with key terms, which are very useful, especially for beginners who are learning how to collect data through fieldwork. It could also be used as a textbook or a supplementary reader for students of related fields. This edition has updated statistics and expanded references. The authors state that they use a transcription system other than the International Phonetic Alphabet (IPA) to make the text "much easier for beginning students to master" (p. xii). However, as an English learner who started with IPA, I found the "Americanist system" more difficult. The text is available in hard copy and Kindle formats. It is a challenge to see information clearly in some tables on a traditional Kindle e-reader, but a touch screen device that allows enlargement could work fine. An advantage of the Kindle version is that online resources listed in the book are hyperlinks.

Reference

Sherzer, Joel. 1986. The report of a Kuna curing specialist: The poetics and rhetoric of an oral performance. In *Native South American discourse*, ed. Joel Sherzer and Greg Urban, 169–212. Berlin: Mouton de Gruyter.

Caleb Everett. 2017. *Numbers and the making of us: Counting and the course of human cultures*. Cambridge, MA: Harvard University Press. Pp. 297. US $27.95 (hardcover).

Reviewed by Jack Chambers, *University of Toronto*

,

Number systems attracted attention among linguists a few decades ago as generative devices that were invented and learned, but apparently analogous to language systems that are innate and irrepressible. Like language, number systems in technologically developed cultures are recursive and unbounded. However, unlike language, they are semantically circumscribed and often derivationally transparent. It is relatively easy to see that *ten* is a basic lexeme, an arbitrary combination of sounds with a stipulated meaning, and that *ten* undergoes certain allophonic adjustments when it grammaticalizes as a suffix on other basic number names, as *-teen* 'plus ten' in *sixteen*, *seventeen*, etc., and as *-ty* 'times ten' in *sixty*, *seventy*, etc. The derivational morphology of, say, *-ly* in *tightly* and *beneficently*, though similar in principle, provides a much less transparent paradigm.

Everett's exploration in *Numbers and the making of us* is not much concerned with the generativity of number systems or other structural matters. His book is much more wide-ranging in a sense, or perhaps I should say much less narrowly linguistic. Everett's academic focus comes from several branches of anthropology with forays into cognitive science and psychology. He has a pleasantly discursive

https://doi.org/10.1017/cnj.2019.2 Published online by Cambridge University Press

manner that encourages him to conduct guided tours of exotic sites along the way, including ancient Mesoamerica, where numbers provided clues for the deciphering of Mayan hieroglyphs (pp. 51–56), various upper Amazonian villages with languages that purportedly have no number words (pp. 125–129), the Khufu pyramid, a geometric marvel (pp. 213–215), Angkor Thom for the putative origin of zero (pp. 231–235), and Blombos Cave with early artifacts that may (or may not) encode counting (pp. 240–248). He also gives space to curiosities such as the Ishango bone, a baboon fibula with markings that may (or may not) be numeric (pp. 34–36), perennial favourite Clever Hans, the horse that fooled experts into thinking he could add (pp. 169–172), cyclical shortages of snowshoe hares in northern Ontario (pp. 172–174), and Alex, a parrot that was, like Clever Hans, said to be capable of adding (pp. 186–187).

Everett summarizes a great deal of research with clarity and insight. His interpretations often push the limits, so that his book treads a fine line between the scholarly and the speculative. He is erudite and almost always entertaining, but his lucidity may entice readers to be less discerning than they sometimes need to be.

A good example of the fine line comes in Everett's discussion of the archaeology of the southern tip of Africa, where early humans took refuge in caves during a climate crisis about 170,000 years ago and stayed for about 30,000 years (p. 242). There are no skeletal remains in the Blombos Cave but artifacts include "refined stone tools," bowl-like shells, engraved pieces of bone, and a piece of ochre with "hatchlike marks" that "may have served some symbolic or quasi-symbolic function" (p. 243). Perhaps, Everett says, the markings are "the first representations of precise quantities" (p. 244). While he is forthright in reminding readers that "we cannot definitively establish the first place where numbers were used" (p. 244), he makes it abundantly clear that he would like to believe that this is the place. His crowning argument—the artifacts include shells gathered sometimes from great distances, and these shells, he says, might have been "valuable, miniscule commodities that they wanted to count [….] In the light of these facts, it is not implausible that they did have numbers" (p. 245). Well, yes, "not implausible," as he says, but perhaps hardly plausible. His discussion is imaginative and appealing, and, as he confesses, "It is weak evidence, admittedly" (p. 246).

At one point, at least, Everett appears to underplay his cautionary tone in favour of a theory that seems dubious. He makes the point that "agricultural modes of living are associated with more elaborate number types" (p. 218). Sophisticated number systems emerged concurrently with the cataclysmic change that saw humans domesticate animals and cultivate crops in lieu of hunting and gathering them in the wild. The converse relationship also holds, as there is "evidence for a clearly discernible correlation between simple number systems (sometimes bordering on the nonexistent) and hunting-gathering subsistence," he says (p. 218). The correlation between number systems and harvesting crops has a straightforward, commonsense interpretation. As people get better at agriculture, they move from subsistence to surplus, and at some point, they progress to bartering grain for meat or eggs or roots. Accumulated goods must be counted, and transactions must be tallied. Agriculture makes quantification useful and productivity makes it necessary.

