

Unusual Aerial Phenomena

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Over a period of years, diverse aerial sightings of an unusual character have been reported. On the assumption that the majority of these reports, often made in concert, come from reputable persons, and in the absence of any universal hypotheses for the phenomena which stimulated these reports, it becomes a matter of scientific obligation and responsibility to examine the reported phenomena seriously, despite their seemingly fanciful character. Accordingly, several hundred serious reports of "unidentified aerial objects" have been studied in detail in an attempt to get a pattern classification. It appears that those reported phenomena which do not admit of a ready and obvious explanation exhibit fairly well-defined patterns and that these are worthy of further study. One pattern in particular, that of a hovering nocturnal light, does not appear to be readily explainable on an astronomical basis or by mirages, balloons, or by conventional aircraft.

PERHAPS the most bizarre phenomenon of our times is the continued popular interest in flying saucers. The term flying saucer, of course, dates back to the treatment by the press of the now famous triggering incident of June 24, 1947, another date which might well be said to live in infamy, when a lone pilot, Mr. Arnold, reported "nine peculiar-looking aircraft" without tails, which flew in a chain-like line and "swerved in and out of the high mountain peaks." The unfortunate newspaper term, flying saucer, as you well know, captured both the press and the public imagination. One can speculate as to the turn of events, and the amount of newsprint that might have been conserved, had Mr. Arnold decided to stay on the ground that day!

Nevertheless, in the past five years, flying saucer has become a standard term in our language, with about as broad a definition as it has been the lot of any term to carry. We can define a flying saucer as *any aerial phenomenon or sighting that remains unexplained to the viewer at least long enough for him to write a report about it*. Lest anyone misunderstand what shall be meant by "flying saucers" in this paper, this definition must be emphasized.

Each flying saucer, so defined, has associated with it a probable lifetime. It wanders in the field of public inspection like an electron in a field of ions, until "captured" by an explanation which puts an end to its existence as a flying saucer.

Thus flying saucers spawned by the planet Venus have generally a short lifetime. In almost no time an astronomer comes along and makes a positive identification, and another flying saucer is shattered. We can expect a host of Venus-inspired flying saucers when this planet is low in the western sky after sunset. It reaches greatest eastern elongation this year on January 31, 1953, and on March 8 attains its greatest brilliance. We can confidently predict a swarm of flying saucers from Venus!

The lifetime of a balloon-sponsored flying saucer is often longer, but before long someone like Dr. Liddell comes along and shoots it down. And Dr. Menzel has as his flying saucer ammunition a large variety of

optical effects, the lethality of which requires separate field tests.

My concern is with flying saucers of long lifetime—those which have not, as yet, been "captured" or demolished by an explanation. Let us further limit them to those that have been observed by two or more people, at least one of whom is practiced in the making of observations of some kind, that is, to pilots, control tower operators, weather observers, scientific workers, etc. Also, let us limit cases to sightings lasting a minute or more, again for obvious reasons.

The Wright-Patterson Air Force Base, where the responsibility for the investigation of unidentified aerial objects has rested for the past several years, asked me in 1948 to help identify reports that had an astronomical basis. It was a relatively simple task to go through about 200 reports and pick out probable astronomical causes. Indeed, some of the most weird reports could be dismissed with clear conscience by the statement that no astronomical explanation is possible for this incident, thus leaving these unsolved cases to the psychologists.

I did wonder of course, as to how they were disposing of the nonastronomical cases. How did they explain the incident in which a pilot, co-pilot, and stewardess followed some rapidly moving dark objects which were silhouetted against the sunset sky and which disappeared presumably because of their superior speed? But my faith in the psychologists was unshaken—and when the Air Forces announced that Project Grudge had been dissolved, I assumed that my colleagues had been successful and had even solved the case in which several observers watched an object, hollow in the middle, travel at a constant slow rate, taking 15 minutes to make the journey across the sky from north to south.

