[ADDENDUM. This analysis was prepared without the benefit of knowing the very extensive and detailed work of Brad Sparks which addresses some of the same issues raised here. In particular the issue of the Biloxi radar and the apparent anomaly in the charted flight path. Sparks' research appears to have established, consistent with the time-distance-bearing arguments discussed above, that the Biloxi radar was not in fact operational. The upscope signal is therefore not only anomalous in behavior (for an electromechanical ambiguity) but appears to lack an obvious conventional source. Sparks' study of the flight plan also provides independently a convincing rationale for a course deviation essentially the same as that hypothesised above on time and distance grounds, which considerably strengthens the inference drawn here that the claimed correlation between the UFO signal(s) and the Dallas area radar pattern is probably unsound. See: Brad Sparks, RB-47 RADAR/VISUAL CASE, in: *The UFO Encyclopedia*, Jerome Clark ed., 1998, pp. 761-790.]

STATUS: Unknown

13. DATE: July 25, 1957 TIME: 0025 local CLASS: R/V ground radar/ground visual

LOCATION: SOURCE: Thayer, Condon 1970 145
Niagara Falls, N.Y.

RADAR DURATION: 3 minutes

EVALUATION: Blue Book/Thayer - balloon

PRECIS: Observers (number unspecified) saw a "circular brilliant white object with pale green smaller lights around its perimeter" travelling slowly at nearly constant altitude. Conditions were "clear with excellent visibility". The object went into a "fast steep climb", disappearing from sight in five to eight minutes. The object was also tracked on a CPS-6B radar for some three minutes in a NE heading.

NOTES: Thayer points out that: 1) the rate of climb could not have been very great if the object remained in sight for 5 to 8 minutes; and 2) the NE heading of the target agreed with "the prevailing winds in the area". It appears that the Blue Book file on this case may be even less complete than usual. This fact combined with the above arguments prompted Thayer to concede by default "the official Air Force view that the object was a lighted balloon". But it would appear that no specific balloon release was identified and that the actual winds aloft at the time (as opposed to those prevailing) are unknown. There are several points to be made about this hypothesis.

It is interesting that apparently no attempt was made to interpret the radar target as anomalous propagation, the standard Blue Book default position during this period. The radar and visual sightings are accepted as sightings of one and the same object. This could mean either that it was simply too implausible to invoke AP in this case or that it was unnecessary in this case because radar target and "balloon" were strongly correlated.

A convincing target on a CPS-6B is *a priori* not especially likely to be due to causes such as AP, interference, internal noise or component failure. The reason is that in addition to the

surveillance beam the CPS-6B had integral height-finding by means of two further diverging beams. Measurement of the transit time of a target between these two beams, combined with the range rate fed to the surveillance PPI, yielded the target's approximate altitude. Each of these electronically independent transceivers operated at very different frequencies, and AP effects are frequency-sensitive. If a normal-appearing point target had been tracked in both plan position and altitude by a CPS-6B it would be consistent with Blue Book's decision to opt for a real radar-reflective object - hence the "balloon".

The available information is sparse. Even the exact locations of the radar and visual sites are unknown, for example. Despite the considerable room for conjecture, however, the balloon hypothesis can be criticized if one is allowed to draw some inferences.

It is not specified in the report that the visual observers were service personnel, but it is perhaps likely given that the CPS-6B would have been a USAF Air Defense Command radar and given that the "balloon" was evidently seen at very low level, which implies proximity to the radar site. The reasoning here expands as follows: Weather balloons are not large visual objects. The intercepted arc is undetectable to the naked eye in daylight beyond about 20,000' slant range, and the 1.5 candle lamp of a nocturnal lighted balloon at altitude would be no more than a point source. The object in this case was visually resolved as a disc with a perimeter defined by a number of secondary lights, and if it was a balloon it was inferably no more than a few thousand feet slant range from the observers and at a very low altitude. This implies, in turn, that the "balloon" was close to the radar site where it was detected, because of the way that minimum detectable altitude varies with range.

That Blue Book rather easily dismissed the case as a probable weather balloon, evidently without much attempt to gather confirming data, can be taken to suggest that it took place at or close to a known balloon launch site. This is consistent with the inference in the previous paragraph, and indeed a map of the >100 routine radiosonde launch sites in the US (source, p.146) identifies an airfield a few miles from Niagara, which it is suggested could well be the location of both the radar and the visual observers.

