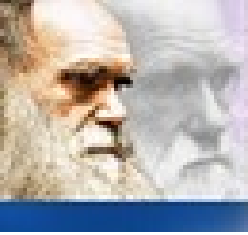
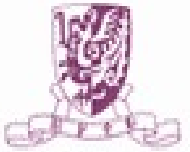


語言工程實驗室
Language Engineering Laboratory



Ancestry *of* Languages *&* Peoples

10th Anniversary ILAS !!

IsCLL 14 Nangang, June 2014

William S-Y. Wang, 王士元
Chinese University of Hong Kong

Homo sapiens or Homo loquens ?

1772: Herder, J.G. *Treatise on the Origin of Language*. Early statement of language determines thought.

1907: Sapir, Edward 1907. Herder's "Ursprung der Sprache". *Modern Philology* 5.109-42.

1970: Pulgram, Ernst. 1970. *Homo loquens*: an ethological view. *Lingua* 24.309-42.

1977: Fry, Dennis. *Homo Loquens*: Man as a Talking Animal. Cambridge University Press.

Speaking made us human;

Writing made us civilized.

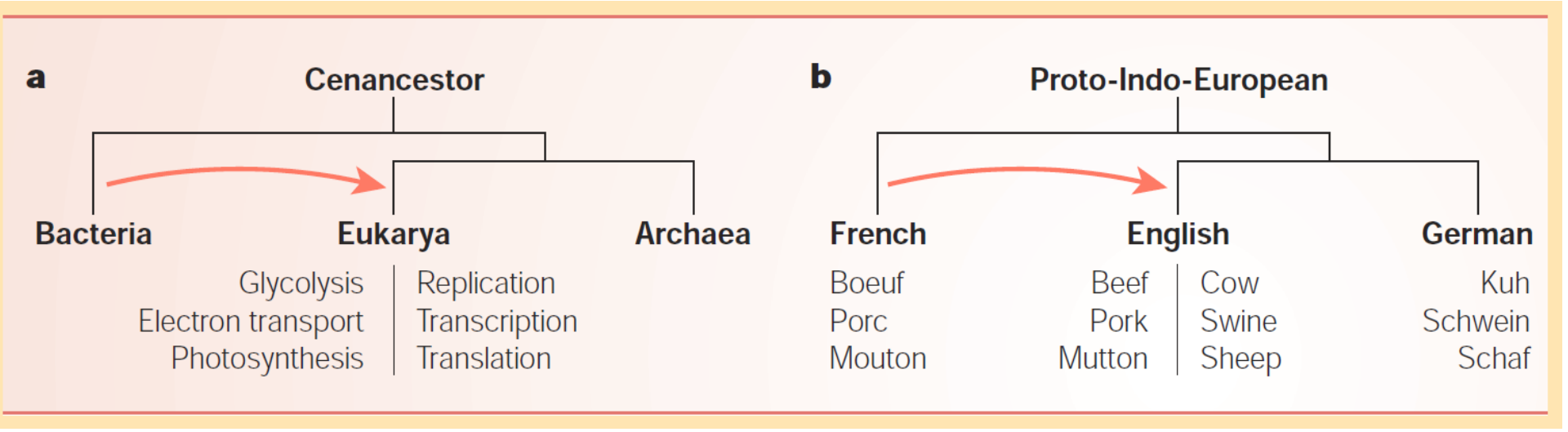
Jakobson, Roman. 1974.
Linguistics and natural sciences.
Main Trends in the Science of Language.
Harper Torchbooks.

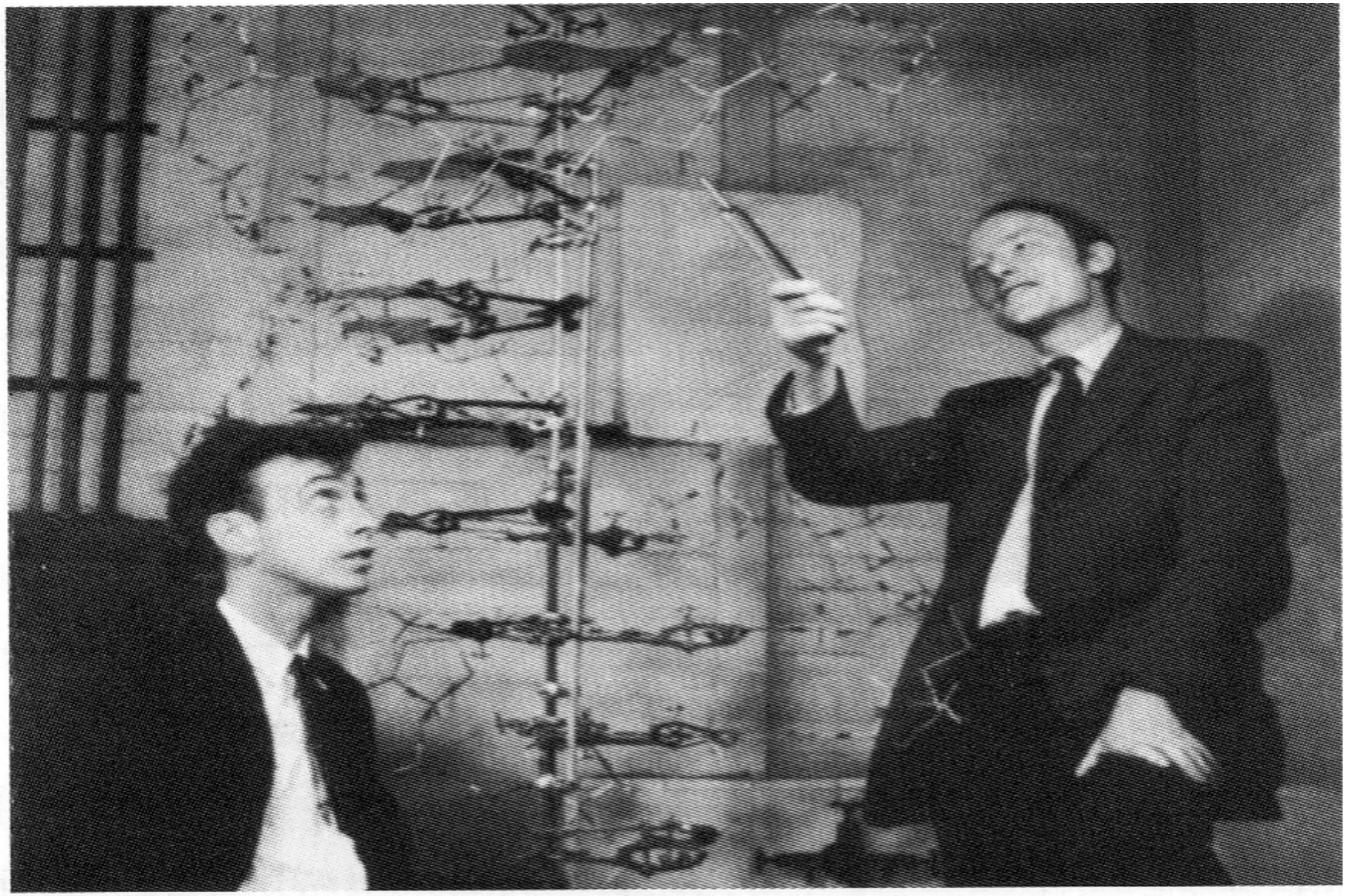
p.52: "The **genetic code**, the primary manifestation of life, and, …, **language** (the universal endowment of humanity) and its momentous leap from genetics to civilization, are the **two fundamental stores of information transmitted from ancestry to progeny**, the molecular heredity and the verbal legacy as a necessary prerequisite of cultural tradition."

In 1968, the French television program '**Vivre et Parler**' presented a discussion between four guests from four distinct disciplines: anthropologist **Claude Lévi-Strauss**, molecular biologist **François Jacob**, linguist **Roman Jakobson** and geneticist **Philippe L'Héritier** A transcript of the conversation was published in *Lettres Françaises, 1221 (14 February 1968)* and1222 (21 February 1968). The conversation is also recounted in Richard Doyle, *On Beyond Living 1997,* and Lily Kay, *Who Wrote the Book of Life? 2000,* both books published by *Stanford University Press*.

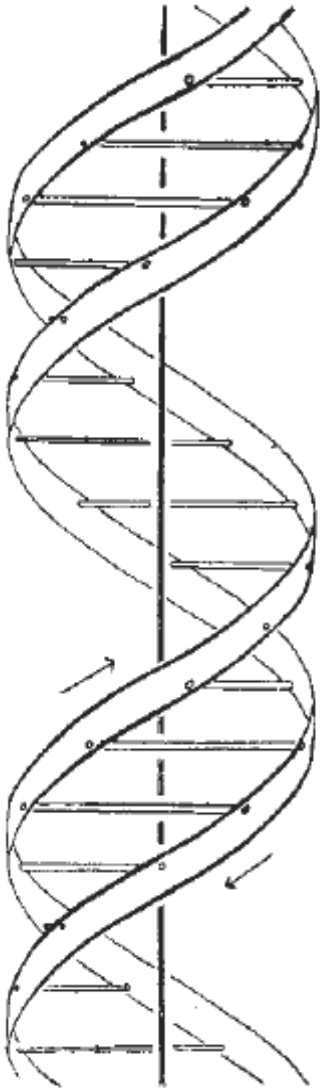
Jerne, Niels K. 1984. The generative grammar of the immune system. Nobel lecture.

Searls, David B. 2003. Trees of life and of language. *Nature* 426.391-2.





James Watson 1928 - Francis Crick 1916-2004



This figure is purely diagrammatic. The two ribbons symbolize the two phosphate—sugar chains, and the horizontal rods the pairs of bases holding the chains together. The vertical line marks the fibre axis

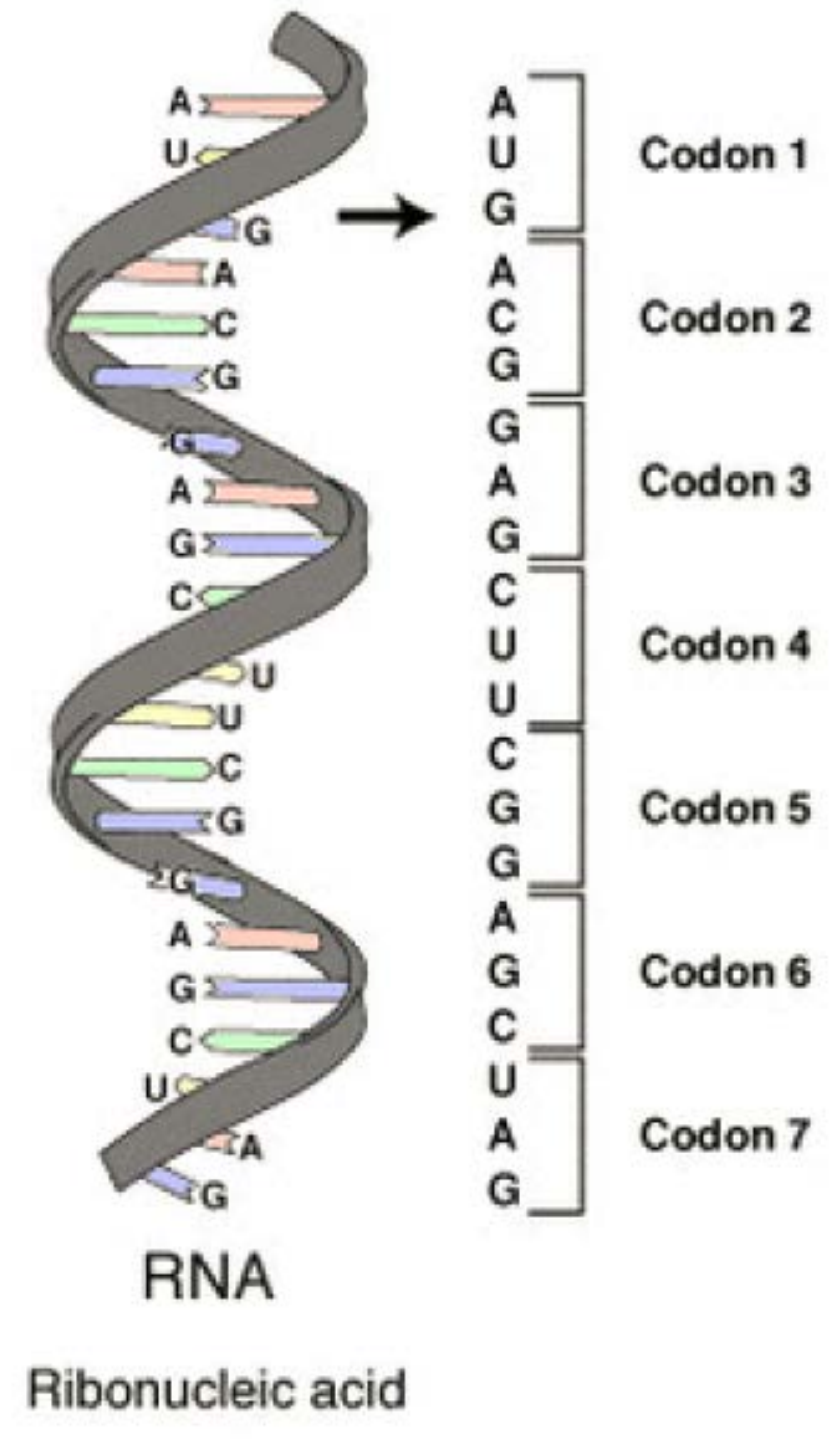
on it.

We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid. This structure has two helical chains each coiled round the same axis (see diagram). We have made the usual chemical assumptions, namely, that each chain consists of phosphate di-ester groups joining β-D-deoxy-ribofuranose residues with 3′,5′ linkages. The two chains (but not their bases) are related by a dyad perpendicular to the fibre axis. Both chains follow right-handed helices, but owing to the dyad the sequences of the atoms in the two chains run in opposite directions. Each chain loosely resembles Furberg's[2] model No. 1; that is, the bases are on the inside of the helix and the phosphates on the outside. The configuration of the sugar and the atoms near it is close to Furberg's 'standard configuration', the sugar being roughly perpendicular to the attached base. There

Watson, J. D. & F. H. C. Crick. 1953.

Molecular structure of Nucleic Acids: A structure for deoxyribose nucleic acid.

Nature 171.737-38.



Genetic code

from Wikipedia, 20140526.

Purines:

Adenine

Guanine

Pyrimidines:

Cytosine

Thymine

[Uracil]

Many forms :: one function. Synonymy.

Standard genetic code

1st base	2nd base U		2nd base C		2nd base A		2nd base G		3rd base
U	UUU	(Phe/F) Phenylalanine	UCU	(Ser/S) Serine	UAU	(Tyr/Y) Tyrosine	UGU	(Cys/C) Cysteine	U
	UUC		UCC		UAC		UGC		C
	UUA	(Leu/L) Leucine	UCA		UAA	Stop (*Ochre*)	UGA	Stop (*Opal*)	A
	UUG		UCG		UAG	Stop (*Amber*)	UGG	(Trp/W) Tryptophan	G
C	CUU		CCU	(Pro/P) Proline	CAU	(His/H) Histidine	CGU	(Arg/R) Arginine	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	(Gln/Q) Glutamine	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	(Ile/I) Isoleucine	ACU	(Thr/T) Threonine	AAU	(Asn/N) Asparagine	AGU	(Ser/S) Serine	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	(Lys/K) Lysine	AGA	(Arg/R) Arginine	A
	AUG[A]	(Met/M) Methionine	ACG		AAG		AGG		G
G	GUU	(Val/V) Valine	GCU	(Ala/A) Alanine	GAU	(Asp/D) Aspartic acid	GGU	(Gly/G) Glycine	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	(Glu/E) Glutamic acid	GGA		A
	GUG		GCG		GAG		GGG		G

One form :: many functions. Homonymy.

.

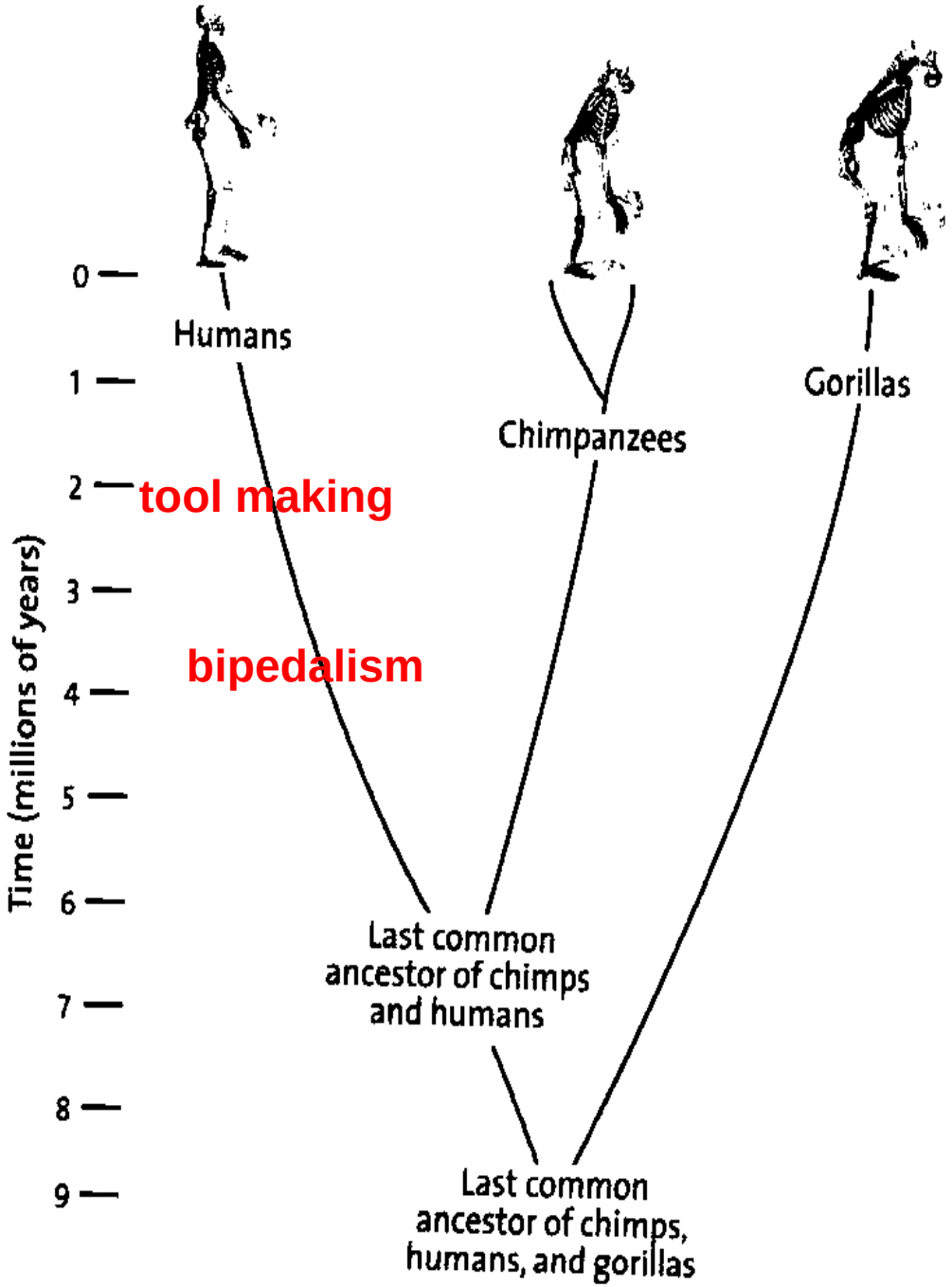
Inverse table (compressed using IUPAC notation)

