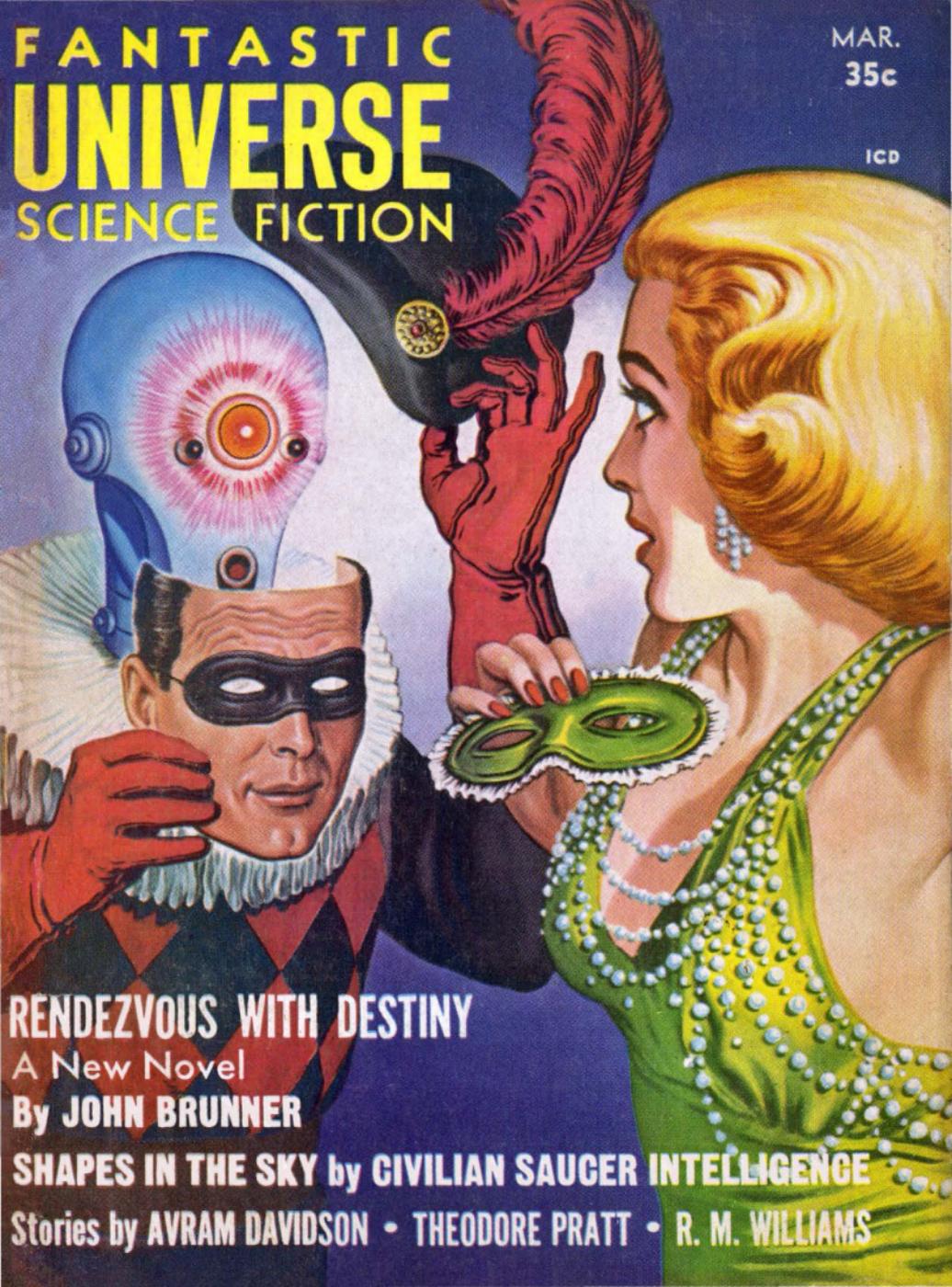


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RENDEZVOUS WITH DESTINY

A New Novel

By **JOHN BRUNNER**

SHAPES IN THE SKY by **CIVILIAN SAUGER INTELLIGENCE**

Stories by **AVRAM DAVIDSON** • **THEODORE PRATT** • **R. M. WILLIAMS**

shapes
in
the
sky

by . . . Civilian
Saucer Intelligence

What are these angels in the sky? Birds? Clumps of water vapor? Mirages? Or really Unidentified Flying Objects?

