

letters

Religion and science

In response to the letter by Lawrence Cranberg (June, page 11) regarding the "historic relation of the church to scientific advance," the church has had a history of continual opposition to scientific progress, in turn suppressing discoveries in astronomy, anatomy, medicine, geology, biology, and psychology.¹ This obstructionism continues to this very day. Recent developments in Arkansas and Louisiana underscore this.

The persecution of Galileo was not an isolated event. Just sixteen years earlier, G. Bruno was burned at the stake for suggesting that many of the witches of that era were perhaps only psychologically disturbed old women. As the church grew less powerful physical persecution of scientists dwindled, but censorship and hostility to new ideas continued. Roman Catholics were officially forbidden to read books containing Copernican theory until well into the nineteenth century. Early books in geology estimating the age of the earth brought on the wrath of the church. The relationship between science and religion has hardly been as rosy as Cranberg might suggest.

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7/81

Reference

1. B. Russell, *Religion and Science*, Oxford University Press, New York (1961).

Lawrence Cranberg's suggestion that the church has been supportive of scientific advance is clearly falsified by the historical record. The Christian churches, both Catholic and Protestant, have for centuries been indifferent or hostile to science. Exceptional individuals have made positive contributions, but only as individuals and frequently against opposition from the mainstream of religious authority.

I present here some examples that demonstrate the antagonism of the churches to science over many centuries. Citations for most historical statements can be found in Andrew Dickson White's "A History of the Warfare of

Science with Theology" (1896; in print, Peter Smith, Gloucester, Mass.).

The attitude of early church fathers toward the investigation of nature is well expressed in the words of Eusebius (third century): "It is not through ignorance of things admired by them, but through contempt of their useless labour, that we think little of these matters." The basis of the inevitable conflict is contained in Augustine's famous statement, "Nothing is to be accepted save on the authority of Scripture, since greater is that authority than all the powers of the human mind." This doctrine, placing myth and legend above reason and observation, is still doing its mischievous work today.

In the eighth century Boniface enlisted the aid of the Pope in a disagreement with Bishop Virgil of Salzburg. Citing relevant biblical passages, Pope Zachary declared the latter's views to be "perverse, iniquitous and against Virgil's own soul," and threatened to drive him from his bishopric for promoting the doctrine that the antipodes might be inhabited.

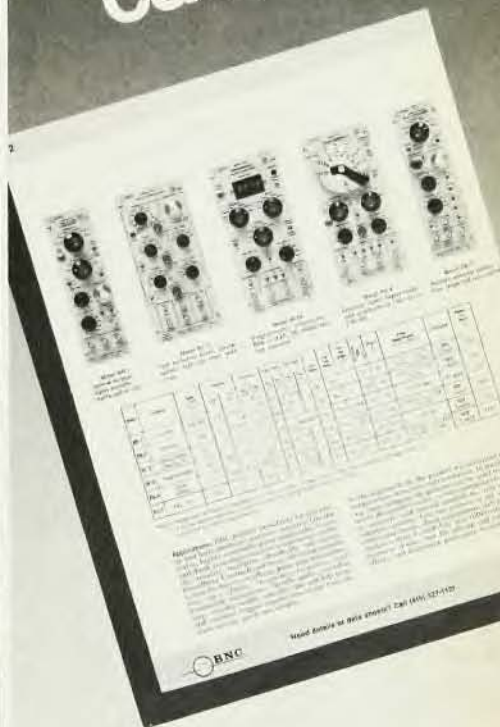
There is a legend that Albertus Magnus created a robot so clever that Thomas Aquinas was unable to answer its reasoning, and so Thomas broke it to pieces with his staff. The story, though fictional, characterizes well the attitude of theology toward science. The experimental method, practiced by Roger Bacon in the 13th century, disappeared for three centuries beneath a morass of theological speculation. Bacon was forbidden to teach and was imprisoned, not for any lack of devotion to the church, but because the experimental investigation of nature was thought to be witchcraft and the experimentalist to be in league with the devil.

Pope Alexander III forbade the study of physics by ecclesiastics (1163). Pope John XXII condemned alchemy (1317), thereby driving it underground and retarding its maturation into chemistry. As late as 1624 theological protest led to a prohibition of chemical research at Paris.

