Bantu expansion

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The Bantu expansion refers to the demic diffusion underlying the spread of Bantu languages across central, eastern, and southern Africa. This entry reviews linguistic, genetic, and archaeological lines of evidence for the Bantu expansion, all of which lead back to the original homeland in West Africa, more specifically the border area of present-day Nigeria and Cameroon.

Bantu is Africa's most widespread language family but only a late development within Niger-Congo, the world's largest phylum (Eberhard, Simons, and Fennig 2022). Niger-Congo largely owes this ranking to the overly vast geographic distribution of Bantu. Within Niger-Congo, Bantu is part of Benue-Congo, whose other descendant languages are all spoken today in a compact area straddling southern Nigeria and western Cameroon (Good 2020). Southern Bantoid, consisting of Bantu's nearest relatives within Benue-Congo, is located in the same frontier zone (Watters 1989; Watters and Leroy 1989; Blench 2015; Marten 2020). Greenberg (1972) was the first to locate the Bantu homeland in this modern area of greatest internal divergence. Within Bantu itself, the highest diversity is also situated in the northwestern area. It is generally acknowledged that the Bantu languages from the Congo rainforest are more diverse among each other than those from the far more extensive savannas further east and south (Bastin, Coupez, and Mann 1999; Nurse and Philippson 2003; Philippson and Grollemund 2019; Grollemund *et al.* 2015; Koile *et al.* 2022). Linguistic heterogeneity thus decreases with distance from the homeland, a clear signal of expansion. Their close relatedness is no doubt the reason why Bantu languages were defined as a language family as early as the mid-nineteenth century CE (Bleek 1858). Distinguishing them from other languages is straightforward in the northwestern, northeastern, and southern Bantu frontier zones (Güldemann 2018). Telling them apart from their closest relatives in the homeland is much less clear-cut. No discrete cut-off point has been identified between Bantu and Bantoid or between so-called "Narrow Bantu" and "Wide Bantu" (Watters 2018). The definition of Narrow Bantu is contingent on Guthrie's non-genealogical inventory of the Bantu languages (Guthrie 1948, 1971).

Genetically, the prevalence of West African ancestry in present-day Bantu speakers' genomes across the continent endorses migration as the principal population dynamic behind the Bantu expansion (Tishkoff *et al.* 2009; de Filippo *et al.* 2012; Pickrell *et al.* 2012; Schlebusch *et al.* 2012; Li, Schlebusch, and Jakobsson 2014; Schlebusch and Jakobsson 2018). Exceptional are relic forager groups in the Congo rainforest who speak Bantu languages but are predominantly of local central African ancestry (Verdu *et al.* 2009; Patin *et al.* 2017; Breton, Fortes-Lima, and Schlebusch 2021). They shifted to Bantu languages at some point in time to the detriment of their original languages (Bahuchet 2012). Another clear signal of demic diffusion is decreasing diversity in the West African genetic component the further one gets away from West Africa (Semo *et al.* 2020; Tallman *et al.* 2022; Fortes-Lima *et al.* 2023). A last line of genetic evidence corroborating a relatively recent demic expansion, though one that still needs more data, is the total absence of West African ancestry amongst the earliest existing ancient DNA (aDNA) samples from what is today Bantu-speaking Africa, i.e., since ∼3900 years ago. All of them are more closely related with modern remnant forager groups in central, eastern, and southern Africa (Schlebusch *et al.* 2017; Skoglund *et al.* 2017; Prendergast *et al.* 2019; Wang *et al.* 2020). For now, the oldest aDNA samples of West African origin in Bantu-speaking Africa come from Pemba Island in Tanzania and are not older than ∼600 years (Prendergast *et al.* 2019).

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Older aDNA data of western African origin are likely to be discovered soon.

