually not borrowed by one language from another but are handed down from generation to generation.

The greatest event in archaeology during the present century was the discovery of radiocarbon dating. This sprang from the discovery that the radioactive isotope of carbon, C 14, which exists in certain kinds of organic matter, wood, charcoal, bone and the like, disappears at a steady rate. The rate at which it disappears was worked out, and so a time-scale was set up against which bits of organic matter discovered in the course of archaeological excavation could be dated. Although evidence is now accumulating which shows that the initial proportion of C 14 in the mix has varied from time to time in the past for natural reasons which are at present imperfectly understood, so that at any rate for certain periods archaeological material derived from certain areas must be dated by reference to an adjusted scale, and although there is a known margin of error involved in every individual analysis, it can be safely asserted that if bits of organic matter, tested against the appropriate time scale, are shown to have been deposited, say, two or three thousand years ago, those dates are approximately correct, subject to a known margin of error; and if several bits of organic matter extracted from the same archaeological deposit show slightly different dates, the margin of error can be reduced accordingly.

Anthropologists have long been anxious to work out the pre-history of various groups of preliterate peoples, more particularly on the American continent and on the mainland and adjacent islands of South East Asia, and to trace the genetic relationship between them. There is good archaeological evidence that some of these groups are descended from nuclear peoples, who at some point in time broke up into smaller groups, some of which scattered in different directions, and this is confirmed by the fact that the peoples forming some of these groups use the same or cognate words for certain basic concepts (concrete objects, verbs and the like) and that within these groups some have more such words in common than others. The archaeological evidence, even when made more

precise by C 14 dating, is not by itself sufficient to suggest even approximate dates at which the original nuclear groups broke up into smaller groups and these groups into smaller groups still, and in about 1950 it was suggested, I think by Professor Morris Swadesh, that the techniques of radiocarbon dating might be applied to linguistic analysis.

Two new words were invented to describe the techniques proposed: *glottochronology* defined as "the study of the rate of change in language and the use of this rate for historical inference, especially for the estimation of time depths, and the use of such time depths to provide a pattern of internal relationships within a linguistic family"; and *lexicostatistics* defined as "the study of vocabulary statistically for historical inference".

In the account of these techniques which follows I have drawn freely on the following series of articles published, each together with a series of comments by other scholars, in *Current Anthropology*, a periodical published at the University of Chicago: January 1960, D. H. Hymes, "Lexicostatistics so far"; April 1962, H. Bergsland and Hans Vogt, "The Validity of Glottochronology"; October 1964, "Comments by D. H. Hymes on the preceding article"; October 1966, N. J. van der Merwe, "New Mathematics for Glottochronology".

I owe a great debt to these scholars; without their lucid explanations it would have been impossible to write this paper.

The starting point was the known fact that languages alter over time; we do not use the same words or words cognate to them for all the basic concepts that our ancestors used for them five hundred or thousand years ago. This was elaborated by Sapir in 1915 in the statement, "the greater the degree of linguistic differentiation within a stock, the greater the period of time that must be assumed for the development of such differentiation".

There is of course a fundamental difference between language and organic matter which should have put the inventor of glottochronology on his guard against assuming that the principles of radiocarbon dating could readily be applied to linguistic analysis. In a piece of organic matter the proportion of C 14 diminishes steadily and finally disappears at the end of a period of between 11,000 and 12,000 years. The number of basic concepts for which every language must have words is constant; the words used for some of them change from time to time, and as each word becomes obsolete and is

replaced by another, the process starts again from scratch. Moreover there is not an even chance that the words used for each of these basic concepts will become obsolete at exactly the same pace; if the word used for one basic concept has become obsolete and been replaced by another, there is a more than even chance that this word will become obsolete again before the words for some other basic concepts have become obsolete even once. Experience shows that this is what in fact seems to happen.

The idea was worked out in stages. The first and most crucial stage was to compile a list of basic concepts for which every language must have words. Such words were defined as "the everyday vocabulary of every language", or "the language of common life and among us – the nucleus of a vocabulary which the child first learns and every (English) speaker uses every day". There is of course nothing novel about the use of lists of basic words in comparative philology, one such list was published over a hundred years ago. What was novel was that in this case particular attention was paid to the scientific choice of concepts to be used as the basis of comparison. Three lists were compiled, one after the other; the final list is set out in full in the first article cited above, the contents of the previous lists can be extracted from the second. The first list contained 215 items, the second 200 items and the third 100 "diagnostic items" and 100 "supplementary items", the distinction between the two being due to appreciation of the fact stated above that the words for some basic concepts are more resistant to change than those for others. The lists seem to have been compiled primarily for the purpose of analysing Amerindian languages but were used from the start for analysing other languages also. All the lists differed marginally from one another; the total number of words included in one or more lists is between 230 and 240. It was realized at a very early stage that no list would be equally appropriate for the study of every language; for example, if a list had been compiled primarily for use in analysing the "Altaic" languages, it would have included one or two items which do not appear in any list and one or two items would have been omitted as less appropriate in this area. It is, however, true that such differences are only marginal, and that almost the whole list is made up of concepts for which every language must necessarily have words.

The next stage was to use the list then currently in use in what was called "control cases", that is comparisons of the basic vocabu-

lary at different dates of individual languages of which written texts covering a relatively long period of time were available. As a result of a series of "control cases", Professor Swadesh announced in 1952 that he had discovered that "fundamental vocabulary changes at a constant rate" (in the same way, though he did not say so, as the amount of C 14 in a piece of organic matter) that rate being defined by the formula, "of any fundamental vocabulary about 81% will still be in use at the end of 1,000 years".

Substituting 80% for 81% to facilitate the calculation without greatly influencing the result, this means that of a basic vocabulary of 200 words in year 0, 160 will still be in use in year 1000, 128 in year 2000, 102 in year 3000, 82 in year 4000, 66 in year 5000 and so on, the number of survivors in year 12000 being 14.

The next stage was to compare the basic vocabularies of two or more languages which were believed to be genetically related, and by ascertaining how many of the basic words were common to two or more of them to deduce the dates at which they had separated and become different languages.