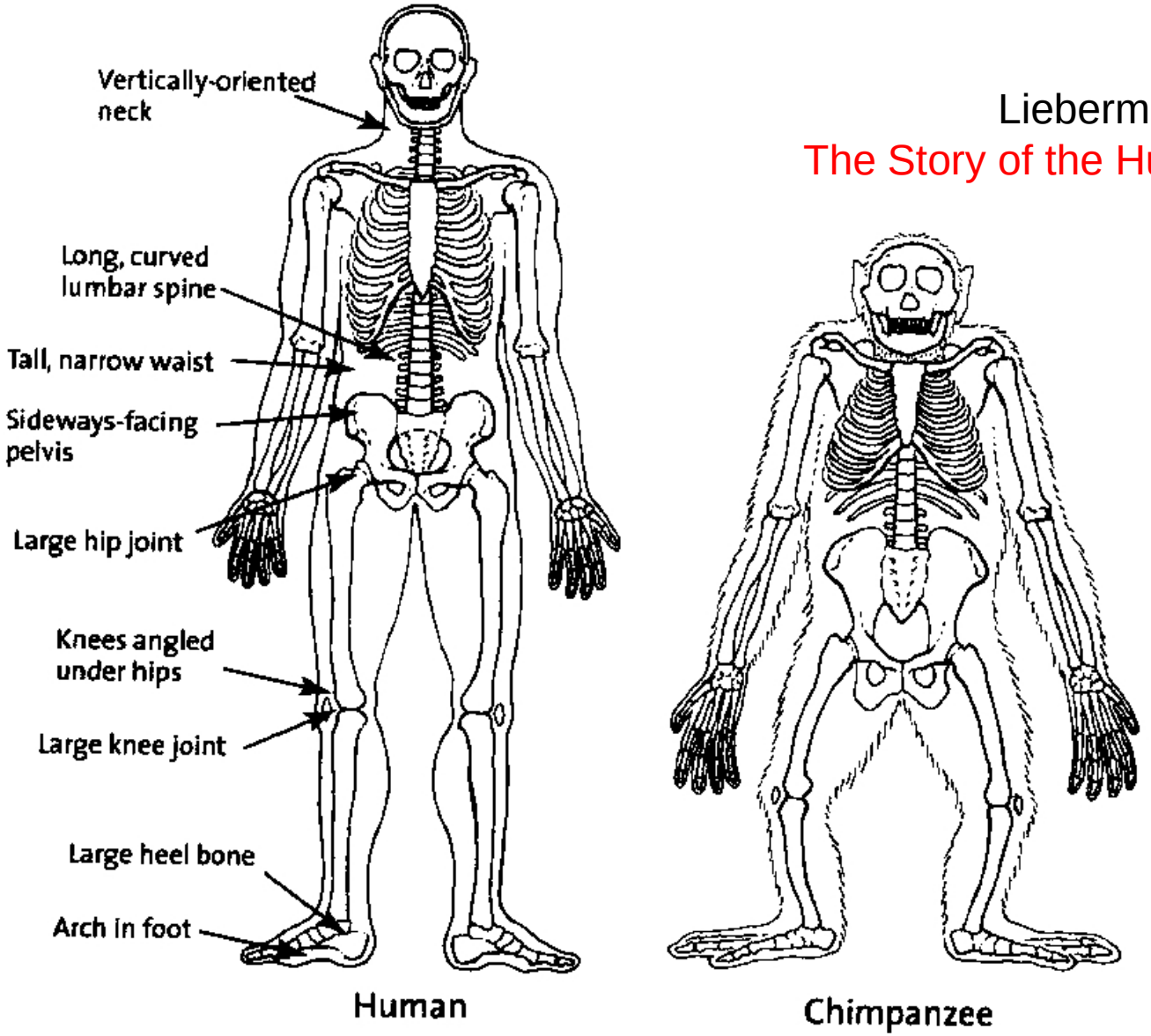
Amino acid	Codons	Compressed	Amino acid	Codons	Compressed
Ala/A	GCU, GCC, GCA, GCG	GCN	**Leu/L**	UUA, UUG, CUU, CUC, CUA, CUG	YUR, CUN
Arg/R	CGU, CGC, CGA, CGG, AGA, AGG	CGN, MGR	**Lys/K**	AAA, AAG	AAR
Asn/N	AAU, AAC	AAY	**Met/M**	AUG	
Asp/D	GAU, GAC	GAY	**Phe/F**	UUU, UUC	UUY
Cys/C	UGU, UGC	UGY	**Pro/P**	CCU, CCC, CCA, CCG	CCN
Gln/Q	CAA, CAG	CAR	**Ser/S**	UCU, UCC, UCA, UCG, AGU, AGC	UCN, AGY
Glu/E	GAA, GAG	GAR	**Thr/T**	ACU, ACC, ACA, ACG	ACN
Gly/G	GGU, GGC, GGA, GGG	GGN	**Trp/W**	UGG	
His/H	CAU, CAC	CAY	**Tyr/Y**	UAU, UAC	UAY
Ile/I	AUU, AUC, AUA	AUH	**Val/V**	GUU, GUC, GUA, GUG	GUN
START	AUG		**STOP**	UAA, UGA, UAG	UAR, URA

Lieberman, Daniel E. 2013:29.

The Story of the Human Body: Evolution, health, & disease.

Pantheon.



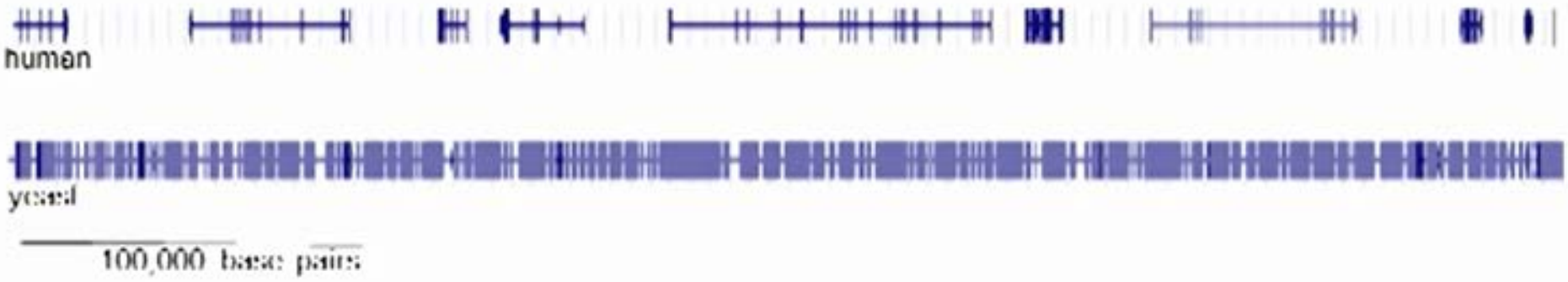


Lieberman, Daniel E. 2013:35.
The Story of the Human Body: Evolution, health, & disease.
Pantheon.

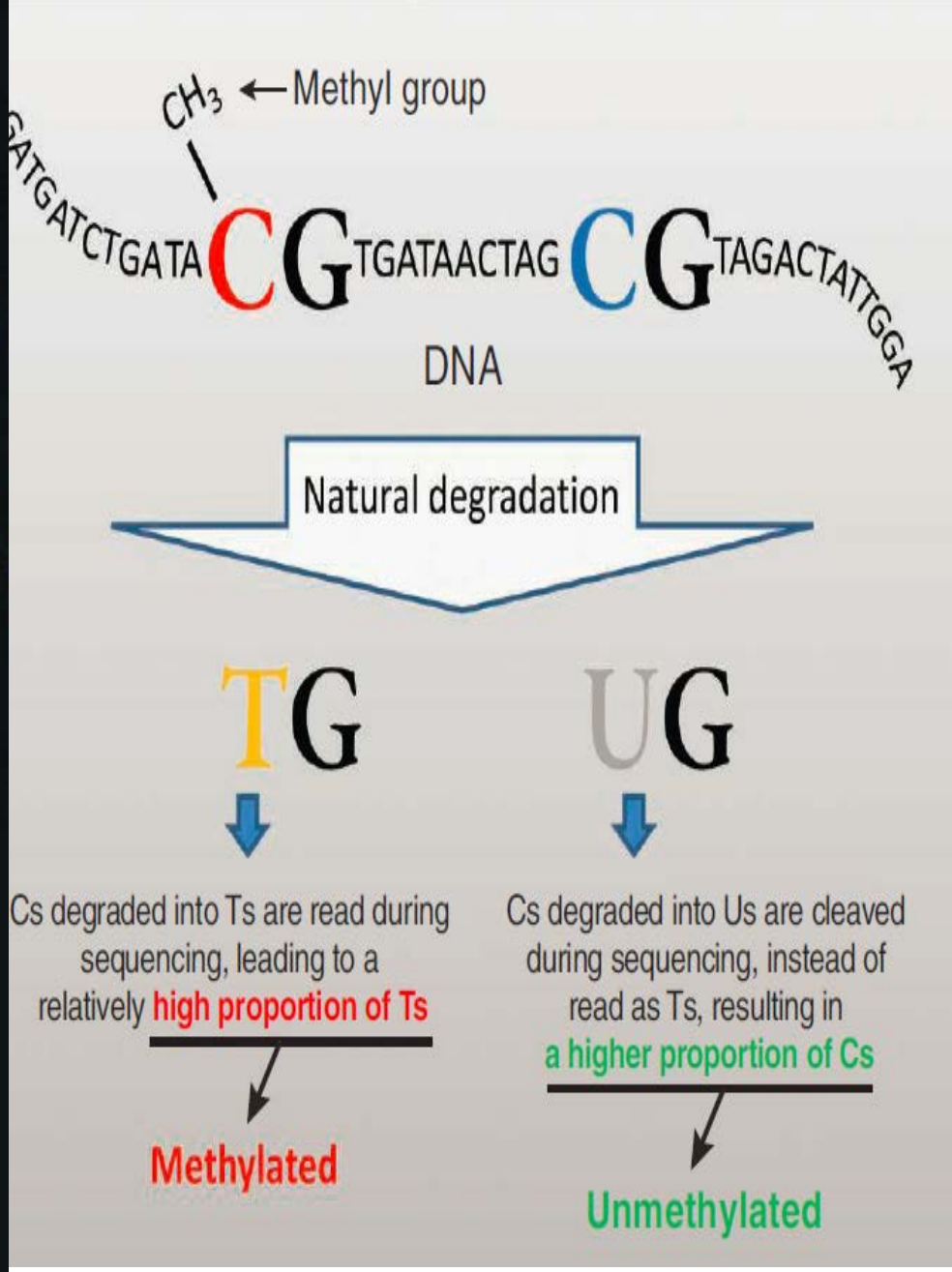
Adrian Bird
‘Genetics, epigenetics and disease’

22 Jan 2013, The Royal Society, London

Protein coding DNA sequences are only 1% of the genome: what is the rest for?



Pennisi
Science
344:245.



DNA methylation may account for skeletal differences between Neandertals & AMH.

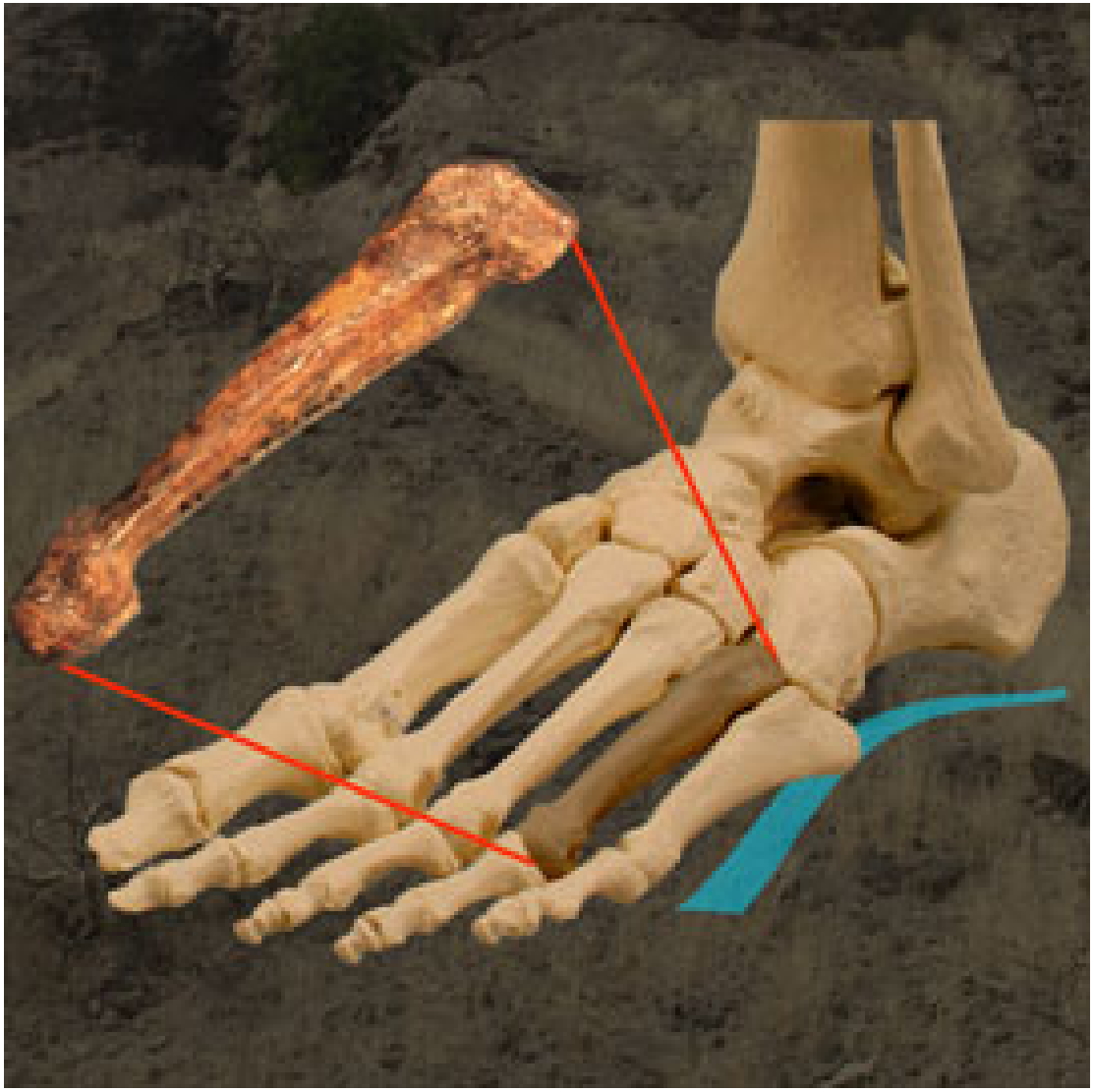
Darwin 1871: 140-2.

"Man alone has become a **biped**; … which forms one of his most conspicuous characters. Man could not have attained his present dominant position in the world without the **use of his hands**, which are so admirably adapted to act in obedience to his will. ... ... If it be an advantage to man to stand firmly on his feet and to have his hands and arms free ... then I can see no reason why it should not have been advantageous to the progenitors of man to have become **more and more erect or bipedal**. They would thus have been better able to defend themselves with stones or clubs, to attack their prey, or otherwise to obtain food. The best built individuals would in the long run have succeeded best, and have **survived in larger numbers**."

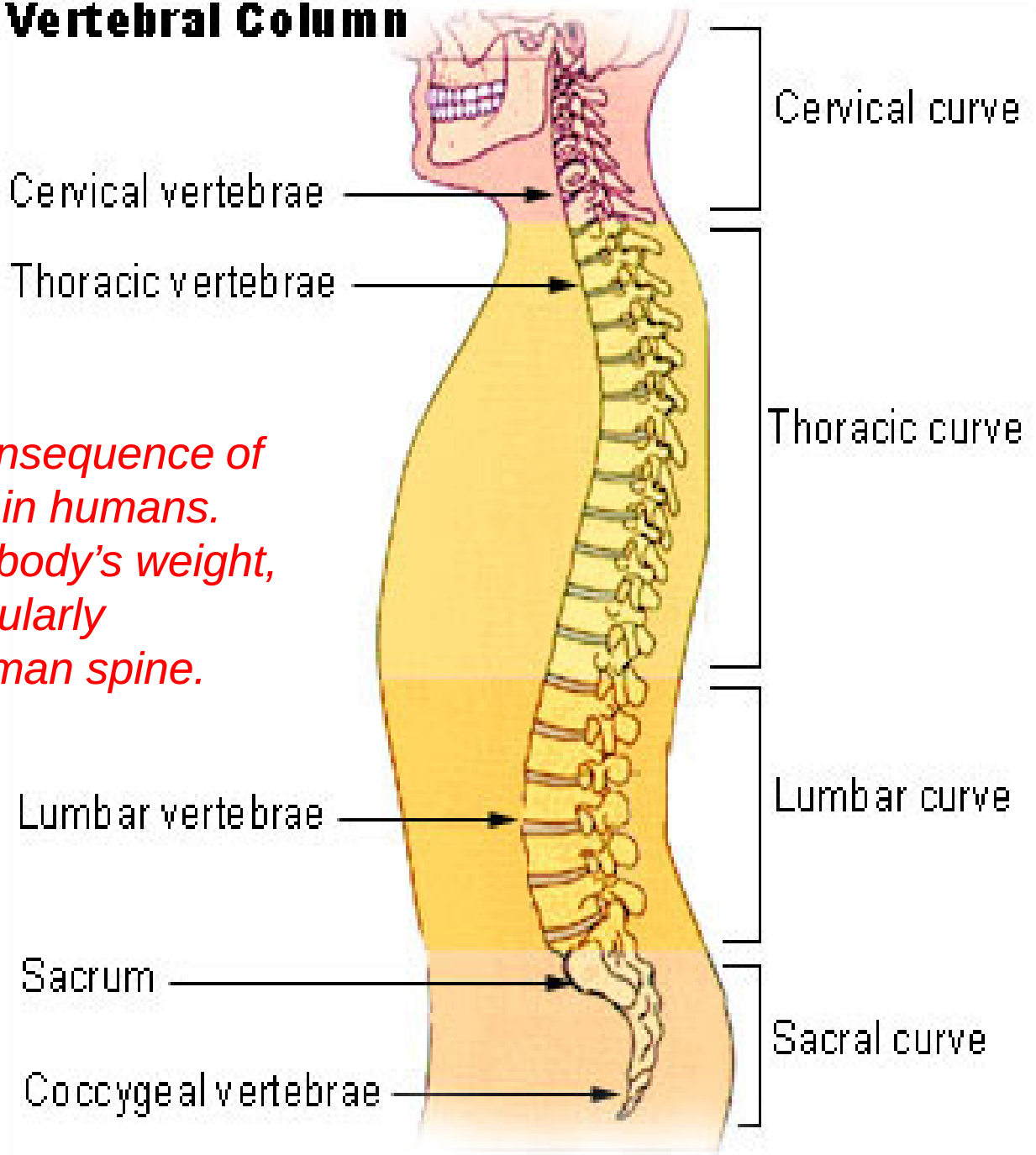
Johanson, D. &
B. Edgar. 1996.
From Lucy to Language.
Simon & Schuster.

Carol V. Ward, et al. ***Science*** *Feb.11, 2011*.

