

## Popper on Science:

I shall certainly admit a system as empirical or scientific only if it is capable of being tested by experience. These considerations suggest that not the *verifiability* but the *falsifiability* of a system is to be taken as a criterion of demarcation. In other words: I shall not require of a scientific system that it shall be capable of being singled out, once and for all, in a positive sense; but I shall require that its logical form shall be such that it can be singled out, by means of empirical tests, in a negative sense: *it must be possible for an empirical scientific system to be refuted by experience.*

--Karl Popper, *The Logic of Scientific Discovery*, p. 18

My view of the matter . . . is that there is no logical method of having new ideas, or a logical reconstruction of this process. My view may be expressed by saying that every discovery contains an 'irrational element' or a 'creative intuition' . . . In a similar way Einstein speaks of the 'the search for those highly universal laws . . . from which a picture of the worlds can be obtained by pure deduction. There is no logical path' he says, 'leading to these . . . laws. They can only be reached by intuition, based upon something like intellectual love of the objects of experience.'

Karl Popper, *The Logic of Scientific Discovery*, pp. 8-9

It should be noted that positive decision can only temporarily support the theory, for subsequent negative decisions may always overthrow it. So long as the theory withstands detailed and severe tests and is not superseded by another theory in the course of scientific progress, we may say that it has 'proved its mettle' or that it is '*corroborated*' by past experience.

Karl Popper, *The Logic of Scientific Discovery*, p. 10

Quotations from Thomas Kuhn  
*The Structure of Scientific Revolutions*

On the idea of paradigms:

These are the traditions which the historian describes under such rubrics as ‘Ptolomaic astronomy’ (or Copernican), ‘Aristotelian dynamics’ (or ‘Newtonian’), ‘corpuscular optics’ (or ‘wave optics), and so on. The study of paradigms, including many that are far more specialized than those named illustratively above, is what mainly prepares the student for membership in the particular scientific community with which he will later practice. Because he joins men who learned the bases of their field from the same concrete models, his subsequent practice will seldom evoke overt disagreement over fundamentals. Men whose research is based on shared paradigms are committed to the same rules and standards for scientific practice. That commitment and the apparent consensus it produces are prerequisites for normal science, i.e., for the genesis and continuation of a particular research tradition.”

--Thomas Kuhn, *The Structure of Scientific  
Revolutions*, pp.10-11

On the Puzzle solving model of Normal science:

"The man who is striving to solve a problem defined by existing knowledge and technique is not just looking around. He knows what he wants to achieve, and he designs his instruments and directs his thoughts accordingly."

--Thomas Kuhn, *The Structure of Scientific  
Revolutions*, chapter IV

On the transformative effects of scientific revolutions:

Led by a new paradigm, scientists adopt new instruments and look in new places. Even more important, during revolutions, scientists see new and different things when looking with familiar instruments in places they have looked before. It is rather as if the professional community had been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well. Of course, nothing of quite that sort does occur: there is not geographical transplantation; outside the laboratory everyday affairs usually continue as before. Nevertheless, paradigm changes do cause scientists to see the world of their research engagements differently. In so far as their only recourse to that world is through what they see and do, we may want to say that after a revolution scientists are responding to a different world.

--Thomas Kuhn, *The Structure of Scientific  
Revolutions*, p. 111