

UFO Study: Condon Group Finds No Evidence of Visits from Outer Space

The final report* of the first extensive study of unidentified flying objects (UFO's) was made public last week, and it contained bad news for flying-saucer fans. The study, which was conducted by the University of Colorado under Air Force sponsorship, found no convincing evidence that UFO's are spacecraft from another world. It also recommended against further large-scale studies of UFO's.

"Our general conclusion is that nothing has come from the study of UFOs in the past 21 years that has added to scientific knowledge," states Edward U. Condon, the project's eminent scientific director. "Further extensive study of UFOs probably cannot be justified in the expectation that science will be advanced thereby."

The study's findings and recommendations, as well as its scope and methodology, were unequivocally endorsed by a special review panel† set up by the National Academy of Sciences. "We are unanimous in the opinion that this has been a very creditable effort to apply objectively the relevant techniques of science to the solution of the UFO problem," the panel asserted. "On the basis of present knowledge the least likely explanation of UFOs is the hypothesis of extraterrestrial visitations by intelligent beings."

The Colorado study is unquestionably the most thorough and sophisticated investigation of the nebulous UFO phenomenon ever conducted. It commenced in October 1966 and continued for about 2 years, at a cost in excess of \$500,000. The project involved a total of 37 staff members, some from the University of Colorado, some from other universities or from government and private laboratories, plus numerous other specialists who

were employed on small aspects of the problem. Investigators made field trips to interview witnesses of alleged UFO sightings ("By all odds the most used piece of physical equipment was the tape recorder," Condon notes). They also conducted historical research, reviewed the UFO literature, arranged several ingenious laboratory tests, and called in experts on radar, optics, meteorology, and perception to help explain puzzling sightings.

The extensive investigation was commissioned by the Air Force in the hope that a study by independent scientists would quiet the persistent controversy over UFO's, but no sooner had Condon's report been issued than it was under attack. The National Investigations Committee on Aerial Phenomena (NICAP), an organization of UFO buffs, staged a press conference in Washington, D.C., and produced two scientists who vigorously criticized the adequacy of the study and the validity of the conclusions drawn from it. One of the scientists was David R. Saunders, a psychologist formerly associated with the project, who has co-authored a paperback book, released last week to coincide with issuance of the Condon report, entitled *UFOs? YES! Where the Condon Committee Went Wrong*. The other was James E. McDonald, an atmospheric physicist from the University of Arizona, who believes the most likely explanation of some UFO's is that they are of extraterrestrial origin. (For an account of previous battles between these men and Condon, see *Science*, 26 July 1968.)

The two scientists and other participants in the press conference charged that Condon was biased against the extraterrestrial hypothesis, that the Colorado group failed to investigate the "vast majority" of significant UFO sightings, and that the report's conclusions are not borne out by the evidence in the body of the document. McDonald also claimed that the Academy panel was "not adequately prepared to assess" the Colorado report.

Thus the UFO controversy seems

unlikely to end, despite the Colorado report's massive documentation (it is 1485 pages long) and its undoubted contributions to an understanding of the UFO problem.

One of the greatest contributions of the study was to demonstrate that much of the seemingly "hard" evidence of UFO's is not very hard at all, and that even the most experienced and responsible observers can be fooled by what they see. This was well illustrated in a UFO scare that swept over Vandenberg Air Force Base and various Pacific Missile Range tracking installations in the fall of 1967. It all started one night when a missile-range official spotted an object in the sky over the ocean. He called another official 3 miles away, who confirmed the sighting and who, in turn, called a third officer, who also confirmed the sighting. The object seemed to have colored lights, and seemed to be stationary, or perhaps spinning. Tracking and search radars from Vandenberg and three other installations were asked to look for the object, and immediately reported dozens of unidentified targets, some stationary, some moving at speeds up to 80 knots. Then additional objects were spotted visually—one appearing to move in such an alarming way that an observer yelled "Duck!" In the heat of the moment, three flights of fighter planes were sent to investigate the situation, but none of the pilots saw anything.