Medicine was retarded by the belief that disease was due to devils, and

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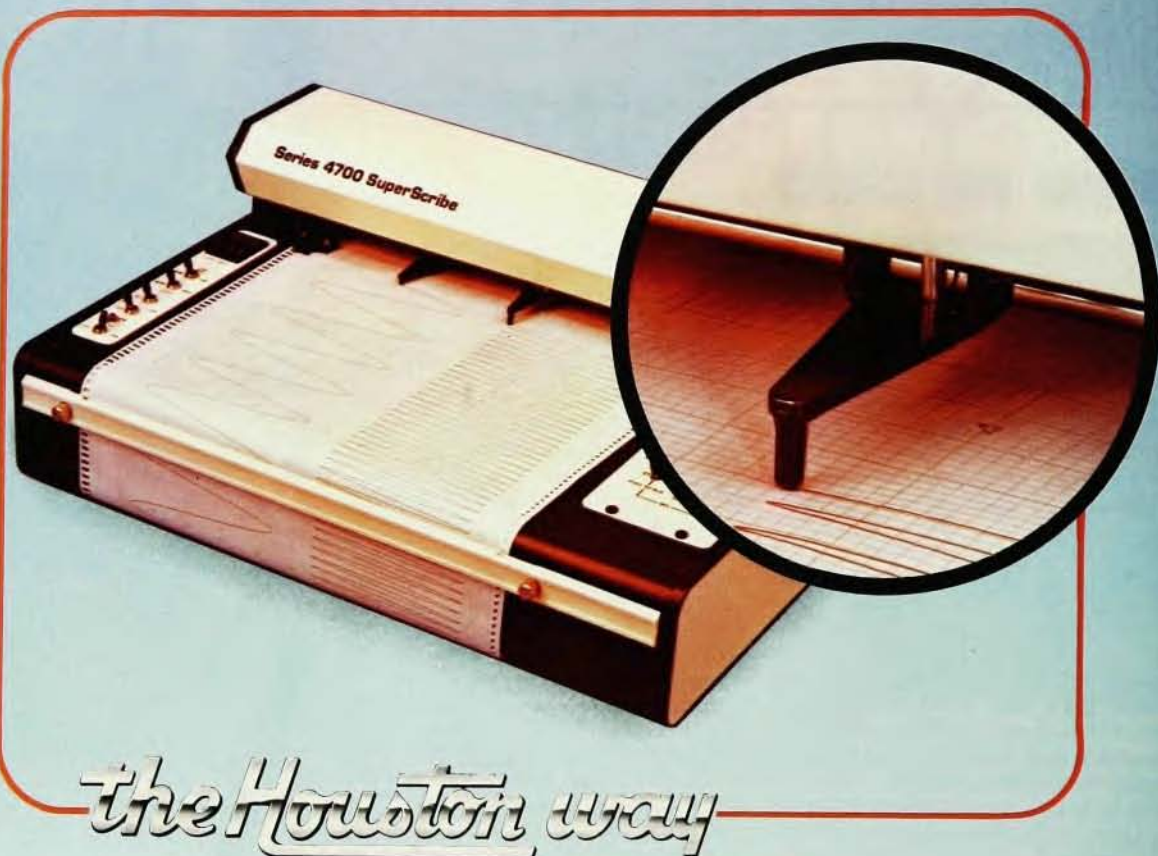


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hence it must be treated by priestly exorcism. Naturalistic approaches to medicine were condemned as sorcery. Thomas Aquinas insisted that the forces of the body are independent of its physical organization, and are therefore to be studied by the scholastic theological method rather than by a study of the body. Consequently Moslems and Jews far surpassed Christians in medical knowledge. When in 17th century Württemberg a Jewish physician was honored, the clergy protested that "it were better to die with Christ than to be cured by a Jew doctor aided by the devil." Smallpox inoculation was condemned by theologians, and was opposed by the Catholic clergy during the 1885 outbreak of the disease in Montreal. Even today blood transfusion is opposed by Jehovah's Witnesses because of some biblical text.

The burning of Giordano Bruno and the persecution of Galileo for their advocacy of the Copernican system of astronomy are well known, so I shall only point out that the Protestants were just as vehement as the Catholics in opposing the heliocentric theory on biblical grounds.

La Peyrère, in 17th-century France, was imprisoned for publishing the view that people existed before Adam. The geologist Buffon, in the 18th century, was forced to recant all of his findings that contradicted "the narrative of Moses." In the latter half of the 19th century Alexander Winchell and James Woodrow were driven from their university positions in the southern US because of their acceptance of the theory of evolution. And today the hardcore fundamentalists are attempting to force biology teachers to present the creation myth, now renamed "Creation Science."

Since so much of the religious opposition to science was based on the Bible, it was inevitable that a major conflict would take place over the application of the methods of textual analysis and criticism to the Bible itself. Scholars who challenged any part of the literal interpretation were subject to abuse by the orthodox party. A celebrated case was the publication in 1860 of *Essays and Reviews* by seven scholars, six of whom were ordained in the Church of England, who undertook to "Interpret the Scripture like any other book." Two of the authors were suspended from their offices, but on this occasion the union of church and state worked to the disadvantage of the orthodox party; the accused clergyman had the right of appeal to the Judicial Committee of the Privy Council which reinstated them. This judgment was protested in a letter signed by eleven thousand clergymen. Two years later Bishop Colenso of Na-

tal published a book in which he admitted that much of the Old Testament is legendary. He was denounced by the Convocation of Canterbury and excommunicated by the Bishop of Cape Town; however, the British Courts found in his favor and saved him from dismissal.

These examples, to which many more could be added, show clearly that the churches have generally been opposed to the progress of scientific knowledge. Even loyal churchmen who helped the cause of science were subject to persecution. In spite of the very bad record to date, one may ask whether religion is necessarily antagonistic to science. The examples of religious persons who attempted, at great personal cost, to persuade the churches to relinquish untenable doctrines, show that it need not be so. But as long as religion continues to advance supernaturalistic interpretations of phenomena which can in principle be studied scientifically and explained naturally, then it will continue to clash with science.

