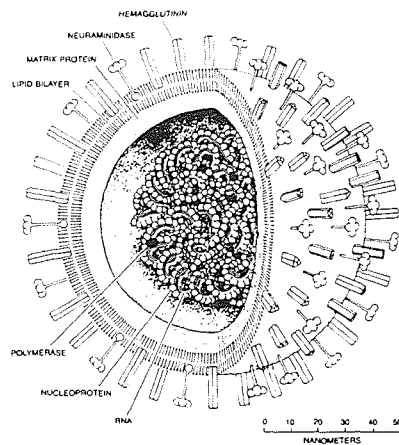


## SCIENCE &amp; TECHNOLOGY

After infection by an influenza virion (right), the body forms antibodies to prevent the hemagglutinin spike from combining with red blood cells. But rearrangement of the RNA, or genetic information (red), can change the composition of the hemagglutinin, rendering antibodies ineffective and permitting reinfection.



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tion. Since the influenza virus is continually changing, the human body's resistance to one strain may not be effective in resisting a deviant strain appearing months later.

The authors' conclusions: A "successful" flu vaccine will have to be continually updated; and influenza remains a "continuing and evidently ineradicable threat to man."

### The Heresy of Science

"The Heresy of Science: A Twelfth Century Conceptual Revolution" by Tina Stiefel, in *ISIS* (Sept. 1977), 156 Fifth Ave., New York, N.Y. 10010.

Early in the 12th century, a small group of Western European intellectuals—including Adelard of Bath, Thierry of Chartres, John of Salisbury, and Peter Abelard—struggled to define natural science as a distinct and separate discipline. These proto-scientists or "cosmologists" (they called themselves *physici*) boasted a respect for empiricism (derived from Arab science) and confidence in the power of reason (gleaned from the study of Aristotelian logic). In retrospect, their work may represent the first gropings toward modern science in the West.

Stiefel, a historian at Pace University, has pieced together the *physici*'s program from arguments scattered, or deliberately buried, in their writings. "There is nothing in nature without *ratio*," explained Adelard of Bath. The Creator was not merely all-knowing but supremely rational, as Plato had proclaimed in the *Timaeus*; nature must therefore be "purposeful, logical," and subject to the probings of reason. Adelard and others advocated basing hypotheses on careful observation, formulating data in mathematical terms, and deducing illustrative models. More provocatively, they suggested that systematic doubt was the beginning of scientific wisdom. "By doubting we come to inquiry," wrote Peter Abelard, "by enquiring we perceive the truth."

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This was too much for 12th-century Europe, Stiefel writes. The *physici* were attacked as heretical or, at best, ignored. Science remained subordinate to theology for another 400 years. Ironically, she adds, the translation of Aristotle's scientific works may have helped defeat this early conceptual revolution. His writings seemed to provide answers to all questions, thereby furthering scholasticism (concerned with applying Aristotle's philosophy to the tenets of Christianity) rather than original inquiry.

*Broken Hearts*

"Emotional Causes of Sudden Death" by Joel E. Dimsdale, in *The American Journal of Psychiatry* (Dec. 1977), 1700 18th St., N.W., Washington, D.C. 20009.

A 71-year-old woman arrived by ambulance at a hospital emergency room with her stricken 61-year-old sister, who was pronounced dead on arrival. The elder woman collapsed at the news, developed a heart attack, and died.

According to Dimsdale, a Harvard psychiatrist, the annals of medicine and folklore are filled with stories of people who, in situations of hopelessness and intense emotion or after violating some taboo or being "hexed," abruptly die. Many theories purport to explain how otherwise healthy people can suddenly succumb to momentary stress. What has been lacking in studies of the phenomenon, Dimsdale contends, is collaboration between cardiologists and psychologists.

Cardiac arrhythmia (irregularity of heartbeat) can be induced in healthy patients asked to recall emotionally upsetting situations; stress on a diseased heart at a certain stage in the cardiac cycle may well trigger a fatal arrhythmia. (What may be the earliest recorded case of this kind occurs in the New Testament's Acts of the Apostles, which tells how the high priest Ananias fell down dead when St. Peter remarked, "You have not lied to man but to God.")

That there is a link between the emotional and physical causes of death seems certain. However, abrupt, psychosomatic heart failure remains unlikely. What is surprising, Dimsdale writes, is not that these incidents occur, but that in a country plagued by heart disease, hypertension, and nervous stress, they occur so infrequently.

*It's All in the Head*

"The Brain's Own Opiates" by Solomon H. Snyder, in *Chemistry and Engineering* (Nov. 28, 1977), P.O. Box 3337, Columbus, Ohio 43210.

Painkilling opiates such as morphine are effective at extremely low dosages because they zero in on specific areas in the human brain. These sites, called "opiate receptors," were first identified in 1973 by the author, a professor of pharmacology and psychiatry at Johns Hopkins. According to Snyder, the familiar "pinpoint pupils" in the eyes of heroin addicts may be explained by the concentration of opiate recep-