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[Book Catalog](#) An excerpt from UFOs - A Scientific Debate:

Editors' Introduction

What does an average person do when he sees something strange, inexplicable, or haunting? How does a scientist react when confronted with observations he cannot readily classify --observations that may challenge some of his most deeply held beliefs? What happens when the observations appear to bear on questions of national security, so that a branch of the armed forces is called upon to perform investigations of a phenomenon it does not understand? What happens when an attempt is made to confront diverse points of view about these events? This book explores what happens. The controversy over unidentified flying objects has for more than twenty years been a lively topic, with representatives of the United States Air Force, the scientific community, and interested public organizations frequently at odds one with another. The public interest in the subject, but only a little of the scientific interest, derives from the idea that unidentified flying objects are space vehicles sent to the earth from elsewhere in the universe. Unambiguous evidence of the extraterrestrial origin of UFO's is obviously not at hand; otherwise there would be no basis for disagreement. Primarily in response to public interest in the topic, the Air Force sponsored a two-year study directed by Professor E. U. Condon at the University of Colorado; the results were published as *Scientific Study of Unidentified Flying Objects* (New York: Bantam Books, 1969), usually referred to as the Colorado Report or the Condon Report.

In the year preceding the publication of the Condon Report, the editors of this book approached the American Association for the Advancement of Science with the idea of organizing a general symposium at an annual meeting of the Association to discuss the UFO issue. The AAAS Board approved such a symposium for the December 1968 meeting in Dallas, Texas. But, largely because the Condon Report-- one of the most detailed examinations of the subject ever performed-- would not have been published in time to be digested for the Dallas meeting, and in part because of opposition from some scientists, the symposium was postponed for a year and was finally held on December 26 and 27, 1969, at the annual meeting of the American Association for the Advancement of Science in Boston. The organizing committee for the symposium at this meeting consisted of Philip Morrison, Department of Physics, Massachusetts Institute of Technology; Walter Orr Roberts, University Corporation for Atmospheric Research, Boulder, Colorado; Carl Sagan, Laboratory for Planetary Studies, Cornell University; and Thornton Page (chairman of the AAAS special committee), Department of Astronomy, Wesleyan University. The symposium could not have been held without the steadfast courage (sometimes in the face of very heated opposition) of the American Association for the Advancement of Science and, in particular, of the Association's then president, Professor Roberts.

The topic of the symposium is, to the surprise of no one, controversial. The AAAS special committee spent a year and a half arranging a Program that attempted to present as fairly and as logically as possible the facts and alternative interpretations that have been offered. The present volume, an only slightly compressed version of the fifteen invited talks and the discussion that followed, is not intended to establish any one interpretation as the "correct" one, but rather to offer the observations and some of the speculations generated by a critical examination of the evidence the traditional scientific method. Scientists, being human beings, do not always approach controversial subjects dispassionately, and the reader will occasionally find in these pages the heat of passion as well as the light of scientific inquiry.

The opposition to holding this symposium, presented in part by some very distinguished scientists, was based upon the view that if such an unscientific subject as the UFO controversy is discussed, we might just as well organize symposia

on astrology, the ideas of Immanuel Velikovsky, and so forth. We believe this conclusion is substantially correct, but it is not the *reductio ad absurdum* that its authors seem to believe it is.

All of us who teach at colleges and universities are aware of a drift away from science. Some of the most sensitive, intelligent, and concerned young people are finding science increasingly less attractive and less relevant to their problems than was the case for previous generations. We all agree that this drift is deplorable. It must be due in part to their misunderstanding of what science is about, the scientists' failure to communicate its power and beauty. At the same time there is a range of borderline subjects that have high popularity among these same people -including UFO's, astrology, and the writings of Velikovsky. We believe that part of the reason for this popularity is precisely that they are often beyond the pale of established science, that they often outrage conservative scientists, and that they seem to deny the scientific method. We have only to pick up the *New York Times Book Review* (September 21, 1969, for example) to find books advertised under such rubrics as "Science says it shouldn't work--but can't explain why it does!" or "Long-suppressed by so-called .orthodox science' " or "Unearths new evidence that shakes smug complacency of Establishment scientists."

But while we may deplore this trend, particularly in its extreme variant as a religious cult, it seems to us unprofitable to ignore it. To talk of "dignifying it by discussing it" is to misunderstand these attitudes. They already are dignified in the sense of having widespread newspaper and magazine coverage which reaches many more Americans, both scientists and laymen, than, for example, the scientific journals that generally avoid such discussion.

There are some things we can expect of scientific symposia on such topics and other things we cannot expect. We will not convert true believers, regardless of the strength of our arguments. One religious sect confidently predicted the world would end in 1914. Since the world has apparently not ended, one would expect the membership of this sect to be close to zero. This is not the case; its membership has in fact been monotonically increasing since 1914. But what can be done in such symposia is to confront unscientific claims and methods with the power of the scientific method. The habits of critical interrogation and of suspending judgment in the absence of adequate data are unfortunately uncommon in everyday life.