Fortunately, the incident produced an unusual amount of hard instrument data, more numbers than any other case in the Colorado files. The information included radar-generated data describing the behavior of the targets, as well as data on weather conditions and tape recordings of conversations between the pilots and their bases. Working with this windfall, specialists from the Stanford Research Institute (SRI) and other facilities were able to identify most of the radar targets "beyond serious doubt," and they were able to make a plausible explanation of the visual sightings.

The experts concluded that an unusually strong temperature inversion provided favorable conditions for both visual and radar mirage effects; that the stationary targets, including the visual observation that touched off the whole incident, were probably mirages of ships beyond the horizon; that the faster radar targets were almost certainly birds, which radar operators had not had occasion to look for before; and that other radar targets were

* A paperback edition of the report, entitled *A Scientific Study of Unidentified Flying Objects*, will be published shortly by Bantam Books; \$1.95.

† The panel, chaired by Gerald M. Clemence, of Yale University, former scientific director of the U.S. Naval Observatory, included H. R. Crane, David M. Dennison, Wallace O. Fenn, H. Keffer Hartline, E. R. Hilgard, Mark Kac, Francis W. Reichelderfer, William W. Rubey, C. D. Shane, and Oswald G. Villard, Jr.

caused by anomalous propagation. Targets with the same general characteristics were picked up under similar weather conditions 3 days after the original sighting, and were picked up on still a third occasion while SRI experts were on the scene.

R. T. H. Collis, of SRI, called the Vandenberg episode "a landmark case in the whole area of UFO studies" and said it provided an "important object lesson" in how specific sightings can be inappropriately juxtaposed and misinterpreted to produce a seemingly mysterious event.

The Colorado report is laced with other examples of puzzling UFO incidents that suddenly became less mysterious when they were subjected to scientific scrutiny. The examples are too numerous to review in detail, but the following three cases will give some idea of the extent to which sophisticated laboratory techniques were able to shed light on the UFO problem.

► One of the most dramatic bits of physical evidence cited to prove that flying saucers are "real" is a piece of magnesium that supposedly came from a flying disk that exploded off the coast of Brazil in 1957. The case was first publicized by a Brazilian society columnist who claimed he had received the metal from a fisherman who witnessed the explosion, though the fisherman has never been located or identified. An interested UFO buff obtained the metal from the columnist and, according to his account, had it analyzed in a Brazilian government laboratory, where analysis supposedly showed it to be of greater purity than human technology could produce.

The Colorado project managed to obtain a sample of this magnesium and had it analyzed by neutron activation, the most sensitive analytical method currently available, in a laboratory of the Internal Revenue Service. The magnesium turned out to be "not nearly so pure" as magnesium produced in 1957 by Dow Chemical Company. It did contain an unusual pattern of impurities, most notably a relatively high strontium concentration, but Dow records indicate that as early as 1940 the company's laboratories made magnesium containing essentially the same concentration of strontium.

Interestingly enough, Saunders, the psychologist formerly associated with the project, cites the pattern of impurities in the Brazilian case as one of three "facts" that lead him to conclude that a new theory, possibly involving



Edward U. Condon

extraterrestrial intelligence, is needed to explain UFO's.

► Many UFO reports allege that automobile ignitions, engines, or headlights have failed when UFO's hovered overhead, presumably because the UFO had been the source of a strong magnetic field. However, the Colorado project was unable to detect any magnetization in the few such cases it studied. In one case, a seemingly responsible woman reported that her car seemed to be under the control of a UFO, and that various mechanical and electrical functions were later found to be impaired. Ford Motor Company specialists who examined the car 2 months later found no faults not attributable to ordinary causes, and no significant magnetic or radioactive anomalies.

