

A VOCABULARY OF SCIENCE

[by John H. Lienhard](#)

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Today, new sciences, new languages. The University of Houston's College of Engineering presents this series about the machines that make our civilization run, and the people whose ingenuity created them.

Instruments have a rhetorical purpose, say Hankins and Silverman in their book *Instruments and the Imagination*. That's because the output of instruments, like language itself, mediates between our minds and the world around us.

Observational science was taking its modern form in the seventeenth century. We had new instruments and were learning their new visual languages. Philosophers had already been asking, "Do words truly represent anything, or are they just a misleading human construct?" John Locke asked whether a microscope image was a reality or an artifact of the instrument. Thomas Hobbes called the new air pump "a dangerous chimera."

Scientific instruments were reviving old concerns about words. Many people believed that God had given Adam the true and accurate language in Eden, but those words had been corrupted upon the Tower of Babel. About the time Galileo died, Jesuit scholar Athanasius Kircher was trying to reconstruct that original language.

Kircher, and then Leibnitz, struggled to rediscover words that would express the true essence of things. English scientist John Wilkins, who worked on the problem, also wrote about intelligent beings on the moon. He worried about their language.

It reminds us of NASA, firing the *Pioneer 10* probe into deep space. They faced the real problem of inventing universal symbols to identify Earth and the human species that'd fired the rocket.

Five hundred years ago, new symbols and images began replacing words. A generation after Gutenberg, printers began putting accurate drawings of plants and animals in books. And books were now reaching everyone. Before long, simple woodcuts gave way to three-dimensional perspective, often created by mechanical means. In the seventeenth century, people expected scientific books to have sophisticated drawings in them.

The eighteenth century brought a new twist: the mathematical graph. In the seventeenthies, a German scientist named Lambert drew tables with outdoor temperatures arranged in columns. The dates when they'd occurred were listed in rows. The result was a picture of temperature varying with time. A few years later, Lambert made the leap to the sort of graph with lines on coordinates that we find in every newspaper. That was

really a new way of seeing, and it took another century to digest it. But today every schoolchild takes graphs for granted.

The search for transcendent languages goes on. Maybe we seek new Internet iconographies -- maybe new forms of mathematics. We need ways to speak to one another about a universe that would've been completely alien in our great-grandparents' day. Creating languages to reflect increasingly counterintuitive realities is no longer just a philosophical riddle. It has become the simple practical problem of telling one another the truth of things.

I'm John Lienhard, at the University of Houston, where we're interested in the way inventive minds work.

(Theme music)

Hankins, T. L., and Silverman, R. J., *Instruments and the Imagination*. Princeton, NJ: Princeton University Press, 1995. (See especially Chapter 6.)

Anwendung der Theorie auf Beobachtungen.

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One of Lambert's tables of outdoor temperatures on various dates

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