After the project dissolved, Wright Field continued to take care of the slow but steady flow of reports as a part of their regular intelligence function. This spring I became curious and requested permission, through official channels, to look through the crop of reports that had accumulated since my official connection with Project Grudge had terminated. As I

looked through the welter of fanciful tales, inaccurate reporting, of misobservation of natural objects, I could not help, as an astronomer, recalling another wave of stories—stories of stones that fell from heaven. Because of poor reporting and poor imagery, scientific progress in meteorites had been held back for a good century. What a difference in imagery there is between “a stone falling from the sky” and “the interception by the earth of a particle pursuing an orbit around the sun.” The use of improper and inaccurate description of what actually happened kept meteorites in the category of old wives’ tales and out of the niche that celestial mechanics had made ready for them a century before! In 1801, Thomas Jefferson said that he would sooner believe that two Yankee professors had lied than that stones had fallen from heaven. And the French Academy of Sciences branded stories of meteorite falls as fanciful and absurd and dismissed a bona fide meteorite whose fall had been sworn to—as an ordinary stone that had been struck by lightning. Perhaps the moral of this is: Beware the ready explanation!

Now, it is clear that stories of real flying saucers, visitors from space, and strange aircraft violating the laws of physics are as reprehensible to the scientist of today as stones that fell from heaven were to the scientist of yesteryear. But, of course, stones *did not* fall from heaven—that was poor reporting and a wrong slant on a perfectly natural phenomenon. And we don’t have space ships that disregard physical laws. But, do we have a natural phenomenon?

The steady flow of reports, often made in concert by reliable observers, raises questions of scientific obligation and responsibility. Is there, when the welter of varied reports are shorn of, in the words of Pooh Bah, all “Corroborative detail to lend artistic verisimilitude to an otherwise bald and unconvincing narrative”—any residue that is worthy of scientific attention?

Or, if there isn’t, does not an obligation still exist to say so to the public—not in words of open ridicule, but seriously, to keep faith with the trust the public places in science and scientists?

The Air Forces are attempting to give all reports a fair hearing, in view of the above. They are having all reported data reduced to punch cards so that in a month or so it will be possible to compare quickly reports made by people facing west on clear Tuesday afternoons with those made on non-inversion Friday nights by pilots going south. In any event, if significant correlations between various sets of sightings exist, this method should bring them out.

In coming down to cases, to illustrate what constitutes at present the best evidence for unusual aerial phenomena, the examples submitted for examination are presented without an all-embracing explanation for them. These are presented in conformance with the school that believes that good observations and discussion of observations come before theory. It is hoped, however, that out of this discussion there may come a

positive approach and, if these sightings do represent heretofore inadequately studied natural phenomena, that these examples will stimulate their serious study; if, on the other hand, no natural phenomena are involved, then an obligation exists to demonstrate *explicitly* how the following specific reports can be explained in terms of balloons, mirages, or conventional aircraft.

The chosen recent examples represent a definite pattern, and for each of the following there are many other similar examples in the files.

One of these patterns might be called “Nocturnal Meandering Lights.” *Reports* falling into this category are characterized by the sighting of a bright star-like light, perhaps of -2 or -3 stellar magnitude which floats along without sound, frequently hovers, reverses its field without appearing to turn, and often abruptly speeds up. The light is most frequently described as a yellow amber or orange, changing to blue or red occasionally, and changing in brightness markedly. Sometimes the description states that the light went out as if someone had pushed a button; at other times the light is reported only as variable. A very characteristic statement by those making the reports is: “I have never seen anything like this in my whole life.” The desire to identify these sightings as balloons is thwarted by the tactics observed.

As an example of a report of this kind, let us take one that came in from Florida this past July. On one night several airmen independently observed a light approach at a very slow speed, come to a *halt nearly overhead*, then *reverse direction* with no apparent turn. On two other nights, three other lights appeared in other sections of the sky, of similar appearance, but maneuvering more rapidly. They were observed for some 10 minutes by 9 airmen, including a control tower operator, an aircraft dispatcher, and two pilots from Wright Field.

In the words of one of the men, “For the next fifteen minutes we watched this light and speculated on what it might be. It was not a sharp light like a bare bulb but more like a light shining through frosted glass. No shape of any kind was discernible. It appeared to blink, but with no regularity whatever.”

Also this past July at an air base in New Mexico, a similar sighting was made. Paraphrasing from sworn statements made by observers, “Our station was notified that an unconventional aircraft had been picked up with both electronic and visual contact. Our station made electronic contact with the object and two of our men and I had gone outside the building and saw it hovering under a cloud layer to the east of us. It appeared as a large light, at an uncertain distance, and was hovering at the time. A minute or so later, it moved rapidly toward the north for a short distance and stopped as suddenly as it had begun to move.”