What was overlooked was that unless the whole basic vocabulary of the ancestral nuclear language is known, so that each language under examination can be treated as a "control case", it is impossible to determine how many of the basic words survive in each language. What actually happens is not of course that at some given point in time the nuclear language becomes obsolete and two or more different languages suddenly come into existence, but that the group of people who speak the nuclear language splits into smaller groups which drift apart. These new groups each still speak the nuclear language, but, owing to the difference in their new physical environments and their contacts with peoples speaking different languages, slowly modify this nuclear language, but in different ways. The simplest case to envisage is that of a group splitting into two smaller groups, one staying in the ancestral home and the other moving elsewhere. The language of the first is likely to change more slowly than that of the second, and the two will certainly change in different ways. If two languages are compared and are found to have sixty-six basic words in common, the one certain fact, if the nuclear language is unknown and the formula stated above is correct, is that they cannot have parted more than five thousand years ago, but if in fact each language has also retained another sixteen original basic words, but different ones, the parting cannot have

been more than four thousand years ago. There is however no means of finding out whether more than the sixty-six common words are in fact derived from the original nuclear language or not, unless that language is known, and if it is known there are, of course, simpler methods than glottochronology for working out the history of the daughter languages.

When other scholars began to apply these techniques other difficulties arose which put the whole validity of the formula in doubt.

In the first place all the basic concepts were expressed as single English words, and some single words in English, or any other language, are notoriously ambiguous. For example "stand" may connote "not to fall", "not to move" or "to rise to one's feet", and other languages may use different words for all three or any two of them. It was also found difficult to determine the exact connotation of words in use a thousand years ago, or indeed more recently, if they are now obsolete, and it is in any case a matter of subjective judgement whether two words which have some points of resemblance to one another are cognate or not, particularly if one or both the languages concerned have undergone far-reaching phonetic changes.

It has been pointed out above that it is *à priori* probable that some languages have been more conservative than others, and tests with the 100 plus 100 list showed that this conservatism tended to be discriminatory, in the sense that words in the "diagnostic items" list proved to be more resistant to change than those in the "supplementary items" list. This is statistically significant since in the long run a combination of a survival rate of 90% for one hundred words and one of 70% for another hundred words produces a different result from a survival rate of 80% for two hundred words.

Worst of all, it was found that the basic vocabularies of some languages were not so accommodating as to survive at the predicted rate of 81% per thousand years; some were more resistant to change than this, others less. Attempts were made to refine the formula in order to make allowance for special factors which were thought to account for these discrepancies, and the last article in the series listed above is a welter of complicated mathematical formulae which only the most highly qualified mathematician could understand.

The whole idea of glottochronology had never commended itself to more than a minority of anthropologists, and critics were soon



launching a general attack on it. They pointed out all the difficulties in its application listed above, and others as well. But their main objection was a fundamental one. Language, they said, is not a concrete object, either inanimate like a bit of organic matter, or animate like a human being or an animal. It is an abstract thing created by human minds, and as such is more likely to behave like a living organism than like a piece of dead matter. Indeed the mere fact that it has proved impossible to devise a rate of survival formula equally applicable to all languages proves that this is so. If a number of living organisms are given a particular task they do not all perform it at exactly the same pace; for example if twelve horses and riders are put in a row and sent off simultaneously to a point two miles away, the one thing which is certain is that they will not all arrive there at the same moment. That is, after all, what races like the Derby are about. Moreover, judging by the analogy of living organisms, it is unlikely that the basic vocabulary of a language will change at an exactly uniform pace over a long period of time; a horse running a two mile race does not maintain an exactly uniform speed over the whole distance, it goes slower at one time and faster at another. So also the rate at which vocabularies alter varies from time to time dependant upon many things, of which the most important is the extent to which those who speak them are in contact with speakers of other languages. This applies not only to the basic, but also, and even more, to the peripheral parts of the vocabulary.

To sum up, glottochronology has not established, and never will establish, itself as an exact science able to determine the exact dates at which modern languages which are genetically connected parted from one another and became separate languages for at least four reasons:

(1) unless the whole basic vocabulary of a nuclear language is known, it is impossible to determine how much of that basic vocabulary survives in any given modern language;

(2) languages do not all change at exactly the same rate;

(3) no language changes at an exactly uniform rate throughout the whole period of its existence;

(4) therefore, even if a particular language has survived in written documents sufficiently long to make it available as a "control case", so that its survival rate over a fairly long period can be calculated, this survival rate cannot safely be projected backwards and used



as a basis for calculating the date at which the language concerned parted from some other language and became a separate independent language in the more remote past.

Nevertheless the investigations in this connexion into the history of individual languages and groups of languages have proved the value of lexicostatistics as a technique for demonstrating the validity of Sapir's dictum quoted above. If the basic vocabularies of a number of related languages are analysed, it can be shown that those which have a greater number of basic words in common parted more recently than those which have a lesser number, and when it is found that some languages have one word in common for a particular concept, while other languages have another word in common for the same concept it can be shown that these two groups trace their ancestry back to the original nuclear language through two different intermediate languages. "Control case" examinations of the vocabularies of individual languages for which evidence over a reasonably long period is available are also of value as indicating whether those languages are by nature more or less resistant to change than is normal.

Conversely if the basic vocabularies of two or more languages which are suspected of being genetically related are analysed, and it is found that they are entirely different or have a bare minimum of words in common, it can safely be deduced that they are not genetically related and that the common words are either loan words or cases of fortuitous resemblance. This deduction is reinforced if "control case" examination of the individual languages shows that they have been unusually resistant to change in the known past.

Perhaps the most valuable contribution which these investigations have made to the science of comparative philology has been the painstaking compilation of a list of basic concepts for use in vocabulary comparisons. This list has put into precise form an idea which, in a vague form, has been at the back of the minds of comparative philologists for a long time past. Lexicostatistics is obviously a perfectly impartial technique, and one not hitherto available, for testing the validity of the Altaic theory.

