



Colorful Pebbles and Darwin's Dictum

Science is an exquisite blend of data and theory By MICHAEL SHERMER

Writing to a friend on September 18, 1861, Charles Darwin reflected on how far the science of geology had come since he first took it up seriously during his five-year voyage on the HMS *Beagle*:

About thirty years ago there was much talk that geologists ought only to observe and not theorise; and I well remember some one saying that at this rate a man might as well go into a gravel-pit and count the pebbles and describe the colours. How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service!

For my money, this is one of the deepest single statements ever made on the nature of science itself, particularly in the understated denouement. If scientific observations are to be of any use, they must be tested against a theory, hypothesis or model. The facts never

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just speak for themselves. They must be interpreted through the colored lenses of ideas: percepts need concepts.

When Louis and Mary Leakey went to Africa in search of our hominid ancestors, they did so not because of any existing data but because of Darwin's theory of human descent and his argument that we are obviously closely related to the great apes. Because the great apes live in Africa, it is there that the fossil remains of our forebears would most likely be found. In other words, the Leakeys went to Africa because of a concept, not a percept. The data followed and confirmed this theory, the very opposite of how we usually think science works. Science is an exquisite blend of data and theory, facts and hypotheses, observations and views. We can no more expunge ourselves of biases and preferences than we can find a truly objective, Archimedean perspective—a god's-eye view—of the human condition. We are, after all, humans, not gods.

In the first half of the 20th century, philosophers and

historians of science (who were mostly scientists doing philosophy and history on the side) presented science as a progressive march toward a complete understanding of Reality—an asymptotic curve to Truth. It was only a matter of time before physics (and eventually even the social sciences) would round out their equations to the sixth decimal place. Later, professional philosophers and historians took over and, in a paroxysm of post-modern deconstruction, proffered a view of science as a relativistic game played by European white males who, in a reductionistic frenzy of hermeneutical hegemony, were hell-bent on suppressing the masses beneath the thumb of dialectical scientism and technocracy. (Yes, some of them actually talk like that, and one really did call Newton's *Principia* a "rape manual.")

Thankfully, intellectual trends, like social movements, have a tendency to push both ends to the middle, and these two extremist views of science are now largely passé. Physics is nowhere near explaining everything to six decimal places, and as for the social sciences, in the words of a friend from New Jersey, "fuhgeddaboutit." Yet science does progress, and some views really are superior to others, regardless of the color, gender or country of origin of the scientist holding that view. Although scientific data are "theory laden," as philosophers like to say, science is truly different from art, music, religion and other forms of human expression in that it has a self-correcting mechanism built into it. If you don't catch the flaws in your theory, the slant in your bias or the distortion in your preferences, someone else will. The history of science is littered with the debris of downed theories.

Future columns will explore these borderlands of science where theory and data intersect. Let us continue to bear in mind Darwin's dictum: all observation must be for or against some view to be of any service. ■

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