

# The Debate Over Dinosaur Extinction Takes an Unusually Rancorous Turn

NYT  
1/19/88

By MALCOLM W. BROWNE

**T**HE impact of a large comet may or may not have killed off the dinosaurs 65 million years ago. But as the debate over dinosaur extinction rages on, personal rancor is increasingly clouding scientific issues.

Scientists on both sides of the argument agree that it has taken an unusually harsh and personal turn, coloring published professional correspondence, scientific meetings and books on the topic. The debate has crystallized into a conflict between opposing camps whose partisans rarely seem to change their minds or soften their positions, whatever the objective evidence may be.

"Lacking conclusive evidence one way or the other," said one scientist, "opponents in this debate have been reduced to name-calling."

Charges and recriminations have also flowed through the informal academic grapevine that can make or break scientific careers. The bitterness of the debate is so much more intense than usual that several historians of science have begun detailed examinations of the sociology of the debate.

All this ill will is a reflection of the deep disagreement among scientists over a crucial aspect of the Earth's history. But the personal venom in the debate, some scientists



University of California/Lawrence Berkeley Laboratory  
Dr. Luis W. Alvarez next to rock in Italy dating from when dinosaurs died out.

fear, is inhibiting rational scientific discourse.

At the center of the controversy is Dr. Luis W. Alvarez, winner of the 1968 Nobel Prize in Physics for discoveries in the field of nuclear particles. Dr. Alvarez played an important role in the development of the atomic bomb, and his varied career has included a personal analysis of evidence concerning the assassination of President Kennedy, the invention of instruments essential to modern physics, and the X-raying of an Egyptian pyramid for hidden chambers.

But in the last decade Dr. Alvarez has been best known for his theory that some large extraterrestrial object hit the Earth 65 million years ago, throwing up a dust cloud that blocked sunlight, halting plant photosynthesis and starving many species of land animals, including all the dinosaurs.

Dr. Alvarez, his son, Dr. Walter S. Alvarez, a geologist, and their colleagues at the University of California at Berkeley based their theory primarily on measurements of the metallic element iridium in sedimentary rock. Analyses of 65-million-year-old sediments in Gubbio, Italy, and elsewhere showed unusually large amounts of iridium, an element the group contends is much more abundant in meteorites and comets than in terrestrial rock. The Alvarez team inferred that the iridium had come from the impact of

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**STAGE:** Vintage musicals being restored in concert version, page C15. / **DANCE:**

**MUSIC:** St. Luke's Orchestra and Samuel Ramey, page C16. / **BOOKS:** 'Afgl

# Debate on Dinosaurs Takes a Rancorous Turn

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an asteroid or comet and that this event caused the mass extinctions at the end of the Cretaceous period.

From the outset, the Alvarez theory has had both supporters and detractors in various fields of science. Notable skeptics have included a large proportion of the world's paleontologists, the scientists who study fossils and other evidence to understand extinct life forms. Many paleontologists argue that the decline and extinction of dinosaurs took place over much too long a period to have been caused by a single sudden catastrophe.

## Undertone Grows Louder

The argument has become complex and convoluted, with new contributions published nearly every week by one side or the other in leading scientific journals. But an undertone of personal recrimination has become increasingly strident.

In his recently published autobiography, "Alvarez: Adventures of a Physicist," Dr. Alvarez ridiculed skeptics of the comet theory as bad scientists. In a telephone interview, he said: "I don't like to say bad things about paleontologists, but they're really not very good scientists. They're more like stamp collectors."

Some paleontologists and other scientists say they believe Dr. Alvarez and some of his collaborators have carried the debate beyond the bounds of decorum.

Dr. Dewey M. McLean, professor of geology at Virginia Polytechnic Institute and State University, charges that at one point efforts to undermine his career were made by Dr. Alvarez's academic allies.

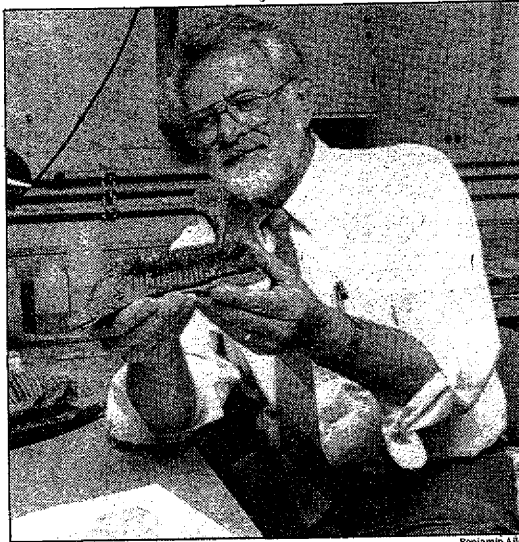
In 1978, a paper by Dr. McLean in the journal *Science* suggested that elevated levels of carbon dioxide in the atmosphere caused a global "greenhouse" warming at the end of the Cretaceous period. He surmised that the relatively high resulting temperatures would have interfered with the reproduction of dinosaurs, eventually bringing about their extinction.

In subsequent papers, Dr. McLean has theorized that the carbon dioxide was released from the Earth's mantle by a gigantic volcanic upheaval known as the Deccan Traps, which began flooding the Indian subcontinent with basaltic lava at the end of the Cretaceous. Dr. McLean and some other scientists contend that such a catastrophe would not only have had grave consequences for many life forms but also might account for the iridium layer.

This theory put Dr. McLean in direct opposition to Dr. Alvarez's group. Several scientists who requested anonymity said in interviews that scientists in the Alvarez camp subsequently tried to intercede with officials of Virginia Polytechnic Institute to block his promotion to full professorship and to discount his work. Dr. McLean did receive the promotion.