The earliest archaeological evidence for a demic diffusion with possible roots in West Africa comes from the Congo rainforest. Several central African sites with a comparable material culture testify to the emergence of a more sedentary way of life from ∼3000 years ago. The equatorial rainforest experienced at that time a significant rise in settlements with large refuse pits that often hold large quantities of pottery and residues of plants such as *Elaeis guineensis* and *Canarium schweinfurthii*, pointing to an intensified exploitation of the natural environment. Only from ∼2500 years ago onward do such sites also yield evidence for metallurgy. This new cultural complex, which spread across the Congo rainforest in less than a millenium, is unmistakabily different from that of preexisting rainforest foragers. It is therefore widely seen as the archaeological signature of the region's first colonization by Bantu speakers (de Maret 1994–5, 2013; Russell, Silva, and Steele 2014; Bostoen *et al.* 2015; Bostoen 2018; Seidensticker *et al.* 2021). It likely originated in the area where linguists situate the Bantu homeland. The archaeological record of the Shum Laka rock shelter in Cameroon's Grassfields region is the most telling in this regard (de Maret 2013; Lavachery 2001). A new industry consisting of pottery, large blades, and bifacial tools of basalt begins to appear there ∼7000 to 6000 years ago, and signals the advent of a new lifestyle that became predominant ∼5000 to 4000 years ago. It gradually replaced older foraging lifeways represented by microlithic quartz tools. Of four children buried at Shum Laka, two ∼8000 and two ∼3000 years ago, aDNA was identified as most closely related to the modern DNA of foragers from western Central Africa (Lipson *et al.* 2020). They probably belonged to local foragers present at Shum Laka since 30,000 years ago (Cornelissen 2003). The innovative technology slowly superseding their hunting equipment has been tentatively linked with the introduction of a more sedentary lifestyle by immigrants from further north (Lavachery 2001; de Maret 2013), possibly Benue-Congo speakers (Bostoen 2007). South of the Bantu homeland, this new lifeway first emerges ∼3500–3000 years ago around Yaoundé (de Maret 1982, 1992). The archaeological record of eastern and southern Africa also testifies to a demic diffusion that has been linked with the initial spread of Bantu speakers. The Urewe Early Iron Age industry, which appeared in the Great Lakes region ∼2500 years ago (Ashley 2010; Clist 1987), is generally seen as the Bantu expansion's kick-off east of the Congo rainforest, but see Grollemund, Schoenbrun, and Vansina (2023) for a recent alternative proposal according to which the earliest users of Urewe ware would not have been Bantu speakers. This novel cultural complex would be ancestral to several Early Iron Age traditions further south and the archaeological backdrop of the first Bantu speakers in East Africa (Phillipson 1985). It reached southern Africa in the first centuries CE (Pikirayi 2009; Mitchell 2013; Soper 1971; Phillipson 2005; Sinclair 1991). It is poorly understood whether and how Urewe and descendant traditions in eastern and southern Africa are linked with the spread of early settlements in the Congo rainforest.

Despite the many remaining gaps in our knowledge and existing incongruities between genetics, linguistics, and archaeology, data from the three fields concur in showing that the Bantu expansion was a demic diffusion, which transformed Africa's linguistic, cultural, and demographic landscape. Even if uncertainty remains about the precise pathways and dynamics of dispersal, Bantu languages apparently spread from their homeland region to southern Africa in roughly two millennia. Such a rapid and huge expansion is exceptional for several reasons. First, it contrasts with the dispersal pace and range of the remainder of Niger-Congo. The modern Niger-Congo territory beyond Bantu is between a half and a third of that of Bantu alone. Its time-depth is estimated at 12 to 10 millennia (Blench 2006). Hence, the spread of Niger-Congo during

