that subitization is an insufficient mechanism to explain the spontaneous, innate number capacities of animals and infants. It is therefore likely that several mechanisms are crucially involved in number representation during both ontogeny and evolution.

As with all claims for domain-specificity, much hinges upon selective deficits and, especially, cases of double dissociation. Some of Butterworth's cases of acalculia and developmental dyscalculia are clearly not restricted to the number domain. (Charles, for example, a developmental dyscalculic who lacks the capacity to subitize, is also dyslexic.) Evidence that there are deficits outside the domain of number diminishes the strength of Butterworth's claim for domain-specificity or modularity.

The great British philosopher Bertrand Russell stated that "It must have required many ages to discover that a brace of pheasants and a couple of days were both instances of the number two." Actually, it didn't. Romping through the world of animals and humans (young and old, normal and abnormal, living and fossilized), Butterworth's *What Counts* shows why.

References and Notes

1. Released in the United Kingdom as *The Mathematical Brain* (Macmillan, London, 1999).
2. E. M. Brannon and H. S. Terrace, *Science* **282**, 746 (1998).
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BOOKS: EVOLUTION

Lingua Franca

Fintan R. Steele

"Come, let us go down, and there confound their language, that they may not understand one another's speech."
Genesis 11:7

Scientific dismay over recent gains made by "creation science" can be traced to a lack of education: not so much on the part of the creationists, or even the general population, but our own. Steeped in the methods of science, few of us can articulate (much less defend) the philosophical principles that guide our endeavors. In *Tower of Babel: The Evidence against the New Creationism*, philosopher of science Robert T. Pennock reveals our blind spot to be the hole through which the truck of creationism now careens.

Many scientists dismiss the problem by claiming that science and religion speak different languages, which makes their encounters as futile as communication among the citizens of Babel ineffectually urging one another to flee the falling bricks of their tower. Pennock acknowledges this unbridgeable linguistic gap and moves beyond it, proposing to renew the discussion between the combatants in the lingua franca of philosophy. His goal, which he largely attains, is to provide a common language with which to consider the relative explanatory and scientific strengths of evolution and creationism.

Tower of Babel
The Evidence against the New Creationism
by Robert T. Pennock
MIT Press, Cambridge, MA, 1999. 451 pp. $35. ISBN 0-262-16180-X.

Unlike some scientists, Pennock takes the creationist argument seriously—"not just because it is mistaken, but because it is mistaken in a way that's dangerous." Central to his book are the "new" creationists, new in the sense that, having learned from their recent defeats in the U.S. courts, they have retooled their arguments to omit any specific reference to Christianity or even a personal god. Pennock is at his best in analyzing and refuting their argument that creationism is simply another theory like evolution, one ignored by scientists who fear losing their influence in the modern world. He points out that the new creationist approach is one of attacking scientific method and conclusions without offering anything substantial (except for revelation or the old argument-from-design) in its place. He also intimates that the "theology" of the new creationists is almost as embarrassing as that of scientists who have lately chosen to dabble in a field that requires as much intellectual rigor as their own disciplines.

Pennock's discussion of the evidence supporting evolution is also thorough and well articulated, though perhaps of less interest to scientists. Less persuasive is the parallel Pennock draws between the evolution of life and the evolution of language, which is echoed in the book's title. Although this comparison provides an effective argument against creationism at one level (the intellectual emptiness of biblical literalism), it fails to address the real fears of the creationists. As Pennock himself admits: "The critical issue for the creationist is not really about the truth or falsity of evolution as a descriptive and explanatory scientific theory, or even about the validity of 'creation-science' as a scientific alternative, but rather about their relative viability and worth as value-grounding creation stories."

In other words, the fear driving the creationist agenda is that if evolution holds sway, any meaning to life, and with it the basis for morality, will fall as surely as the Tower of Babel. This fear cannot be lightly dismissed, though some of the excesses to which creationists go in articulating this fear are surprising. (I was particularly amused to learn that homosexuality is considered by most creationists to be a direct evil arising from the acceptance of evolution.) But as Pennock rightly notes, this either-or dilemma (creation equals God versus evolution equals godlessness) is posed by the creationists themselves to win the support of a public untrained in either science or theology. He submits, as have many others, that evolution does not preclude the possibility of God, although the theory has no room for a "god-of-the-gaps" (one that is directly responsible for the as-yet-unexplained) or other scientifically and theologically suspect ways of keeping God's finger in the natural pie.

Pennock's restraint, patience, and thoroughness in taking on creationist arguments stand in marked contrast to recent authors who too glibly poke fun at what they think is mere superstition (and with whom I tend to agree). Unfortunately, like the authors of all recent books shoring up evolution against creationist inroads, Pennock is preaching primarily to the converted. Nevertheless, opening the eyes of bewildered scientists to the reasons for the recent creationist successes makes *Tower of Babel* worth reading. Perhaps it can give us the language by which we can defeat these new creationists in the court of public opinion, where it appears that—at least for now—the battle will be decided.

Genesis of Babel. Pieter Bruegel the Elder's interpretation (1563) of the tower that, in the Bible's account, led God to create the variety of languages.

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