And from another statement, “Our scope operator at that time reported a strange target about thirty miles east of our station. Two of us went outside and sighted

a very bright light traveling at what we estimated to be around 200 miles an hour. The light went out at least two times but did not stay out more than two or three minutes. The light seemed to have a floating effect and made no sound. At one time around seven or eight smaller lights could be seen. The object seemed to drop to about 10 or 12 thousand feet and then climbed to about 25 000 taking a northern course."

Radar observations as well as visual observations are involved in this problem. Early last month shortly before dawn colored lights were observed in the sky southeast of the radar station. At the same time and the same azimuth, unidentified targets appeared on the scope. Only a very slight temperature inversion was present, 1° at 25 000 feet. No more than two lights appeared at one time. They were observed to be moving in a rather erratic pattern and changing colors occasionally. The last thirty minutes of observation revealed the lights remaining yellow—prior to that they were red, green, and blue. They moved in no apparent formation but mostly appeared in one area and disappeared in another, when either the light went out or the objects dived behind clouds. They were starlike objects and appeared to develop long, white vapor trails, when they dived. They were motionless at times and moved rapidly at other times. This corresponded to similar movements observed on the radar scope.

One white light went out as it changed direction and continued as a *black silhouette* against the dawn sky. Observation was for a period of about an hour and was made by two airmen and a radar operator—all three observers were experienced aircraft control and warning operators. Objects were observed 20 to 40° above horizon. Radar gave distances of 50 to 80 miles. This implies a height of about 40 miles. There was no air traffic on radar within 100 miles.

Quoting from the observer's statement, "receiving a call concerning a strange light in the sky, I went out and scanned the sky in several directions before I saw a light. My first glimpse was a very bright blue light, but it lasted only about a minute, then it faded into a light green. It moved in a slow orbit.

I was startled at first so I closed my eyes and opened them again. The light was still there. I stared at it a few minutes and now the light seemed more yellow than before.

I did not think anyone would believe me, so I went inside the building and relieved the radar scope operator. I found a target at 123° , 53 miles. After that it appeared as a permanent echo. In about two minutes, it disappeared and almost immediately another pip appeared, at 134° , 73 miles. It also seemed like a permanent echo. It stayed on the scope for $1\frac{1}{2}$ minutes. These pips were at no time caused by malfunction of the radar set.

It was daylight when it (the object) seemed to fade both visually outdoors and electronically indoors."

And another sighting—in Northern Michigan—on

July 29 of last year, a pilot chased a brilliant multi-colored object close to the horizon, and due north. He flew at 21 000 feet, followed the object for over a half-hour but could not gain on it. Radar operator reported contact with the object for about thirty seconds. And ground control interceptor station reported blips too. In this case, it seems certain that our harried pilot was pursuing Capella! Reference to a star map will show that at his latitude, at the time of his sighting, Capella was at lower culmination, that is, at the lowest point of its swing around the pole just skirting the horizon. I have seen it at that position myself in Canada, and, can vouch for the fact that its blue, yellow, and red twinkling can be spectacular.

Unfortunately, neither Capella nor any other star can explain many other nocturnal meandering lights. But there is no question in my mind, just to make this point exceedingly clear, that there exists a relatively simple, natural explanation for them, perhaps even ordinary aircraft under special test conditions. The chief point here, is to suggest that nothing constructive is accomplished for the public at large—and therefore for science in the long run—by mere ridicule and the implication that sightings are the products of "bird-brains" and "intellectual flyweights." In short, it would appear that the flying saucer situation has always been a problem in science-public-relations, and that fine chance has consistently been missed to demonstrate on a national scale how scientists can go about analyzing a problem. A lot is said about the proper interpretation of science to the public, but the only answer they receive to a question about which they are more widely concerned than perhaps any other in this century, is ridicule. Ridicule is not a part of the scientific method and the public should not be taught that it is.

Let me quote an additional report, to show that the original flying disks, as distinct from wandering lights, are still with us.

On the day that our pilot chased Capella, a radio from Seattle announced that flying saucers were seen heading toward Montana. At an airport in Montana several pilots gathered outside the hangars to wait and watch. A perfect set-up for suggestibility—and yet, quoting from one of the many signed statements, "Objects were seen that resembled flat disks reflecting sun's rays. One of the objects hovered from three to four minutes, while the other three circled around it like satellites. Then the stationary object moved south-east to disappear, while the three satellites moved due west and disappeared—at very high speeds!"