Complete Fourth Metatarsal & Arches in the Foot of *Australopithecus afarensis*

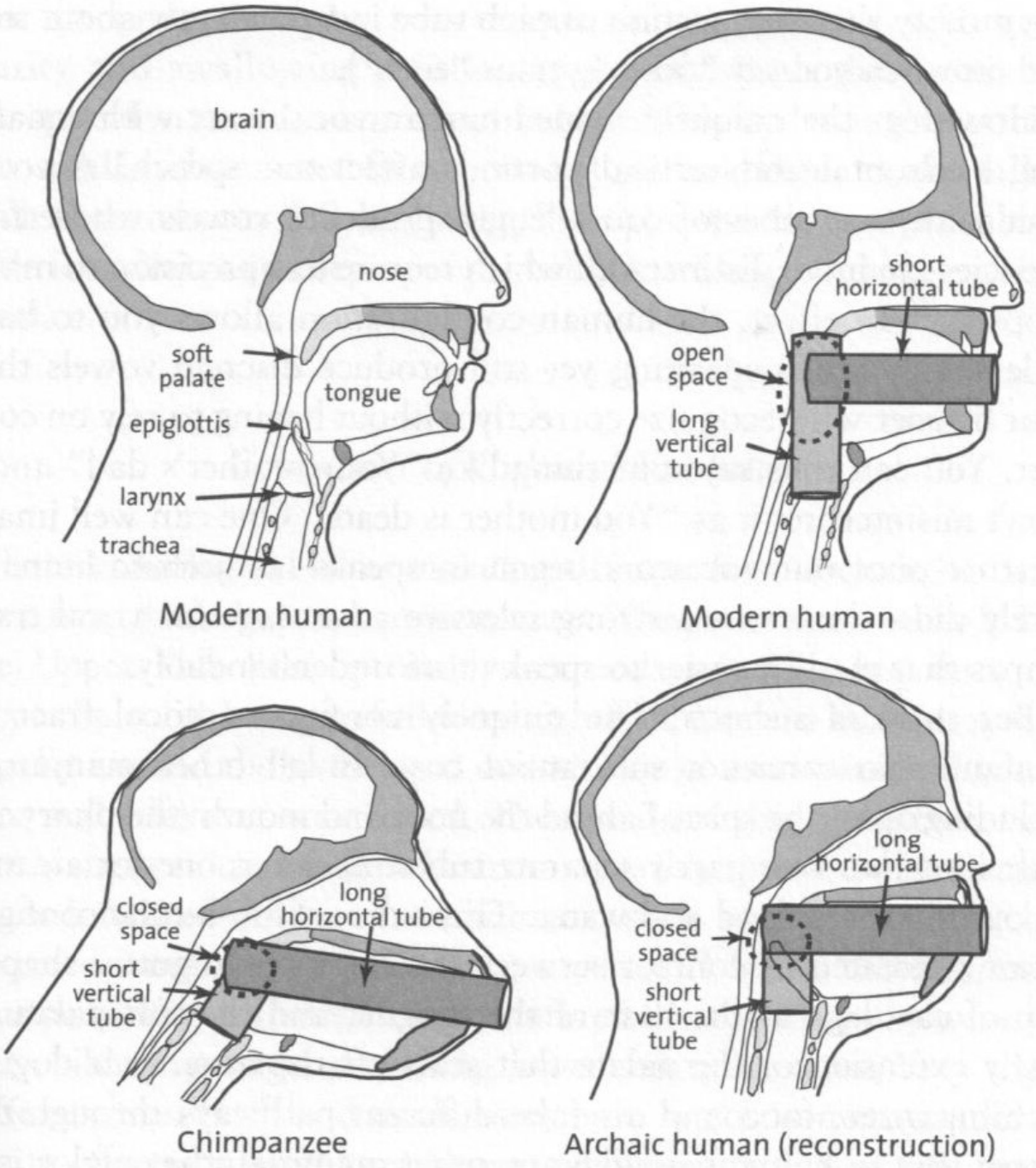


Vertebral Column



The lumbar curve is a consequence of bipedal posture, evolved in humans. While it helps center the body's weight, the lower back is a particularly vulnerable part of the human spine.

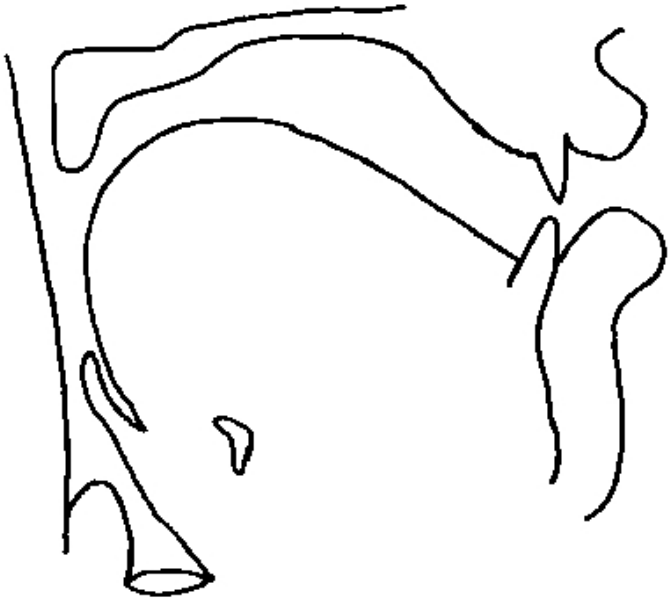
Lieberman, Daniel E. 2013:143.
The Story of the Human Body: Evolution, health, & disease.
Pantheon.

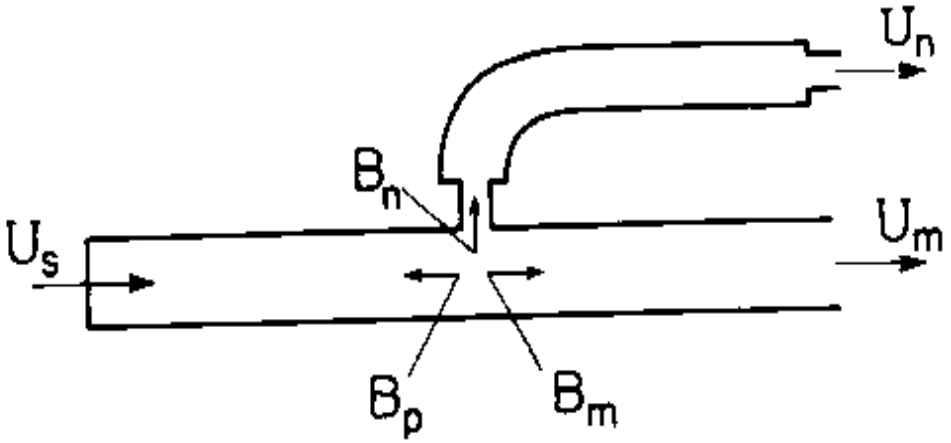


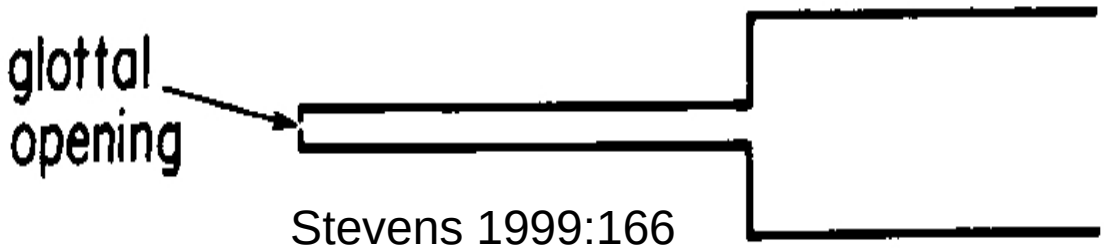
Darwin 1859, Chapter 6.

“We can thus … understand the strange fact that every particle of food and drink which we swallow has to pass over the orifice of the trachea with some risk of falling into the lungs, notwithstanding the beautiful contrivance by which the glottis is closed.”

Stevens, Kenneth N. 1999:305
Acoustic Phonetics: M.I.T.Press

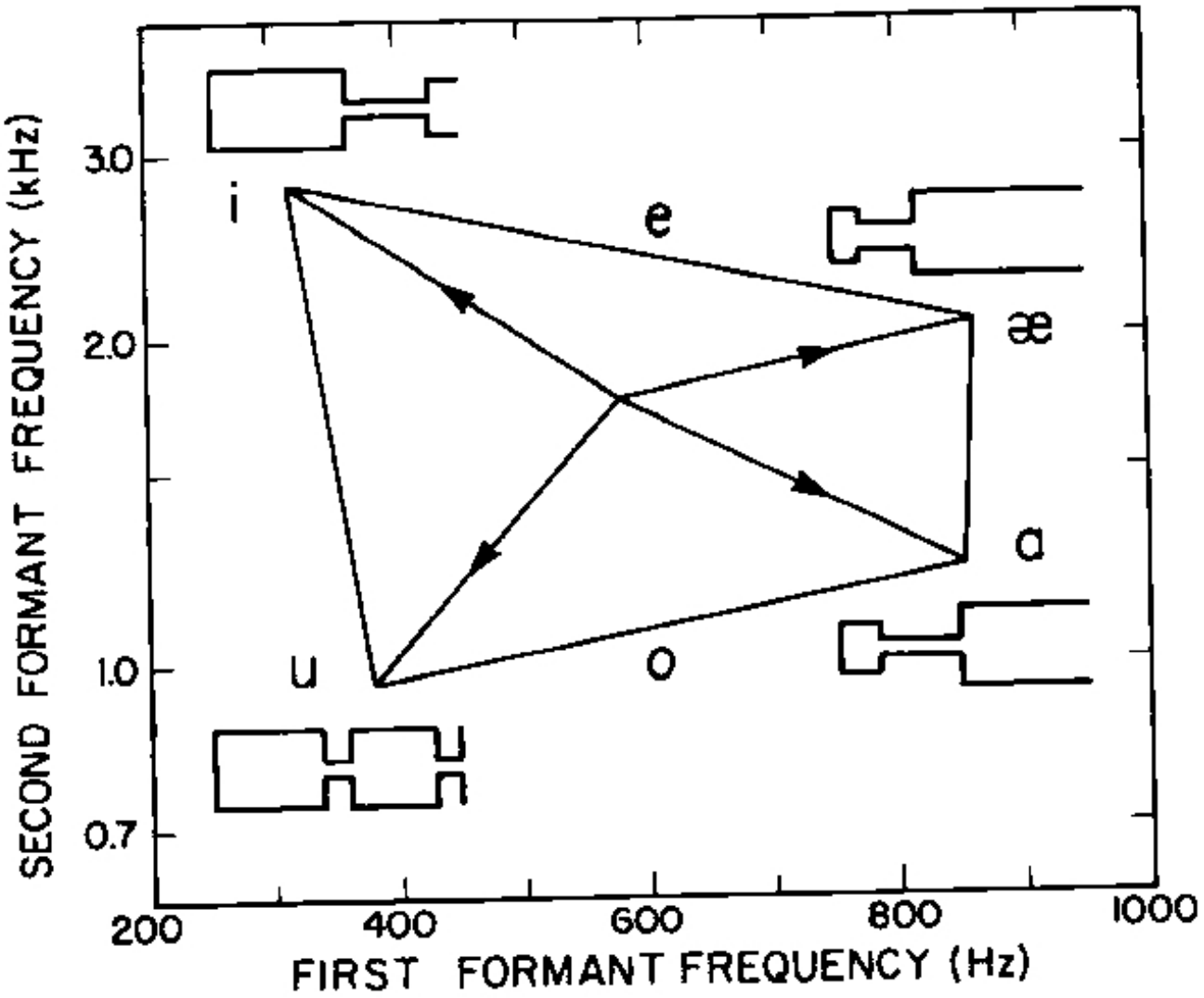






Stevens 1999:166

Stevens, Kenneth N. 1999:286
Acoustic Phonetics: M.I.T.Press

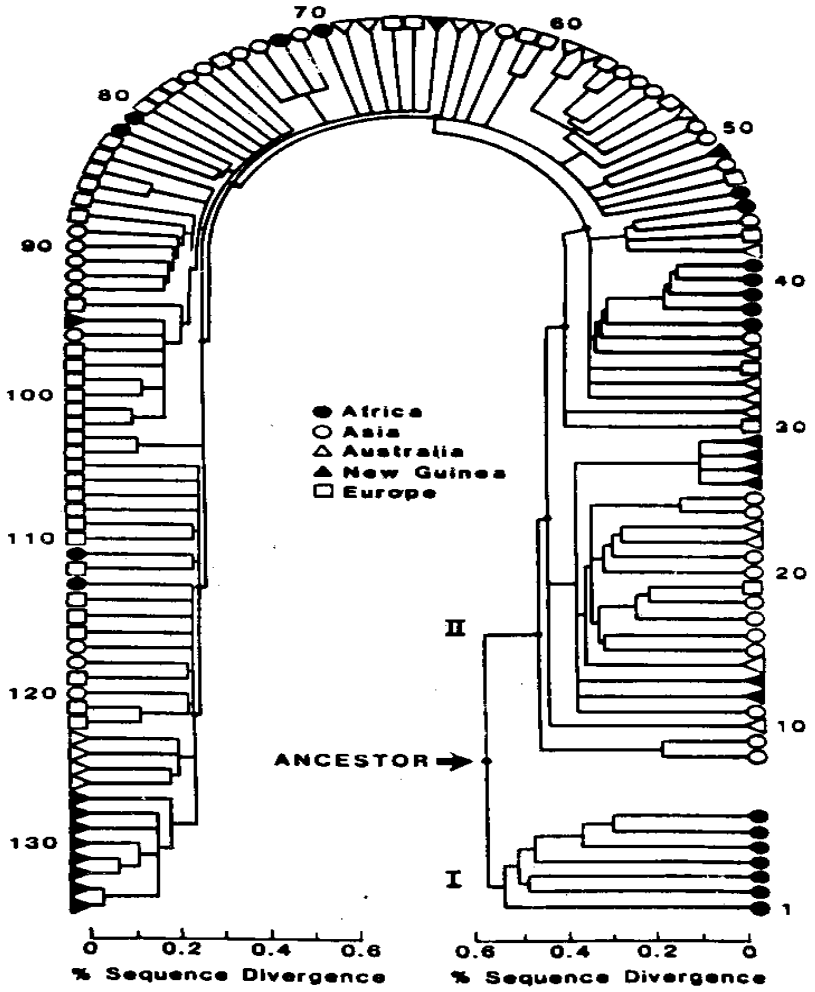


Darwin 1859:

"It is therefore probable that **Africa** was formerly inhabited by extinct apes closely allied to the **gorilla** and **chimpanzee**; and as these two species are now man's nearest allies, it is somewhat more probable that our **early progenitors** lived on the African continent than elsewhere."

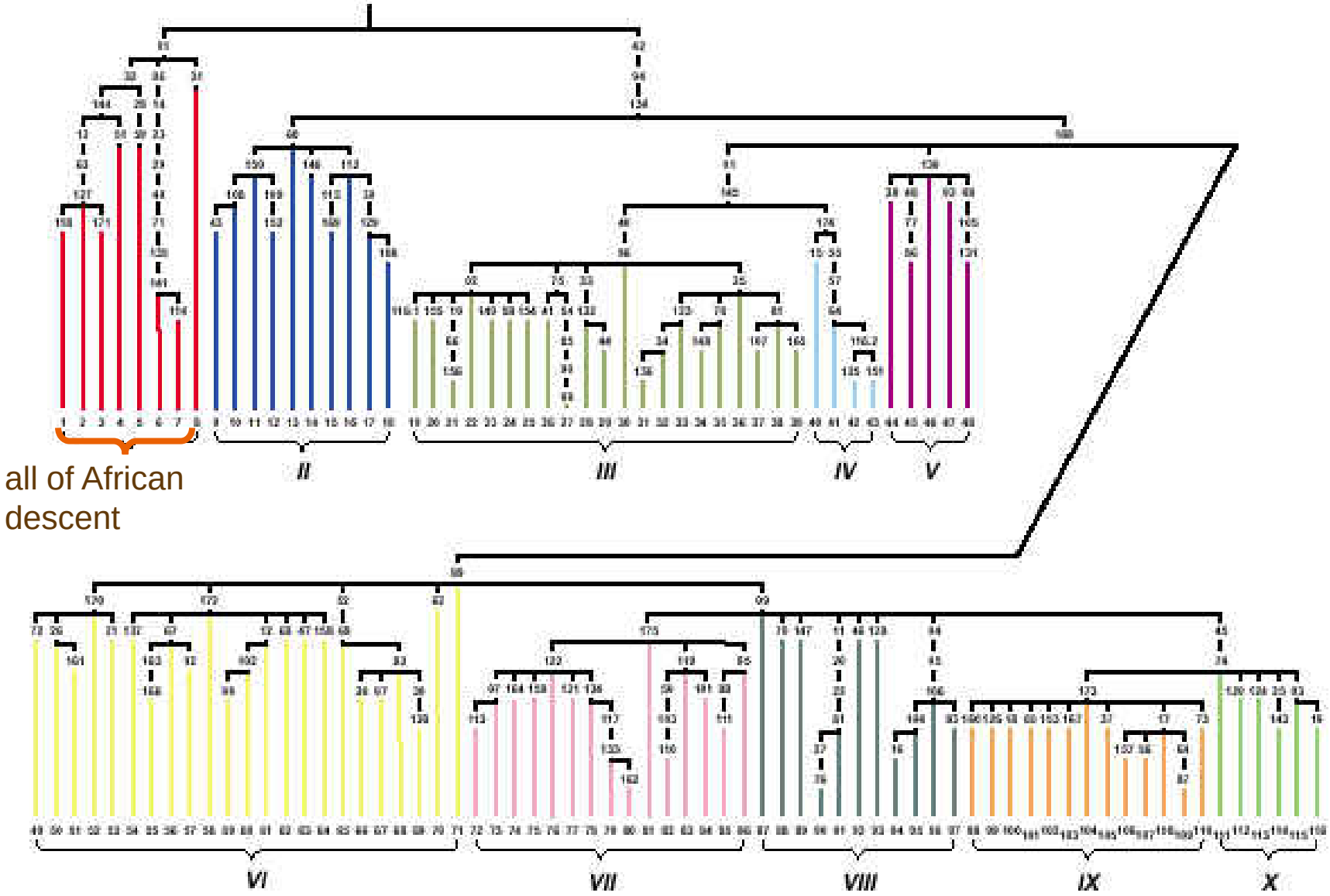
“Mitochondrial Eve” and The Out of Africa Hypothesis

Cann, R., Stoneking, M., and Wilson, A. (1987). Mitochondrial DNA and human evolution. *Nature* 325.31-36.