Angels.
Hordes upon hordes of them.
We shall have data of hosts of angels. . .

THUS Charles Fort begins one of the chapters of *The Book of the Damned*. He was speaking of the hosts of unknown bodies that have often been seen to cross our skies. Of course, in 1919, when Fort wrote, it was a question of visual observation only. It was not until many years after his death in 1932 that it was possible to write: " 'Radar angels' are spots on a radar screen that are caused by something unknown in the atmosphere." (*Science News Letter*, Sept. 14, 1957.)

In our last article we cited some examples of UFOs observed on radar. "Radar angels" form a rather ill-defined class of these, distinguished by two rather non-"saucer"-like characteristics:

(1) They loaf along at horse-and-buggy speeds.

(2) They are invisible, or at least hard to see, to the human eye.

This is the category of radar observations that the Air Force's Project Blue Book felt was "of no significance whatsoever" (Special

The following article, which could more properly have been called THE NATURAL HISTORY OF ANGELS, is undoubtedly one of the most unusual articles to be prepared specially for this magazine by the Research Section of CSI, which publishes a newsletter and has an extensive file of UFO material.

Report #14, 1955, p. 77). The Report authors certainly did not mean to imply that the phenomena are spurious, due to malfunctioning of the radar, which would be untrue. Perhaps what they meant was that these "angels" are "of no significance" as evidence for flying saucers in the *narrow* sense—i.e., that they don't seem like observations of *metallic spaceships*. We may readily grant that they don't suggest metallic spaceships, without feeling, as the Report authors seem to do, that this takes all the interest out of them. It's uncertain whether these angels really differ from the high-speed objects mentioned in our last article. Maybe they simply have more time on their hands. As we shall see a bit later, some of these slow objects seem to be quite able to pour on the speed in true UFO fashion when they feel so inclined. Some of the cases we cited last time might well qualify as angels—the radar kibitzers at Orlando Air Force Base, though our information on them is scanty, sound particularly "angelic."

The apparently *purposeful* behavior of these Orlando objects (which are said to congregate when a rocket is about to be fired) is characteristic; it has been recognized for a long time. In what seems to be the first article on the subject in a non-technical publication, Wesley Price's "The Sky Is Haunted," in the *Saturday Evening Post* of March 9, 1948, this feature was singled out. Price stated that Ken-

neth Ehlers, of the Landing Aids Experiment Station at Arcata in northern California, had been picking up "gizmos" (angels) on his radar screen "for almost a year." Ehlers offered some generalizations on those he had seen:

"(1) Gizmos always cruise at 30 miles an hour. (2) They fly singly or in groups up to five. (3) They appear in any weather, day or night. (4) They cruise low, often at 800 feet. (5) They usually take a course about south-by-east. (6) They fly upwind, downwind, or crosswind."

"Ehlers has shown gizmos to such notable scientists as Dr. Luis W. Alvarez, the inventor of the radar Ground Control Approach System," wrote Price. "Dr. Alvarez cannot explain the gizmos, but he agrees that all radar pips must be caused by 'a discontinuity in atmospheric conditions.' A 'discontinuity,' in radar jargon, is usually something tangible, like an airplane or a rain cloud. . . . 'I don't understand, though,' added Dr. Alvarez, 'why the gizmos don't always move with the wind—if *they aren't alive.*'"

According to Price, "gizmos were reported in wartime before the A-Bomb." To be precise, it seems that they were first reported—and dubbed "angels"—in 1944 by radio engineers who were developing microwave radar systems at three eastern U. S. laboratories: Bell Telephone Laboratories in Holmdel, N. J., the Signal Corps Labo-

ratories at Belmar, N. J., and the Chesapeake Bay Annex of the Naval Research Laboratory. (See *Proc. Inst. Radio Engrs.*, 35 (1947), pp. 494, 1105; 36 (1948), p. 363.) Of course, all this was secret at the time. It may perhaps be significant that 1944 was also the year of the sudden appearance of the "foo-fighters"—luminous, apparently intelligently maneuvering spheres seen by bomber pilots over Germany. These foo-fighters were seen the following summer over the Pacific (see *Amer. Legion Magazine*, Dec. 1945). So were the radar angels.

