

The image size being roughly that of the Montana film (a few of the objects being perhaps 10% larger than the largest on the Montana) the same remarks as to airplane reflections apply, i.e., they might have been caused by sun reflections from airplanes within one to three miles of the observer, although at these distances they should have been identified as conventional aircraft by the film or the observer. No specific conclusions as to sun reflection angles can be drawn since the line of motion of the objects cannot be confirmed. However, the reported E to W motion of the UFO and their passing overhead coupled with the SE azimuth of the sun would make the achievement of optimal sun reflections rather difficult.

That the images could have been produced by aluminum foil "chaff" * seems possible, at least on the basis of the images shown, as very intense specular sun reflections from ribbons of chaff might flare out to about the size of the UFO.

Examination of figures 4b, 5a, and 5c, obtained from the photogrammetric experiment -- reference Analysis of Photographic Material, Serial 01, Appendix II, show that no significant broadening is produced by flat white diffuse reflectors such as birds, bits of paper, etc. at f/16 under the conditions of the filming. Actual measurements show a slight "bleeding" or flaring of about 10% to 20%.

The rectangular flat white cardboards of the aforementioned experiments represented very roughly the configuration of birds. The light reflected by such a surface is probably greater than that from a curved feather surface of a bird. Figure 4(b) shows the appearance of one and two foot birds. ** (See arrows.) as they might appear on a 16mm frame taken with a 3" telephoto lens f/16 at a distance of 1200', figure 5(a) at 3000' and figure 5(c) at 3300'. Many of the images on the "Utah" film have an angular diameter of 0.0012 radians (some as large as 0.0016 radians), thus they might be interpreted as one foot birds at 600' to 800', two foot birds at 1200' to 1600' or three foot birds at 2400' to 3200'. At these distances, it is doubted if birds would give the appearance of round dots; also they would have been identifiable by the camera if not visually. However, actual movies of birds in flight would have to be taken to completely confirm this conclusion. The following type of gulls have been known to fly at times over this locality: California Herring Gull (a common summer resident), Ring-Billed Gull and the Fork-Tailed Gull, see reference (4).

The images are probably not those of balloons as their number is too great and the phenomenon of flaring up to a constant brightness for several seconds, and then dying out again cannot well be associated with any known balloon observations.

* Bits of aluminum foil dumped overboard by planes, often utilized as a countermeasure against anti-aircraft radar. This material might possibly be in the form of large ribbons several feet long and several inches across.

** The dimensions refer to wing spread. The actual exposed white area of a bird is usually less and depends upon the perspective of the observer. This difference has been roughly accounted for in the data given, however, if the body were the principal reflector the distance given should be reduced by a factor of 2 or 3.

Certain soaring insects - notably "ballooning spiders" (reference (5) and (6)) produce bright moving points of light. The author has witnessed such a phenomenon. It is produced by sun reflections off the streamers of silken threads spun by many types of spiders. Caught by the wind, these streamers serve as a means of locomotion floating the spider high into the air. They occasionally have the appearance of vast numbers of silken flakes which fill the air and in some recorded instances extend over many square miles and to a height of several hundred feet. The reflection, being off silk threads, is not as bright as diffuse reflection from a flat white board. Thus no flaring of the images could be expected. The author noted that the sections of the "web" that reflected measured from 1/4" to 1/2" for the largest specimens. Thus the images might be attributed to ballooning spiders at distances of 50 to 100 feet. However, these web reflections ordinarily show up only against a rather dark background and it is doubted if their intensity would be great enough to produce the intense UFO images against a bright sky.

No quantitative densitometer examination of image brightness could be made, as the original film was not available. It is understood from Al Chop that the government analysts did make measurements of this kind on the original films and found the Utah images to be very intense *.

Besides the above remarks, pertinent to the actual images, several facts can be gleaned from the motion of objects. The observations are not apt to support the supposition that the objects were conventional aircraft as the maneuvers are too erratic, the relative accelerations probably ruling out aircraft at distances of over five miles. Several observers familiar with the appearance of chaff have seen the film and concluded that the persistence of the nonwinkling constellations, their small quantity, and the reported absence of aircraft overhead makes chaff unlikely. Furthermore, the single object passing across the field of view would be most difficult to explain on the basis of chaff. These same remarks would apply also to bits of paper swept up in thermal updrafts.

The relative angular velocity might be compatible with soaring bird speeds at distances of less than one mile, the angular velocity of the single object could be attributed to a bird within about one thousand feet. There is a tendency to pan with a moving object - not against it - so the velocities in the table probably represent a lower bound. The motion of the objects is not exactly what one would expect from a flock of soaring birds (not the slightest indication of a decrease in brightness due to periodic turning with the wind or flapping) and no cumulus clouds are present which might betray the presence of a strong thermal updraft. On the other hand the single object might represent a single soaring bird which broke away in search of a new thermal -- quite a common occurrence among gulls -- see reference (7).

That the air turbulence necessary to account for their movement if they were nearby insects (even the single object's motion!) is possible, can be concluded from examination of reference (8). However, if the objects were nearby spider webs the lack of observed or photographed streamers is unusual. Furthermore, the fact that they were visible from a moving car for several minutes is hard to reconcile with localized insect activity.

The phenomenon of atmospheric mirages, reference (9), might conceivably account for the images. Such a hypothesis is hampered by the clear weather conditions and the persistence and clarity of the images. Also no "shimmering" can be detected and the motion is steady. Again the object which breaks away would be difficult to explain.

It has been suggested that spurious optical reflections or light leaks in the camera might be responsible. Examples of such effects have been examined and found to be quite different from the UFO's.

The evidence remains rather contradictory and no single hypothesis of a natural phenomenon yet suggested seems to completely account for the UFO involved. The possibility of multiple hypotheses, i.e. that the Utah UFO's are the result of two simultaneous natural phenomena might possibly yield the answer. However, as in the case of the "Montana" analysis, no definite conclusion could be obtained.