

culture to about the same period—ca. 400–500 B.C.—and the Adena mound material to a date—ca. A.D. 800—not far from the end of Teotihuacan as usually accepted. Thus the Hopewell-Adena span appears to correspond roughly to the Teotihuacan period in Mexico—an interval during the early part of which the basin floor below Teotihuacan seems not to have been the scene of much cultural activity.

It is true that some Archaic mound material (antler and shell) from Kentucky has been assigned an antiquity of the order of 3000 B.C. This naturally raises the question of its relation, ethnic and cultural, to the much later Hopewell. On internal evidence the Mexican affinity of the latter seems strong. Was this affinity an effect of mass migration, or of a more subtle influence?

At any rate, it is now clear that the great flowering of the Ohio Mound cultures took place during the xerothermic, when dry climate, minimum lake levels, and suspended activity characterized the inner Basin of Mexico City.

This situation offers a remarkable parallel to the intrusion of cereal culture in Scandinavia during the warm dry sub-boreal (4). So far as I can tell, the latter corresponds in position to our xerothermic, but how closely it corresponds chronologically can only be determined by further research.

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Illiteracy Triumphant

CHESTER LONGWELL certainly deserves hearty congratulations for his letter, "The 1950 Silly Season," published in the April 13 issue of *SCIENCE*. Many readers must have been as delighted as I was with his pungent remarks about the *Saturday Evening Post's* inspired editorial in defense of Galileo, Velikovsky, and *Worlds in Collision*.

Now for the next important point—where do we go from here? A good chuckle and a well-directed barb may be enough for Dr. Longwell, but not for me. The editorial was silly. As a work of scientific research, *Worlds in Collision* ranks with Grimm's fairy tales and the *Rubaiyat*. The increasing popularity of pseudo science is a matter for the deepest concern.

These truths are self-evident in the columns of *SCIENCE*. But isn't the problem important enough for more than a few semiprivate communications among friends, or an occasional biting book review? Has the shift of publishers from Macmillan to Doubleday (which has no soft underbelly in the form of a textbook department) improved the situation in any fundamental sense? Can scientists do more than they have done, and take positive steps through their professional societies?

The above questions are only partly rhetorical. I feel that something more ought to be done; perhaps others will not consider it worth the trouble. But I am reminded of the biologists and physicians who are taking aggressive action against the antivivisectionists. Also, the American Psychological Association has spoken out mildly against dianetics and "engrams."

Why haven't the astronomers, linguists, geologists, or anthropologists—speaking through their societies—come out with their feeling about *Worlds in Collision*? Or should that be the function of the AAAS? If not, is there an organization that represents the body of American science in such matters?

The pseudo-science enthusiasts have excellent public relations. Science has no public relations to counteract them. We are justly proud of the fact that the standards of popular science reporting as represented in the National Association of Science Writers are as high as any in the world. But it seems to me that scientists and their official representatives must take the initiative in combating pseudo science—and, on the positive side, presenting science and the scientific method in the best possible light.

This would not be an easy task, even if we were not on the verge of a dangerous reaction against research and rational thinking of all kinds. The difference between Galileo and Velikovsky hardly needs arguing here. But it may be helpful to shift our perspective for a moment. An American who has not been trained in science may sincerely feel that Galileo and Velikovsky are both martyrs of "authoritarian" tendencies. Imagine that we have to show him the error of his ways—and, sooner or later, we may have to do just that. What shall we tell him, and how shall we put it? We must be as articulate and brief as that *Saturday Evening Post* editorial which, for all its silliness, was clearly written in straightforward language.

Science has a message beyond the results it has achieved in medicine and technology. It has not yet succeeded in communicating this message to the American public, and, until it does, pseudo science will continue to find a wide audience. Perhaps some publishers, authors, and scientifically illiterate critics deserve the lion's share of the blame. But scientific societies deserve a brickbat or two. They know the facts—and have maintained a dignified silence.

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(Editorial Note: *The editors disclaim any dignity in the silence maintained in SCIENCE until Chester R. Longwell's comment was published. They have been only too mindful of the box-office successes and best-seller records of plays and books that have been literary and financial failures until some society, watchful of public morals, gave them the boost that paid off. There is, however, cause for alarm that there are publishers and editors so scientifically illiterate as to appear unable to differentiate between fact and fiction—authentic science and hoax.*)