the first 8000 to 6000 years of its existence was significantly much slower and less extensive than that of Bantu. Second, the spread of Niger-Congo before the Bantu expansion mainly had a latitudinal orientation, as with most demic diffusions and other spreads of biological species, because migration from east to west or west to east involves less change in climate, rainfall, day length, and diseases of crops and livestock, and thus less adjustment to new ecologies (Crosby 1986; Diamond 1997; Diamond and Bellwood 2003; Ramachandran and Rosenberg 2011). The Bantu expansion, however, had a predominantly north–south axis and required migration and settlement across the Congo rainforest, in between the Sudanian savanna belt where the Bantu homeland is located and the Zambezian savanna belt which hosts most current-day Bantu speakers. Even if a climate-driven shrinking of the Congo rainforest between 4000 and 2500 years ago may have boosted the Bantu expansion (Maley 1992; Schwartz 1992; Oslisly *et al*. 2013; Bostoen *et al*. 2015; Grollemund *et al*. 2015), its mostly longitudinal orientation remains unusual. Third, the speed and amplitude of the Bantu expansion are remarkable because it was initially not driven by agriculture, in contrast to what often is claimed (Diamond and Bellwood 2003; Phillipson 2003; Russell, Silva, and Steele 2014). The oldest available evidence for food production is much younger than the Bantu expansion's assumed start and situated south of the homeland (Neumann 2005; Eggert *et al*. 2006; Kahlheber, Höhn, Neumann 2014; Wotzka 2019; Bostoen 2020; Cagnato *et al*. 2022; Neumann, Eichhorn, and Wotzka 2022). The earliest Bantu speakers in the Congo rainforest rather had a lifestyle situated toward the foragers' side of the "middle ground," i.e. "the large transitional zone in the continuum between hunter-gatherers on the one hand and agriculturalists largely depending on domesticated crops on the other" (Neumann 2005). Even in the Great Lakes region, the first Bantu speakers ∼2500 years ago did not depend on domesticated plants as their principal subsistence. Archaeological evidence for West African crops such as pearl millet and cow pea only shows up several centuries later (Giblin and Fuller 2011; Crowther *et al*. 2014, 2016, 2018). East African savanna crops such as sorghum and native finger millet are initially more important (Robertson 2010; Giblin and Fuller 2011; Crowther *et al*. 2018; Mueller *et al*. 2022). Pastoralism significantly predates the Bantu expansion, i.e., from ∼4000 years ago onward, in both eastern Africa (Phillipson 1975, 2005; Katanekwa 1979; Lane 2004; Huffman 2007; House *et al*. 2021) and southern Africa (Güldemann 2008; Breton *et al*. 2014; Macholdt *et al*. 2014).

SEE ALSO: African furnaces, smelting, refining, and smithing; Agriculture, Central African forests; Ancient DNA; Climate change, Congo Basin; Climate change, lacustrine zone; East African coast; Hunting and foraging, Central Africa; Iron in Africa; Kilwa Kisiwani; Oil palm; Pearl millet; Population movement, Southern Africa; Upemba Depression.

REFERENCES AND SUGGESTED READINGS

Ashley, C. (2010) "Towards a socialised archaeology of ceramics in Great Lakes Africa." *African Archaeological Review* 27: 135–63.

Bahuchet, S. (2012) "Changing language, remaining Pygmy." *Human Biology* 84: 11–43.

Bastin, Y., Coupez, A., and Mann, M. (1999) *Continuity and divergence in the Bantu languages: perspectives from a lexicostatistic study*. Tervuren.

Bleek, W. H. I. (1858) *The library of His Excellency Sir George Grey, K.C.B. Philology, vol. I — part I. South Africa (within the limits of British influence)*. London.

Blench, R. (2006) *Archaeology, language and the African past*. Lanham.

Blench, R. (2015) [online] [Accessed July 11, 2023.] "The Bantoid languages." In *Oxford handbook topics in linguistics*. Oxford. Oxford Handbooks Online. Available from http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199935345.001.0001/oxfordhb-9780199935345-e-17.

Bostoen, K. (2007) "Pots, words and the Bantu problem: on lexical reconstruction and early African history." *Journal of African History* 48: 173–99.

Bostoen, K. (2018) [online] [Accessed July 11, 2023.] "The Bantu expansion." In T. Spear, ed., *The Oxford encyclopedia of African historiography*. Oxford. Oxford Research Encyclopedias Online. Available from https://global.oup.com/academic/product/the-oxford-encyclopedia-of-african-historiography-methods-and-sources-9780190698706?q=bostoen&lang=en&cc=us#.