A dramatic account has been given by Keyhoe in *The Flying Saucer Conspiracy* (pp. 221-224) of an alarming radar sighting of a horde of angels during the Navy's attack on Okinawa in the spring of 1945. The incident was described in detail to Keyhoe by one of the observers, the Combat Information Center officer aboard an aircraft carrier in the Nansei-Shoto (Ryukyū) islands. A dense formation of 200-300 "bogies" (unidentified aircraft) was detected on the scopes 120 miles to the northeast at a height of 12,000 feet, advancing toward the task force at 700 miles per hour—faster than any known planes could fly at that time. As the host of "bogies" approached, the carrier sent up twelve fighter planes in what looked like a futile gesture against certain doom. But to the utter amazement of the radar men, not a ship nor a plane was

able to see a single thing in the clear blue sky when the radar showed the objects all about them.

In the fall of 1954, there occurred some very remarkable sightings of formations of invisible radar angels, similar in some respects to the "Nansei-Shoto ghosts." The locale this time was England. One day in late September, about noon, a U-shaped formation of blips suddenly appeared on radarscopes, flying westward at 12,000 feet. It consisted of forty or fifty objects, and covered an area eight miles wide and twelve miles long. As the operator watched, the end of the U opened up and the formation changed to two parallel lines; a few moments later, the formation assumed the shape of a "Z" (or "N"), before finally disappearing. This weird demonstration took place in a sky which, to the human eye, was empty—devoid of aircraft, birds, or UFOs.

Incredible to relate, the identical phenomenon was repeated no less than six times before November 7th, according to the London *Sunday Dispatch* of that date, which credited "a War Office spokesman" as its source. "Neither the War Office, which controls inland radar, nor the Air Ministry can say what these 'blips' represent. A careful check has shown that they have not been caused by any identifiable aircraft. . . . They appear from nowhere, about midday, flying at a height of 12,000 feet in an east-to-west direction. First seen by a civil-

ian radar scientist, they have since then been plotted by all radar sites in the area. They are invisible to the human eye. . . . On the radar screen they appear as lots and lots of dots formed by between forty and fifty echoes. Every time they have been seen they have followed the same pattern." (Keyhoe, *The FS Conspiracy*, pp. 217-18)

Strange and sensational as these repeated English appearances were, they caused nothing like the furor that erupted in the United States in the summer of 1952 when some radar angels took a notion to inspect our nation's capital. Actually, this sighting was not essentially different from dozens of others, but it caught the newspaper editors' attention because of its location, and they gave it front-page scare headlines. The resulting uproar lasted for some days. Finally, all was "officially explained"—as radar mirages! Although the newspapers strove to convey that impression, the Air Force was not really responsible for this "explanation"—which traded on the reader's credulity so brazenly as to merit comparison with the yarns told by saucer "contact" claimants. The Air Force's *real* "official explanation" (if such it can be called!) has never received much attention.

Here—in brief—is what happened at Washington, D. C.:

The first objects appeared at 12:40 a.m. on July 20, 1952. Harry Barnes, senior air traffic controller for the CAA, was on duty in the