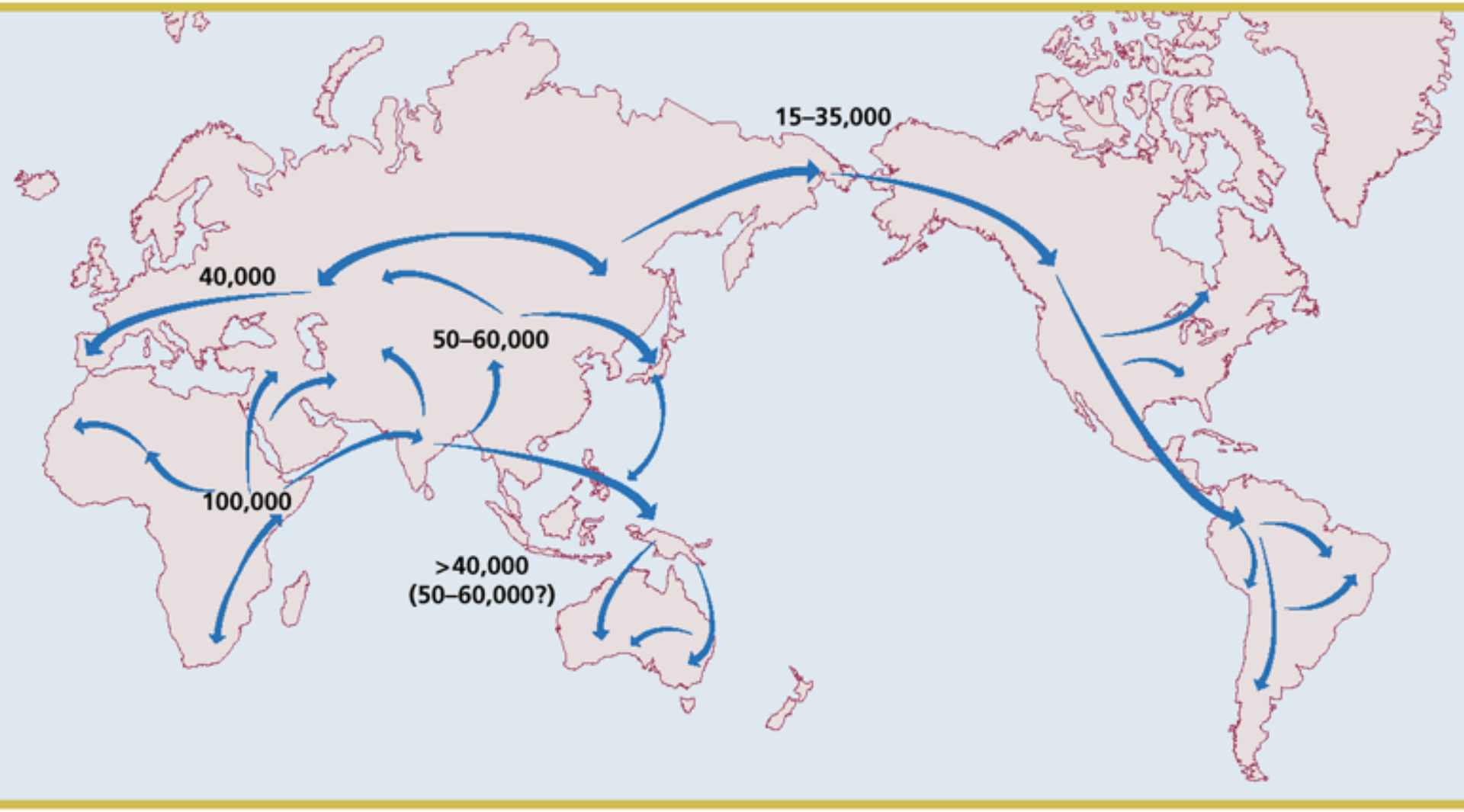


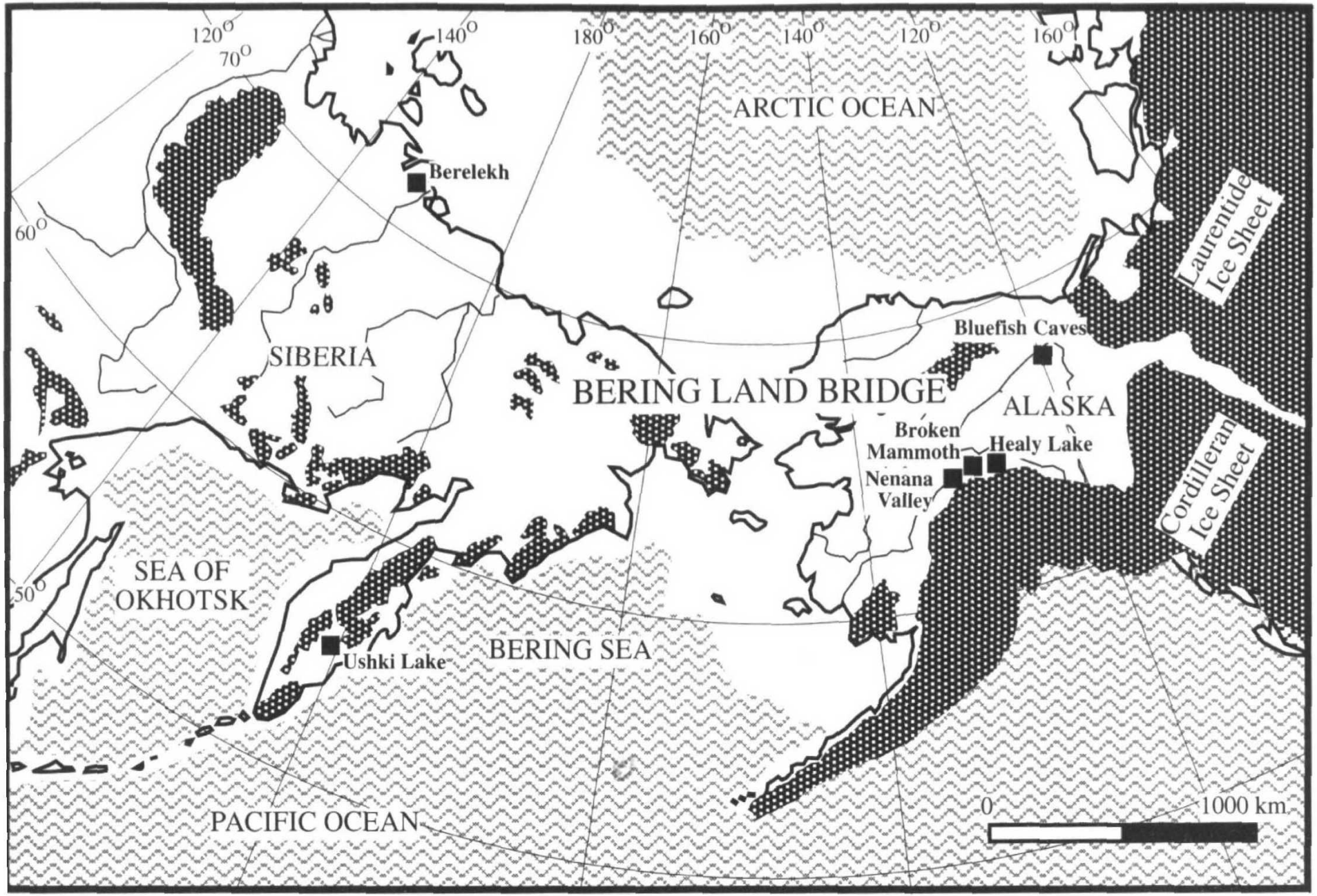
all of African descent

Underhill, P. et al. 2000. *Nature Genetics* 26.358–61.



L.L.Cavalli-Sforza & M.W.Feldman. The application of molecular genetic approaches to the study of human evolution. *Nature Genetics Suppl.* 33.266-75. 2003.





Richard Klein. 1999. The Human Career.

Diamond, Jared. 2011.
Deep relationships between languages. *Nature* 476.291-2, August 18.

Vovin, A. 2000. Did the Xiongnu speak a Yeniseian language? *Central Asiatic Journal* 44.87-104.
Gao, Jingyi 2012. Huns and Xiongnu identified by Hungarian and Yeniseian shared etymologies. *Central Asiatic Journal* 56.41-8.

Ruhlen, Merritt. 1998.
The origin of the Na-Dene. ***Proc.Natl.Acad.Sci****. 95.13994-13996.*

	Ket	Proto-Athabaskan
birch bark	qɨ'y	
birch tree		*q'əy

Postponement of glottal stop also occurs in the words for *stone*, *utensil*, *bow*, and *foot*.

Gibbons, Ann. 2014.

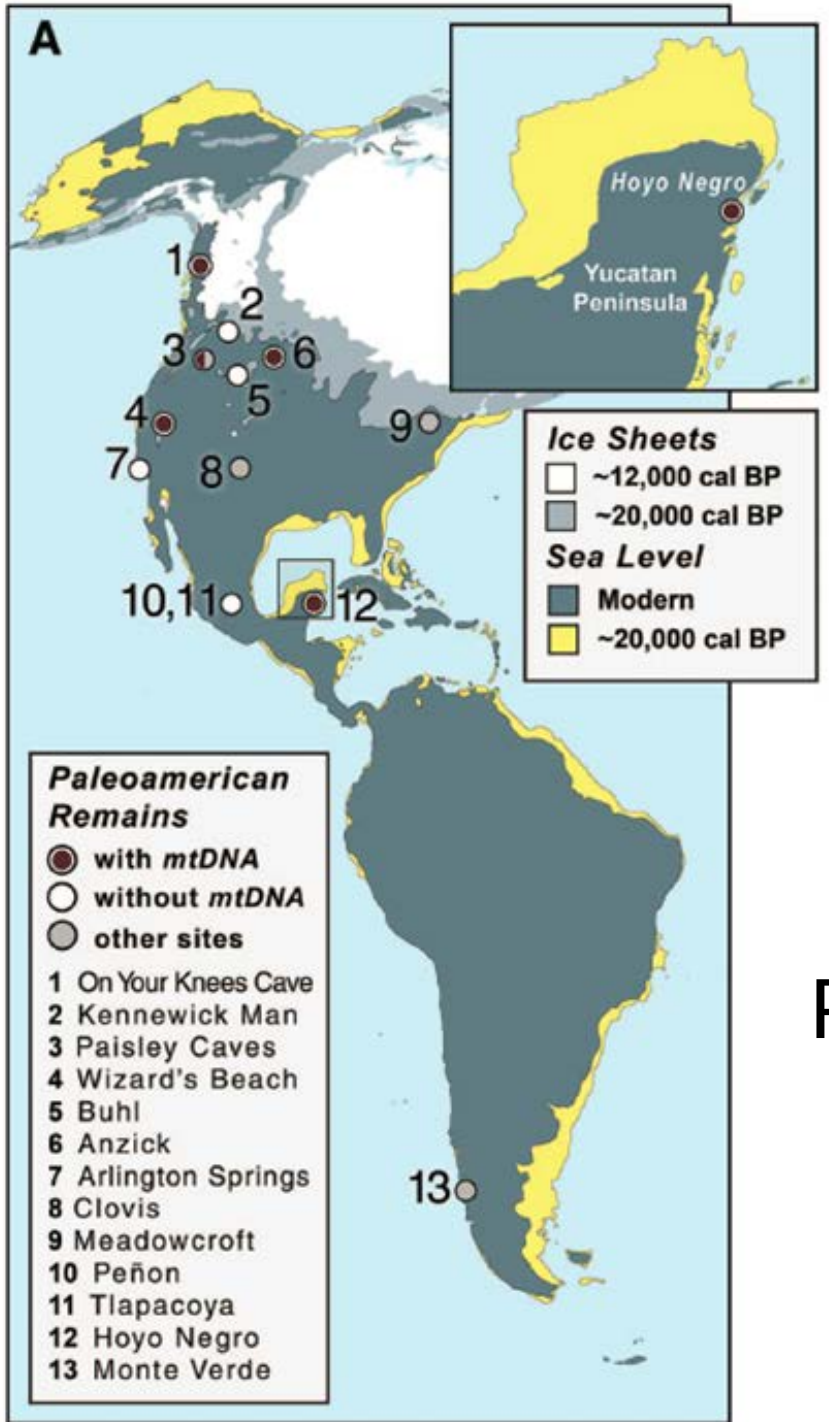
New Sites Bring the Earliest Americans Out of the Shadows.

Science 344.567-68.

Hodges, Glenn. May 15, 2014.

Most Complete Ice Age Skeleton Helps Solve Mystery of First Americans: Ancient bones provide glimpse of the New World's earliest inhabitants.

National Geographic.



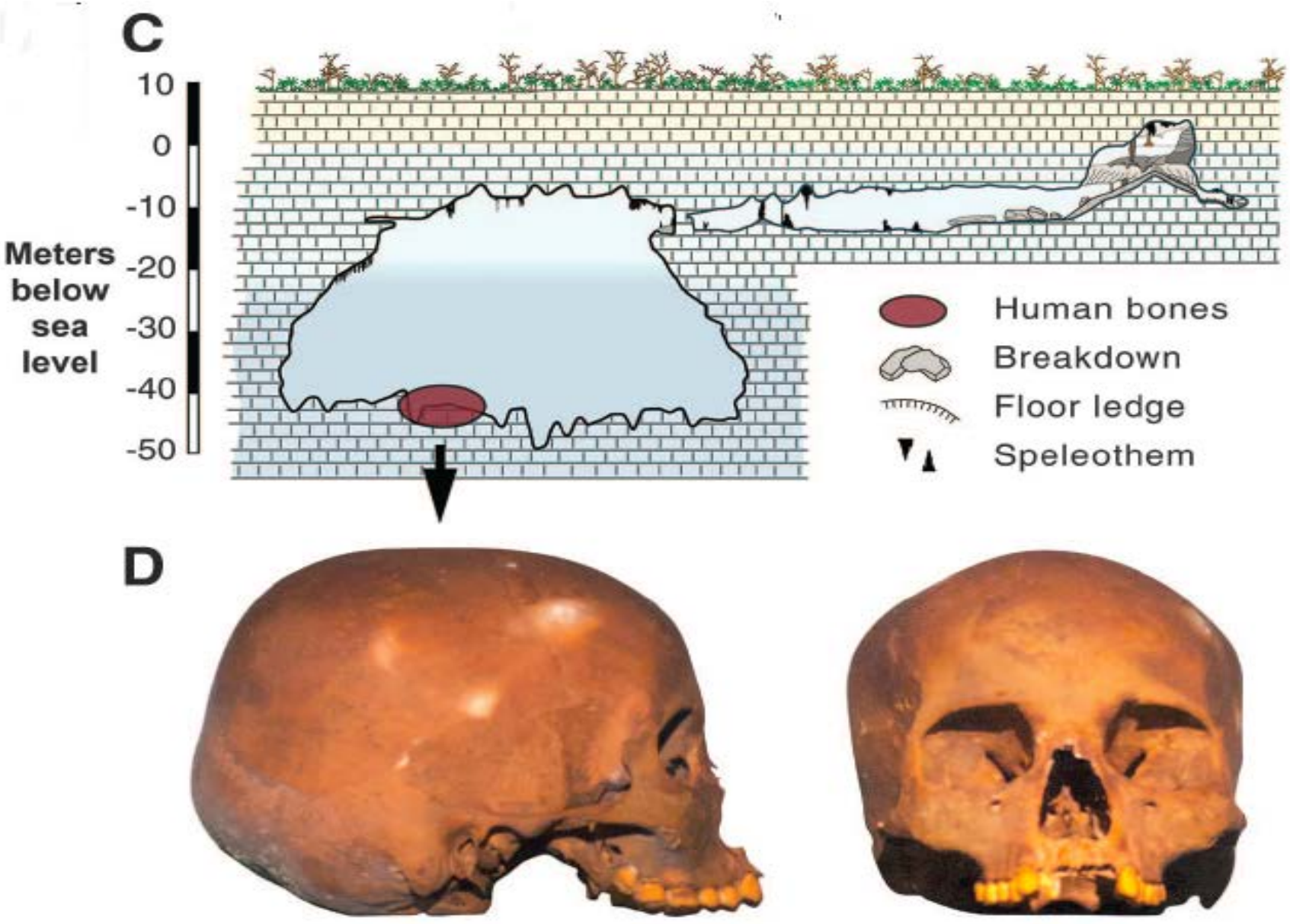
Chatters, J.C., et al. 2014.

Late Pleistocene Human Skeleton and mtDNA Link Paleoamericans and Modern Native Americans.

Science 344.750-4.

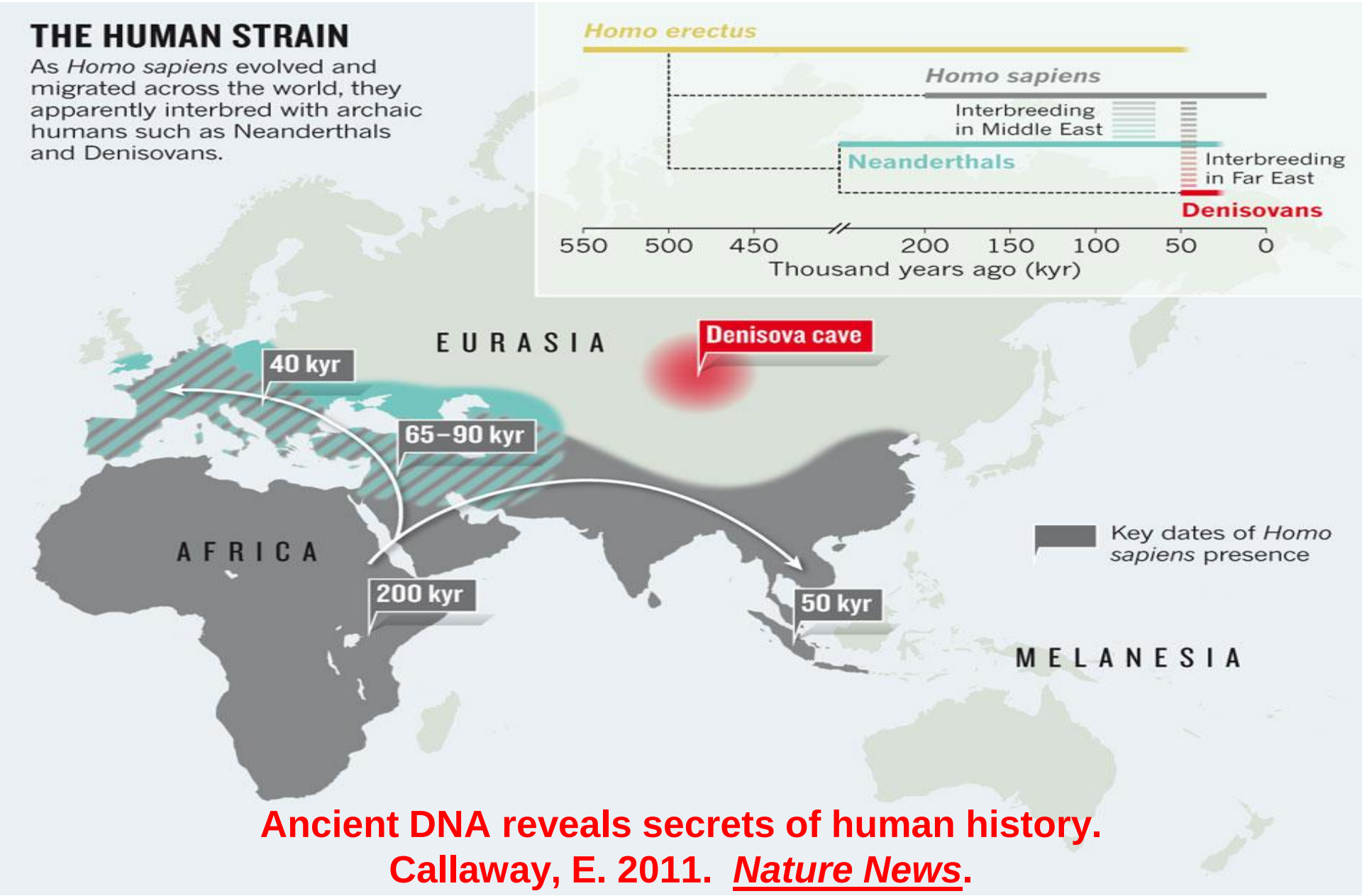
Hodges, G. May 15, 2014. *National Geographic*.

Chatters, James C., et al. 2014.
Late Pleistocene Human Skeleton and mtDNA Link Paleoamericans and Modern Native Americans. *Science* 344.750-4.



"We describe a near-complete human skeleton with an intact cranium and preserved DNA found with extinct fauna in a **submerged cave** on Mexico's Yucatan Peninsula. This skeleton dates to between 13,000 and 12,000 calendar years ago and has **Paleoamerican craniofacial characteristics and a Beringian-derived mitochondrial DNA** (mtDNA) haplogroup (D1). Thus, the differences between Paleoamericans and Native Americans probably resulted from in situ evolution rather than separate ancestry."

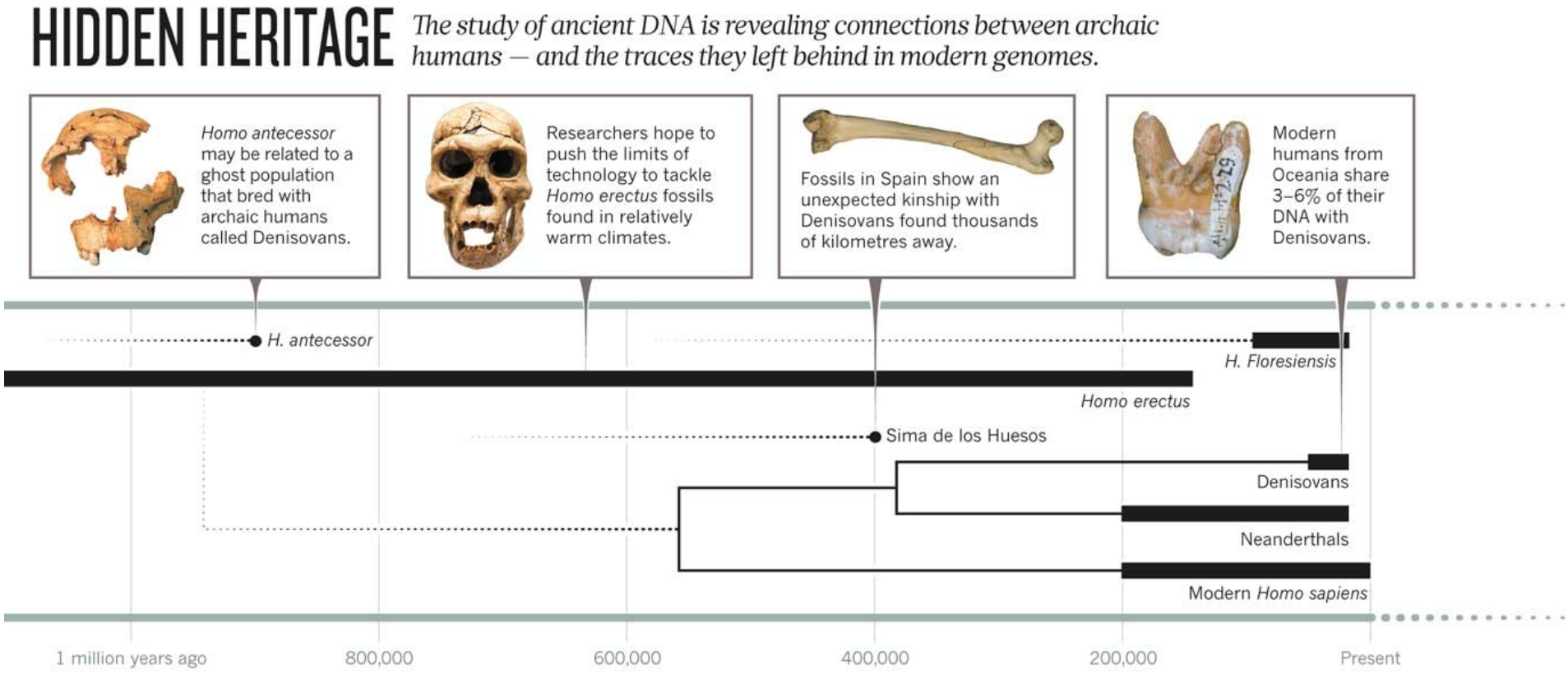
Chatters, James C., et al. 2014.
Late Pleistocene Human Skeleton and mtDNA Link Paleoamericans and Modern Native Americans. *Science* 344.750-4.