And from another observer: "After watching for approximately five minutes I was able to see what appeared to be a disk, white or metal in color approaching from the west. As it moved directly overhead it turned generally north at a 90° turn, then slowing down and then making several more 90° turns and proceeding east. After seeing this I knew what I was looking for

and was able to pick up at least five more of these objects. *Being skeptical, I did my best to see them as either dandelion seeds or other small particles close to the surface of the earth rather than large objects at extreme distance.* However, after keeping them in sight long enough to study their appearance they definitely seemed to be very high. *I won't make an estimate of the height since I did not know their size.* All of these appeared in

the west and proceeded east at what appeared to be an extremely high rate of speed."

I submit that this Air Force lieutenant was not incompetent, but rather that his manner of reporting—as far as it went—was commendable and that his report, made in good faith, is therefore entitled to a hearing without prejudice or ridicule, but also, without fanfare, hysteria, and fantastic newspaper publicity.

Phantasmagoria or Unusual Observations in the Atmosphere*

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For many eras in man's history, the sky has been occupied by various gods, or constellations, or birds, mythical or real. A new concept has arisen in the last few years, largely a product of aviation and balloony, and civil air defense spotters. In general the reports have more psychological than physical significance. However, certain optical phenomena are now gaining far wider interest than among research men in optics. Some "authentic reports" by "reliable, competent observers" are recounted and considered. While complete interpretation of all "reports" is impossible, due to lack of sufficient experimental data, NO evidence exists for any phenomena not explicable by standard physical concepts.

IT is most unfortunate that man's early activities are not properly recorded for posterity. Thus it is not known when man first became aware of unusual phenomena in the atmosphere. The fear of solar and lunar eclipses was almost universally prevalent until very modern times. Gods in general inhabited the atmosphere—but not in visible form. Unusual birds appear in various myths and may have had some basis for reality in pterodactyls and other large avia. Rainbows have played a prominent part in various stories. As well as we understand lightning today, it is not generally realized that this knowledge has been accepted by the people for only slightly over a hundred years. Benjamin Franklin was greatly exasperated by the loss of life and property which continued even after widespread publication of his experiments. In particular, many churches were being destroyed by fire caused by lightning hitting the steeple. In addition, the bell ringers were being killed by lightning traveling down the wet bell cord. A papal edict had previously been issued that church bells were to be tolled during thunderstorms. This edict was the result of a theory that thunder (and thus storms) could be warded off by countering the noise with the peal of the church bells. The edict was, of course, rescinded, but only about 150 years ago.

* At the time this paper was prepared, the nation was in the throes of a flying saucer scare, apparently of greater magnitude than any previous one. Since the impact was so great, it was believed most worth while to take any action which might alleviate the hysteria. In this spirit, the invitation to present this paper was accepted.

The origin of the general concept now known as flying saucers is difficult to ascertain. It seems that the name was attached to a newspaper report of mysterious objects seen in 1947 and has continued in prevalent use. However, many unusual phenomena were noted in the atmosphere prior to this time. Perhaps the best known is the Star of Bethlehem. In very early American history, a great explorer, David Thompson, who preceded Lewis and Clarke, records in his narrative dated November, 1792, an occurrence on Landing Lake in the Northwest Territory. He observed something which appeared globular and which, he said, from its size must have had some weight. It had no tail and no luminous sparks came from it until dashed to pieces. He assumed that it was a meteor, since he wrote, "The next morning we went to see what marks the meteor had made on the ice but could not discover that a single particle was marked or removed."

Lieutenant Bassett, U. S. Navy, published a book in 1885 entitled *Legends and Superstitions of the Sea and of Sailors*. Even at this early date he stated: "There is an obvious tendency in the human mind to exaggerate wonders. This has been especially true with regard to those wonders found in the great ocean, where a limitless horizon sets no bounds to thought, and where the smallest object, often by atmospheric causes, will easily be magnified." Remember this was written 67 years ago!

He goes on to recount: "The occasional reflections of mountains, cities, or ships in mirage or fog-bank, the land-look of such banks themselves, coupled with