

Handout #15

Kuhn, The Structure of Scientific Revolutions (3)

COMMUNICATION BREAKDOWN

Debates over paradigm choice have been characterized by misunderstandings and mutual incomprehension. "The proponents of competing paradigms are always at least slightly at cross purposes. Neither side will grant all the non-empirical assumptions that the other needs in order to make its case" (p. 148). Why not?

...BECAUSE REASONS DIFFER

One such non-empirical assumption is: a good theory should explain such and such. "The proponents of competing paradigms will often disagree about the list of problems that any candidate for paradigm must resolve. Must a theory of motion explain the cause of...attractive forces...or may it simply note the existence of such forces? Newton's dynamics was widely rejected because, unlike both Aristotle's and Descartes' theories, it implied the latter answer. When Newton's theory had been accepted, a question was therefore banished from science" (p. 148).

BUT: This doesn't rule out comparisons between competing packages of problems and solutions. One can see "from the outside" that a different package might offer a better success ratio. Also the new theory might have something to say about why the old problems should not be taken seriously -- as evolution teaches about the transmission of *élan vital* -- or are better left for another day -- as Newton teaches about the slow-down phenomena that preoccupied Aristotelians.

...BECAUSE MEANINGS DIFFER

Another sort of non-empirical assumption has to do with the meanings of shared words. Translation between the theoretical vocabularies of rival paradigms can at best be only partial. "The laymen who scoffed at Einstein's general theory of relativity because space could not be "curved" -- it was not that sort of thing -- were not simply wrong or mistaken....What had previously been meant by space was necessarily flat, homogeneous, isotropic, and unaffected by the presence of matter...[T]he men who called Copernicus mad because he proclaimed that the earth moved...were not either just wrong or quite wrong. Part of what they meant by 'earth' was fixed position....Copernicus' innovation was not simply to move the earth....[it] necessarily changed the meaning of both 'earth' and 'motion'" (pp. 149-50).

BUT: Suppose it is true that there is a type or level of meaning that changes with every change in surrounding theory. Then we face a choice between saying that there is no disagreement at all (because disagreeers by definition have different theories), or that disagreement does not require sharing of that level of meaning. Which is more plausible? Meaning splits into sense and reference; what Kuhn is talking about is sense,

and what communication mainly requires is shared reference, which is quite a different thing. On the one hand, meaning does not determine reference (Twin Earth example), and on the other, reference can be preserved when the relevant sort of meaning isn't. The Greeks thought that water was a plenum, and stars were apertures in the dome of heaven. For us to disagree with them, it's enough that we are talking about the same external phenomena. (Or almost enough: the coreference has to be non-accidental, as surely it is.)

...BECAUSE WORLDS DIFFER

A person's observations depend heavily on his/her beliefs. Proponents of different paradigms do not share a body of observations that they can test their theories against in a mutually agreeable way. There is no theory-neutral language which, for any theory T, can be used to state the perceptual evidence for T. "[They] practice their trades in different worlds. One contains constrained bodies that fall slowly, the other pendulums that repeat their motions again and again. One is embedded in a flat, the other in a curved, matrix of space....That is why a law that cannot even be demonstrated to one group of scientists may...seem intuitively obvious to the other....it is why, before they can hope to communicate fully, one group or the other must experience the conversion that we have been calling a paradigm shift. Just because it is a transition between incommensurables, the transition...cannot be made a step at a time, forced by logic and neutral experience. Like the gestalt switch, it must occur all at once...or not at all" (p.150).

BUT: Two different distinctions are being run together here. There is indeed a phenomenon of gestalt shift, but it isn't brought on by surrounding beliefs. After all, a line drawing isn't believed to be a duck or a rabbit! And the sun still looks like it's setting. (Perception as informationally incapsulated.) What may be sensitive to surrounding belief is the construals we put on our experiences. Looking at a pendulum, Aristotle felt himself to be observing repeatedly thwarted attempts to fall. Galileo interpreted the experience differently. But while the construals may be different, what they literally see is the same. So there seems to be no good sense in which they are living, perceptually speaking, in different worlds. (What about wax museums, and the plastic food some restaurants display in their windows?)

WHAT IS LEFT OF PROGRESS? QUITE A BIT, IT SEEMS

(1) "To say that resistance is inevitable and legitimate, that paradigm change cannot be justified by proof, is not to say that no arguments are relevant or that scientists cannot be persuaded to change their minds" (152)

(2) "[There are also] arguments, rarely made entirely explicit, that appeal to the individual's sense of the appropriate or the aesthetic -- the new theory is said to be "neater," "more suitable," or "simpler" than the old" (155). ...Nothing [here] implies that there are no good reasons for being persuaded or that those reasons are not ultimately decisive for the group. Nor does it even imply that the reasons for choice are different from those usually listed by philosophers of science: accuracy, simplicity, fruitfulness, and the like." (201)

(3) "Probably, the single most prevalent claim advanced by proponents of a new paradigm is that they can solve the problems that have led the old one to a crisis...Claims of this sort are particularly likely to succeed if the new paradigm displays a quantitative precision strikingly better than its older competitor" (153)

(4) "A decision ..is called for, and in the circumstances that decision must be based less on past achievement than future promise....[One] must have faith that the new paradigm will succeed with the many large problems that confront it, knowing only that the older paradigm has failed with a few" (158).

(5) "What the participations in a communication breakdown can do is recognize each other as members of different language communities and then become translators...[This] allows the participants..to experience vicariously something of the merits and defects of each other's points of view" (202)

(6) "To say that the members of different groups may have different perceptions when confronted with the same stimuli is not to imply that they may have just any perceptions at all. In many environments a group that could not tell wolves from dogs would not endure....It is just because so very few ways of seeing will do that the ones that have withstood the tests of group use are worth transmitting from generation to generation...[Thus] we must speak of the experience and knowledge embedded in the stimulus to sensation route" (196)