Somehow, in Everett's narrative, this scenario gets inverted. It comes as a surprise when he declares, "So numbers make agriculture possible" (p. 223). The likely view, on the contrary, is that agriculture makes numbers possible, and Everett does not deny it outright, but he seems to give primacy to his claim that "numeric tools are obviously required for us to keep track of the lunar cycle, astronomical cycles more generally, and other basic environmental features that are essential to the development of many agricultural practices" (p. 222). Here he does not strike the precautionary note – at least not noticeably – that astronomical cycles were marked long before geometry was codified. Mathematical complexity followed from the arithmetical acuity that evolved from sedentary lifestyles in agricultural settings. Everett's claim that agriculture follows from number systems seems to be in service of his title maintaining that numbers are "the making of us." But as Everett himself acknowledges in discussing the Blombos Cave people (and many other places), humans invented numbers because they had "commodities they wanted to count" (p. 245). We are the makers of numbers.

Another theme of Everett's throughout the book, number cognition, seems especially well informed. He cites research indicating that "much of our basic numerical reasoning takes place in a [cortical] region called the intraparietal sulcus (IPS)" (p. 210). He then notes that higher mathematical functions "need to use portions of the left hemisphere associated with linguistic processing to expand numerical thought into the realm of exact discrimination, exact addition, exact subtraction, and so on" (p. 211). Here is the reification of the venerable notion that complex number systems are invented on the model of grammatical systems.

Number systems and mathematical calculations are obviously learned, hence the repetitions of preschoolers learning to count on, say, *Sesame Street,* and grade 3 students fretting over times tables, and high school students struggling with sines and cosines. However, we do not start with a clean slate. Everett offers experimental evidence suggesting humans are "innately equipped with two mathematical senses" which he calls *approximate number sense* and *exact number sense* (p. 120). For the approximate number sense, he cites research showing that infants ("newborn babies") can "recognize large differences between quantities," between, say, eight items and sixteen items. For the exact number sense, all humans can differentiate between three items, telling one from two, three from one, and so on (p. 120, and chapter 6 "Quantities in the minds of young children," pp. 142–165). The experimental paradigm that allows cognitive inferences from prelinguistic subjects based on attention fixation is neatly explained by Everett along with a number of relevant experiments (pp. 144–152). For the approximate number sense, it seems plausible that infants presented with eight black dots on a white background or sixteen black dots on a white background might fixate their attention on differences that are not necessarily quantitative. Nevertheless, the symmetry of the two putative innate mathematical senses – the exact and the approximate – has esthetic appeal as well as experimental weight.

The central importance of the human hand in the development of number systems comes up in many ways. Fingers are transparently the root of number systems: in English the word *digit* means both 'finger' and 'number'; in West

https://doi.org/10.1017/cnj.2019.2 Published online by Cambridge University Press

Greenlandic Inuit, the word for 'six' literally means "one on the other hand." The dominance of decimal bases in number systems arises from the ten fingers, with occasional vigesimal bases from counting the toes as well: of the number systems in 196 diverse languages surveyed by Bernard Comrie (2013), 125 are decimal, 22 are "hybrid decimal/vigesimal," and 20 are vigesimal (reported by Everett, p. 72). The primacy of the fingers leads Everett to the provocative conclusion that "ten is the roundest of numbers" (p. 251). He suggests that it appears to have "spiritual import," citing the ten commandments of Moses, "the ten avatars of Vishnu, the ten human gurus in Sikhism, the ten attributes in Kabbalah, and so on" (p. 251). "This may seem a bit of a stretch, ascribing spiritual significance to numbers," he confesses (p. 247), but it is an entertaining stretch, and not the only one in the book.

REFERENCE

Comrie, Bernard. 2013. Numeral bases. In *The world atlas of language structures online*, ed. Matthew Dryer and Martin Haspelmath. Leipzig: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/131>

Jason Kandybowicz and Harold Torrence (eds.). 2017. *Africa's endangered languages: Documentary and theoretical approaches*. Oxford: Oxford University Press. Pp. x + 520. US $99 (hardcover).

Reviewed by Justin Case, *University of Ottawa*

Africa's endangered languages: Documentary and theoretical approaches is an edited collection of articles stemming from a workshop held at the University of Kansas in April 2014. This volume aims to explore the interdependence of linguistic theory and language documentation as practiced by specialists working on endangered languages in Africa. The contributions highlight the fact that the researcher's documentary work informs theoretical generalizations, and vice versa. Two chapters (chapters 7 and 8) mainly advocate community-based approaches on the grounds of their successes in high-quality documentation and revitalization. As is common for proceedings-type volumes, the heterogeneity of the contents and languages under scrutiny makes for a series of superficial treatments of diverse issues. Regardless, the approaches, anecdotes and insights are presented so as to make them broadly applicable and, importantly, not exclusively relevant to linguists working in Africa.

In chapter 1, "Africa's endangered languages: An overview", Kandybowicz and Torrence introduce certain circumstances that distinguish language endangerment in Africa from other areas, for example, shift to other subnational languages, migration

https://doi.org/10.1017/cnj.2019.2 Published online by Cambridge University Press