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This Week's Citation Classic®

Holton G. *Thematic origins of scientific thought: Kepler to Einstein*. Cambridge, MA: Harvard University Press, 1973. 495 p.
[Harvard University, Cambridge, MA]

The book presents a new analysis of the ways scientific ideas evolve, based on in-depth case studies of the work of selected physical scientists, from the Scientific Revolution to this century. A key concept is that of themata, and their role in the initiation and acceptance or rejection of individual scientific insights. [The *SSCI*® and *SCI*® indicate that this book has been cited in over 225 publications.]

On the Origins of *Thematic Origins*

Gerald Holton
Department of Physics
Harvard University
Cambridge, MA 02138

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The origin of the studies that yielded this book in its first (1973) edition and the two subsequent companion volumes[1,2] lies in good part in a series of happy accidents. That this is by no means uncommon I found on reviewing recently a volume of *Citation Classic* commentaries. My early research in experimental physics, starting shortly after World War II, was under the mentorship of Harvard's P.W. Bridgman. In addition to being a Nobel Prize-winning scientist, Bridgman was also an influential philosopher of science, sympathetic to the then-reigning logical empiricism. He was broadminded enough to sympathize with my discomfort with the limitations of positivistic philosophy, many of whose practitioners seem to me to neglect the need to base philosophical systems better in carefully researched historical cases of actual scientific practice.

A turning point for me came during a visit to the Institute for Advanced Study in Princeton shortly after Einstein's death in 1955. I had been asked to write a retrospective piece on Einstein's work. Helen Dukas, Einstein's secretary, took me to a large, dark vault-room in the basement of Fuld Hall, where it turned out that Einstein's huge correspondence, manuscripts, and other documents were kept in a whole row of filing cabinets. The collection was in too haphazard an order to be called an archive.

For the next few years, including two semester leaves spent at the institute and many separate trips, I immersed myself in the documents. They were the raw materials for studies eventually amounting to about one-third of my *Thematic Origins* book, and it has been said to have started the large-scale attention given subsequently among historians of science to Einstein's contributions. More important for me, the close study of much of Einstein's correspondence and manuscripts confirmed my early attempts to break out beyond the positivistic limits, by demonstrating that in specific cases, fruitful scientific ideas evolve (or controversies erupt) when personal, thematic presuppositions are allowed to play a dominant role, alongside the more traditionally recognized empirical or analytical content of the material at hand.

Over the years I have pursued a largely inductive study of the work of other physical scientists—ranging from Kepler to Bohr, Heisenberg, and Steven Weinberg—to identify more of the active themata (singular: thema) and their opposites (antithemata). They are those relatively few fundamental, largely stable, and widely diffused preconceptions that are not resolvable into or derivable from observation and analytic ratiocination; yet, they are the mainsprings of the scientific imagination and often the reasons for fundamental disagreements among contending parties facing the "same" observational evidence. The recent publication of the revised, second edition of the *Thematic Origins* book[3] gave me the opportunity not only to add some case studies but also to gather in a Postscript a finding-aid to books and essays in which others used or reviewed the thematic approach. In addition to listing recent commentators who have tried to place this approach among the other options for understanding scientific production and scientific progress,[4-6] the Postscript also cites publications that show the use of thematic analysis to have spread to such other fields as sociology, literary criticism, linguistics, and psychology.

Of course not all commentary is equally cheering—it is surely the nature of all *Citation Classics* that a bimodal distribution lies behind the numbers. The likely explanation for the high rate of citations is threefold: First is the fact that in many courses in the history and philosophy of science, the role of the thematic component of scientific work has become part of the standard presentation of the total spectrum of different approaches in our field. Second is the adoption of the volume by science book clubs and the number of translations of the *Thematic Origins* book as a whole or in major part, including into German, French, Italian, Spanish, Portuguese, Russian, and Chinese. Third is the remarkable growth in terms of working scholars and teachers of the whole field of the history of science during the past two decades. In addition, an acknowledgment is due here to my publisher, Harvard University Press, which bravely kept the book in print in its earliest years, when it was by no means evident that the sales would cover the costs.

1. **Holton G.** *The scientific imagination: case studies*. Cambridge, England: Cambridge University Press, 1978. 382 p.
2. ————. *The advancement of science, and its burdens: the Jefferson lecture and other essays*. Cambridge, England: Cambridge University Press, 1986. 351 p.
3. ————. *Thematic origins of scientific thought: Kepler to Einstein*. Cambridge, MA: Harvard University Press, 1988. 499 p.
4. **Brush S G.** *The history of modern science: a guide to the second scientific revolution, 1800-1950*. Ames, IA: Iowa State University Press, 1988. 544 p.
5. **Losee J.** *Philosophy of science and historical enquiry*. Oxford, England: Clarendon Press, 1987. 153 p.
6. **Kragh H.** *An introduction to the historiography of science*. Cambridge, England: Cambridge University Press, 1987. 235 p.

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