

Analysis of a UFO Photograph

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Abstract—This report reviews various investigative activities and analyses surrounding a photograph of a purported unidentified flying object (UFO) taken on October 8, 1981 at about 11:00 a.m. local time on Vancouver Island, British Columbia. The evidence consisted of a single frame of 35 mm color film which showed a sharply focused disc-like object against a clear blue sky with wooded mountain peak nearby. Analyses of the original negative included micro-densitometry, computer enhancements, and other measurements intent upon showing a support thread, atmospheric disturbance, or other evidences of a hoax. These analyses suggest that the disc was a three dimensional object located at a distance of at least 30 feet from the camera; the object's surface albedo was diffuse and of lower luminance than sunlit cloud. Extensive interviews with the photographer (who never saw the aerial object), her husband and daughter and site survey tended to support the entire narrative account. The identity of the disc object remains unidentified.

Introduction

Contrary to common belief there are many photographs of alleged UFOs. Of course the problem lies not so much with the details of the photograph and its negative as with the photographer and the equipment used. It is for this reason that one must be careful to fully document seemingly unimportant details concerning the person taking the photograph, the social situation which surrounded the photograph(s), the camera-lens-film data, the developing-printing-enlarging activities and the manner in which the photograph came to the attention of the investigator. Since such a photograph image is only as credible as the photographer who took it, one must exercise "due diligence" in each of the above areas. Many older UFO photographs remain useless artifacts of the UFO enigma because the investigator did not or could not obtain all of the relevant background information. As will be made clear, the author attempted to consider all of the above factors. Length restrictions of this paper impose certain practical limits upon the depth to which these facts can be documented, however.

The remainder of this report will cover the following topics: (a) the photograph and negative, (b) the camera and lens, (c) the film and its processing, (d) the results of image analysis, (e) the site visit results, (f) credibility of the photographer, and (g) a brief review of Frisbee characteristics.

The Photograph and Negative

The author received a color negative strip of two frames. The higher numbered frame showed a small child standing in front of a fireplace inside a

Density calibration was carried out using a Kodak ND step wedge spanning the densities on the negative. Greatest optical density (brightest positive image) was approximately 0.65 to $0.7 \log_{10}$ ND and was found on the sunlit cloud. This is equivalent to about 12,500 ft-L luminance. Figure 5 is a vertical scan through the disc's two brightest areas using the micro-densitometer. The tracing peak marked T represents the upper-most (dome) bright area and B represents the lower area of brightness on the front edge of the disc. This scan line is shown in Figure 6 which is an enlargement of the disc's image. Points T and B both have optical densities of about 0.55 to 0.6.

Optical density of the blue sky on the negative is shown in Figure 5 and has a value of approximately $0.4 \log_{10}$. The gradual slope of this densitometry tracing is due to the progressive sky brightness increase from the zenith to the horizon while the smaller amplitude deviations are due to single and grouped film grains.

Of particular note is the fact that the brightest area on the disc was of lower brightness than the cloud by approximately $0.15 \log_{10}$ unit. According to a physics handbook (Allen, 1963), a smooth, polished silver surface reflects (within the visible spectrum) increasingly higher percentages of incident radiation with increasing wavelength. An average reflectance value of about 90% is found. Polished aluminum reflects about 85% regardless of wavelength of the incident radiation; this is also true for nickel (reflectance of about 60%), silicon (about 30%), and steel (about 54%). This comparison of dark areas on the negative suggests that the surface of the disc is very likely *not* a polished surface of any of the above metals. If direct sunlight has a brightness of about 750,000 ft-L and a 90% reflectance is assumed for the disc's surface, the brightest area should produce a brightness of about 675,000 ft-L which is more than an order of magnitude greater than what was found on the negative.

A horizontal scan using the micro-densitometer also was made to see if there was any evidence of a double exposure. A double exposure might be indicated by the presence of double edges if the film registration is not precisely the same during a manual rewind. No such evidence was found. In addition, this camera could not take double exposures due to its frame locking mechanism.

Black and White Enlargements on Different Wavelength Sensitive Paper. The disc area of the negative was enlarged and printed on panchromatic film which provided a relatively complete and undistorted translation of the three primary colors in the negative into shades of gray. This is shown in Figure 7(a). The top "dome" protruberance is clearly visible. The same area on the negative also was printed at the same enlargement using blue-green sensitive paper which significantly reduces the contribution of the red emulsion layer to the final black and white print. This is shown in Figure 7(b). The blue-green sensitive paper increases the overall brightness of the sky and causes the "dome" area on the disc to almost disappear. Apparently, the dome is not reflecting or emitting radiation in the red end of the spectrum.