If this chain of inference is correct then several conclusions follow:

1) the balloon was seen by personnel at a site where radiosonde balloons were being launched 4 times a day, 365 days a year, yet they failed to recognize it as a balloon;
2) if it was their own balloon and was seen climbing from a low level (at a typical 1000-1200 fpm) it had been released no earlier than a few minutes and was currently being tracked;
3) records of the release time and weather data would be available, yet after investigation local base intelligence personnel failed to identify the object as their own balloon, forwarding a report of a UFO through channels at a time when there were strong disincentives to do this - including the specific instruction to clear up as many reports as possible at the base level; and
4) Blue Book themselves did not identify the object with any specific balloon launch, despite their suspicion that the object was a balloon, when this should have been easy to do.

Granted there is some supposition here, but it should be noted that the visual description of the object is not strikingly like a balloon. In particular, the ring of green peripheral lights

corresponds to no known kind of balloon lighting. The color could be ascribed to an optical contrast effect if the central disc had been described as red or reddish; but this was described as "brilliant white". Scattering of sunlight through the translucent stretched neoprene of a balloon at high altitude can create an unusual glowing appearance near dusk or dawn: but the green color is inappropriate, the time was past midnight, and this "balloon" was at low altitude. Moonlight is a possible source, but a low altitude radiosonde would not be very distended and thus should be essentially opaque; again there is no convincing explanation for either the brilliance of the central disc or the ring of green lights. If a balloon was being tracked whilst illuminated by a searchlight for some reason this simply increases the strangeness of so noteable an experiment being unknown to base intelligence officers. The only likely source seems to be the balloon's own tracking light, but as has been mentioned these 1- or 2-candle lamps are scarcely "brilliant" and would at best very faintly illuminate the undersurface of the balloon (note that pilots in close encounters with balloons have typically mistaken these lamps for small "UFOs" precisely because the fabric of the balloon itself was invisible); there is essentially no likelihood that this lamp would also be bright enough to generate an array of discrete specular reflections disposed around the periphery of the balloon, and no obvious reason why they should appear green if it did.

This last point raises the suggestion that what was seen was a very large research balloon at great altitude, unconventionally illuminated for who knows what special purpose. When stretched by internal gas pressure at high altitude, the orange-like segmentation caused by the seams of such balloons can be very visible, and it is possible to imagine that the peripheral lights were highlights on a reflective material. But it is difficult to square steady balloon drift at a great height either with the eyewitness descriptions of a "fast steep climb" or with the fact that the CPS-6B only had the target on scope for 3 minutes.

The motion of the object, at least during the 3 minutes of radar tracking, was from SW to NE. The prevailing wind at Niagara is generally SW. This is really the only strong point of similarity between the object and a balloon. The report does not contain any estimate of the speed or kinetics of the radar target, but the visual observers estimated that the object's movement was slow and at a level altitude until it went into "a fast steep climb". Qualitatively speaking this does not sound like behavior typical of a balloon.

Thayer questions the implied rate of climb by pointing out that if it remained visible for 5 to 8 minutes then it cannot have climbed very fast, suggesting that this is consistent with a balloon. However, this argument is not entirely valid. It is an example of a theory-dependent argument: A balloon light isn't very bright; if this light wasn't very bright it can't have climbed high and fast, otherwise it would not have been visible for several minutes; it was visible for several minutes, therefore it must have climbed low and slow. Ergo, it was a balloon.

Firstly, it should be said that there are no data on the intrinsic luminosity of "a UFO", and therefore it cannot be said to what altitude such an object might be visible; hence it is not possible to conclude that the rate of climb implied by a duration of 5 to 8 minutes must have been low. Secondly it can on the other hand be argued that this time is far too short for a balloon. A lighted weather balloon climbing at an average 1100 fpm from an initially very low altitude (*ex hypothesi)* for a mean estimated 6.5 minutes would only have reached an

altitude somewhat above 7000' and should have remained visible - in the "clear" sky with "excellent visibility" - as a source of magnitude in excess of +3, that is, brighter than an average star. (A 1-candle source at 1000 meters has a visual magnitude of +0.8, from which it may be calculated that a 1.5-candle source would be visible to over 15,000' as a 5th magnitude light - that is, still more than twice as bright as a faint star - and could have been seen for about 15 minutes. Indeed, some balloon lamps are 2 candle, so the above values should be taken as minima.)

