

The Original Rap

As the discovery of new ideas, objects, and worlds is the goal of science, one of the most important responsibilities of science editors is to help make such discoveries understandable, if not acceptable, to readers. The difficulty of communicating new information, however, is predicted by Shannon and Weaver's information theory, which states that for communication to occur, a message must contain information that is already shared by the communicators involved. The articles below, all enjoyable reading, provide more details about this and fascinating examples.

Lightman A, Gingerich O. When do anomalies begin? *Science* 1991;255:690-5.

These authors define an anomaly as an observed fact that is difficult to explain in terms of an existing conceptual framework. In some cases an anomaly is accepted as given or unimportant in one conceptual framework, and its value is not recognized until after it is explained within a new conceptual framework that displaces the old one. The authors call this process "retrorecognition" and describe five cases of it. The examples include the development of plate tectonics theory, which spanned about 150 years: from 1800, when it was first observed that the continents bordering the Atlantic Ocean looked as though they would fit together, to the late 1960s, when the theory of plate tectonics was accepted. The authors propose that retrorecognition results from the difference between a "fact in itself", wherein an observation is an anomaly in the old conceptual framework, and a "reasoned fact", wherein the observation is accepted as such by means of a new conceptual framework that replaces the old one. Factors that the authors think contribute to retrorecognition include the conservatism of science and the tendency to ignore the problem of an anomaly because of the lack of a solution to it.

Boring EG. The problem of originality in science. *Am J Psychol* 1927;39:70-80.

Because "the history of science is primarily a history of thought", psychologists ought to be more adept at understanding the process, but history has shown that this is not the case. For example, at the time Boring wrote this article, there was apparently a perpetual debate in psychology about who was the "founder" of experimental psychology. Boring notes that "the historian is impressed by the fact that almost never does an idea seem entirely new"—this about 60 years before Lightman and Gingerich coin the term *retrorecognition*. Boring gives his own list of science anecdotes illustrating that "the 'fathers' are necessarily also 'sons' and that the 'founders' are very apt to be 'promoters'." Included in the list are brief histories of such subjects as reflex movement, behaviorism, and hypnotism. At the end of the examples Boring gives an insightful analysis of the nature of originality and the very human, nonscientific factors that can affect the acceptance or rejection of it.

Shearer RR, Gould SJ. Of two minds and one nature. *Science* 1999;286:1093-4.

In this essay the authors address the difficulty that boundaries create. Not only is a division created, but also there is a tendency to demean the view on the other side of the boundary, whether by simply discounting it or, worse, by ridiculing it. The specific boundary addressed here is that between science and art, and it is explored through the example of the modern artist Marcel Duchamp (1887-1968), who was a disciple of the scientist Henri Poincaré. Duchamp's interest in science led to innovations in optics, mathematics, and perception that scientists in those fields "rediscovered" later. The moral of the story: To triumph in the difficult sphere of conceptual innovation, "we need to access all the tools at

our command—even when linguistic and sociological convention parcels out these common mental devices among noncommunicating disciplinary camps.”

Jackson PW. On learning to see what is not there. *Perspect Biol Med* 1992;35:499-510.

Speaking of art, this article explores perception in art. It has something to offer editors on two levels. On one, it looks at the process of creation, which can be

considered a form of discovery. On the other, it affords insight into the process that editors must often go through when they have to figure out what an author has inadvertently left out of a work even though it is essential to an understanding of the work. Those are times when editors may often feel as though they are seeing what is not there. 

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