Science has itself become a kind of religion, and many pronouncements cloaked in scientific attire are blandly accepted by much of the public. We believe that organizations like the AAAS have a major obligation to arrange for confrontations on precisely those science-related subjects that catch the public eye. Previously such confrontations have served science well. For example, in the Huxley-Wilberforce confrontation on evolution, the novel position has stood the test of time, but the belief that the asteroid Icarus would impact the earth in 1968 has not stood the test of time. In both cases, science has been served well by demonstrations of its power and predictiveness. Recent meetings of the AAAS have shown salutary trends toward increased public relevance --largely on the application of technology for the public good. There seems to us to be an equally important area which has not been adequately stressed, namely, the application of scientific thinking to problems of human interest. Symposia on such subjects as unidentified flying objects can play a significant role in correcting this omission.

There are other topics that might illustrate the scientific method as well or better; but not all of these are in the public eye. All the speakers in this symposium have made recognized scientific contributions. When there is a difference of opinion between scientists with such established credentials, we believe the scientific community is honor bound to keep the lines of communication open and to aid constructive discussion. We do not see how such a symposium can fail to serve science well.

A similar position has been stated in the document "Science and the Future," a conference summary of a joint meeting sponsored by the British Association for the Advancement of Science and by the American Association for the Advancement of Science, April 13-19, 1969, in Boulder, Colorado. In a discussion of "Education throughout Life" the following paragraphs appear:

Students are often taught "the scientific method" in a rigid and formal way which neglects the role of creativity, which reduces its intellectual and social value, and which implies that it is a limited sequence of steps. It should, instead, be thought of as a continuing series of predictions, tests (with adequate controls), and creative hypotheses, and it can only be thoroughly understood by active involvement in this continuing

process. There is danger in mistaken ideas amongst the general public of what constitutes a scientific experiment; many "experiments" are performed by individuals, but few of them are scientific in any sense. It may well be far more important to have a large body of people who know how to choose between alternatives on public policy matters based on science, or at the least to be able to follow complex arguments, than it is to have people understand detailed procedures of scientific methods. Perhaps the Associations should include in their programs doubtfully scientific areas of current public interest, such as astrology, extra-sensory perception, and unidentified flying objects, to show how these can be considered in a scientific way.

It is clear to us that the present and future well being of mankind depends upon scientific knowledge. Distrust of science, however, commonly arises from ignorance, or from a mistaken idea of the motivations of scientists. It is very important for young people to know that a "self-correcting" process is inherent in science. Although scientists are aware of this, young people must learn that science and scientists are not free from error and other limitations. Positive and creative attitudes should be promoted, especially at Association meetings, rather than mere negative or apologetic stands.

We consider that it is desirable to have courses at school level on choice-making, and on the difficulties of making true judgments when one is too close to a subject. The Associations should help in discovering such courses if they exist, in developing them if they do not yet exist, and in any case by promoting continuing discussion and study through symposia and other means, and by expressing publicly their concerns about these matters. A conscious and explicit presentation of value-judgments is needed at all stages, together with statements of what choices are involved and of what possibly different points of view may exist.

What is good at the present time in one field and for one country may be evil for the future, or in another field, or for another country or for the world. Decisions involving value-judgments must be made, and we should stress that the avoidance of decision is in itself a decision.

The statement was authored by a subgroup chaired by Kenneth Hutton of the British Association, with William Kabisch of the AAAS as Rapporteur and the following scientists as members: E. U. Condon, Ian Cox, Steven Dediljer, Dame Kathleen Lonsdale, Robert Morison, and Carl Sagan.

The order of presentation of topics in this book has been slightly altered from that in the original symposium for reasons of coherence. The first section is introductory and historical; the second is largely devoted to the observations and debates on their interpretation; the third, to social and psychological aspects of the UFO problem; and the fourth is a retrospective and perspective. The participants are astronomers, physicists, sociologists, psychologists, psychiatrists, and a representative of the communications media, and they include most of the scientists primarily involved in discussion of UFO's over the years.

This book begins with a collection of UFO cases, including some of the instructive, puzzling, or fashionable ones discussed from various points of view later in the book. The first paper, by Thornton Page, argues that while much of the UFO reporting has been abysmally sensational and inaccurate, widespread public interest in the subject, viable to the present day, makes the discussion of UFO's an ideal medium for introducing many related scientific issues. William Hartmann and Franklin Roach, both professional astronomers who participated in the preparation of the Condon Report, present different perspectives on the UFO problem. Dr. Hartmann discusses a range of misapprehended natural phenomena that have been identified as UFO's, considers the photographic evidence on UFO's which he has studied extensively, and concludes that "there may be fewer than a dozen [cases] that involve phenomena marginally outside the borders of accepted science." Dr. Roach argues that the cumulative sky coverage of astronomical telescopes is so small that no strong negative conclusions can be drawn from the fact that professional astronomers have not reported UFO's. He suggests that there may be large numbers of civilizations substantially in advance of our own which are capable of interstellar space flight.