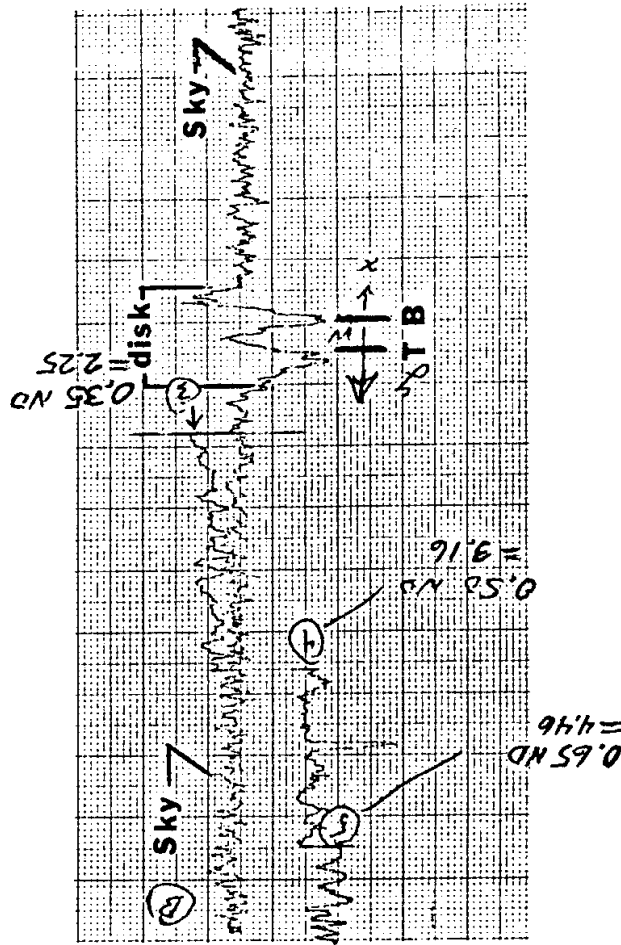


Fig. 5. Micro-densitometer vertical scan through disc image.

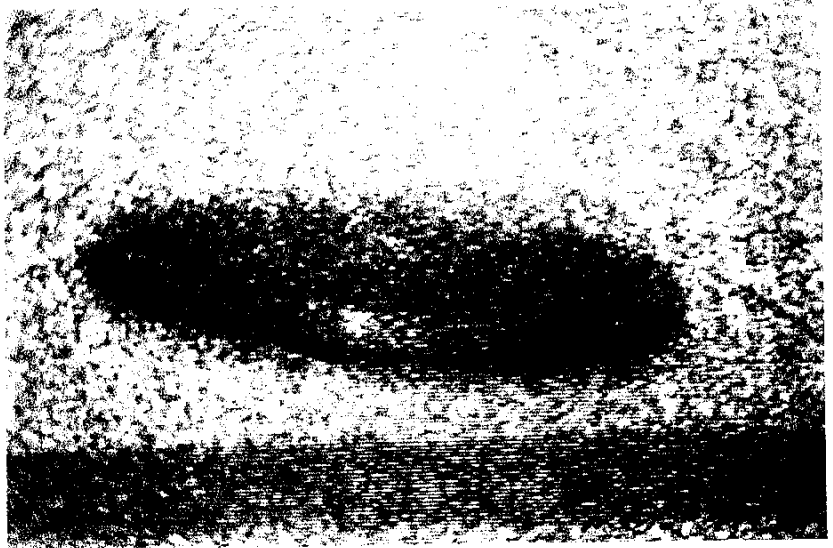


Fig. 9. Black and white enhancement with undistorted contrast.

tain from the local horizontal was 3,117 feet while the elevation of the photographer's position was 984 feet above mean sea level.

Although the Provincial park was located within an area cleared of evergreen trees, second growth timber extended from the base of the mountain almost to its top. After inspecting the site it was clear that there was sufficient flat ground to have flown a model airplane or thrown a Frisbee⁴ into the air. Neither the photographer nor her husband admit to doing this. There are no buildings or stores within a radius of 15 miles of this spot. The photographer does not remember passing any vehicles on the morning she took the photo other than a few logging trucks with loads of logs.

Credibility of the Photographer

In cases such as this it is essential to establish the credibility of the persons involved. Mrs. D.M. (age 26) was the photographer. She was accompanied by her husband (age approximately 30) and their 18 month-old daughter and

⁴ Both Mr. and Mrs. D.M. stated that there were no other persons at the Provincial park before, during, or while they were leaving the camp site. The large open area would have afforded a wide and unobstructed view of the surrounding terrain had there been someone else there. They also stated that no sounds were heard from the direction of the mountain while they were at the camp site.