Ancient DNA reveals secrets of human history.
Callaway, E. 2011. *Nature News*.

Human evolution: The Neanderthal in the family

Thirty years after the study of ancient DNA began, it promises to upend our view of the past. Ewen Callaway. *Nature* 26 March 2014



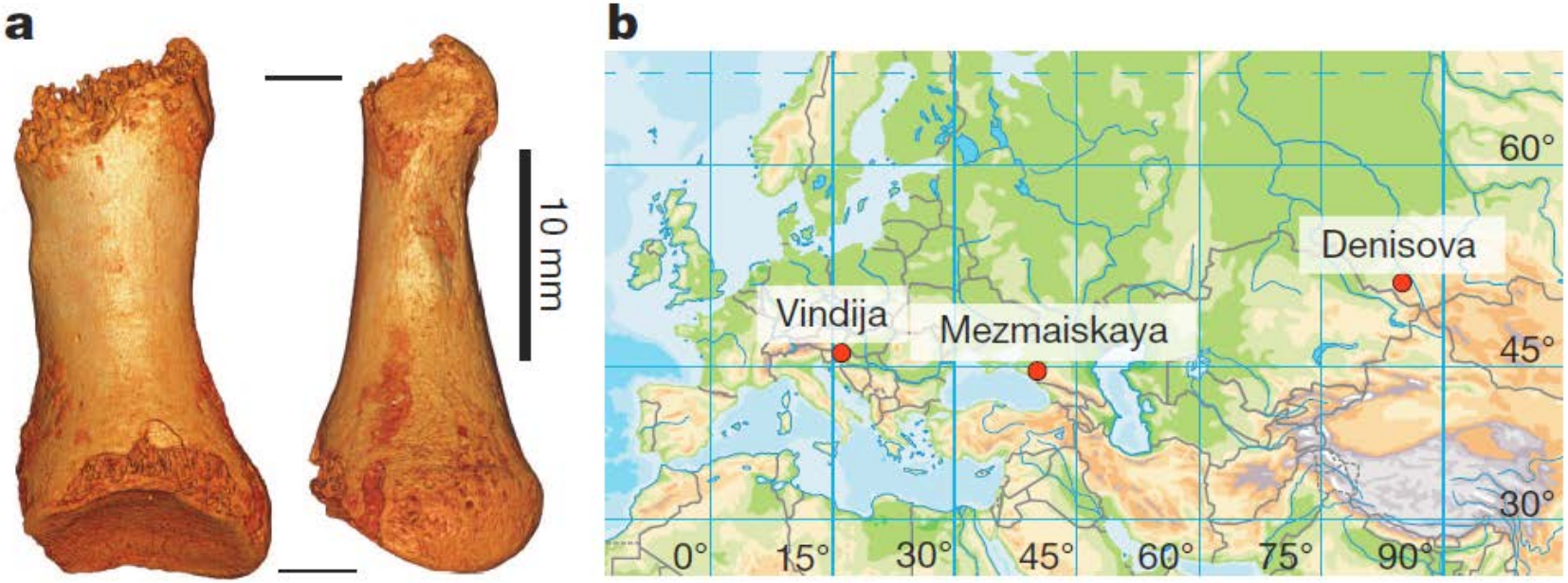
ARTICLE

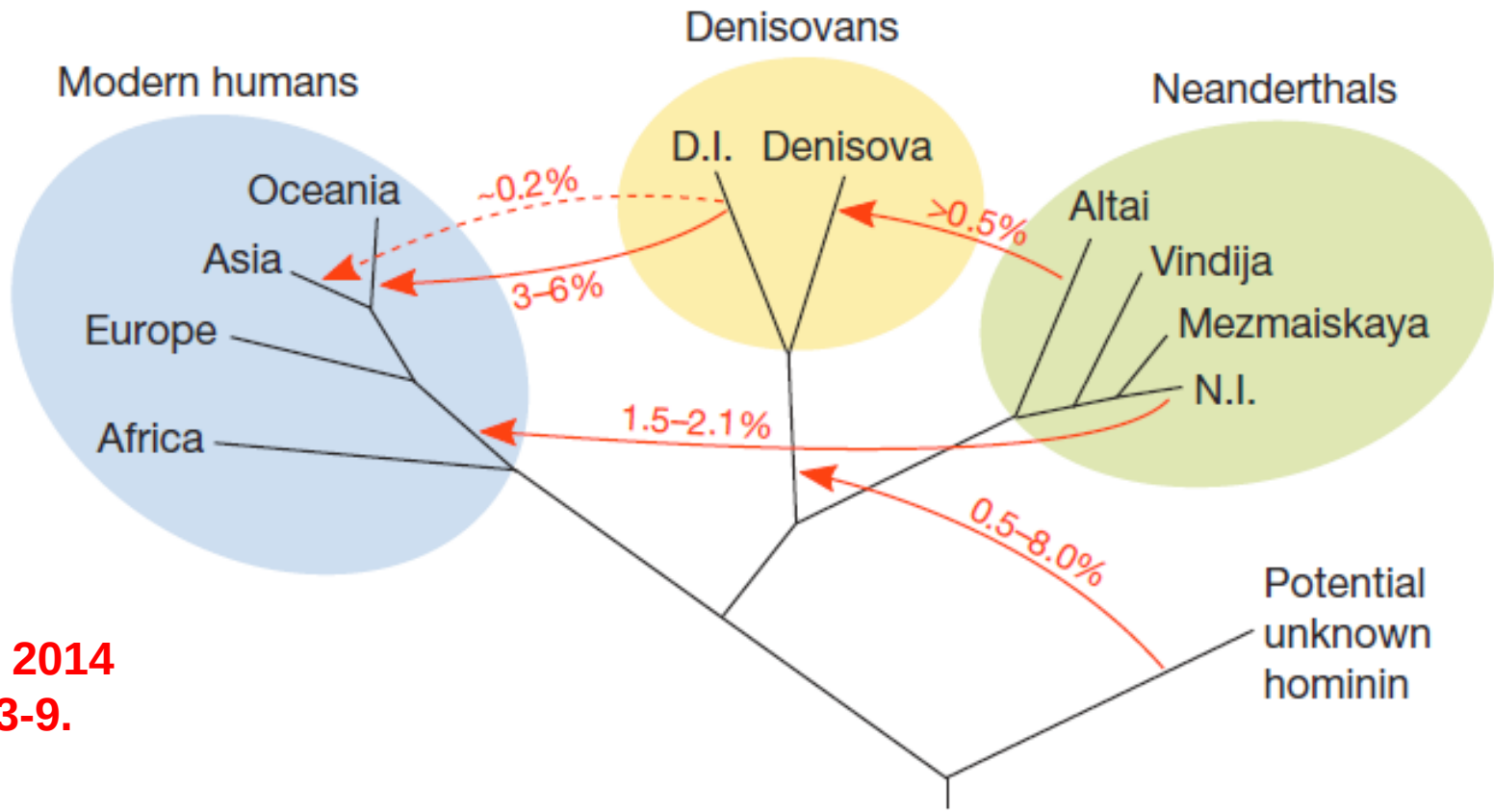
Nature 505.43-9, 2014.

doi:10.1038/nature12886

The complete genome sequence of a Neanderthal from the Altai Mountains

Kay Prüfer[1], Fernando Racimo[2], Nick Patterson[3], Flora Jay[2], Sriram Sankararaman[3,4], Susanna Sawyer[1], Anja Heinze[1], Gabriel Renaud[1], Peter H. Sudmant[5], Cesare de Filippo[1], Heng Li[3], Swapan Mallick[3,4], Michael Dannemann[1], Qiaomei Fu[1,6], Martin Kircher[1,5], Martin Kuhlwilm[1], Michael Lachmann[1], Matthias Meyer[1], Matthias Ongyerth[1], Michael Siebauer[1], Christoph Theunert[1], Arti Tandon[3,4], Priya Moorjani[4], Joseph Pickrell[4], James C. Mullikin[7], Samuel H. Vohr[8], Richard E. Green[8], Ines Hellmann[9]†, Philip L. F. Johnson[10], Hélène Blanche[11], Howard Cann[11], Jacob O. Kitzman[5], Jay Shendure[5], Evan E. Eichler[5,12], Ed S. Lein[13], Trygve E. Bakken[13], Liubov V. Golovanova[14], Vladimir B. Doronichev[14], Michael V. Shunkov[15], Anatoli P. Derevianko[15], Bence Viola[16], Montgomery Slatkin[2], David Reich[3,4,17], Janet Kelso[1] & Svante Pääbo[1]





Pruefer at al. 2014
***Nature* 505.43-9.**

Figure 8 | A possible model of gene flow events in the Late Pleistocene. The direction and estimated magnitude of inferred gene flow events are shown. Branch lengths and timing of gene flows are not drawn to scale. The dashed line indicates that it is uncertain if Denisovan gene flow into modern humans in mainland Asia occurred directly or via Oceania. D.I. denotes the introgressing Denisovan, N.I. the introgressing Neanderthal. Note that the age of the archaic genomes precludes detection of gene-flow from modern humans into the archaic hominins.

"An analysis of the relationships and population history of available archaic genomes and 25 present-day human genomes shows that several **gene flow events occurred among Neanderthals, Denisovans and early modern humans**, possibly including gene flow into Denisovans from **an unknown archaic group**. Thus, interbreeding, albeit of low magnitude, occurred among many hominin groups in the Late Pleistocene."

Pruefer, K. et al. 2014. The complete genome sequence of a Neanderthal from the Altai Mountains. *Nature* 505.43-9.

Curnoe, D. & X.P.Ji, et al. 2012. Human remains from the Pleistocene-Holocene transition of Southwest China suggest a complex evolutionary history for East Asians.

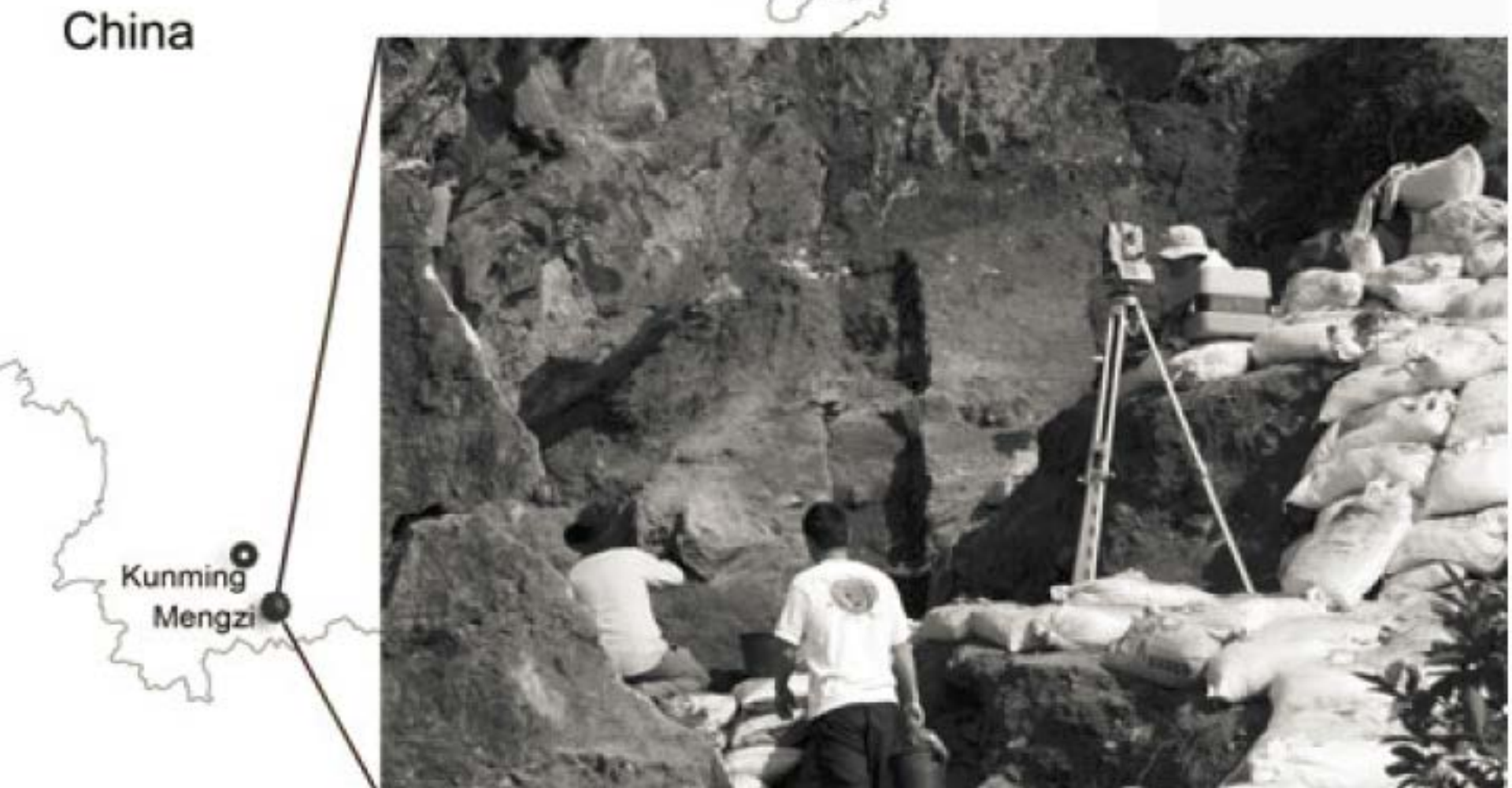
PLoS ONE 7.1-28.

1. Lijiang
2. Longtanshan
3. Zhirendong
4. Liujiang
5. Maba
6. Ziyang
7. Huanglong
8. Salawasu
9. Xujiayao
10. Zhoukoudian, *upper cave.*

隆林洞
马鹿洞, 蒙自

Curnoe,D. & X.P.Ji, et al. 2012. Human remains from the Pleistocene-Holocene transition of Southwest China suggest a complex evolutionary history for East Asians. *PLoS ONE* 7.1-28.

JI,X.P., D.Curnoe, et al. 2013. Further geological & palaeoanthropological investigations at the Maludong hominin site, Yunnan Province, Southwest China. *Chin Sci Bull* 58: 4473.



Curnoe, D. et al. 2012.

Human Remains from the Pleistocene-Holocene Transition of Southwest China Suggest a Complex Evolutionary History for East Asians.

PLoS ONE 7.e31918.

C.Stringer. *The Guardian* March 14, 2012.

- "The human remains from the Longlin Cave and Maludong are very important, particularly because we do not have much well-described and well-dated material from the late Pleistocene of China.
- "The fossils are unlike recent populations of modern humans in several respects, and the mosaic of more **archaic** features could indicate the dispersal of a poorly known and more primitive form of modern human that left Africa **before the main exodus at about 60,000 years**. This dispersal could have reached as far as China, surviving there for many millennia, before disappearing in the last 12,000 years."
- "There might be another possible explanation for the more archaic features. Could these alternatively be attributed to gene flow from a more archaic population that survived alongside modern humans? In the case of the Longlin Cave and Maludong fossils, the most likely candidate would be the enigmatic Denisovans who apparently interbred with the ancestors of modern Australasians somewhere in Southeast Asia. Could these Chinese fossils be further evidence of such **hybridisation**?"

Darwin1871. *The Descent of Man, and Selection in Relation to Sex*.
Chapter 3. Comparison of the mental powers of man and the lower animals.

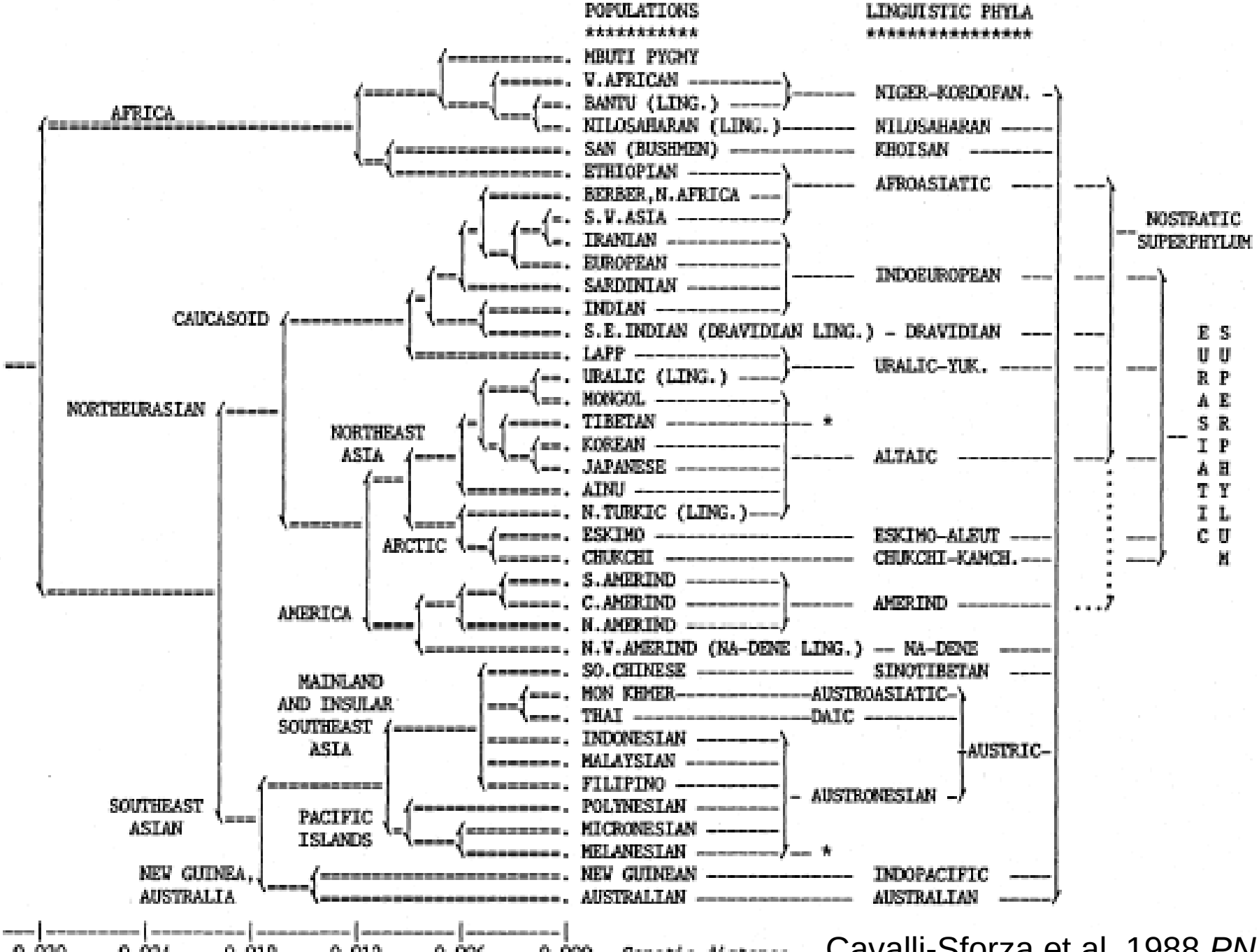
The formation of different languages and of distinct species, and the proofs that both have developed through a gradual process, are curiously parallel. … We find in distinct languages striking homologies due to community of descent, and analogies due to a similar process of formation. The manner in which certain letters or sounds change while others change is very like correlated growth. We have in both cases the reduplication of parts, the effects of long continued use, and so forth.

Darwin. 1859. *On The Origin of Species by Means of Natural Selection, or The Preservation of Favoured Races in the Struggle for Life*.
Chapter 14. Classification.