Control Center at Washington National Airport. Suddenly he and his crew saw a group of seven "blips," at a distance of 15 miles, that had just appeared on the 24-inch scope. Since they had not come in from the edge of the screen, they had evidently come down into the radar beam from above. Their motion, by UFO standards, was languid—100 to 130 mph—and entirely uncoordinated. They performed the typical UFO angular turns and sudden reversals. "They acted as if directed by some innate curiosity—like a bunch of small kids out playing," according to Barnes. (NEA in N. Y. *World-Telegram*, July 29.) At intervals they disappeared, or perhaps jumped at great speed from one point to another. The other radar sets at the airport, and that at nearby Andrews Field, confirmed the presence of these unaccountable objects. Soon they were hopping and crawling all over the scope, flying with casual indifference over such sacrosanct and militarily *verboden* spots as the White House and the Pentagon. Some airport personnel went out to look, and saw orange lights in the sky. Airplanes in the vicinity were asked to look out for the objects, and some saw irregularly-moving bright lights. The veteran Capital Airlines pilot "Casey" Pierman saw six of these lights in fourteen minutes, and according to Barnes each of these lights agreed in position with one of the radar targets. The Air Force was notified early, but it was

two hours before an F-94 jet arrived. While it was flying about, the radar blips absented themselves; and after it returned to its base, they came back. Although they seemed to shun this military plane, they showed an interest in the commercial aircraft and frequently followed them (as at Orly, in last month's article). About 4 a.m. one followed Pilot Howard Dermott of Capital's Flight 610 to within four miles of the airport; to Dermott it appeared as a large white light, in the same position as indicated by the radar. Shortly before daybreak there were ten of them playing leapfrog over Andrews Field. Andrews tower operators, notified by the Barnes group that their radar showed one of the angels was hovering directly over their radio range station, looked out: there it was. They described it as "a huge fiery-orange sphere." (Ruppelt, p. 214).

On the morning of the 23rd a great many more of these things were seen on the scope, loafing along at 35 to 40 mph "in pairs and threes" in a sort of procession to the southeast. This sighting—which showed remarkable agreement with Kenneth Ehlers's 1948 description—did not get into the newspapers. But at 9:08 p.m. on the evening of the 26th, just one week after the first excitement, eight objects—the original eight, maybe—returned to the National Airport and Andrews Field radar screens. Again commercial pilots saw lights where radar showed

angels: United Airlines Flight 640, notified by Barnes that it was near three blips, replied: "We got one in sight. He's real pretty." Again a jet intercept was requested and—after a considerable delay—dispatched; but just as before, all the angels disappeared from the scopes when the two F-94's arrived, only to return a few minutes after the jets had left. But the radar controller wasn't going to let the things make him look like a fool this way. He called for the jets again, and a second pair was sent over at 1:40 a.m. This time the UFOs were obliging enough to stay within radar range. One of the interceptor pilots, Lt. William Patterson, saw four of them, as white lights about ten miles ahead of him and slightly above him; he gave chase at his top speed (about 600 mph) but "had no closing speed"—i.e., couldn't catch up with them; the objects disappeared, still ahead of him. A few minutes later, when about 15 miles southeast of Washington, he saw another as a steady white light about five miles away. He chased this one for about a minute before he "lost visual contact." (Sources for the above description: Ruppelt, pp. 212-224; Keyhoe, *FS from Outer Space*, pp. 62-87; LIFE, August 4, 1952; Barnes, as cited. These accounts agree on all essential points.)

On the same night, exactly the same thing was happening in California. Here the UFO was seen not only on ground radar, and visually

by the F-94 pilot (as a large yellow-orange light), but was also "locked on to" by the F-94's own radar. The jet approached the object several times, only to have it pull away at a terrific speed; then in a minute or two it would slow down enough to let the plane approach it again—a "cat and mouse game," in the pilot's words. This occurrence was not made known to the public until Ruppelt's book appeared in 1956 (p. 222).

However, the events over Washington got into the papers, with a bang. The fact that jets were scrambled for "saucers" reached the public for the first time. Reporters besieged the Air Force press desk. On the morning of July 29 the *New York Times* half-plaintively, half-angrily demanded that the Air Force assure the nation immediately that it was all a ludicrous mistake: "Though the Air Force has done its best to dispose of the nonsense that comes from imaginative observers of 'objects,' it might do better. Why did pilots of jet planes that pursued 'objects' over Washington fail to catch up with their quarry? Such questions are bound to be asked. Unless they are answered in simple language, belief in visitors from outer space will be strengthened in those who cannot distinguish between speculation and scientific reasoning."