Apart from arguments relating to phonetic and grammatical structure which can never be decisive, since many unrelated languages have similar phonetic and grammatical structures, the proponents of the Altaic theory have always based their case on the contention

that the Turkish, Mongolian and Tungus languages have so many words in common that the only reasonable explanation of these words is that they were inherited from \*Proto Altaic. But no serious consideration seems ever to have been given to the question whether these common words are parts of the basic vocabularies, in which case they would be significant, or of the peripheral vocabularies, in which case they are as likely as not, indeed more likely than not, to be loan words. With lexicostatistics we can approach the problem from the other end and discover with mathematical accuracy whether the proportion of common basic words is statistically significant or not.

In applying the technique I had to follow the same stages as those described above. First I had to compile a list of 200 basic concepts suitable in an "Altaic" environment. The latest, 100 plus 100, list seemed to be appropriate with only minor modifications. No change seemed to be required in the 100 "diagnostic items", but the list of "supplementary items" did not include several which are supremely typical of "Altaic" life, bow, arrow, dwelling (tent, hut, house, etc.), horse and to ride, and it seemed unfortunate that "to cry (weep)", which was included in the first, 215 concepts, list, had been omitted from the final one. On the other hand it seemed sensible to make room for these six items by dropping (1) "dull (not sharp)" which at any rate in Turkish is expressed by periphrases, "not piercing, without sharpness, without a point" etc. which vary from language to language; (2) "saliva" which is hardly a subject of every-day conversation in this area; (3) "rain" which appears in both halves of the list, presumably both as a verb and as a noun, and can be omitted from the latter; (4) "spear" which is a much less characteristic weapon of the area than bow and arrow; and (5), (6) "at" and "in", which in these languages are expressed by declensional cases and not independent words. The list of supplementary items was altered accordingly. In the original list the items are entered in no discoverable order; it seemed tidier to break them up into grammatical categories and to arrange the words in most categories in alphabetical order, the "diagnostic items" being numbered 1 to 100 and the supplementary items S 1 to S 100.

The next stage was to prepare lists of the words which expressed these concepts in the earliest available forms of the three languages. So far as Turkish is concerned it was possible by drawing on the Türkü and Uyğur inscriptions, the Uyğur manuscripts and (to fill in a

few gaps) Kāşğarī's *Dīwān Luġātī'l-Turk* to compile a list of the basic words in Turkish about thousand years ago. So far as Mongolian is concerned it was possible to compile a similar list from the Secret History, the Mongolian-Chinese *Hua-i I-yü* and the Mongolian glosses to Zamaxşarī's *Muqaddimatu'l-Adab*, representing the basic words in use in Mongolian about seven hundred years ago. Dr. Charles Bawden, the Reader in Mongolian at the School of Oriental and African Studies, University of London, was so good as to check this list for me. Tungus presented a special problem. The remains of the Jurchen language, the oldest known Tungus language, are too scanty to provide the necessary material. Manchu, the only other Tungus language written before the nineteenth century, seemed to be the obvious alternative, but is not particularly satisfactory for three reasons; it is somewhat atypical of the language group as a whole, it is notoriously riddled with Chinese and Mongolian loan words some of which have even penetrated the basic vocabulary, and there is, so far as I am aware, no dictionary into Manchu in any foreign language. I was therefore compelled to compile a list by laborious search in the jungles of the so-called "Ch'ien-lung Pentaglott", a dictionary of Manchu with translations into Tibetan, Mongolian, the Türki of Chinese Turkestan and Chinese. This task would have been for practical purposes impossible if I had not had the benefit of the admirable Index to that work compiled by Professor John Krueger of Indiana University and published in *Ural-Altaische Jahrbücher*, XXX B (1963), pp. 228 ff. Professor Dr. Walter Fuchs of Universität Köln was so good as to check and complete this list for me.

Next I thought that it would be useful to discover how resistant to change Turkish and Mongolian have been during the last thousand and seven hundred years respectively, and compiled tables showing the equivalents of the old Turkish words in four modern Turkish languages as different from one another as possible, Tuvan, Uzbek, Osmanli as it was spoken forty years ago before the modern period of language reform began, and Chuvash, and the equivalents of the old Mongolian words in two modern Mongolian languages of which dictionaries were readily available, the modern Mongolian of Inner Mongolia written in the traditional Mongolian script and the modern Mongolian written in Cyrillic script which is the official language of the Mongolian People's Republic. These are of course only two of the modern languages; an analysis of other languages, like Kalmuk or Buriat, might have produced a slightly different result.

It is unnecessary to include in this paper more than a tabulation of the results. These are contained in Tables I and II.

In preparing these tables I was confronted by the same difficulties that have confronted other workers in this field. Survival is not the simple concept which it at first sight seems to be; there are in fact four kinds of survival of different degrees of completeness:

(1) the old word, with or without phonetic change, or a closely cognate one, for example a different noun adjective derived from the same verb, may survive with its original meaning;

(2) the old word may survive but with a modified meaning (for example the old Mongolian word for "head", in an anatomical sense, now survives only as an adjective in such phrases as "head man") and its place in its original sense may be taken by some other old word which originally had a slightly different meaning;

(3) the old word may survive with a modified meaning, and its place in its original meaning may be taken by some other word which is not demonstrably an old one and may even be a loan word;

(4) the old word may have become obsolete and been replaced by another old word which originally had a slightly different meaning.

Only the first of these is a case of complete survival, but there is some element of survival in the others. In the tables these four cases are tabulated as survival (1), (2), (3) and (4) respectively.

Indeed there is a further complication. Dr. Bawden has pointed out to me that in some modern Mongolian languages some old words have survived in their original meanings but are no longer the words most commonly used in those meanings. This is, however, a phenomenon fairly common in all languages; for example in English the old word "banquet" is well understood, but the word commonly used in this sense is "dinner".

When an old word has disappeared and not been replaced by another old word, it is sometimes replaced by a loan word and sometimes by a word which is not demonstrably an old word but cannot be traced in an earlier period. It seemed useful to distinguish between these two cases in the Tables.