"It may be worthwhile to illustrate this view of classification, by taking the case of languages. If we possessed a perfect pedigree of mankind, **a genealogical arrangement of the races of man would afford the best classification of the various languages now spoken throughout the world;** and if all extinct languages, and all intermediate and slowly changing dialects, were to be included, such an arrangement would be the only possible one. …..
The various degrees of difference between the languages of the same stock, would have to be expressed by groups subordinate to groups; but the proper or even the only possible arrangement would still be genealogical; and this would be strictly natural, as it would connect together all languages, extinct and recent, by the closest affinities, and would give the filiation and origin of each tongue."

Huxley, T. H. 1865. On the methods and results of ethnology. *Fortnightly Review* 1, 257-77.

"It seems to me obvious that, though in the absence of any evidence to the contrary, unity of languages may afford a certain presumption in favour of the unity of stock of peoples speaking those languages, it cannot be held to prove that unity of stock, unless philologers are prepared to demonstrate that no nation can **lose its language and acquire that of a distinct nation without a change of blood corresponding with the change of language.**"



Cavalli-Sforza et al. 1988 *PNAS*

Luigi Luca Cavalli-Sforza, 中央研究院 榮譽院士

- Cavalli-Sforza, L.L., A. Piazza, P. Menozzi & J. Mountain. 1988. Reconstruction of human evolution: bringing together genetic, archeological and linguistic data. *PNAS* 85.6002-6.
- Cavalli-Sforza, L.L., P. Menozzi & A. Piazza. 1994. *Historical Geography of Human Genes*. Princeton University Press.
- Cavalli-Sforza, L. 1994. An evolutionary view in linguistics. Interdisciplinary Studies on Language and Language Change. Eds. M.Y. Chen & O.J.L.Tzeng, 17-28. Taipei: Pyramid Press.
- Cavalli-Sforza, Luigi Luca. 2000. *Genes, Peoples, and Languages*. London: Penguin Books.
  吳一豐 等 譯。2003。追蹤亞當夏娃。臺北：遠流出版社。.

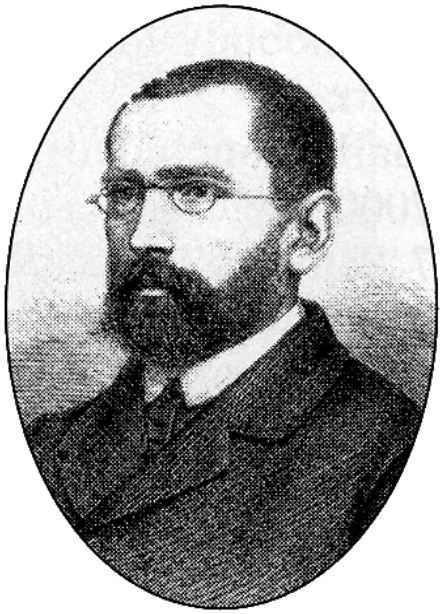
Early Comparative Linguistics

- "*The Sanscrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity … than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists.*"

(William Jones, 1786)

Stammbaumtheorie

- Soon after reading Darwin's Origin of Species, August Schleicher (1863) proposed the following "family tree" of Indo-European:



1821-68.

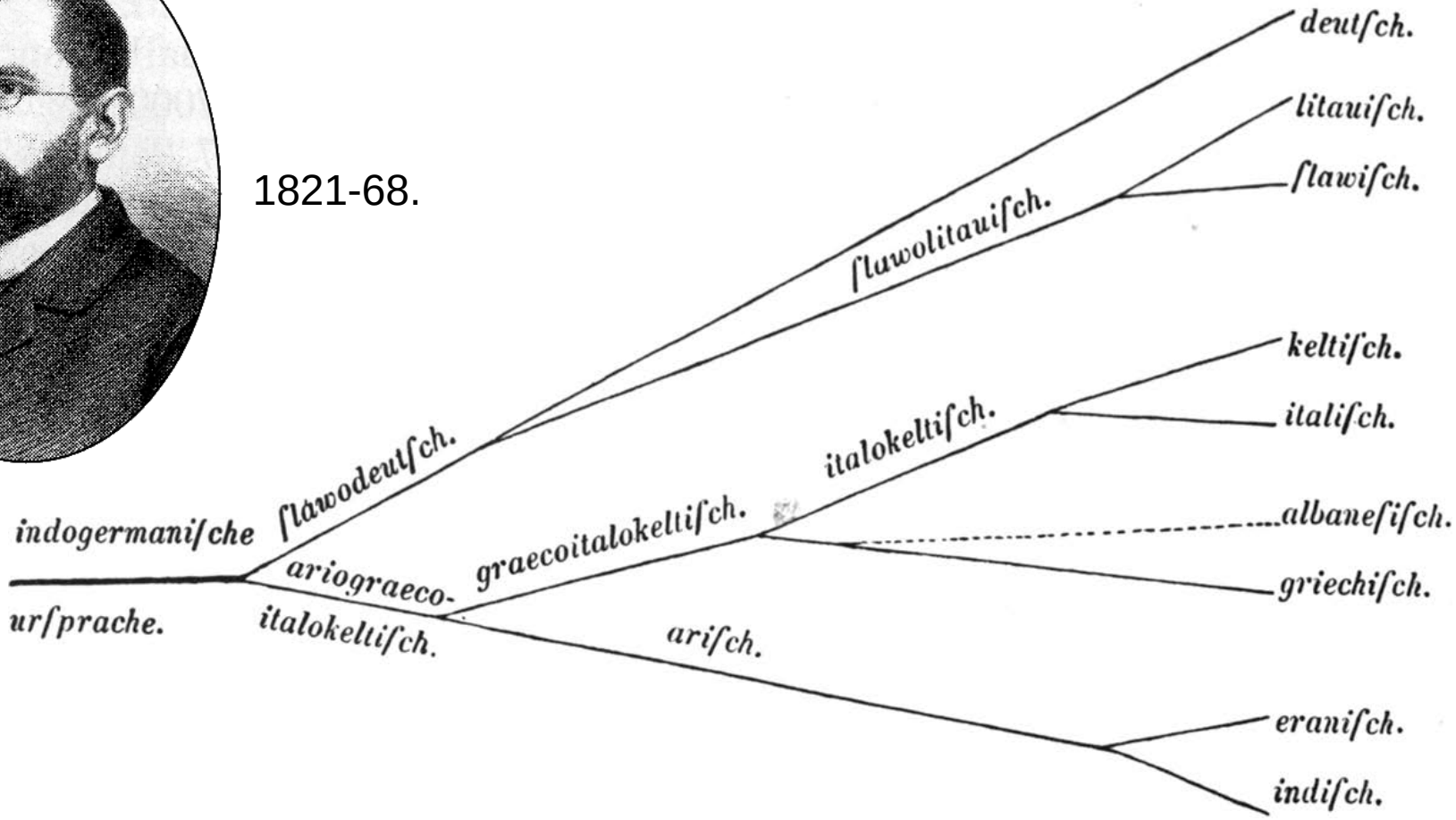


FIGURE 3. Some overlapping features of special resemblance among the Indo-European languages, conflicting with the family-tree diagram. — Adapted from Schrader.

1. Sibilants for velars in certain forms.
2. Case-endings with [m] for [bh].
3. Passive-voice endings with [r].
4. Prefix ['e-] in past tenses.
5. Feminine nouns with masculine suffixes.
6. Perfect tense used as general past tense.

Figure from :
LANGUAGE 1933.
Bloomfield, L.

Gentic relationship & spatial distance

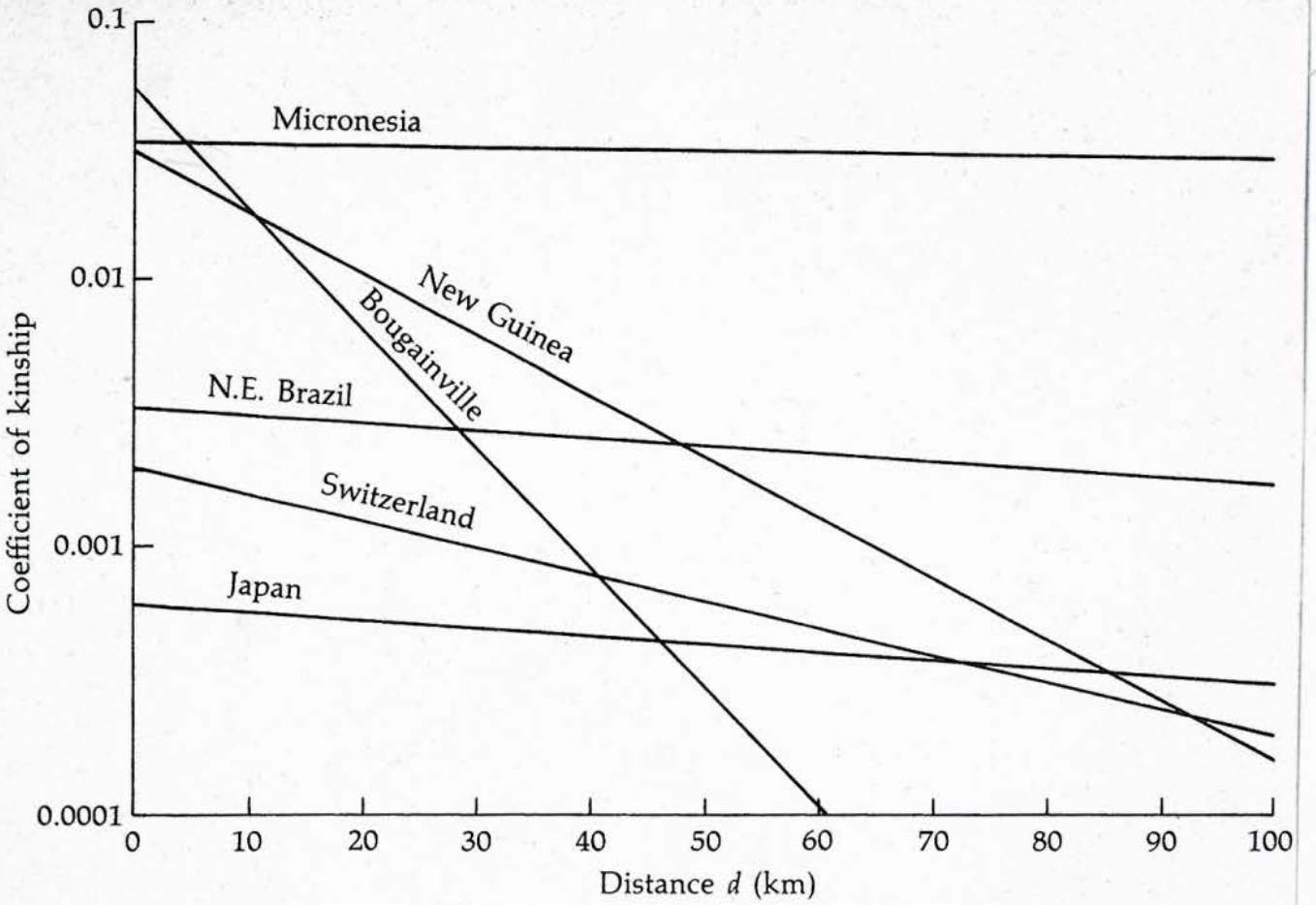
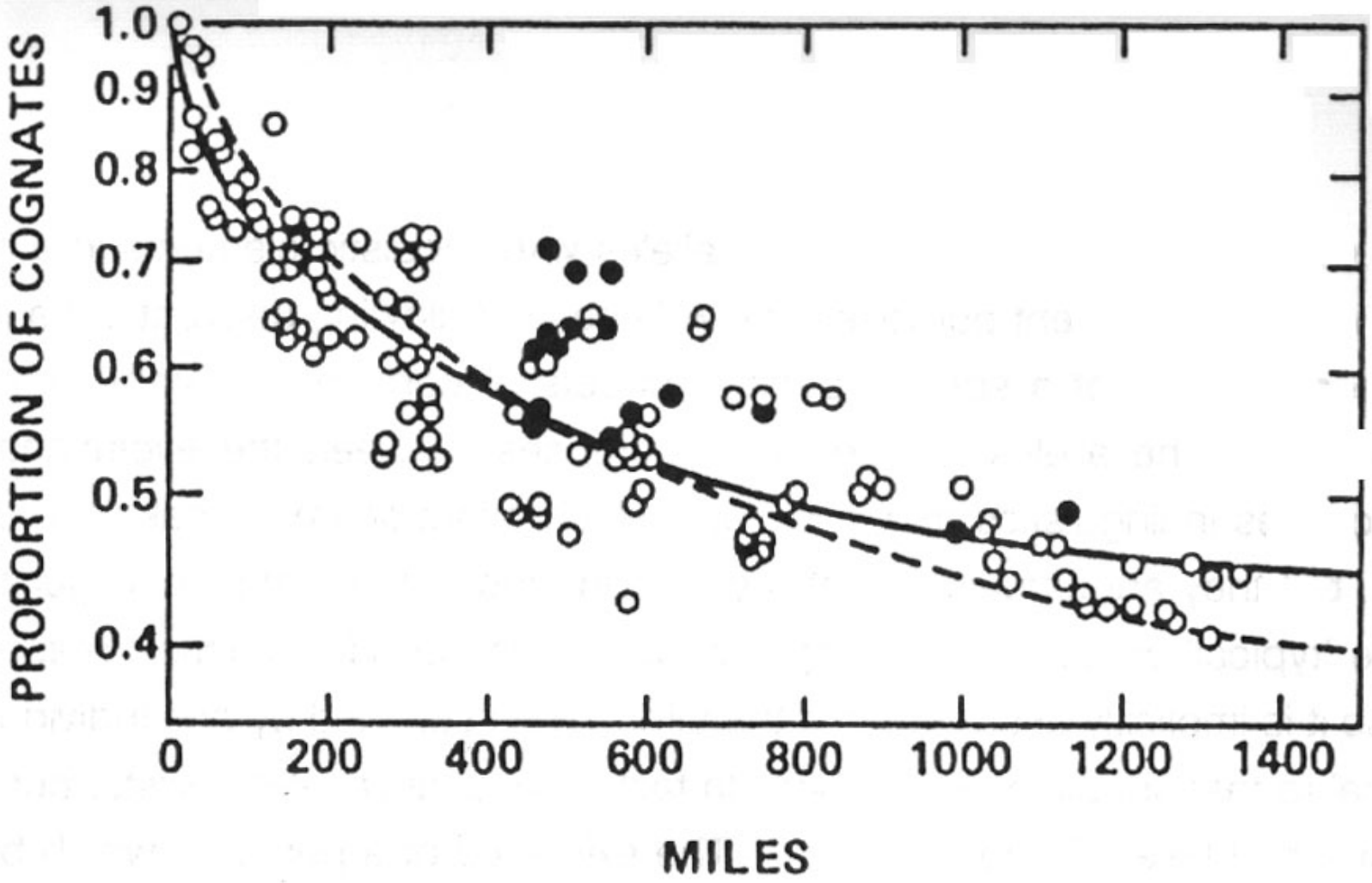


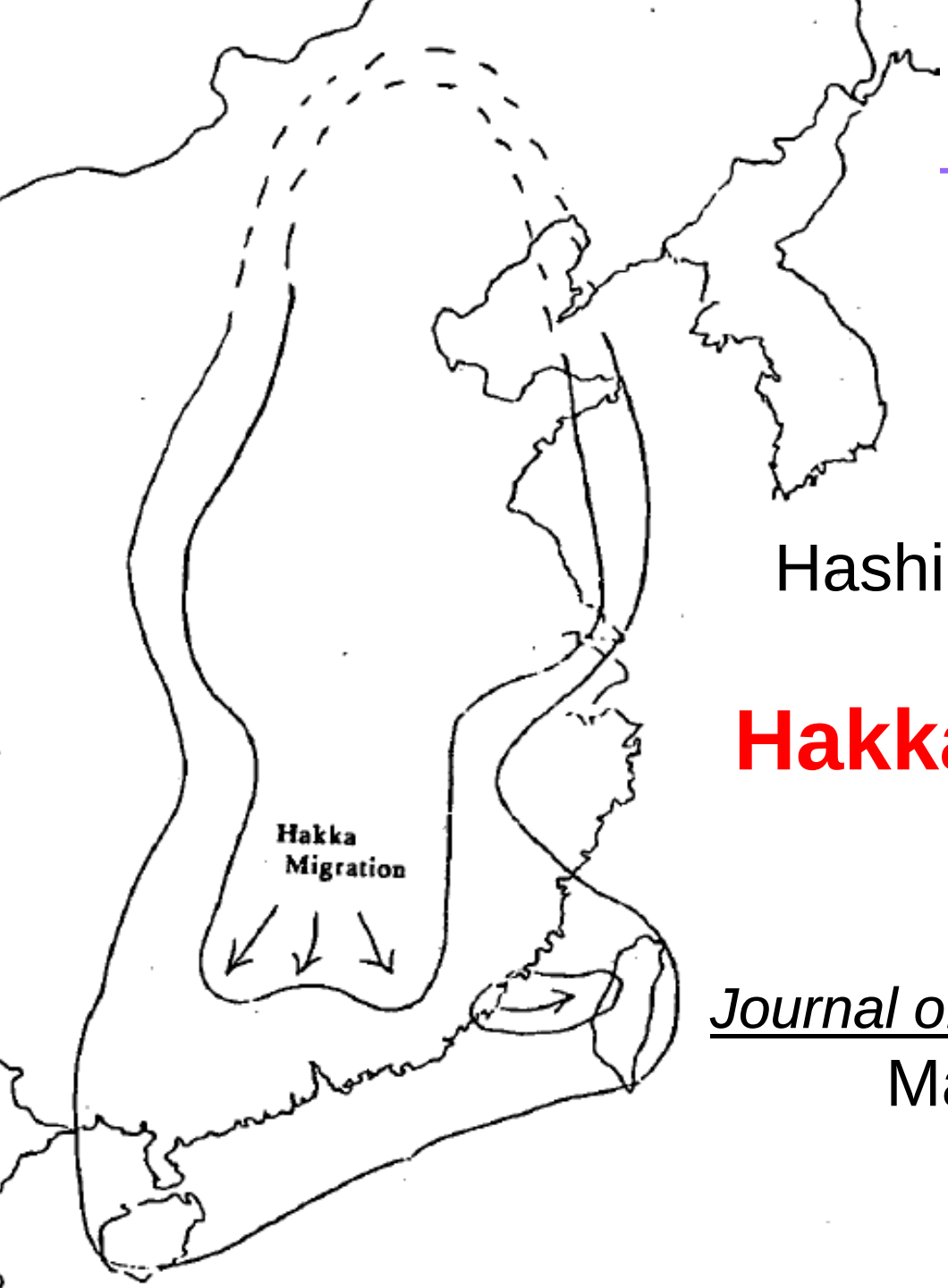
Figure 12.16

Genetic relationship and geographic distance. Each of the straight lines is interpolated from "kinship" values between pairs of villages (or higher administrative divisions) for a particular population. The kinship coefficient is a measure of genetic relationship (computed on the basis of gene frequencies) and is closely connected with the inbreeding coefficient F discussed in Chapter 11. (From J. S. Friedlaender, *Proceedings of the National Academy of Sciences*, vol. 68, pp. 704–707, 1971.)

Cavalli-Sforza, L.L. and W.S-Y.Wang. 1986.

Spatial distance and lexical replacement. Language 62.38-55.





Hashimoto, Mantaro J. 1992.

Hakka in Wellentheorie Perspective.

Journal of Chinese Linguistics 20.1-48.

Map 3: Nonaspirates.

Laryngeals in Indo-European.