On the afternoon of the 29th, Major-General John Samford, Director of Air Force Intelligence, held a press conference in which

he attempted to allay these anxieties, without actually saying anything concrete—after all, since he knew no more about them than anyone else, there was really nothing he *could* say. If he enunciated an "official explanation" at all, it was in this immortal sentence: "I think that the highest probability is that these are phenomena associated with the intellectual and scientific interests that we are on the road to learn more about." Whatever this meant (if anything), it was not of much help to the press, which wanted to run the headline "AIR FORCE DEBUNKS SAUCERS"; so the next day's headlines ("AIR FORCE DEBUNKS 'SAUCERS' AS JUST NATURAL PHENOMENA": *Times*, July 30) were based on some remarks on radar mirages that Captain Roy James of ATIC had made at the conference. As Ruppelt puts it, "Captain James's answers were construed by the press to mean that this was the Air Force's answer—even though, today, these sightings are still carried as Unknowns."

Thus the "debunk" headlines were in fact *erroneous*, and simply represented wishful thinking by the press; but the Air Force made no effort to correct the error—far from it! Ruppelt (p. 224) candidly reports their satisfaction with these misleading news stories: "exactly the result that was intended—the press got off our backs." The fact that the public was being misinformed was of considerably less

concern to the Air Force people. As for the newspapers, their ignorance and prejudice had virtually guaranteed in advance that the public would be misinformed.

Although the radar-mirage "explanation" favored by the newspaper pundits and Capt. James is known by all radar experts to be entirely inapplicable, it seems to be the most popular with laymen, possibly because of its association with the optical-mirage "saucer" theory of Donald Menzel. As we mentioned in our previous article, it was even proffered by the anonymous authors of Blue Book Report #14: "It cannot be said with any assurance what these radar sightings mean, but the most logical explanation is that they are ground targets reflected by an atmospheric temperature-inversion layer" (i.e., radar mirages); to which they prudently added, "The validity of this statement cannot be established." This is putting it pretty mildly: its *invalidity* can be established.

Since radar beams are more easily bent than light rays, radar mirages (unlike optical mirages) are an everyday occurrence, and are quite familiar to any radar operator. As Barnes told Keyhoe, "Every man in here knows temperature-inversion effects. When an inversion's big enough, it picks up all sorts of 'ground clutter' — water tanks, buildings, shore lines, and so on. But anybody here can recognize it. It's nothing like those things we tracked. In the six years I've watch-

ed the scopes, absolutely nothing—high-speed jets, storms, inversions, or anything else—has ever caused blips that maneuvered like that." (*FS from Outer Space*, p. 100.) The traffic-control men at National Airport were bitter about the newspapers' publicizing of the mirage "explanation": they felt that such a suggestion amounted to calling them incompetent simpletons.

Probably no one concerned in this episode was aware that a competent discussion of "angels" by a radar specialist, Herbert Goldstein, had been published the previous year (in *Propagation of Short Radio Waves*, ed. D. E. Kerr, pub. McGraw-Hill, 1951; pp. 593-595). Goldstein states that "these echoes, known as 'angels,' have been observed by an increasing number of investigators," using 1-cm to 10-cm radar equipment, and, like Barnes, he comments that they "have a distinctive appearance." Speaking of unpublished observations made by his own group at the M.I.T. Radiation Laboratory, he says, "The echoes moved irregularly with speeds up to 20 mph. Occasionally they were seen at distances as great as 20 miles. The 'angels' seemed especially prominent after sunset. At times, the PPI (plan position indicator: radarscope) would be almost covered with them in a stippled dot pattern extending out 10 to 15 miles."

Goldstein mentions several explanations that have been suggested

by radar men; mirage is not one of them. "The tendency at first seemed to be to ascribe the echoes to *inhomogeneities in the atmosphere*: thus, Baldwin states: "The most attractive possibility is that the echoes are from clumps of water vapor." However, in Sec. 7.4 it is shown that the gradients of refractive index believed to exist in the atmosphere are much too small to account for the observed echoes." Baldwin's idea has also been disproved experimentally: A. B. Crawford (*Proc. Inst. Radio Engrs.* 37 (1949), 404) poured water on hot rocks to generate a dense cloud of steam. Far from producing intense radar echoes, it proved to be practically invisible on the radarscope.