Asked to comment on the charge, Dr. Alvarez denied trying in any way to undermine Dr. McLean's academic career. But he added: "If the president of the college had asked me what I thought about Dewey McLean, I'd say he's a weak sister. I thought he'd been knocked out of the ball game and had just disappeared, because nobody invites him to conferences anymore."

In fact, Dr. McLean's review was favorably cited in a recent article on



Benjamin Allen

Dr. William A. Clemens of the University of California, Berkeley, above, with dinosaur fossils discovered in Alaska's North Slope, and Dr. Charles B. Officer of Dartmouth College; both are opponents of the Alvarez theory.



dinosaur extinctions published by *Science* in November.

Dr. Alvarez also criticizes three earth-sciences professors at Dartmouth College, Charles B. Officer and his colleague Charles L. Drake as well as Robert Jastrow, who all reject the cometary impact hypothesis. "It is now clear," Dr. Jastrow said in an interview, "that a catastrophe of extraterrestrial origin had no discernible impact on the history of life as measured over a period of millions of years."

Dr. Alvarez responded: "There isn't any debate. There's not a single member of the National Academy of Sciences who shares Jastrow's point of view." (Dr. Alvarez is himself a member of the academy.)

He added: "Jastrow, of course, has gotten into the defense of Star Wars, which for me personally indicates he's not a very good scientist. In my opinion, Star Wars doesn't stand a chance."

In rejoinder, Dr. Jastrow noted that Dr. Alvarez had personally flown on the nuclear raid that destroyed Hiroshima, and that in 1954, Dr. Alvarez had been one of only five physicists writing to appear before the Atomic Energy Commission to denounce J. Robert Oppenheimer as a security risk. Dr. Oppenheimer had been Dr. Alvarez's superior as head of the Los Alamos National Laboratory during the development of the atomic bomb, and when he was later deprived of his security clearance, the Oppenheimer case became a major political cause.

In his public barbs at Dr. Officer, Dr. Alvarez asserted that the Dartmouth geologist was laughed to scorn at a 1985 meeting of the American Geophysical Union and that the inci-

dent had shorn Dr. Officer of scientific credibility.

dent had shorn Dr. Officer of scientific credibility. The incident had to do with sanidine spherules, tiny balls of mineral material that some scientists believe condensed from the mineral vapor hurled into the atmosphere by the impact of a comet or asteroid. Sandro Montanari, a student of Dr. Walter Alvarez's, found them in sediment corresponding in age to the time of the dinosaurs' demise. The discovery appeared to support the comet theory.

Dr. Officer and his colleagues, skeptical of the finding, examined the same sediments and reported that the spherules were present not only at the extinction boundary but in rock above and below it; in other words, they said, the spherules had been deposited over millions of years and thus could not have come from a cometary impact.

But according to Dr. Alvarez, "My son Walt took just two minutes to demolish Officer after he delivered that paper." Dr. Alvarez said his son showed that the "spherules" found by Dr. Officer's team were merely insect eggs and had been mistaken for mineral spherules because they were not cleaned well enough. "At that point," Dr. Alvarez wrote in his auto-

biography, "the audience of several hundred earth scientists burst into laughter, something I'd never witnessed before in my 53 years of attending scientific meetings."

## Question of Distribution

Dr. Officer responded: "This is a misstatement. There was no outburst of laughter following Walter's brief comment, and no direct or implied derision of me as a scientist by the audience."

"My talk at that meeting," he said, "concerned the hypothesis that intense volcanic activity and the lowering of sea levels explains the mass extinctions at the end of the Cretaceous." During that talk, mention was made of the distribution of microspherules. Walter had kindly pointed out to us previously that there were contaminant hollow spherules of recent origin as well as solid spherules of a mineral composition indigenous to the geologic section.

"After duly eliminating the insect eggs and giving due credit to Walter in our subsequent scientific publication," Dr. Officer said, "we found that all the solid spherules, throughout the whole section, extended both above and below the terminal Cretaceous layer. They were present in sediments spanning a time period of several million years and could therefore not have come from an impact."

Closer to home, Dr. Alvarez has harsh words for some of his colleagues at Berkeley. Among them is Dr. William A. Clemens, a paleontologist who recently reported in *Science* that he had found abundant dinosaur fossils along Alaska's North Slope. The dinosaurs would not have faced the danger of freezing since temperatures were much milder then, but at such high latitudes, total darkness must have persisted for several months every winter, thereby halting the growth of plants and curtailing food supplies.

That the dinosaurs nevertheless survived such conditions, Dr. Clemens contends, undermines the comet theory because a cometary impact would not have blocked sunlight for nearly as long as the polar winter. Dr. Alvarez responds by saying that he considers Dr. Clemens inept at interpreting sedimentary rock strata and that his criticisms can be dismissed on grounds of general incompetence, a charge Dr. Clemens rejects.

## Debate in Popular Press

Dr. Clemens's daughter Elizabeth S. Clemens, a sociologist, said she believed that the popular press has strongly buttressed the comet theory. In her recent paper in the journal *Social Studies of Science*, Miss Clemens suggested that the Alvarez hypothesis owes much of its support to its relative simplicity and a favorable press. "It offered an elegant and parsimonious solution to a question firmly embedded in popular culture," she said.

Despite growing doubts about his theory expressed by some scientists, Dr. Alvarez has no intention of yielding ground. The 76-year-old physicist, who is suffering from cancer of the esophagus, told an interviewer: "I can say these things about some of our opponents because this is my last hurrah, and I have to tell the truth. I don't want to hold up these guys to too much scorn. But they deserve some scorn, because they're publishing scientific nonsense."