► Since much of the evidence cited by UFO enthusiasts involves photographs of supposed flying objects, the Colorado project analyzed numerous available photographs with great care. Using sophisticated geometric techniques that require a pair of pictures showing substantially the same scene from two different camera locations, a photogrammetrist employed by the Raytheon Company was able to demonstrate that one widely publicized pair of UFO photos from Roseville, Ohio, had been taken in a sequence, and at a time interval, different from that claimed by the owner of the pictures.

Most of the photographic detective work was performed by William K. Hartmann of the University of Arizona, and involved such techniques as analyzing shadow patterns or other details in the picture. Of 35 photographic cases investigated, from the years 1966

to 1968, Hartmann concluded that nine were probably fakes, seven were misidentified natural phenomena, 12 provided insufficient data for analysis, and seven were possible fakes. None proved to be "real objects with high strangeness."

Of 18 older "classic" cases studied, Hartmann concluded that only two cases raised perplexing questions. One was a 1950 McMinnville, Oregon, case, which involved photographs that Condon called "too fuzzy" for good analysis, but which Hartmann identified as "one of the few UFO reports in which all factors investigated, geometric, psychological, and physical, appear to be consistent with the assertion that an extraordinary flying object, silvery, metallic, disk-shaped, tens of meters in diameter, and evidently artificial, flew within sight of two witnesses." The other case involved movies taken at Great Falls, Montana, in 1950 which seemingly indicated the presence of "real objects with high strangeness." However, Hartmann said his study turned up no "conclusive evidence" of the existence of "flying saucers."

The two perplexing photographic cases were not the only UFO incidents that the Colorado project was unable to explain. Perhaps the most puzzling incident occurred at Lakenheath Air Base in England in 1956. A UFO that seemed to be traveling at great speed, perhaps 4000 miles per hour, was tracked by radar operators on the ground, simultaneously with apparently corresponding visual sightings of round, white, rapidly moving objects which changed directions rapidly. Two fighters were sent up to intercept the UFO. One pilot even reported airborne radar contact and radar gunlock, but no sooner were his guns locked on, than the UFO seemed to whiz around behind him. The UFO then tailed the plane despite intense evasive maneuvers by the pilot. Contact was not broken until the aircraft returned to base, low on fuel. Gordon D. Thayer, who conducted optical and radar analyses for the project, calls this "the most puzzling and unusual case in the radar-visual files. The apparently rational, intelligent behavior of the UFO suggests a mechanical device of unknown origin as the most probable explanation of this sighting."

The scientists who criticize the Condon report attach great significance to the residue of perplexing cases, and suggest that even a few such cases may indicate that there is an extraterrestrial

NEWS IN BRIEF

• TRUMAN NAMED MOUNT HOLYOKE PRESIDENT:

David B. Truman has resigned as vice president and provost of Columbia University to become president of Mount Holyoke College in South Hadley, Mass. Truman, who has filled Columbia University's second highest administrative post since June 1967, was formerly dean of Columbia College and has been at Columbia for 19 years. He was a central figure in the student-administration confrontations, which occurred at Columbia last spring (see *Science*, 22 Nov.). Truman will assume on 1 July 1969, his duties as president of Mount Holyoke, a woman's college with 1800 students.

• EDUCATION UNDER THE GI BILL:

More than a half million veterans are now enrolled in education and training programs under the "Post-Korean GI Bill" and nearly 325,000 of these are involved in college-level programs. A Veterans Administration (VA) report shows that nearly 1 million, or about 20 percent, of all recent veterans have received some educational benefits under the present GI bill, which became effective 1 June 1966. VA officials told *Science* that the percentage of veterans expected to seek educational benefits under the present bill will probably approach 50 percent, as was the case with both World War II and Korean War veterans. Under the present bill, servicemen are eligible for educational benefits for 8 years after they terminate their service. The 325,000 veterans now enrolled in college-level programs constitute slightly more than 5 percent of the 6 million students estimated in higher education last fall.