"British investigators have paid considerable attention to echoes from *birds*. Some of the echoes may possibly be accounted for in this manner, although Baldwin failed to see any in a telescope mounted on his antenna." The bird theory has recently been revived by L. L. Bonham and L. V. Blake in an interesting article in *Scientific Monthly*, April 1956. Bonham and Blake describe and illustrate "phantoms" observed on shipboard radar off the Virginia coast in early 1950 and 1952. The average air speed of these "birds," as they call them, was 31 mph, ranging up to 63 mph (there are very few birds that can attain 60 mph in sustained flight), and the direction of flight was predominantly northward, "which suggests that many of the birds were

migrating northward" (this in mid-June!)

Bonham and Blake were injudicious enough to lay their theory before expert ornithologists. They were told that in mid-June, 100 miles out in the Atlantic, migratory land birds, and even gulls, are out of the question; of the few oceanic species, only the shearwater is even partially nocturnal ("many of the observations of phantom echoes were made at night") and it flies so low on the water that radar could not see it more than two miles away. Gannets are large and high-flying, but they do not fly by night, and in any case they would not be present in that area in June. The ornithologists had no other feathery candidates to offer. Bonham and Blake mention this expert testimony (p. 207) without seeming to realize that it is fatal to their theory.

It should be added, however, that *at sufficiently short distances* it is undoubtedly true that birds *can* be detected on radar. Bonham and Blake give just one example of radar blips that could be correlated with visually-observed birds; in this case, the birds were "at considerably less than a mile." Indeed, at even shorter distances (up to a few hundred feet), even *insects* can be picked up on some short-wavelength radar sets, as both Bonham and Blake and Crawford have shown. Of course these short-distance observations have no real relevance to the problem of "angels."

In spite of their enthusiasm for

the bird theory, Bonham and Blake are constrained to admit that "the characteristics of some of the many reports of 'phantom' targets may possibly require explanations other than those suggested here." Goldstein puts it more positively: "There seems to be a residuum of observations that cannot be accounted for by such explanations."

So much for mirages, "clumps of water vapor," birds, and insects. Can any other theory be devised to escape from the obvious conclusion that these "angels" must be some sort of Unidentified Flying Objects?

Disregarding purely amateurish suggestions such as "clusters of ionized air from atom-bomb tests" and "ball lightning," there is still one non-UFO hypothesis that deserves mention: floating radar mirrors. This idea was conceived by R. C. Borden and T. K. Vickers, two young physicists employed by the Civil Aeronautics Administration's Technical Development and Evaluation Center at Indianapolis, and was published in September 1952 in the C.A.A.'s mimeographed "Technical Development Report #180." This slim booklet, which was made available to the public at the time (though it is doubtless out of print by now) contains more detailed information on radar-angel observations than anything else we have seen.

In a large table, Borden and Vickers summarize 18 radar and 17 visual observations (mostly on ma-

neuvering lights, but including some clear-cut daylight "saucer" sightings) from the Washington area alone. All but one of these occurred in the brief period between July 10 and August 16, 1952—the height of the great 1952 wave of saucer sightings. The authors also report briefly on "angel" observations from other CAA airport radar installations: they are seldom or never seen at Minneapolis, Atlanta, and New York, and rarely at Boston, but are frequent at Cleveland and Chicago, where they "occasionally form a nuisance problem," since it is hard to distinguish them from helicopters.