Bostoen, K. (2020) "The Bantu expansion: some facts and fiction." In M. Crevels and P. Muysken, eds., *Language dispersal, diversification, and contact*: 227–39. Oxford.

Bostoen, K., Clist, B., Doumenge, C., Grollemund, R. *et al*. (2015) "Middle to Late Holocene paleoclimatic change and the early Bantu expansion in the rain forests of west central-Africa." *Current Anthropology* 56: 354–84.

Breton, G., Fortes-Lima, C. A., and Schlebusch, C. M. (2021) "Revisiting the demographic history of Central African populations from a genetic perspective." *Human Population Genetics and Genomics* 1: 0004. https://doi.org/10.47248/hpgg2101010004.

Breton, G., Schlebusch, C. M., Lombard, M., Sjödin, P. *et al*. (2014) "Lactase persistence alleles reveal partial East African ancestry of southern African Khoe pastoralists." *Current Biology* 24: 852–8.

Cagnato, C., Nlend, P., Ngouoh, F., Oslisly, R., and de Saulieu, G. (2022) "Analysis of Early Iron Age (2500 BP) and modern period (150 BP) starch grains in western Central Africa." *Scientific Reports* 12: 18956.

Clist, B. (1987) "A critical reappraisal of the chronological framework of the early Urewe Iron Age industry." *Muntu* 6: 35–62.

Cornelissen, E. (2003) "On microlithic quartz industries at the end of the Pleistocene in Central Africa: the evidence from Shum Laka (NW Cameroon)." *African Archaeological Review* 20: 1–24.

Crosby, A. W. (1986) *Ecological imperialism: the biological expansion of Europe, 900–1900*. Cambridge.

Crowther, A., Faulkner, P., Prendergast, M. E., Quintana Morales, E. M. *et al*. (2016) "Coastal subsistence, maritime trade, and the colonization of small offshore islands in eastern African prehistory." *The Journal of Island and Coastal Archaeology* 11: 211–37.

Crowther, A., Horton, M., Kotarba-Morley, A., Prendergast, M. *et al*. (2014) "Iron Age agriculture, fishing and trade in the Mafia Archipelago, Tanzania: new evidence from Ukunju Cave." *Azania: Archaeological Research in Africa* 49: 21–44.

Crowther, A., Prendergast, M. E., Fuller, D. Q., and Boivin, N. (2018) "Subsistence mosaics, forager–farmer interactions, and the transition to food production in eastern Africa." *Quaternary International* 489: 101–20.

de Filippo, C., Bostoen, K., Stoneking, M., and Pakendorf, B. (2012) "Bringing together linguistic and genetic evidence to test the Bantu expansion." *Proceedings of the Royal Society B (Biological Sciences)* 279: 3256–63.

de Maret, P. (1982) "New survey of archaeological research and dates for west-central and north-central Africa." *Journal of African History* 23: 1–15.

de Maret, P. (1992) "Sédentarisation, agriculture et métallurgie du Sud-Cameroun: synthèse des recherches depuis 1978." In J. M. Essomba, ed., *L'archéologie au Cameroun: actes du premier colloque international de Yaoundé, 6–9 janvier 1986*: 247–62. Paris.

de Maret, P. (1994–5) "Pits, pots and the far west streams." *Azania* 29–30: 318–23.

de Maret, P. (2013) "Archaeologies of the Bantu expansion." In P. Mitchell and P. Lane, eds., *Oxford handbook of African archaeology*: 319–28. Oxford.

Diamond, J. (1997) *Guns, germs, and steel: the fates of human societies*. New York.

Diamond, J., and Bellwood, P. (2003) "Farmers and their languages: the first expansions." *Science* 300: 597–603.

Eberhard, D. M., Simons, G. F., and Fennig, C. D., eds. (2022) *Ethnologue: languages of the world*, 25th ed. Dallas. Online version at http://www.ethnologue.com.