Some element of subjective judgement has inevitably gone into the compilation of the tables, but there were rather special difficulties in interpreting the Chuvash list. Fundamentally it is descended from the language of a Turkish people who moved from their original homes in eastern Asia to the Volga valley perhaps as early as the fourth or fifth century, and there is some evidence that even as

early as this the language had become in some respects, and notably in its phonetics, rather different from the ancestor of the other Turkish languages. Later it absorbed a number of loan words, mainly in the peripheral part of the vocabulary, some from the languages of the Tatars and other Turkish peoples who arrived in this area at a later date, and some from the languages of neighbouring Finno-Ugrian peoples. It did not become a written language until the nineteenth century. Enough is known of its phonetic history for us to be certain that, for example, *verem* "long" is the same word as the standard Turkish *uzu:n* pronounced differently, and that *pilek* "five" is cognate to standard Turkish *bé:s*; but in some cases there is a real doubt whether a particular Chuvash word is cognate to some standard Turkish word with the same meaning or not.

TABLE I

Basic vocabulary of Early Turkish compared with:

<i>Diagnostic items</i>	Tuvan	Uzbek	Osmanli	Chuvash
Survival (1)	81	91	92	77
Survival (2)	3	—	1	—
Survival (3)	2	—	1	—
Survival (4)	5	3	4	7
Loan words	3	6	—	3
Miscellaneous	6	—	2	13
	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
<i>Supplementary items</i>				
Survival (1)	80	88	84	62
Survival (2)	3	1	1	—
Survival (3)	1	1	1	2
Survival (4)	5	3	4	9
Loan words	2	3	4	2
Miscellaneous	9	4	6	25
	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>

TABLE II

Basic vocabulary of Early Mongolian compared with:

<i>Diagnostic items</i>	Modern Written Mongolian	MPR Mongolian
Survival (1)	94	94
Survival (2)	—	—
Survival (3)	5	4
Survival (4)	—	—
Loan words	—	—
Miscellaneous	1	2
	<u>100</u>	<u>100</u>

<i>Supplementary items</i>	Modern Written Mongolian	MPR Mongolian
Survival (1)	95	93
Survival (2)	2	2
Survival (3)	2	3
Survival (4)	1	1
Loan words	—	—
Miscellaneous	—	1
	<hr/> 100	<hr/> 100

An examination of these tables shows:

(1) that Mongolian has been quite exceptionally resistant to change; only about 1% of the words in current use seven hundred years ago are now completely obsolete, and very nearly 95% are still in current use in their original meaning, although 1 or 2% are no longer the words most commonly used in these meanings.

(2) that except for Chuvash, which in any event parted from the other Turkish languages not a thousand years ago but fifteen hundred or perhaps even more, and to a lesser extent for Tuvan, the Turkish languages also have been more than usually resistant to change. The diagnostic items have been marginally more resistant than the supplementary items. In Uzbek only 9% and in Osmanli only 10% of the words in use thousand years ago have become completely obsolete (these figures representing the totals of "survival (4), loan words and miscellaneous" in the table) and nearly 90% are still in use in their original meanings.

In the light of this knowledge we can now proceed to examine the lists of words used for the 200 basic concepts in tenth century Turkish, thirteenth century Mongolian and eighteenth century Manchu set out in Table III. To facilitate the comparison words in any column which are identical with, or seem to be related to, words in another column are italicized.

TABLE III

Comparison of

Concept	Early Turkish	Early Mongolian	Manchu
<i>Diagnostic items</i>			
<i>Nouns</i>			
1 ashes	kül	(h)ünesü(n)	fulenggi
2 (birch) bark <sup>1</sup>	to:z	uyilsun	čalfa, alan
3 belly	karın	ke'eli	hefeli
4 bird	kuş	šiba'un	gasha
5 blood	ka:n	čisun	senggi
6 bone	sünük	yasun	giranggi
7 breast, chest	tö:ş (dö:ş), kögöz	če'eji	tunggen
8 claw/(nail) <sup>2</sup>	tırnak, tarma:k	kimüsü(n)/kimül	ošoho
9 cloud	bulut	e'ülen	tugi
10 dog	ıt	noγay	indahôn
11 ear	kul(k)ak	čikin	šan
12 earth			
(a) general <sup>3</sup>	yé:r	γaγar	na
(b) soil	topra:k	köser, široy	boihon
13 egg	yumurtğa:	ömdegen/öndegen	umhan
14 eye	kö:z (gö:z)	nidun	yasa
15 fat	ya:ğ	e'ükün/ö'ükün	nimenggi
16 feather	yüg	ödön	funggaha
17 fire	o:t (o:d)	al	tuwa
18 fish	balık	jıyasun	nimaha
19 flesh (/meat)	et	miqan	yali
20 foot <sup>4</sup>	ađak	köl	bethe
21 hair			
(a) general <sup>5</sup>	kıl	(h)üsü	funiyehe
(b) of head	saç	"	"
(c) of body	tü:	"	"
22 hand <sup>6</sup>	elig	γar	gala
23 head	baş	teri'un	uju

<sup>1</sup> Birchbark is the only bark of economic significance in the "Altaic" area.

<sup>2</sup> Most languages use the same word for (human) "nail" and (animal) "claw".

<sup>3</sup> All three languages distinguish between "earth" as opposed to "heaven", this word also being used for "country, place" and the like, and "earth" in the sense of "soil".

<sup>4</sup> There is a tendency in all three languages for the same words to be used for "hand" (22) and "arm" (s 1) and "leg" (s 20) and "foot" respectively. Russian does the same thing (*ruka* "hand/arm"; *noga* "leg/foot"), while in Chinese the same word is used for "hand" and "arm" and different words for "leg" and "foot". Both Turkish and Mongolian have different words for "upper arm" and "thigh" and these too are sometimes used for "arm" and "leg".

<sup>5</sup> Turkish seems to be alone in distinguishing between "hair (of the head), (body or animal) hair, a hair (generally)".

<sup>6</sup> See note 4.