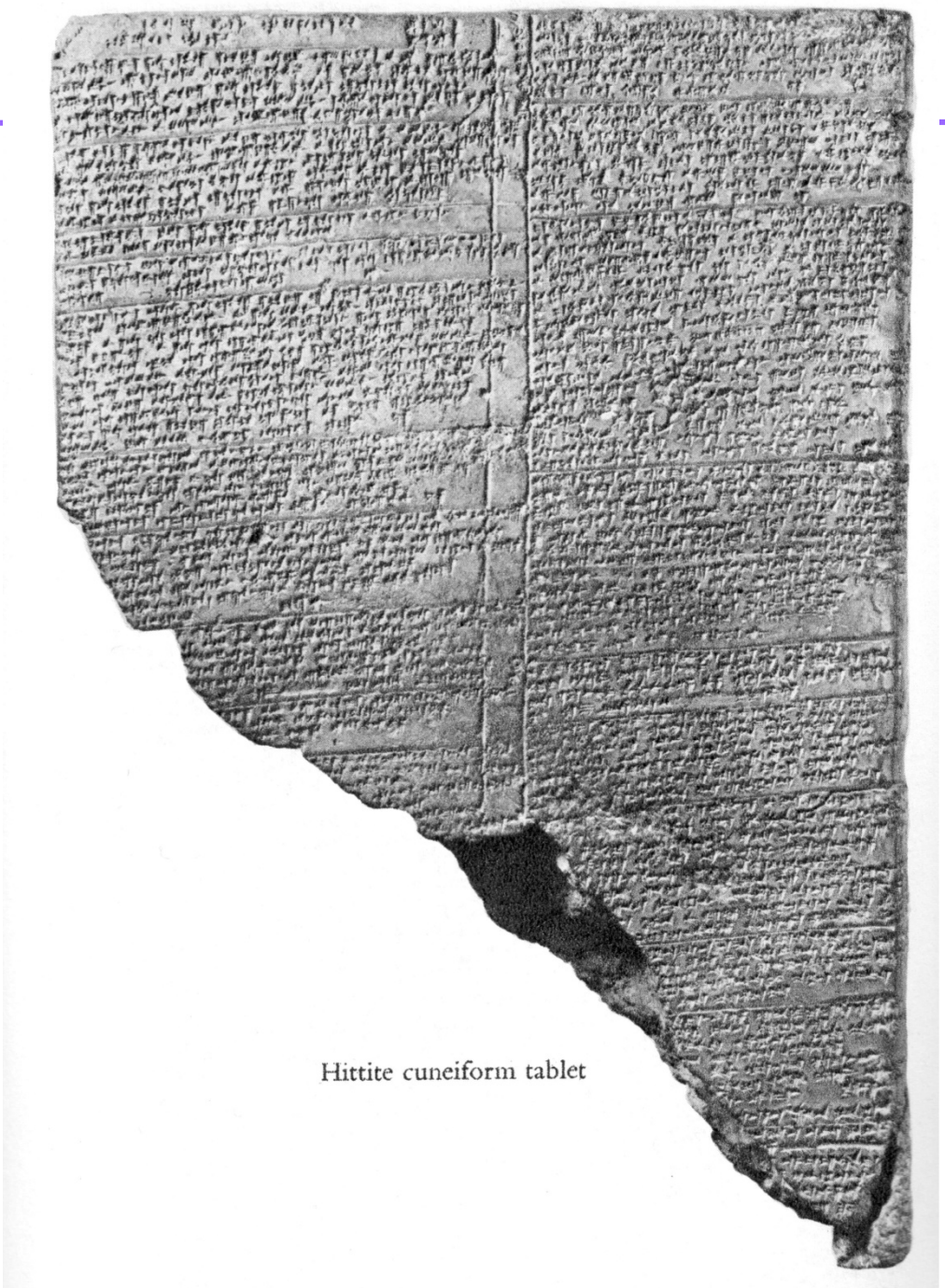
de Saussure, Ferdinand. 1879. *Mémoire sur le système primitif des voyelles dans les langues indoeuropéens*. Paris.

Hrozny, Bedrich. 1915. Die Lösung des hethitischen Problems. *Mitteilungen der Deutschen Orient-Gesellschaft* 56.17-50.

Kurylowicz, Jerzy. 1927. ə indoeuropéen et h hittite. *Symbolae Grammaticae in Honorem Ioannis Rozwadowski* 95-104. Krakow.

Koerner, E. F. Konrad. 1985. The place of Saussure's memoire in the development of historical linguistics. *Papers from the 6th International Conference on Historical Syntax* 323-46. J. Benjamins.

Ferdinand de Saussure
1857 - 1913


Hittite cuneiform tablet

Gurney, O. R.

The Hittites.

Penguin. 1952

The language is attested in cuneiform in records from the 16th down to the 13th century BCE.

Gloss	Actual	Saussure *1879*	Hittite *Kurylowicz 1927*
‘in front’	Greek: anti	*Aanti	ḫanti
‘while’	Greek: arges	*Aarges	ḫarkis
‘protect’	Latin: pāsco	*paAsk-	paḫsanzi

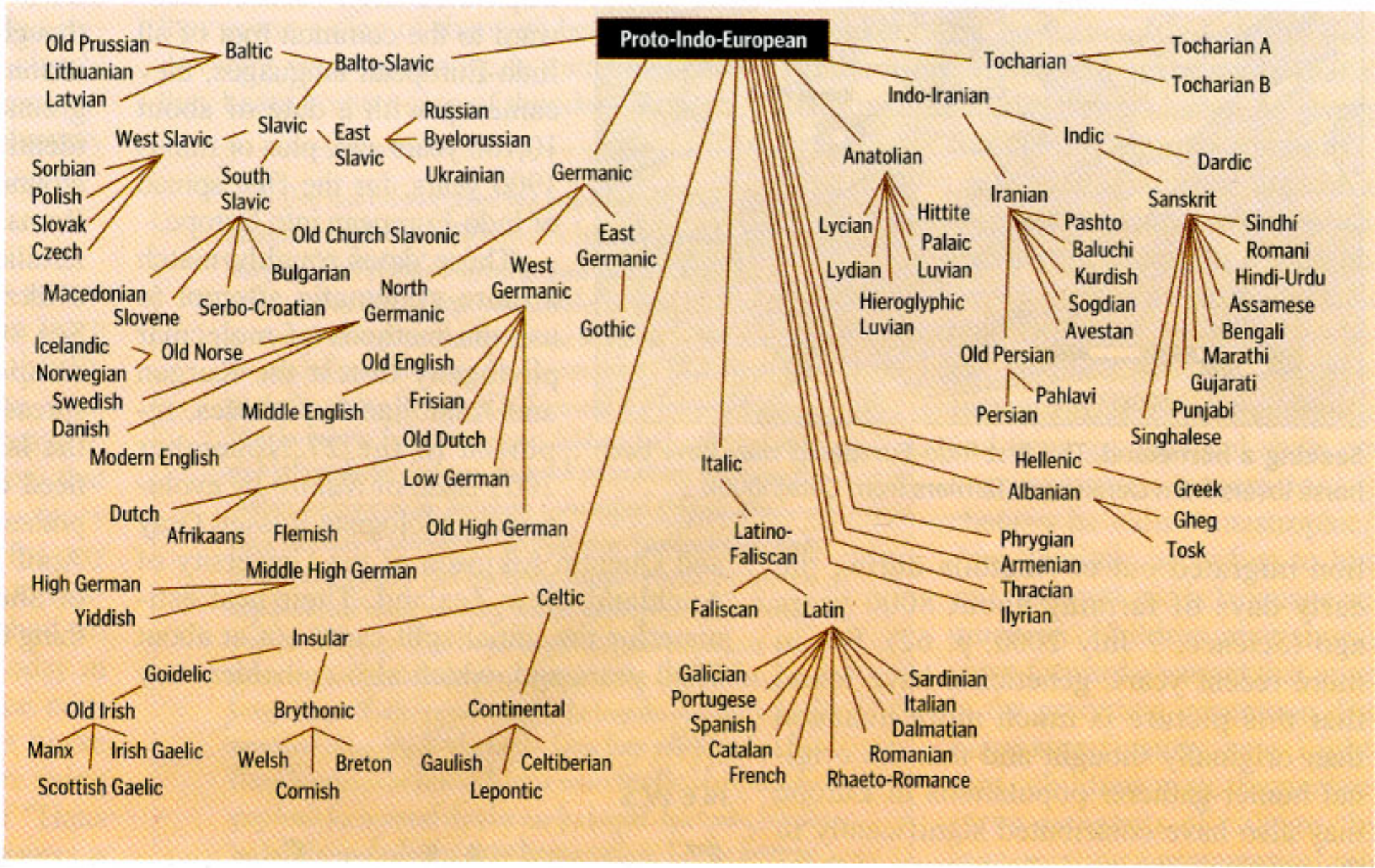
Adapted from Koerner, E. F. Konrad. 1985. The place of Saussure’s “Memoire” in the development of historical linguistics. 323-346 in Fisiak, J. ed. *Papers from the 6th International Conference on Historical Syntax*. Benjamins, p.339.

Mendeleev in St. Petersburg, Nov. 19, 1861

I	II	III	IV	V	VI	VII	VIII		
H 1.01									
Li 6.94	Be 9.01	B 10.8	C 12.0	N 14.0	O 16.0	F 19.0			
Na 23.0	Mg 24.3	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5			
K 39.1	Ca 40.1		Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7
Cu 63.5	Zn 65.4			As 74.9	Se 79.0	Br 79.9			
Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9		Ru 101	Rh 103	Pd 106
Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127			
Ce 133	Ba 137	La 139		Ta 181	W 184		Os 194	Ir 192	Pt 195
Au 197	Hg 201	Ti 204	Pb 207	Bi 209					
			Th 232		U 238				

Eka-Aluminum
= Gallium;
Eka-Silicon
= Germanium.

From Science Feb.27,2004.



Say it in Indo-European. The 144 languages of this family descend from one ancient mother tongue.

Blust, R. 2000.

Why lexicostatistics doesn‘t work: The ‘universal constant’ hypothesis and the Austronesian languages. 311-31.

Time depth in historical linguistics, ed. by C. Renfrew, A. McMahon & L.Trask, McDonald institute for Archaeological research, Cambridge.

Figure 13.1. *A lexicostatistical classification of the Austronesian languages. (After Dyen 1965.)*

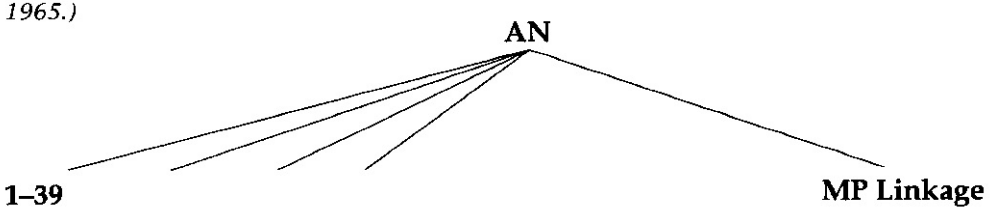
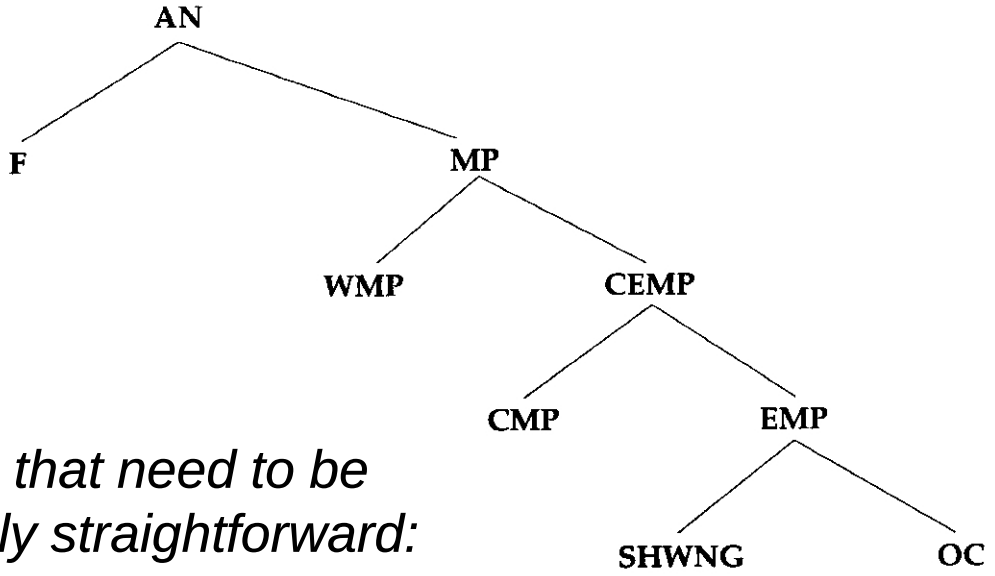


Figure 13.2. *The currently dominant view of the higher-level subgroups of Austronesian. (After Dahl 1976; Blust 1977; 1978; 1982; 1983/84a; 1999.)*



"Although there are complications that need to be addressed, the answer is relatively straightforward: ***lexicostatistics counts innovations and Retentions indiscriminately****, while it is a fundamental tenet of the Comparative Method that they be distinguished."*

G = Gondi

K = Konda

Ku = Kui

Kv = Kuvi

P = Pengo

M = Manda

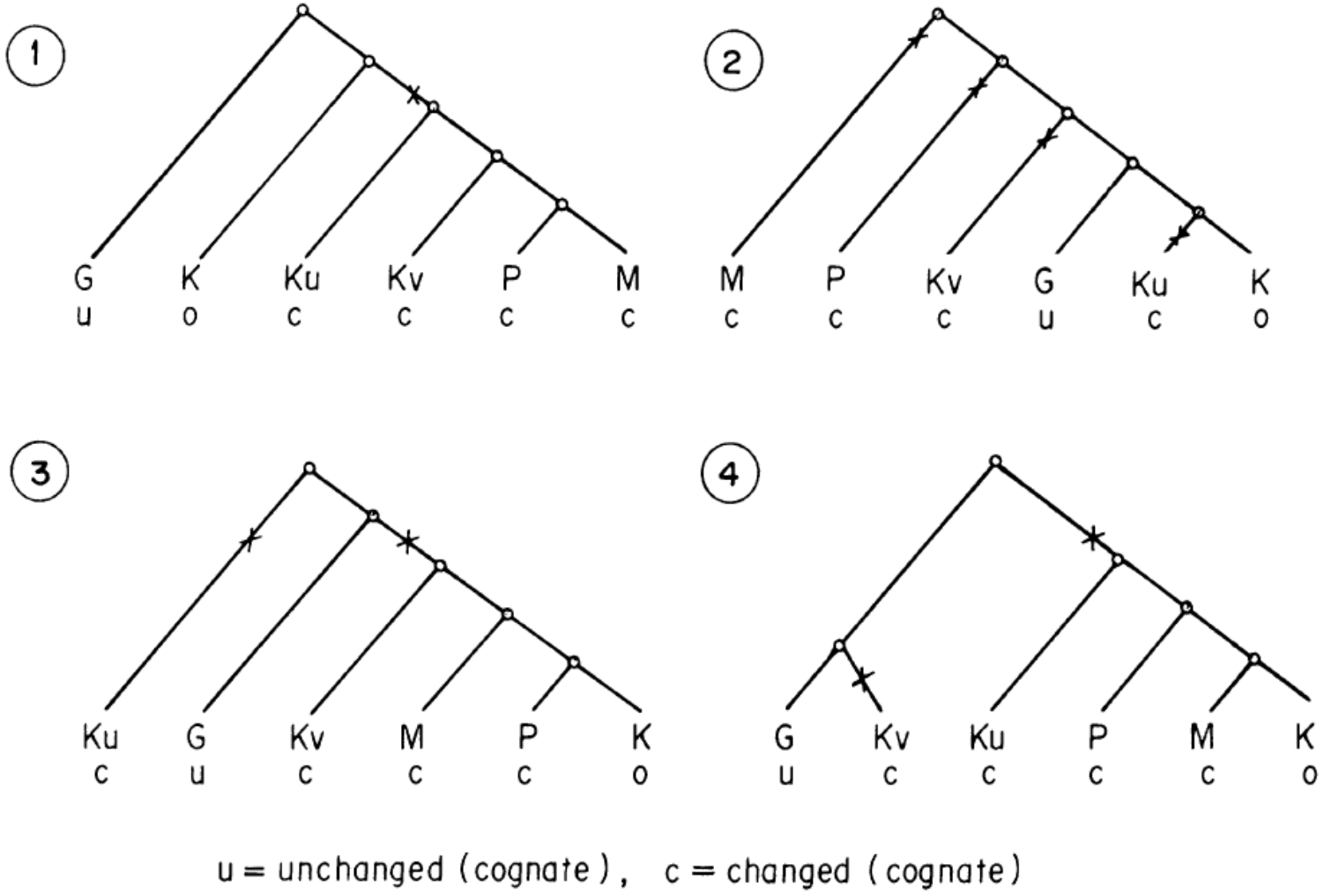
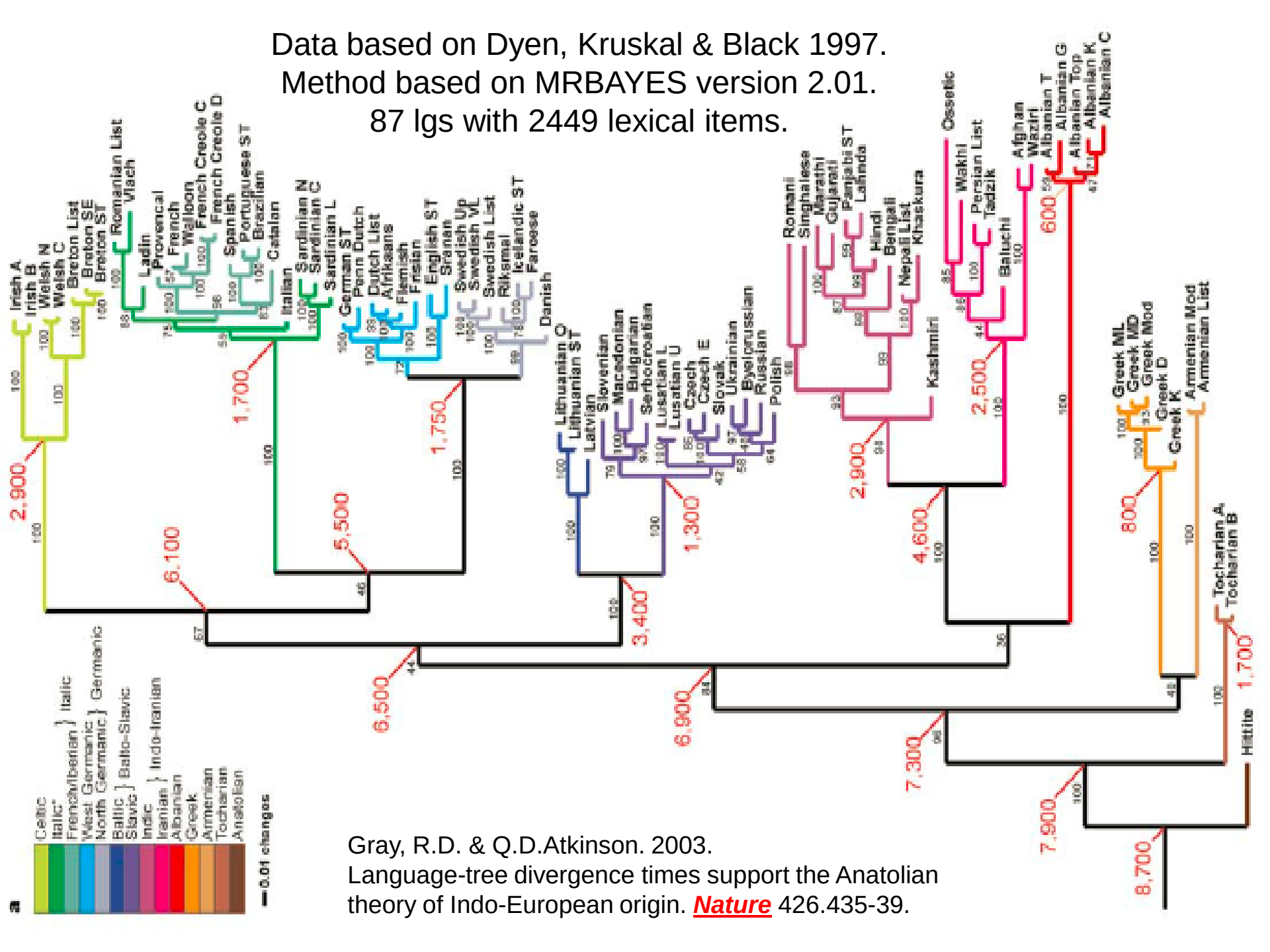


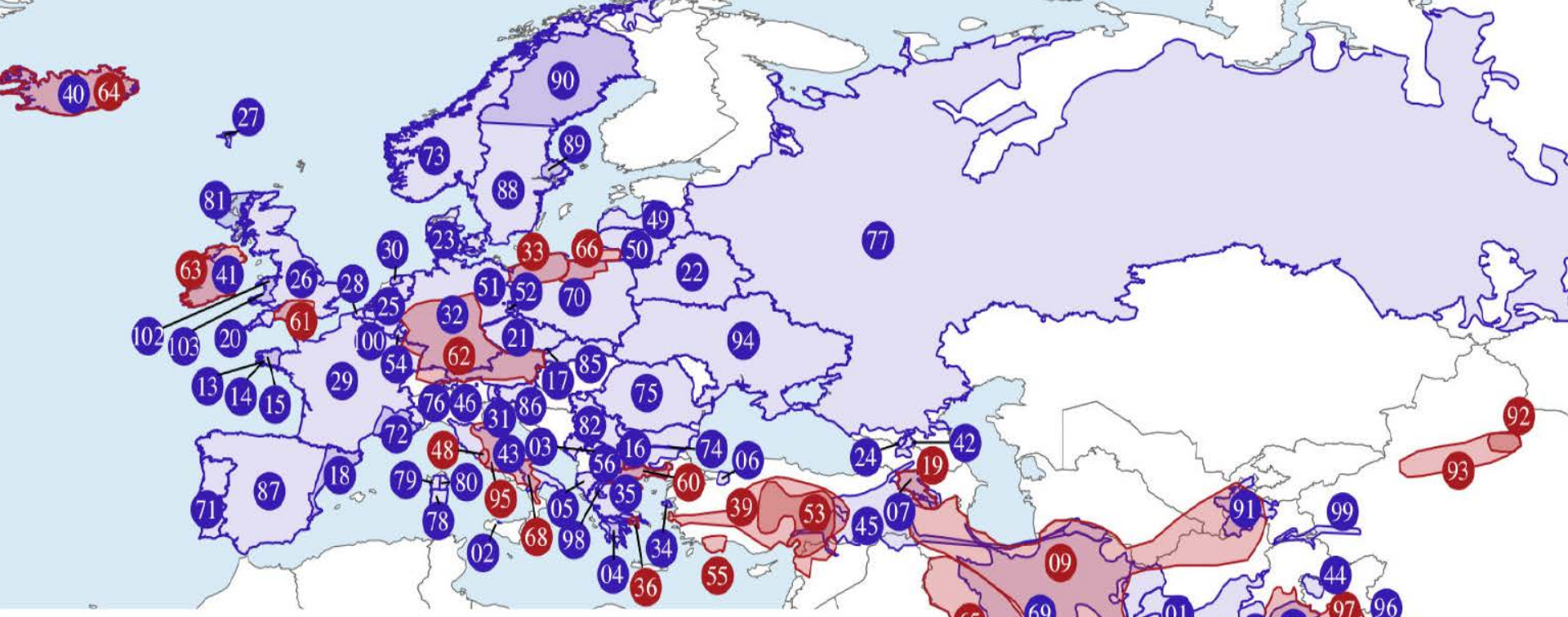
FIGURE 2. Four possible trees for *DED*(*S*) 4524.