Eggert, M. K. H., Höhn, A., Kahlheber, S., Meister, C. *et al*. (2006) "Pits, graves and grains: archaeological and archaeobotanical research in southern Cameroon." *Journal of African Archaeology* 4: 273–98.

Fortes-Lima, C. A., Burgarella, C., Hammarén, R., Eriksson, A. *et al*. (2023) "The genetic legacy of the expansion of Bantu-speaking peoples in Africa." *bioRxiv*: 2023.2004.2003.535432.

Giblin, J. D., and Fuller, D. Q. (2011) "First and second millennium AD agriculture in Rwanda: archaeobotanical finds and radiocarbon dates from seven sites." *Vegetation History and Archaeobotany* 20: 253–65.

Good, J. (2020) "Niger-Congo, with a special focus on Benue-Congo." In R. Vossen and G. J. Dimmendaal, eds., *Oxford handbook of African languages*: 139–60. Oxford.

Greenberg, J. H. (1972) "Evidence regarding Bantu origins." *Journal of African Languages and Linguistics* 13: 189–216.

Grollemund, R., Branford, S., Bostoen, K., Meade, A. *et al.* (2015) "Bantu expansion shows that habitat alters the route and pace of human dispersals." *Proceedings of the National Academy of Sciences of the United States of America* 112: 13296–301.

Grollemund, R., Schoenbrun, D., and Vansina, J. (2023) "Moving histories: Bantu language expansions, eclectic economies, and mobilities." *Journal of African History* 64: 13–37.

Güldemann, T. (2008) "A linguist's view: Khoe-Kwadi speakers as the earliest food-producers of southern Africa." *Southern African Humanities* 20: 93–132.

Güldemann, T. (2018) "Areal linguistics beyond contact, and linguistic areas of Afrabia." In G. Tom, ed., *The languages and linguistics of Africa*: 448–545. Berlin.

Guthrie, M. (1948) *The classification of the Bantu languages*. London.

Guthrie, M. (1971) *Comparative Bantu: an introduction to the comparative linguistics and prehistory of the Bantu languages*, vol. 2: *Bantu prehistory, inventory and indexes*. Farnborough.

House, M., Sealy, J., Chirikure, S., and le Roux, P. (2021) "Investigating cattle procurement at Great Zimbabwe using 87Sr/86Sr." *Journal of African Archaeology* 19: 146–58.

Huffman, T. N. (2007) *Handbook to the Iron Age: the archaeology of pre-colonial farming societies in southern Africa*. Pietermaritzburg.

Kahlheber, S., Höhn, A., and Neumann, K. (2014) "Plant and land use in southern Cameroon 400 BCE–400 CE." In C. J. Stevens, S. Nixon, M. A. Murray, and D. Q. Fuller, eds., *Archaeology of African plant use*: 113–28. Walnut Creek.

Katanekwa, N. M. (1979) "Namakala and Nanga sites and the chronology of the early Iron Age in southern and south-west Zambia." *The South African Archaeological Bulletin* 34: 120–2.

Koile, E., Greenhill, S. J., Blasi, D. E., Bouckaert, R., and Gray, R. D. (2022) "Phylogeographic analysis of the Bantu language expansion supports a rainforest route." *Proceedings of the National Academy of Sciences of the United States of America* 119: e2112853119.

Lane, P. (2004) "The 'moving frontier' and the transition to food production in Kenya." *Azania* 39: 243–64.

Lavachery, P. (2001) "The Holocene archaeological sequence of Shum Laka rock shelter (Grassfields, Cameroon)." *African Archaeological Review* 18: 213–47.

Li, S., Schlebusch, C., and Jakobsson, M. (2014) "Genetic variation reveals large-scale population expansion and migration during the expansion of Bantu-speaking peoples." *Proceedings of the Royal Society B (Biological Sciences)* 281: 20141448.

Lipson, M., Ribot, I., Mallick, S., Rohland, N. *et al.* (2020) "Ancient West African foragers in the context of African population history." *Nature* 577: 665–70.