Concept	Early Turkish	Early Mongolian	Manchu
24 heart	<i>yürek</i>	<i>ḡirüge/ḡürüge</i>	niyaman
25 horn	büñüz	eber	uyhe
26 knee	ti:z (di:z)	ebüdüg	buihi
27 leaf	yapurğa:k	nabčēn	abdaha
28 liver	bağır	(h)elige(n)	fahûn
29 louse	bit	bö'esün	čihe
30 man, male <sup>7</sup>	<i>er, erkek</i>	<i>ere</i>	haha
31 moon	a:y	sara(n)	biya
32 mountain	ta:ğ (da:ğ)	a'ula	alin
33 mouth	ağız	ama(n)	angga
34 name	a:t (a:d)	nere	gebu
35 neck	boyun	küjügün	meifen
36 night	tün (dün)	süni	dobori
37 nose	burun	qabar	oforo
38 person	kişi:	gü'ün	niyalma
39 rain	yağmur	qura	aga
40 road (/path) <sup>8</sup>	yo:l/oruk	ḡam/mör	ḡugôn
41 root	kök, yıldı, tö:z	(h)uḡa'ur/uḡu'ur	da
42 sand	kum, kayır	elesü(n)	yongga
43 seed	uruğ	(h)üre	use
44 skin	teri: (deri:)	arasun	suku
45 smoke	tütün	(h)uni	ṡanggiyan
46 star	yultuz	(h)odun	usiha
47 stone	taş	čila'un, gürü	wehe
48 sun <sup>9</sup>	kün	naran	ṡun
49 tail	kuḡruk	se'ül	unčehen
50 tongue	tıl (dıl)	kelen	ilenggu
51 tooth	tiṡ (diṡ)	ṡidü(n), südü(n)	weihe
52 tree, wood	ıḡaç	modon	moo
53 water	su:v	usu(n)	muke
54 woman (female) <sup>10</sup>	evçi:, ura:gut (tiṡi: (diṡi:))	eme	hehe

<sup>7</sup> Turkish and Mongolian use the same (Turkish) word for “man” (as opposed to “woman”) and “husband” (517), Manchu different words. The words used for “man”, in the sense of “person” (No. 38), are all different from these.

<sup>8</sup> “Path, track” in the sense of a route used by animals or pedestrians, is an older concept than “road” in the sense of a route used by bodies of people or vehicles. Turkish uses *oruk* and Mongolian *mör* for the first. The Turkish word for “road”, *yo:l*, probably originally meant “route” in an abstract sense, rather than “a made road”. The Mongolian word for “road” *ḡam*, later borrowed by Turkish as *yam*, seems to be a loan word from Chinese *chan* (Middle Chinese *i'am*), which originally meant “a stage on a journey; a posting station” and only later came to mean “road”.

<sup>9</sup> Turkish has the same word for “sun” and “day” (s 6), Mongolian and Manchu different words.

<sup>10</sup> Mongolian and Manchu have specific words for “woman”; Turkish has a specific word for “female (generally)”, *tiṡi: (diṡi:)*, but has used different words or phrases for “woman” at different periods; in the earliest period the

Concepts	Early Turkish	Early Mongolian	Manchu
<i>Adjectives</i>			
55 all <sup>11</sup>	barça:, kop <i>kamağ</i>	büri, <i>qamuy</i>	yooni
56 big	uluğ, beğük	yeke	amba
57 black	kara:	<i>qara</i>	sahaliyan
58 cold	soğuk	köyiten	sahôrun
59 dry	kuruğ	qokimay	olhon
60 full	tolu: (dolu:)	dü'üren	jalu
61 good	edgü:, yaxşı:	<i>sayin</i>	<i>sain</i>
62 green	yaşıl	noyo'an	niowanggiyan
62 hot	isig	<i>qala'un</i>	<i>halhôn</i>
64 long	uzu:n	urtu	golmin
65 many	üküş	olon	geren, labdu
66 new	yañı:	şine	içe
67 red	kızıl	(h)ula'an	<i>fulgiyan</i>
68 round (circular)	<i>tegirmi: (degermi:)</i>	<i>tögörigey, tö'erig</i>	muheliyen
69 small	kiçig	ücügen	añige, osohon
70 white	a:k	çağa'an	şanyan
71 yellow	<i>sariğ</i>	<i>şira (sira)</i>	suwayan
<i>Pronouns</i>			
72 I <sup>12</sup>	<i>ben</i>	<i>bi</i> (Gen. minö)	<i>bi</i>
73 we <sup>13, 14</sup>	<i>biz</i>	<i>ba</i> (excl.) <i>bida</i> (incl.)	<i>be</i> (excl.) <i>muse</i> (incl.)
74 thou	sen	çi (*ti)	si
75 this	bu: (?bo:)	ene (Pl. ede)	ere
76 that	ol	tere (Pl. tede)	tere

phrase commonly used was *uzu:n tonluğ* "with long clothes"; *ura:ğut* is attested only from the eleventh to the fourteenth century; *evçi:*, literally "housewife" was used in this sense from an early period and still survives in some languages, but most modern languages use Arabic loan words which have other literal meanings ("pudenda, weak" etc.).

<sup>11</sup> The only word common to Turkish and Mongolian is an Iranian loan word which reached Turkish as *kamağ* and was passed on with labial attraction, as *qamuy*.

<sup>12</sup> It is a known, but unexplained, fact that there are assonances between the Personal Pronouns of languages which are quite unrelated to one another, as for example between English *mine*, German *mein* and the Genitives (with labial assimilation) of Turkish *ben*, *menîğ*, and Mongolian *bi*, *minö* and between Latin *tu* "thou" and Mongolian *çi* (\*ti). The assonances between the three languages in items 72 and 73 cannot therefore be taken as significant.

<sup>13</sup> Both Mongolian and Manchu have different words for exclusive "we" (i. e. we but not you) and inclusive "we" (I, or we, and you). Turkish uses the same word for both.