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Fig. 10. Color enhancement of disc image using a green filter.

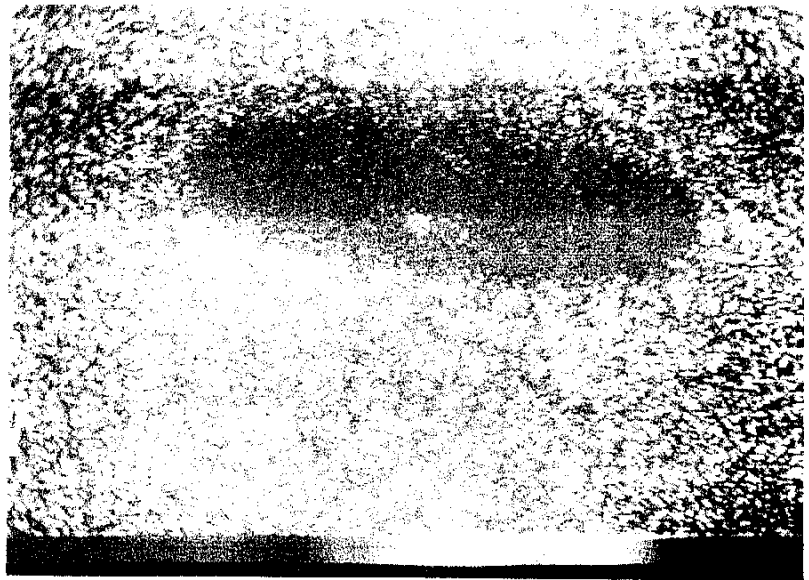


Fig. 11. Color enhancement of disc image using a red filter.

the family dog. The family was on their way to visit her sister at Holberg, located at the northwest tip of Vancouver Island. Mrs. D.M. was an outgoing, pleasant person with a casual interest in UFOs. Inspection of their home did not indicate any interest at all in the occult, the psychic realm, or related subjects. Mr. D.M. worked at the lumber mill in Campbell River. Neither person claimed to have read any books specifically on UFOs, but had seen the movie *Close Encounters of the Third Kind*. The husband was an avid science fiction fan in earlier years.

When asked what they had done immediately after noticing the disc on the photograph (some 18 days later on October 26, 1981), Mrs. D.M. replied, "Well, we didn't know what to do. Eventually we showed it to our neighbors and Mr. and Mrs. M. Sr. (husband's parents)." Mrs. D.M. phoned the Canadian Forces Base at Comox in mid-November 1981 concerning their possible interest in seeing the photograph. She ". . . just wanted to see if they were interested in it and if they knew anything about what the object could be." An air force representative (allegedly) said they were not interested in viewing it, but did take her name and address. It was not until the summer of 1982 that the family travelled to Vancouver, B.C. bringing one 4" x 5" color print with them. They visited the Vancouver Planetarium and spoke with the Director, David Dodge who called in David Powell who was interested in UFO phenomena. The couple were persuaded to lend the original negative to them to make enlarged copies. The negatives were delivered to Mr. Powell in June 1982 and were returned to Mr. and Mrs. D.M. on January 28, 1983. These dates may be significant since they suggest that the photographer was willing to wait a long time before pursuing an explanation for the disc-like image on her photograph. If this event had been a deliberate hoax it is more likely that some overt action to capitalize on it might have been taken soon after the disc had been discovered and not almost a year later. Of course this is not a conclusive argument to support this contention.⁵

The author found the photographer and her husband to be middle-class, hard-working people. Their property was well kept. Nothing could be found which pointed to a deliberate hoax. Both displayed genuine puzzlement about the origin of the disc on the photograph. Mr. and Mrs. D.M. were not defensive nor did they ever attempt to cover up anything as far as could be determined. For example, when asked if he owned a Frisbee, Mr. D.M. said yes and located it immediately for the author's inspection. It was a 9" diameter, dull black, "Professional FIFI model." He claimed to have been proficient in throwing it in the past, but had not done so in some time. There was no indication that some type of dome-like structure had been attached to it. The suspicion lingered throughout the investigation that a Frisbee or other similar object had merely been tossed up into the air and photographed. It became important to learn more about the subject of Frisbees and their "flight" qualities.

⁵ While it is true that Mr. and Mrs. D.M. have had color enlargements made of their photograph and have sold some, this was done as a courtesy to their friends and to others who wrote asking for copies. Almost no profit has been made from the sale of these photographs.