One sees from this table what one could not have learned from the newspapers: that after the well-publicized incidents of July 20 and 27, the angels *continued to be seen* on Washington radarscopes with undiminished frequency. On the morning of the 29th, a host of them in a belt fifteen miles wide passed over on a southeast heading, traveling at speeds of 90-120 miles per hour. This time no visual contact was made, and the CAA radar men, made prudent by their earlier experiences, did not notify the Air Defense Command. This incident, occurring just before Gen. Samford's press conference, "made the papers": AP in the *Santa Fe New Mexican*, UP in *N. Y. Post*, July 29. On the night of August 5-6, another such procession or host passed over—heading east-southeast, at an average speed of 38 miles per

hour. At 2 p.m. on the 8th, three angels heading south at 60 mph; at 10:10 the next night, two heading east; on the evening of the 13th, sixty-eight objects heading southeast or south at speeds from 27 to 68 mph; on the night of the 15th-16th, a dozen, some following this path and some crossing it at right angles, at 24 to 52 mph. Further the CAA report (issued in September) sayeth not. Spectacular as were these sightings that occurred *after* the Air Force's press conference, none of them was mentioned by the newspapers.

Borden and Vickers deal principally with the 68 angels observed on August 13th-14th. For 16 of these, which passed over within an hour of a weather-balloon check on winds aloft, they found a striking correlation. Twelve of these 16 "targets" could be interpreted as objects moving with the wind at 8000 feet—*the altitude at which a small temperature inversion existed*—but at *twice* the wind's 25-mph velocity. They rationalized this discrepancy in speed in a very ingenious way: they interpreted the floating objects, not as direct sources of radar echo, but as horizontal radar *mirrors* (or lens-like atmospheric masses having the effect of mirrors) floating with the wind at the inversion level, in which the *ground* could be "seen" by the radar. In other words, they postulated that the "angels" were small, isolated, windborne spots of radar-mirage effect. The spot of reflected

ground image on the radarscope would appear at *twice* the real distance of the floating mirror, and would seem to move at *twice* its real speed.

This pretty theory was of course given much newspaper publicity, although one may wonder whether the journalists understood wherein it differed (or indeed, that it differed at all) from the theory of generalized radar mirage that they had found so convincing a few months earlier. Of course none of the newspaper commentators noticed anything wrong with it.

It seems a shame to spoil a theory that dispatched twelve angels so neatly, but the fact is that it breaks down on all the rest. Four of the sixteen August 13th angels were southbound, and would have to be interpreted as windborne mirrors at 2000 feet—where there was no inversion. Of the six August 15th angels considered, only *one* could be interpreted as a windborne mirror at the "inversion layer" (there was an insignificant inversion at 900 feet); the speed and direction of the other five necessitated assigning them to other levels. Turning to the tabulation of radar-angel incidents, we find that on more than half of the occasions when angels appeared, *no inversion at all* was present! Whatever possible rationalization may have existed for the "mirror" suggestion disappears when it turns out that there is no connection between the height of

the postulated "mirrors" and the structure of the atmosphere.

The second drawback of the Borden-Vickers theory is that it is impossible. As Goldstein pointed out, there is definitely nothing known or imaginable in the normal atmosphere that can affect radar waves so drastically. "Although the exact nature of the discontinuity is not known," say Borden and Vickers, "one possible explanation might be that it is an eddy in the atmosphere produced by the shearing effect of dissimilar air masses at the inversion boundary . . . bulges or dimples in the inversion layer." This optimistic statement overlooks (a) the fact that, on the evidence they themselves present, the inversion layer has nothing to do with the observed phenomena; and (b) the theoretical demonstration by Goldstein, and the experimental demonstration by Crawford, that no matter what assumptions one makes, it is simply not possible to combine air and water vapor so as to produce any such effect on the radar beam.

We conclude that nobody has yet

produced a "normal" explanation for radar angels that will stand up under the slightest serious examination—and that after all this time, it's scarcely likely that one will be produced in the future. In our simple-minded way, we suppose that the angels must, after all, be pretty much what they seem to be: some sort of unknown, luminous-at-night, intelligently-moving aerial bodies, often only a foot or so in diameter, and of some composition that is not easily visible by daylight at any great distance—evidently non-metallic. They show a gregarious tendency and like to travel in pairs and large swarms; they are interested in aircraft; although they don't usually travel very fast, they can outrun jets if they care to; and they certainly do not originate on the surface of this planet. In short, these angels must be something not too different from the aerial "jelly-birds" of our article on "angel hair." Perhaps, even, they are not different at all. It is pleasing to think—and it is by no means unlikely—that the source of "angel hair" may be, simply, "angels."