<sup>14</sup> Although there is a theoretical possibility that Turkish *ye:-* was earlier *d'e:-* and cognate to Mongolian *ide-*, this is very improbable. There is also a possibility that Manchurian *jë-* is cognate to Turkish *yé:-* (in some dialects *jë-*) or Mongolian *ide-*, but this too is improbable. The resemblance is almost certainly fortuitous.

Concept	Early Turkish	Early Mongolian	Manchu
77 who ?	kim	ken	we, ya
78 what ?	ne	ya'u	ay, ya
<i>Numerals</i>			
79 one	bi:r	nigen	eme
80 two	ékki:	qoyar	juwe
<i>Adverbs etc.</i>			
81 not(a)isolated	(suffix)	ese, ulu	akâ
(b) is not	dağ ol, degül	—	akâ
(c) does not exist	yok	üge'üy	akâ
<i>Verbs</i>			
82 bite	ısır-, tışla:- (dışla:-)	ja'u-, qağa-	sai-
83 burn (trans.)	örte:-, küñür-, yak-	tüle-	tufada-
84 come	kel- (gel-)	ire-	ji-
85 die	öl-	ükü-	buče-, buda-
86 drink	iç-	u'u-	omi-, waida-
87 eat	yé:-	ide-	je-
88 fly	uç-	nis-	teye-
89 give	bé:r-	ök-	bu-
90 hear (listen to)	éşid-, (tinla-)	sonos-	donji-
91 kill	ölür-	ala-	wa-
92 know	bil-	mede-	sa-
93 lie (down)	yat-	kebte-	dedu-
94 say	té:- (dé:-), sözle:-	ke'e-, ügüle-, kelele-	se-, gisure-
95 see	kör- (gör-)	üje-	tuwa-
96 sit	olor-	sa'u-	te-
97 sleep	uđı:-	umta-, unta-	amga-
98 stand	tur- (*dur-)	baiyi-	ili-
99 swim	yüz-	onba-	selbi-
100 walk	yori:-	yabu-	yabu-
<i>Supplementary items</i>			
<i>Nouns</i>			
S 1 arm <sup>15</sup>	elig, kö:l	yar	gala
S 2 arrow	ok	sumu(n)	niru
S 3 back (anatomical)	arka:	aru	fisa
S 4 bow	ya:	numu(n)	beri
S 5 child	ké:nç (gé:nç)	no'un, kö'üken	jui
S 6 day <sup>16</sup>	kün	üdür	inenggi
S 7 dust	to:z, to:ğ	to'uson	buraki

<sup>15</sup> See note 4.<sup>16</sup> See note 9.

Concept	Early Turkish	Early Mongolian	Manchu
S 8 dwelling	e:v	ger	boo
S 9 father	kaŋ; ata:	eči'e	ama
S 10 flower	çécek	čéčeg	ilha
S 11 fog, mist	tuma:n (duma:n)	budan, manan	talman
S 12 fruit	yémiş	jimiš	tubihe
S 13 fur <sup>17</sup>	kürk	nekey	furdehe
S 14 grass	ot	ebesün	orho
S 15 guts (bowels)	bağırsuk, içegü:	abit, gedesün	duha
S 16 horse	at	mori(n)	morin
S 17 husband <sup>18</sup>	er	ere	eygen
S 18 ice	bu:z	mölsün	juhe
S 19 lake	kö:l (gö:l)	na'ur	omo
S 20 leg <sup>19</sup>	ađak, bu:t	γuya	bethe
S 21 lip	érin	(h)urul	femen
S 22 milk <sup>20</sup>	sü:t (sü:d)	sün	huhun (human) sun (animal)
S 23 mother	ö:g; ana:	eke	eme
S 24 navel	kindik	köyesün	ulenggu
S 25 rope, cord	yıp	de'esün	futa
S 26 salt	tu:z	dabusun	dabsun
S 27 sea <sup>21</sup>	taluy, teniz (deñiz)	dalay	mederi
S 28 sky <sup>22</sup>	teñri:, kö:k (gö:k)	tengeri, (oqtaryoy)	abka
S 29 snake	yıla:n	moγay	meihe
S 30 snow	ka:r	časun	nimanggi
S 31 wife	kisi:	gergey	sargan
S 32 wind	yé:l	key	edun
S 33 wing	kanat	ji'ür	asha

<sup>17</sup> It is difficult to find generic terms for “fur” in early Turkish or Mongolian. Originally the same words were used for individual fur-bearing animals like the ermine and sable and their furs; later the words for “skin” were attached to these words. Turkish *kürk* as a generic term is not attested before the eleventh century and Mongolian *nekey*, now “fur” generally, originally meant specifically “sheepskin”.

<sup>18</sup> See note 7.

<sup>19</sup> Ibid.

<sup>20</sup> Only Manchu distinguishes between human and animal “milk”.

<sup>21</sup> Turkish *taluy* is certainly a Chinese loan word, and it has been plausibly suggested that it is a combination of *ta* “great” and *luy* the mediaeval name of the Sangkan river in Chihli, down which the Turks made a raiding expedition and saw the sea for the first time in the late seventh century. Mongolian *dalay* is obviously the same word, but whether it was borrowed from Turkish or direct from Chinese is uncertain.

<sup>22</sup> *teñri:* was inherited by the Turks from the language of the Hsiung-nu, which may or may not have been an ancestor of the Turkish language. It properly meant “heaven” in a mystical, religious sense and was used in a physical sense only in such contexts as “heaven and earth”. It was certainly a loan word in Mongolian where it was used in the same way. The modern Mongolian word for “sky” *oqtaryoy/ogtorguy* is not noted in the early period but may be an old word.