A Review of Frisbee Characteristics

Three topics are briefly reviewed here (a) surface characteristics, (b) flight records in competition, and (c) subtended angles and related distances. The author consulted with a person⁶ who had previously worked for a well known manufacturer of Frisbees. He explained the necessity of having a smoothly curved leading edge at the circumference of the disc and tiny microgrooves in the top surface in order to create a lifting force during its spinning flight. He suggested that the addition of a dome-like structure to the top would probably reduce or destroy this aerodynamic lift. The author (later) proved that this was indeed true. The author also contacted various toy stores to inspect various Frisbee models. A total of seven different models were inspected. All possessed a glossy (specular) outer surface. Most had reflectances of about 80% or less. Of the six models produced before 1981, only two had paper labels, the other four⁶ had colorful embossed drawings centered across the top surface.

Men's and women's world records for throwing Frisbees were obtained from the International Frisbee disc Association (IFA). This organization has hosted tournaments which have become qualifying events for the World Frisbee Championship. It was discovered that the men's outdoor distance record is 166 m (540 feet) and the women's record is 122 m (397 feet). These records were set in 1983 and 1980, respectively and are meant only to indicate the general range of human capability for this skilled activity. The men's world record for maximum time aloft is 15.5 seconds (1981); the women's record is 11.4 seconds (1980).

The linear width of the disc's image on the negative was 0.98 mm. The width of the 36 mm frame was equivalent to a horizontal angle of 48°. The useful ratio can be formed:

$$36/48 : 0.98/X$$

where: X = the angle subtended by the disc. This angle is 1.307°. Therefore, $\tan 1.307/2 = 0.0114 = (W/D)2$ where: W = the assumed object width and D = the separation distance between the camera and object. Letting W = 9 inches, D = 32.88 feet which exceeds the hyperfocal distance. If the disc object was 10 or 50 feet in width it would have been 438 feet or 2,192 feet from the camera, respectively. And if the disc had been hovering directly over the mountain (i.e., 7,580 feet away) it would have been 173 feet in width.

Assuming that the camera shutter speed was 1/125th second and the disc image was produced by a typical Frisbee travelling at 10 feet per second, a 9 inch diameter disc moving normal to the line of sight would move 0.96 inches in his duration. Approximately 9.3% of the Frisbee's diameter would show up as a blur on the leading and trailing edge of the Frisbee's photographic image. There is virtually no blur visible on the photograph in question which strongly argues that the disc was not travelling normal to the line of sight. If it was motionless it would be far more difficult to perceive, particularly if the

⁶ I wish to thank Mr. Gordon Holt for his professional assistance in this phase of the analysis.

photographer was (a) looking through a camera's optics and (b) was not expecting to see anything hanging motionless in the air.

It is highly unlikely that the object photographed was a commercially available Frisbee. There are significant top surface contour differences between a Frisbee and the photographed disc. This was shown by a careful comparison of photographs of a Frisbee model with scale dome oriented the same as the photographed disc and illuminated by sunlight under the same angular conditions. The surface reflections were markedly different in each case. In addition, the presence of the tiny, concentric micro-grooves on all Frisbees would not be expected to yield a sharp contrast gradient as is seen in Figures 7(b), 8, and 9. When the author attached a light-weight dome to a Frisbee it would not fly very far nor very high. It is problematical whether another person could have achieved such a feat. The author inspected the frame immediately following the frame in question and found that it had been taken in Campbell River following the trip north. The immediately preceding frame was also located. It showed Mr. D.M. and their daughter standing in front of a small pond at the Provincial park on the day the photograph had been taken, exactly as stated by the photographer. If someone had tossed a model up into the air in order to photograph it, only one photo was taken. It is fortuitous that such a clearly focused image was obtained on the first try, if this is what happened. Furthermore, this explanation does not stand up under scrutiny of the author's in-depth interviews and site visit. The fact that the photographer stated that she was taking a photograph of the mountain (and not of a UFO disc or model) is further supported by the fact that the top of the mountain was well centered in the photograph. The object was not centered. The lack of any image blur suggests that the disc was nearly motionless which would make it more difficult to see, other factors equal.

In summary, this investigation has shown that a mature adult with high credibility and little or no interest in UFO phenomena obtained a single, colored, sharp imaged photograph of an unidentified aerial disc-like object. Her subsequent reactions to seeing the disc's image on her photograph produced surprise and dismay as well as the normal array of "answer-seeking" behavior. She has not capitalized on having such a photo⁷ and still acts somewhat embarrassed at having taken it without seeing the disc. The disc's identity has not been identified to date.

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⁷ See footnote 5.