• **CRIME RESEARCH GRANTS:** The Justice Department has announced "Exercise Acorn," a small grants program to encourage new ideas in research and development in broad areas of crime prevention, crime control, and the administration of justice. The recently established National Institute of Law Enforcement and Criminal Justice within the Justice Department plans to award about 50 grants, not exceeding \$5000 each, to scientists, scholars, and other professionals interested in research in such areas as the reduction of crime, the improvement of law enforcement services, courts, and correctional institutions, including parole and probation agencies. There are no spe-

cific eligibility requirements for grant applicants. Institutional and individual project proposals may be submitted to Ralph G. H. Siu, Director, National Institute of Law Enforcement and Criminal Justice, Department of Justice, Washington, D.C. 20530.

• **POWER PLANT PERIL:** An inter-agency report, which calls for advance planning in choosing power plant sites, warns that an estimated 250 huge new power plants needed to fulfill the nation's future power demands by 1990, could constitute a serious peril to the nation's air and water supply. *Considerations Affecting Steam Power Plant Site Selection*, which was prepared by the Office of Science and Technology, calls for scientific and engineering developments to reduce danger from thermal pollution, radiation contamination, and other potential pollution hazards; it may be obtained for \$1.25 from the Superintendent of Documents, U.S. Government Printing Office.

• FEDERAL RAT CONTROL GRANTS:

The final grants to cities for rat control pilot studies have been announced by Wilbur J. Cohen, Secretary of Health, Education, and Welfare. The grants were provided by Congress on second thought after it defeated the President's Rat Bill in 1967. The Partnership for Health Act provided a total of \$15 million to 14 urban areas which were selected to pose a variety of rat control problems. The federal grants are supplemented by almost \$6 million in matching funds. The projects will be evaluated at the end of 1969, and the experience derived will be made available for use in the rest of the 130 major cities in the country.

• ARS ANIMAL RESEARCH CENTER:

A \$2.7-million National Meat Animal Research Center is being established by the Agriculture Research Service (ARS) in Clay Center, Neb., to coordinate all new ARS research efforts in livestock breeding and management. The purpose of the center, which will support about 240 specialists, will be to conduct new ARS basic and applied research programs in the feeding, breeding, and genetics of livestock and meat production; to study how animal wastes contribute to water pollution; and to continue research conducted formerly at ARS regional centers.

reality behind the UFO mystery. But Condon and the Academy panel, noting that UFO cases tend to be explicable in conventional terms when enough data are available, disagree. The Academy panel asserts that, "while some incidents have no positive identification with familiar phenomena, they also have no positive identification with extraterrestrial visitors or artifacts." It adds that, while some UFO sightings are not easily explained, the Condon report suggests "so many reasonable and possible directions in which an explanation may be found that there seems to be no reason to attribute them to an extraterrestrial source without evidence that is much more convincing."

The Condon report emphatically asserts that there is no evidence of a government conspiracy to hush up the truth about flying saucers. "We have no evidence of secrecy concerning UFO reports," Condon states. "What has been mis-called secrecy has been no more than an intelligent policy of delay in releasing data so that the public does not become confused by premature publication of incomplete studies of reports."

In the past, however, there was considerable official secrecy, for up to 1960 UFO reports were handled as classified information. Condon believes this secrecy did much to fuel the UFO controversy, for it allowed dark suspicions to take root, and it fostered sensationalized commercial exploitation of the idea that the government knew much about UFO's that it was concealing. "Had responsible press, magazine writers, and scientists been called in and given the full story . . . they would have seen for themselves how small was the sum of all the evidence and in particular how totally lacking in positive support was the ETH [extraterrestrial hypothesis] idea," Condon says.

Whether the Condon report will ultimately quiet the UFO controversy remains to be seen, but the criticisms already stirred up by the Colorado project serve as a reminder that scientific methods are not always able to resolve problems in fields where emotions run high and data are scarce. Meanwhile, a Nobel prize probably awaits the first scientist who conclusively demonstrates that UFO's really are vehicles from another world. As Condon notes, this would be "the greatest single scientific discovery in the history of mankind."

—PHILIP M. BOFFEY