Concept	Early Turkish	Early Mongolian	Manchu
S 34 worm	kurt	qoroqay	umiyaha
S 35 year <sup>23</sup>	<i> yıl</i>	(h)on, <i> yıl</i>	aniya
<i>Adjectives</i>			
S 36 alive	tirig (dirig)	amidu	ergengge
S 37 bad	yavлак, yavuz, yama:n	ma'u	ehe
S 38 correct, true	çin, kértü:	ünen	mene, yala
S 39 dark	<i> karañğıu:</i>	<i> qarayğıuy</i>	farhôn
S 40 dirty	kirlig	burtaq	langse
S 41 far	uzak, ırak	qola	goro, aldangga
S 42 few	a:z	jöyen	komso
S 43 heavy	ağır	kündü	uñen
S 44 left (not right)	so:l	je'ün	dashôwan, hasho
S 45 narrow	ta:r (da:r)	(h)i'utan	isheliyen
S 46 near	yağuk, yakın	oyira	hançi
S 47 old (a) general <sup>24</sup> (b) human	eski: (avıçğa:), karı:	qa'uçin (ebügen)	fe sagda
S 48 other, different	özge:, öñi:	busu, ö'ere	ençu
S 49 right (not left)	oñ	bara'un	jebele, içi
S 50 ripe	bısığ, olğun	bolbasun	ureshôn
S 51 rotten <sup>25</sup>	irig	(iljilemel)	niyaha
S 52 sharp	yitig	qurça	daçun
S 53 short	kısğa:	oqor	foholon
S 54 smooth, level	tü:z (dü:z)	qabtayay	neçin, halfiyan
S 55 straight	köni:	şiduryu	tondo
S 56 thick	kalın, yoğun	juja'an	muwa, jiramin
S 57 thin	yinçge	nimgen, narin	narhôn, nekeliyen
S 58 wet	ö:l, çig	noyitan	usihin
S 59 wide	ké:ñ	a'uy, örgen	leli, ončo

<sup>23</sup> Mongolian  *yıl* is used only in the restricted sense of "a year of the twelve-animal cycle" and is certainly a loan word borrowed at the same time as the cycle itself. We know from Kāşğari (I 31 in Atalay's translation) that the sound change  $y > c$  ( $y$ ) was characteristic of some Oğuz dialects. By the eleventh century most of the Oğuz had moved far to the west, but in the eighth century they were still mainly located in the northeastern corner of the steppes in the region of the Selenga and Tola rivers and they had been there for a long time. The word was probably borrowed from them by the Mongols or their ancestors the Kitan, together with the twelve-animal cycle, some time in the second half of the first millennium.

<sup>24</sup> Turkish  *karı:* means "old" (generally) of humans, but  *avıçğa:* and Mongolian  *ebügen* meant, more specifically, "an old man".

<sup>25</sup> No old Mongolian word for "rotten" seems to have survived.

Concept	Early Turkish	Early Mongolian	Manchu
<i>Pronouns</i>			
S 60 ye	siz	ta	suwe
S 61 he	ol (Gen. anı)	(* i, Gen. inö), tere	i
S 62 they	ola:r; anla:r	(* a, Gen. ano), tede	če
<i>Numerals</i>			
S 63 three	üç	γurban	ilan
S 64 four	tört (dört)	dörben	duin
S 65 five	bé:ş	tabun	sunja
<i>Adverbs etc.</i>			
S 66 down (downwards)	kođı:	dooro (dooyşı)	fejile, fejirge
S 67 here	bunta:	ende	erede
S 68 how ?	neçük, kalı:, kaltı:	ker	adarama
S 69 if <sup>26</sup>	abañ (suffix)	kerber (suffix)	aikabade (suffix)
S 70 there	anta:	tende	terede, tede
S 71 up (upwards)	örü: (yokaru:)	de'ere (de'egşi)	dergi
S 72 when ?	kaçan	keli, (kejiye)	atanggi
S 73 where ?	kanta:, kanı:	qa'a	yade, aibide
S 74 with <sup>27</sup>	birle:	(suffix) qamtu	sasa, emgi
<i>Verbs</i>			
S 75 blow	ür-, es-	keyis-	edu-
S 76 cry (weep)	ıgla:-	uiyila-	songgo-
S 77 cut	biç-, kes-	čabči-, oqta-	giri-, fata-
S 78 dig	kaz-	uqu-	fete-
S 79 fall	tüş- (düş-)	una-	tuhe-
S 80 fear	kork-	ayu-	gele-
S 81 flow	ak-	urus-	eye-
S 82 freeze (intrans.)	toñ- (doñ-)	köbši-	beye-
S 83 hit	ur-, çap-, sok-	aşigi-, delet-, tus-	tanta-
S 84 hold	tut-	(h)atyu-, bari-	sefere-, jafa-
S 85 pierce	öt-, tel- (del-), teş- (deş-), sanç-	qatyu-, ülge-	fondolo-
S 86 pull	tart-	čir-, jikdü-, tata-	tata-
S 87 push	it-	türe-	ana-
S 88 ride (trans.)	bin-	uno-	yalu-
S 89 rub	türt- (dürt-), sürt-	arči-	hisha-, sibisa-, monji-

<sup>26</sup> In all three languages "if" is represented by a conditional mood, and in all three a conditional sentence may, but need not, begin with an independent word meaning "if". Turkish *abañ* became obsolete at an early date.

<sup>27</sup> "With" is expressed in Mongolian and most Tungus languages by a Comitative case, which does not exist in Turkish. In Turkish and in Manchu, which has lost its Comitative case, it is expressed by a postposition, and in Mongolian a postposition is sometimes attached to that case.

Concept	Early Turkish	Early Mongolian	Manchu
S 90 sew	tik- (dik-)	oya-	ifi-, ufi-
S 91 sing	ırla:-	da'ola-	uçule-
S 92 split (trans.)	yar-	qayal-	saçi-
S 93 squeeze	kıs-, sık-	daru-	siri-
S 94 suck			
(a) generally	sor-	<i>šimi-</i> (* <i>simi-</i> )	<i>simi-</i>
(b) the breast	em-	kökö-	
S 95 swell	siş-, kabar-	šiberi-, qabud-	aibi-
S 96 think	sakin-	setki-	gôni-
S 97 throw	at-	tebçi-	faha-, waliya-
S 98 tie, bind	ba:-, bağla:-	büsele-	hotho-, hōwaita-
S 99 vomit	kus-	bö'ölje-	ogši-
S 100 wash	yu:-	ukiya-	obo-
(trans.)			