Macholdt, E., Lede, V., Barbieri, C., Mpoloka, S. W. *et al.* (2014) "Tracing pastoralist migrations to southern Africa with lactase persistence alleles." *Current Biology* 24: 875–9.

Maley, J. (1992) "Mise en évidence d'une péjoration climatique entre ca 2500 et 2000 ans BP en Afrique tropicale humide." *Bulletin de la Société Géologique de France* 163: 363–5.

Marten, L. (2020) "Bantu and Bantoid." In R. Vossen and G. J. Dimmendaal, eds., *Oxford handbook of African languages*: 205–19. Oxford.

Mitchell, P. (2013) "Early farming communities of southern and south-central Africa." In P. Mitchell and P. Lane, eds., *Oxford handbook of African archaeology*: 657–70. Oxford.

Mueller, N. G., Goldstein, S. T., Odeny, D., and Boivin, N. (2022) "Variability and preservation biases in the archaeobotanical record of *Eleusine coracana* (finger millet): evidence from Iron Age Kenya." *Vegetation History and Archaeobotany* 31: 279–90.

Neumann, K. (2005) "The romance of farming: plant cultivation and domestication in Africa." In A. B. Stahl, ed., *African archaeology: a critical introduction*: 249–75. Malden, MA.

Neumann, K., Eichhorn, B., and Wotzka, H.-P. (2022) "Iron Age plant subsistence in the Inner Congo Basin (DR Congo)." *Vegetation History*

and Archaeobotany 31: 481–509. https://doi.org/10.1007/s00334-021-00865-8.

Nurse, D., and Philippson, G. (2003) "Towards a historical classification of the Bantu languages." In D. Nurse and G. Philippson, eds., *The Bantu languages*: 164–81. London.

Oslisly, R., White, L., Bentaleb, I., Favier, C. *et al.* (2013) "Climatic and cultural changes in the West Congo Basin forests over the past 5000 years." *Philosophical Transactions of the Royal Society of London. Series B* 368: 20120304.

Patin, E., Lopez, M., Grollemund, R., Verdu, P. *et al.* (2017) "Dispersals and genetic adaptation of Bantu-speaking populations in Africa and North America." *Science* 356: 543–6.

Phillipson, D. (1975) "The chronology of the Iron Age in Bantu Africa." *The Journal of African History* 16: 321–42.

Phillipson, D. W. (1985) "An archaeological reconsideration of Bantu expansion." *Muntu* 2: 69–84.

Phillipson, D. W. (2003) "Language and farming dispersals in sub-Saharan Africa, with particular reference to the Bantu-speaking peoples." In P. Bellwood and C. Renfrew, eds., *Examining the farming/language dispersal hypothesis*: 177–87. Cambridge.

Phillipson, D. W. (2005) *African archaeology*. Cambridge.

Philippson, G., and Grollemund, R. (2019) "Classifying Bantu languages." In M. Van de Velde, K. Bostoen, D. Nurse, and G. Philippson, eds., *The Bantu languages*, 2nd ed.: 335–54. Oxford.

Pickrell, J. K., Patterson, N., Barbieri, C., Berthold, F. *et al.* (2012) "The genetic prehistory of southern Africa." *Nature Communications* 3: 1143. https://doi.org/10.1038/ncomms2140.

Pikirayi, I. (2009) "The archaeology of sub-Saharan Africa." In C. Gosden, B. Cunliffe, and R. A. Joyce, eds., *The Oxford handbook of archaeology*: 723–62. Oxford.

Prendergast, M. E., Lipson, M., Sawchuk, E. A., Olalde, I. *et al.* (2019) "Ancient DNA reveals a multistep spread of the first herders into sub-Saharan Africa." *Science* 365: eaaw6275.

Ramachandran, S., and Rosenberg, N. A. (2011) "A test of the influence of continental axes of orientation on patterns of human gene flow." *American Journal of Physical Anthropology* 146: 515–29.

Robertson, J. H. (2010) "Early Iron Age archaeology in central Zambia." *Azania* 35: 147–82.