J. Allen Hynek summarizes his twenty-one years of experience with UFO reports as principal scientific consultant to the U.S. Air Force Project Bluebook. After "detailed examination of thousands of reports and interrogation of hundreds of witnesses" Dr. Hynek concludes that the unexplained cases "do not specify any known physical event [or] any known

psychological event or process." He believes that puzzling cases have been explained away in much too cavalier a fashion, that there is a convention of ridicule which prevents interesting cases from seeing the light of day, and that the UFO phenomenon demands serious scientific attention. He is cautious on the question of explaining the unresolved cases.

The late James McDonald was extremely critical of U.S. Air Force handling of the UFO problem but stressed that the inadequacies of Air Force investigations were due to incompetence rather than conspiracy. Charging inadequacy in all past UFO investigations, McDonald writes: "I speak not only from intimate knowledge of the past investigations, but also from three years of detailed personal research, involving interviews with more than five hundred witnesses in selected UFO cases, chiefly in the United States. In my opinion, the UFO problem, far from being the 'nonsense problem' it has been labeled by many scientists, constitutes an area of extraordinary scientific interest." And he concludes: "it is difficult for me to see any reasonable alternative to the hypothesis that something in the nature of extraterrestrial devices engaged in something in the nature of surveillance lies at the heart of the UFO problem."

Donald Menzel, author of one of the earliest books on flying saucers and also a consultant to the Air Force Project Bluebook, contends that all of the UFO reports can be understood in terms of misapprehended natural phenomena. Some of these, he argues, may be very complex-- although most explanations turn out to be fundamentally simple. He uses meteorological, astronomical, biological, human technological, and psychological explanations for many puzzling cases and is critical of those who maintain there is a residuum of inexplicable cases. His report includes seven appendixes, four on particularly interesting cases, one on whether flying saucers tend to move in straight lines, and two on UFO's in art and in the Bible.

Kenneth Hardy draws upon his experience with ultrasensitive radar systems at the Air Force Cambridge Research Laboratories. He describes how radar echoes can be caused by atmospheric refraction and offers remarkable cases of detection of single birds or insects over distances of many miles. R. M. L. Baker, Jr., describes his detailed analyses of four motion pictures of UFO's which have features not completely explained, in his view, as well as about a dozen other films which he concludes were either hoaxes or photographs of natural phenomena.

Initiating the discussion of the social and psychological aspects of the UFO problem, Robert Hall discusses rumor processes, belief systems, mass hysteria, hysterical contagion, and systematic misperception. He believes, however, that some of the "hard-core UFO reports stand up better than many a court case" as far as witness credibility is concerned, and contends instead that scientists may have been unwilling to accept evidence that threatens their belief systems. Douglass Price-Williams is interested in the epistemology of UFO reports and the extent to which the actual nature of the phenomenon is hidden by the attempt of the observer to describe it. He believes that a massive statistical search for invariants across a mass of puzzling reports may reveal the intrinsic nature of some of the puzzling reports.

Lester Grinspoon and Alan Persky, drawing upon a background in psychiatry, are impressed by the unusual emotions exhibited by both witnesses and interpreters of UFO phenomena (including at least some of the participants in the symposium). Unlike other topics in scientific study, UFO's seem to rouse a fervor usually reserved for politics, morality, or religion. Drs. Grinspoon and Persky discuss a range of unconscious mental processes, arguing that a large and possibly growing fraction of the community, while generally normal, is subject to transient mental disturbances in stressful situations. UFO's provide powerful and universal psychological symbols.

In a lucid discussion of the reliability of witnesses of scientific phenomena, Frank Drake chooses three examples: (1) a case of seemingly clear-cut photographic evidence for a flying metallic disk; (2) the apparently verified report of the receipt of a television signal from a station three years off the air; and (3) conclusions drawn from eyewitness reports of meteor falls. All three examples are from Professor Drake's personal experience and may shed considerable light on phenomena of the UFO type. Waiter Sullivan, the science editor of the *New York Times*, describes the connection between the UFO phenomenon and the news media. He discusses the subtle impediments to more precise reporting and holds that at the very least the UFO phenomenon provides a useful case study of the processes that tend to mold our belief systems.

In the first of two retrospective papers, Carl Sagan argues that there is insufficient evidence to exclude the possibility that some UFO's are space vehicles from advanced extraterrestrial civilizations, but he maintains that other speculative

hypotheses are equally probable or improbable, and that the insignificance of our civilization and the vast distances between the stars make the extraterrestrial hypothesis unlikely. He discusses some of the psychological factors molding popular beliefs in UFO's. Philip Morrison's summary of what constitutes scientific evidence is extremely rich in concrete cases connected with UFO's and is a model of critical analysis of controversial phenomena.

In his remarks which opened the symposium, Professor Roberts stressed his belief that the public understanding of science is at stake and that the borders between scientific and nonscientific discussion need explicit delineation. He expressed his hope that the discussion would be well balanced and provide that self-correcting process required for the advancement of science. We hope that the present volume contributes toward this goal.

-- CARL SAGAN
THORNTON PAGE