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7/81

THE AUTHOR COMMENTS: Are the really serious sources of irrationality and unreason in the world today the established religions, or are they the secular media which bombard us daily with astrology columns, and trashy stories about psychics, the occult, and so on?

The conclusions of a recent study¹ are that "fundamentalists reject a wide range of occult or pseudo-scientific ideas that may threaten the progress of human culture," that "cults flourish precisely where the conventional churches are weakest," and that "a further decline in the influence of conventional religion may not inaugurate a scientific Age of Reason but might instead open the floodgates for a bizarre new Age of Superstition."

Does it make sense to inveigh against the injustices done to Bruno and Galileo, and lose allies in the fight against the astonishing credulousness of our own day?

When Leslie Ballentine points out that Moslem-Judaic medicine surpassed that of the Christian world, he of course confounds his simplistic thesis that science and religion are inherently antagonistic. But having raised the point about relationships between religion and medicine, let us bring the subject up-to-date and compare medicine in the Christian West with that in anti-religious Soviet Russia.

According to Davis and Feshbach ("Rising Infant Mortality in the USSR in the 1970s," US Bureau of The Census, Series P-95, No. 74, Sept., 1980), infant mortality in the USSR is estimated to be 40 deaths per thousand live births, while the corresponding figure in Western Europe and the US is less

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Nicholas Eberstadt, of the Harvard Institute of Population Studies, in his review of the work of Davis and Feshbach (*The New York Review of Books*, 19 February 1981, page 2) concludes: "Measured by the health of its people, the Soviet Union is no longer a developed nation."

We must stop fighting over dead issues and face the real ones of today, with a realistic perception of who are the friends of science and peace and who are their enemies.

References

1. W. S. Bainbridge and R. Stark, *Superpositions Old and New*, *The Skeptical Inquirer* 4 (4), 18 (1980).

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8/81

Status of high-school teaching

I am disgusted by the physics community's attitude toward high-school physics teaching as demonstrated in two letters in April: "Librarians Beware" (page 76) and "University-School Cooperation" (page 11). In the first letter, Tamar Harari stated that the overpriced bibliography "must have been published by a local high school" as a way of emphasizing the poor quality of the publication he received. What is unfortunate is not merely did the editors of *PHYSICS TODAY* allow the slander against high schools to be published, but many educated readers of *PHYSICS TODAY* accepted this specious reasoning, linking the high school to a low-quality publication, even though the fact that there is no connection is clear. It may even be likely that the publication is produced by some college or college professor. I suggest that Harari and future critics be honest and place criticism in proper context. In Harari's case, it could have been stated, "Gatekeepers is not the professional informational publishing company it purports to be."

For the information of Harari and the rest of the physics community, many high schools have modern printing plants. Montebello High School, for example, has never had a Xerox copier machine in the printing shop, and the linotypes have long since given way to a computerized photoelectric typesetter that makes photograph-ready masters to produce plates for the big presses. Furthermore, the teachers do little dittoing, since the print shop, like the neighborhood instant printing service, supplies our needs within the hour.

The letter from Feshbach and Fuller, "University-School Cooperation," is a

further tragic example of the inability of both APS and AAPT to grasp the problem described as the "deterioration in both quality and quantity of secondary physics education in the US." They are treating only symptoms. The *main problem* is to first change the attitude of the physics community toward secondary school physics teaching—the attitude largely expressed in Harari's letter. Feshbach and Fuller appear to be condescending by trying to give the high schools a university "hand-out." I say *condescending* because of the unfortunate statement in their letter, "It may also serve as an effective recruitment tool for colleges seeking a wider pool of able potential majors..." This indicates to me, and most other high-school teachers, that it is *not* sufficient motivation for the colleges to want to establish ties with the high schools to end the "deterioration." It further indicates that the colleges have to be shown the advantages of a possible increased physics enrollment so that college instructors can keep their jobs, before the advantages of reversing "deterioration" can be appreciated.

For those seriously interested in university-school cooperation, I call your attention to the fine summer workshop for high-school teachers conducted by R. L. Wild at the University of California at Riverside. In addition, Robert Frost, Cal Poly, San Luis Obispo, has formed a joint committee of the Northern and Southern California Sections of AAPT to look into the problem.

So that I am not misunderstood—I think that *Feshbach and Fuller are right!* There should be university and high-school cooperation. I have enjoyed excellent cooperation with a number of institutions, most especially the physics staff at CSULA, and I am grateful for that cooperation. But the proposal by Feshbach and Fuller is weak, at best, and will prove ineffective.

If the physics community is serious about reversing this so-called "deterioration," I suggest, among other things being done, the following:

► That colleges and universities require high-school physics as a prerequisite to freshman standing with majors in mathematics, chemistry, physics, and engineering. If the colleges are interested in a "wider pool of potential majors," then establish a requirement that gives students the motivation to become a part of that pool.

► Since high-school physics programs vary greatly in quality, do not accept just any high school's physics credits. Find out which programs and teachers provide the preparation acceptable. Give that school recognition, and give its students preference in admissions

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