Russell, T., Silva, F., and Steele, J. (2014) "Modelling the spread of farming in the Bantu-speaking regions of Africa: an archaeology-based phylogeography." *PLoS ONE* 9: e87854.

Schlebusch, C. M., and Jakobsson, M. (2018) "Tales of human migration, admixture, and selection in Africa." *Annual Review of Genomics and Human Genetics* 19: 405–28.

Schlebusch, C. M., Malmström, H., Günther, T., Sjödin, P. *et al.* (2017) "Southern African ancient genomes estimate modern human divergence to 350,000 to 260,000 years ago." *Science* 358: 652–5.

Schlebusch, C. M., Skoglund, P., Sjödin, P., Gattepaille, L. M. *et al.* (2012) "Genomic variation in seven Khoe-San groups reveals adaptation and complex African history." *Science* 338: 374–9.

Schwartz, D. (1992) "Assèchement climatique vers 3000 BP et expansion bantu en Afrique centrale atlantique: quelques réflexions." *Bulletin de la Societé Géologique de France* 163: 353–61.

Seidensticker, D., Hubau, W., Verschuren, D., Fortes-Lima, C. *et al.* (2021) "Population collapse in Congo rainforest from 400 CE urges reassessment of the Bantu expansion." *Science Advances* 7: eabd8352.

Semo, A., Gayà-Vidal, M., Fortes-Lima, C., Alard, B. *et al.* (2020) "Along the Indian Ocean coast: genomic variation in Mozambique provides new insights into the Bantu expansion." *Molecular Biology and Evolution* 37: 406–16.

Sinclair, P. (1991) "Archaeology in eastern Africa: an overview of current chronological issues." *Journal of African History* 32: 179–219.

Skoglund, P., Thompson, J. C., Prendergast, M. E., Mittnik, A. *et al.* (2017) "Reconstructing prehistoric African population structure." *Cell* 171: 59–71.e21.

Soper, R. C. (1971) "A general review of the Early Iron Age of the southern half of Africa." *Azania* 6: 5–38.

Tallman, S., das Dores Sungo, M., Saranga, S., and Beleza, S. (2022) "Whole-genome sequencing of Bantu-speakers from Angola and Mozambique reveals complex dispersal patterns and interactions throughout sub-Saharan Africa." *bioRxiv*: 2022.02.07.478793. https://doi.org/10.1101/2022.02.07.478793.

Tishkoff, S. A., Reed, F. A., Friedlaender, F. R., Ehret, C. *et al.* (2009) "The genetic structure and history of Africans and African Americans." *Science* 324: 1035–44.

Verdu, P., Austerlitz, F., Estoup, A., Vitalis, R. *et al*. (2009) "Origins and genetic diversity of Pygmy hunter-gatherers from western Central Africa." *Current Biology* 19: 312–18.

Wang, K., Goldstein, S., Bleasdale, M., Clist, B. *et al*. (2020) "Ancient genomes reveal complex patterns of population movement, interaction, and replacement in sub-Saharan Africa." *Science Advances* 6: eaaz0183.

Watters, J. (1989) "Bantoid overview." In J. Bendor-Samuel and R. L. Hartell, eds., *The Niger-Congo languages: a classification and description of Africa's largest language family*: 401–20. Lanham.

Watters, J. (2018) "East Benue-Congo." In J. R. Watters, ed., *East Benue-Congo: nouns, pronouns, and verbs*: 1–25. Berlin.

Watters, J., and Leroy, J. (1989) "Southern Bantoid." In J. Bendor-Samuel and R. L. Hartell, eds., *The Niger-Congo languages: a classification and description of Africa's largest language family*: 431–49. Lanham.

Wotzka, H.-P. (2019) "Ecology and culture of millets in African rainforests: ancient, historical, and present-day evidence." In B. Eichhorn and A. Höhn, eds., *Trees, grasses and crops: people and plants in sub-Saharan Africa and beyond*: 407–29. Bonn.