Krishnamurti, Bh, Lincoln Moses & Douglas G. Danforth. 1983. Unchanged Cognates as a Criterion in Linguistic Subgrouping. *Language* 59.541-68.

Data based on Dyen, Kruskal & Black 1997.
Method based on MRBAYES version 2.01.
87 lgs with 2449 lexical items.



Gray, R.D. & Q.D.Atkinson. 2003.
Language-tree divergence times support the Anatolian theory of Indo-European origin. ***Nature*** 426.435-39.



1. Afghan
2. Albanian C
3. Albanian G
4. Albanian K
5. Albanian Top
6. Armenian List
7. Armenian Mod
8. Assamese
9. Avestan
10. Baluchi
11. Bengali
12. Bihari
13. Breton List
14. Breton SE
15. Breton ST
16. Bulgarian
17. Byelorussian
18. Catalan
19. Classical Armenian
20. Cornish
21. Czech
22. Czech E
23. Danish
24. Digor Ossetic
25. Dutch List
26. English ST
27. Faroese
28. Flemish
29. French
30. Frisian
31. Friulian
32. German ST
33. Gothic
34. Greek ML
35. Greek Mod
36. Ancient Greek
37. Gujarati
38. Hindi
39. Hittite
40. Icelandic ST
41. Irish_A
42. Iron Ossetic
43. Italian
44. Kashmiri
45. Kurdish
46. Ladin
47. Lahnda
48. Latin
49. Latvian
50. Lithuanian ST
51. Lusatian L
52. Lusatian U
53. Luvian
54. Luxembourgish
55. Lycian
56. Macedonian
57. Marathi
58. Marwari
59. Nepali List
60. Old Church Slavonic
61. Old English
62. Old High German
63. Old Irish
64. Old Norse
65. Old Persian
66. Old Prussian
67. Oriya
68. Oscan
69. Persian List
70. Polish
71. Portuguese ST
72. Provencal
73. Riksmal
74. Romani
75. Romanian List
76. Romansh
77. Russian
78. Sardinian C
79. Sardinian L
80. Sardinian N
81. Scots_Gaelic
82. Serbocroatian
83. Sindhi
84. Singhalese
85. Slovak
86. Slovenian
87. Spanish
88. Swedish List
89. Swedish Up
90. Swedish VL
91. Tadzik
92. Tocharian A
93. Tocharian B
94. Ukrainian
95. Umbrian
96. Urdu
97. Vedic Sanskrit
98. Vlach
99. Wakhi
100. Walloon
101. Waziri
102. Welsh C
103. Welsh N

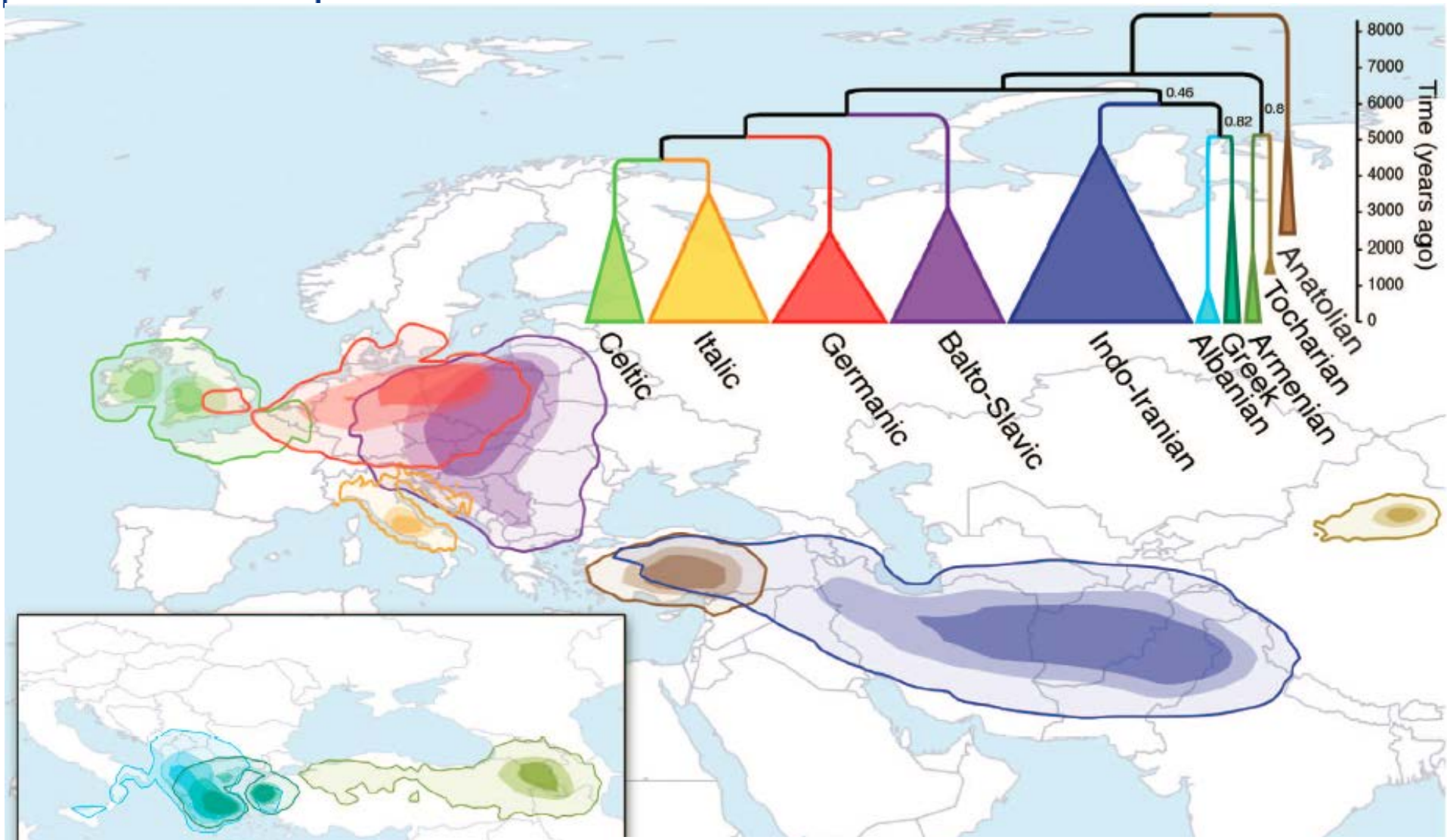
Bouckaert, R. et al. 2102 *Science*.

Science
AAAS

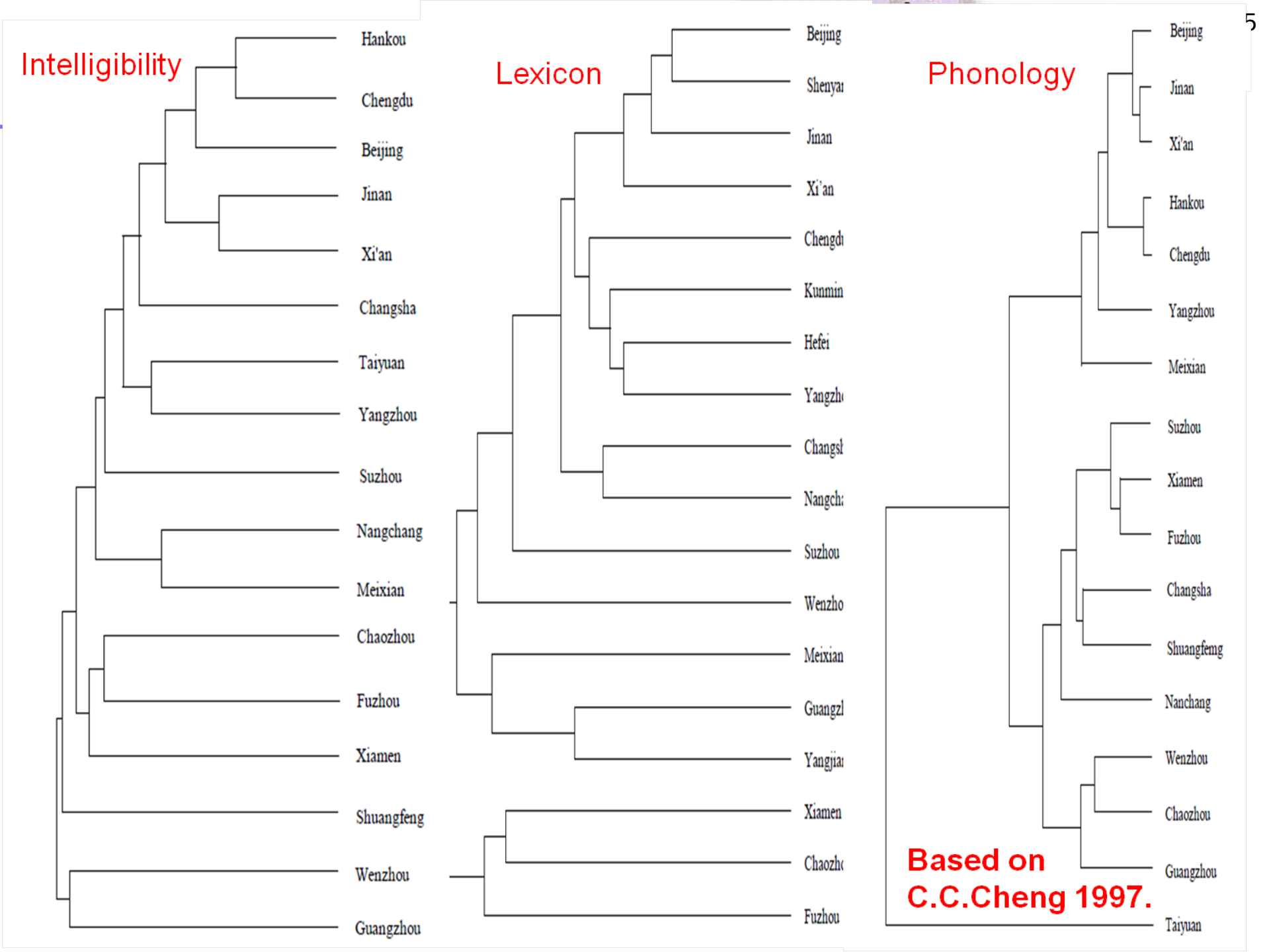
Mapping the Origins and Expansion of the Indo-European Language Family

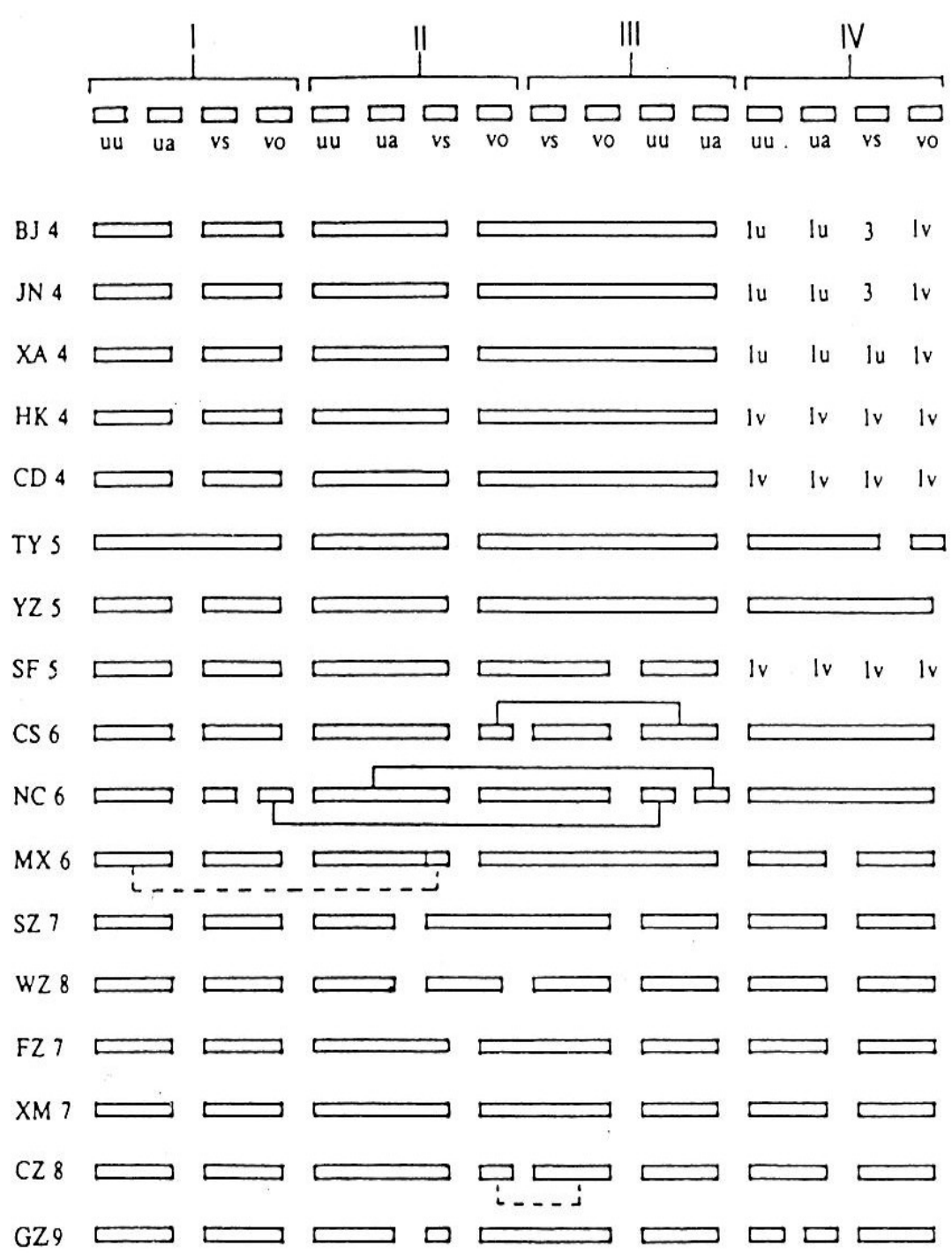
Remco Bouckaert *et al.*

Science **337**, 957 (2012);
DOI: 10.1126/science.1219669



Remco Bouckaert,[1] Philippe Lemey,[2] Michael Dunn,[3,4] Simon J. Greenhill,[5,6] Alexander V. Alekseyenko,[7] Alexei J. Drummond,[1,8] Russell D. Gray,[5,9] Marc A. Suchard,[10,11,12] Quentin D. Atkinson[5,13]*


Intelligibility
Hankou
Chengdu
Beijing
Jinan
Xi'an
Changsha
Taiyuan
Yangzhou
Suzhou
Nangchang
Meixian
Chaozhou
Fuzhou
Xiamen
Shuangfeng
Wenzhou
Guangzhou
Lexicon
Beijing
Shenyan
Jinan
Xi'an
Chengdu
Kunmin
Hefei
Yangzh
Changsh
Nangch
Suzhou
Wenzho
Meixian
Guangzh
Yangjia
Xiamen
Chaozh
Fuzhou
Phonology
Beijing
Jinan
Xi'an
Hankou
Chengdu
Yangzhou
Meixian
Suzhou
Xiamen
Fuzhou
Changsha
Shuangfeng
Nanchang
Wenzhou
Chaozhou
Guangzhou
Taiyuan
Based on
C.C.Cheng 1997.



Wang,W.S-Y. & C.C.Cheng

Middle Chinese tones in modern dialects.

In Honor of Ilse Lehiste

513-23,1987.

"From the point of view of the tree theorist, the exceptional preservation of M.C. tone I as a single category ... is probably due to the reversal of an earlier split which was initiated in Middle Chinese before it diverged into the six major dialect groups.... However, from the point of view of the wave theorist, it is also possible that the split of tone I began in M.C., but that areas showing unsplit tone I are simply conservative speech communities that somehow did not go along with the general trend."

* Hsieh, Hsin-I. 1973. A new method of dialect subgrouping. *Journal of Chinese Linguistics* 1.64-92.

* Wang, W.S-Y. 1987. A note on tone development. *Wang Li Memorial English volume*. 435-43. HK: Joint Publishing Co.

Ancestry of Peoples & Languages - 1

• As we probe more deeply into the ancestry of peoples, the situation becomes evermore complex. New fossils are discovered at far away places, as new and powerful methods become available for inferring the past from an ever enlarging data-base.

• Advances in epigenetics and in analyzing ancient DNA promise to yield much new knowledge on the ancestry of peoples, including their cognitive capacities and social behaviors. Such knowledge is essential for understanding how and when language emerged.

• Research on ancient hominins, their migrations, their interactions within and across populations offers another window for us to understand the deeper relations among the world's extinct as well as extant languages.

Ancestry of Peoples & Languages - 2

• Linguistics has long developed its own set of tools for studying language history and prehistory, including the comparative method, internal reconstruction, lexicostatistics, areal linguistics, etc. These tools have been applied unevenly to the world's languages, with the Indo-European languages leading the way.

• New methods for classification developed in biology can sometimes be usefully harnessed for linguistic questions, perhaps at first in the form of multidisciplinary collaborative research.

• Ancestry of peoples and ancestry of languages are distinct and complementary questions in biological evolution and cultural evolution respectively. Findings in these two areas must closely inform each other to their mutual benefit. Ultimately, the story of human evolution must be based on findings in both areas.

THANK YOU !

AND BEST WISHES TO ILAS FOR MANY DECADES TO COME !

wsywang@ee.cuhk.edu.hk