A comparison between the Turkish and Manchu columns shows that apart from the assonances in Nos. 72 and 73 and possibly 87, which for the reasons stated above cannot be taken as significant, there are no basic words common to Turkish and Manchu and consequently the two languages cannot possibly be genetically related.

A comparison between the Turkish and Mongolian columns shows that there may be as many as sixteen items in which the words in the two columns are certainly or possibly identical or cognate, but not more. Twelve of them fall into four groups containing words with similar characteristics:

(1) The assonances in Nos. 72 and 73 cannot be taken as significant.

(2) The words common to the two columns in Nos. 55 ("all"), S 27 ("sea") and S 28 ("sky") are, in Turkish, loan words from other languages and, in Mongolian, loan words either from Turkish or, less probably, from the languages from which they originally came.

(3) In No. 24 ("heart"), S 12 ("fruit") and S 35 ("year") a Mongolian word beginning with *š*- corresponds to a Turkish word beginning with *y*-. For the reasons already stated *šil* "year" must be a Turkish loan word; so too must *šimiş* "fruit", since *yemiş* is a deverbal noun from *yé*:- "to eat", and neither the suffix *-miş* nor the verb itself occur in Mongolian. It is therefore reasonable to suppose that No. 24 is also a Turkish loan word borrowed from the same dialect and at about the same time as the other two. It is also reasonable to suppose that S 10 ("flower"), a word of the same kind as S 12 ("fruit"), is a Turkish loan word.



(4) In three cases, Nos. 47 ("stone"), 68 ("round") and S 7 ("dust") the Mongolian words are easily explained as Turkish loan words with Mongolian suffixes, but difficult to explain in any other way.

"Stone", *taş* in standard Turkish, is *çul* in Chuvash. There are reasons, too complicated to explain here, for supposing (1) that the name *Çuvaş* is a later form of the old tribal name *Tavğaç*; and (2) that the Chuvash language is descended from that of the historic Tavğaç (*T'o-pa* in the Chinese records) who founded the Northern Wei, or T'o-pa, Dynasty in northern China in the fourth century and were for a number of years in close contact with the Kitan. *Čila'un*, *čil* (*taş*) with the Mongolian suffix *-(a)'un*, probably entered the Kitan language during that period.

The correspondence in No. 68 is imperfect. *Tegirmi*: is a deverbal adjective from the verb *\*tegir-* "to surround, encircle, revolve" and the like, which has not survived in the basic form, but is the basis of Turkish words like *tegre*:, *tegirt*-, *tegirmek* and *tegirmen*. Another possible derived word, *\*tegirig* is not actually recorded but might be the origin of Mongolian *tö'erig*, while *tö'erigey* might be a cognate word with the Mongolian suffix *-gey*. There is no known Mongolian verb from which these words could be derived.

*To'osun* "dust" is fairly obviously the Turkish word *to:ğ* with a Mongolian suffix *-(o)sun* attached.

This leaves only No. 30 (and S 17) *er - ere* "man, husband", 57 *kara*:- *qara* "black", S 39 *karayğu*:- *qarayğuy* "dark" and perhaps No. 71 *sarğ* - *šira* (*sira*) "yellow" to form the basis of the theory that the two languages are genetically related. They are obviously quite insufficient for this purpose.

Comparison of the Mongolian and Manchu columns is complicated by the fact that there are known to be a great many Chinese and Mongolian loan words in the peripheral, and to some extent even in the basic, vocabulary of Manchu. In the present list at least two words. No. 52 "tree, wood" *moo* and S 40 "dirty" *langse*, are unquestionably Chinese loan words; it would therefore not be surprising to find some Mongolian loan words also. A comparison of the two lists shows that there may be as many as fifteen items in which the words in the two columns are certainly or possibly identical or cognate, but not more. It is significant that none of these items are the same as those in which there are correspondences between the Turkish and Mongolian columns, except Nos. 72 and 73. For the reasons already stated these assonances cannot be taken as signifi-

cant. The remaining thirteen items (two of them dubious) include four terms for animal and economic products of a kind which very primitive forest-dwelling peoples might be expected to borrow from their more advanced neighbours, No. 13 "egg" (dubious); S 16 "horse" (perhaps culturally the most significant word in the list); S 22 "(animal) milk" and S 26 "salt". Of the two pronouns S 61 *i* is peculiar to Manchu in the Tungus language group and so, if not fortuitous, probably borrowed from Mongolian, and *tere* "that" is the Manchu form of the general Tungus pronoun *tara* analysed as *ta* with a suffix *-ra*. The remainder are one noun, No. 3 "belly"; three adjectives, Nos. 61 "good", 63 "hot", and 67 "red" (dubious) and three verbs, No. 100 "to walk", S 86 "to pull" and S 94 "to suck". This last group represents no more than 3.5% of the whole list. It is obviously quite insufficient to serve as a basis for the theory that the two languages are genetically related.

The results of the application of lexicostatistical techniques to the appraisal of the Altaic theory can be summarized as follows:

(1) During the historical period Mongolian has been quite exceptionally resistant to change and Turkish more than usually resistant. There is no reason to suppose that these are recent phenomena.

(2) Turkish and Manchu are demonstrably not genetically related since they have no basic vocabulary in common.

(3) After excluding the words which can certainly or reasonably be regarded as loan words the common elements in the Turkish and Mongolian basic vocabularies are no more than 2% of the whole, and these can more easily be explained as loan words than as evidence of a genetic relationship, particularly having regard to (1) above.

(4) After making similar exclusions, the common elements in the Mongolian and Manchu basic vocabularies are no more than 3.5% of the whole, and these can more easily be explained as loan words than as evidence of a genetic relationship, particularly having regard to (1) above and to the known fact that Manchu is full of Chinese and Mongolian loan words.

(5) Even if it is still considered that the minimal correspondences between the basic vocabularies of Mongolian and Turkish and Mongolian and Manchu respectively afford some *prima facie* evidence of a genetic relationship, Mongolian cannot be genetically related to both, since Turkish is not related to Manchu. The Altaic theory is therefore not valid.