Conversely, a light which was described as "brilliant" when closest to the observers might be thought brighter than a small lamp of 2 candle or less. At a slant range of only a couple of thousand feet, for example, a 1.5 candle radiosonde lamp would have a brightness of about -1.5, some 5 times fainter than the planet Jupiter at opposition and about 10 times fainter than Venus which is commonly described as "brilliant". Of course these comparisons are only illustrative, since the relative magnitude of a balloon lamp is very sensitive to distance owing to the inverse square relation, and the true distance is not known (without the full radar report). Nevertheless it is fair to say that for a balloon lamp to appear "brilliant" it has to be very close, which means that the start of its visible ascent would be very low, reinforcing the argument that it should have stayed visible from the ground for appreciably longer than 5 to 8 minutes. If the intrinsic luminosity of the source were much brighter, of course, then a visible ascent of this duration implies a proportionately rapid rate of climb to a propor-tionately greater altitude.

These arguments are hardly conclusive, since the start altitude of the ascent cannot be accurately inferred and, more importantly, the "disappearance" of the light may not have been due entirely to its dimming below the level of perceptibility; it may, for example, merely have become indistiguishable from the surrounding stars. The reports of duration could be wrong also. But the match with the behavior of a lighted balloon is hardly conclusive either, and the prior motion of the object has to be taken into account. If it was a balloon then its initial horizontal motion would be best explained by a leaking balloon with a near-neutral buoyancy; but such a balloon could not spontaneously become buoyant again and ascend rapidly out of sight. And anyway, a balloon with less than maximum buoyancy would have a slower rate of climb still less consistent with the mere 5 to 8 minutes during which it was observed visually. It is possible for such a balloon to be caught up by a local updraft, but whether it could remain in such an updraft (in the clear weather of a summer night, let us remember), losing buoyancy all the while, for several minutes until it was borne upwards out of sight is to say the least debatable.

In conclusion, it appears likely that the same object was seen visually by multiple military observers and tracked rather unambiguously on ADC radar for 3 minutes (although there is insufficient information to prove this). The balloon hypothesis is not very strong as it stands. The reported motions of the object can only in part, and inconclusively, be compared to a balloon. The object has not been identified as a specific balloon despite evidence suggesting that it should have been easy for base intelligence officers to do so. Data on the actual winds-aloft conditions at the time were apparently not obtained, so that the only direct correlation invoked in support of a balloon is suppositious. The reported visual appearance of the object, as described by witnesses who might be expected to be familiar with local balloon launches, is not consistent with a balloon. No other conventional

object or phenomenon accords with the description of a brilliant disc encircled with green lights, which reportedly displayed considerable angular motion and appears to have been a radar reflector.

In terms of the information available the case is an "unknown". However, in view of the shortcomings of the Blue Book file - in particular the absence of crucial weather and radar date - it is judged reasonable only to carry the case as "insufficient information", with the rider that it would appear to warrant further study.

STATUS: insufficient information

14. DATE: August 30, 1957 TIME: night CLASS: R/V air radar/air visual

LOCATION:
Chesapeake Bay
Nr. Norfolk, Virginia

SOURCES: Thayer (Condon 128)

RADAR DURATION: unspecified

EVALUATIONS: Thayer - unknown

PRECIS: A Capital Airlines pilot with 17 years & 3,000,000 miles logged was flying a Viscount at 12,000' approaching Norfolk, Va., with a Northeast Airlines DC-6 "directly above" on the same heading at 20,000. The Viscount pilot saw a "brilliant" object which "flew fast and then abruptly halted 20 mi. in front of us at 60,000 ft. altitude." The Northeast pilot tried to acquire the object on radar: with the antenna at 0 degrees elevation nothing was detected, but with the antenna elevated to 15 degrees he acquired "an excellent blip right where I told him to look for the object." According to the Viscount pilot, the object "dissolved right in front of my eyes, and the crew above lost it from the scope at the same time. They said it just faded away." The entire incident lasted "several minutes".

NOTES: Thayer points out that if the DC-6 radar at 20,000' painted the target at 15 degrees elevation, range 20 miles, this would place the object at a little less than 50,000', not at the 60,000' estimated visually by the Viscount pilot. This might be thought a good match within the limits of observation and second-hand reportage (the DC-6 pilot did not apparently report his radar contact officially), and perhaps does not warrant Thayer's remark that the pilot's visual estimate was "in error". Further, the vertical coverage of the DC-6 radar would be at least several degrees and would paint a target with the antenna boresight aligned to a point somewhat below its real elevation (15 degrees quite possibly being the maximum antenna tilt limit), so it is not excluded that the match between visual- and radar-altitude indications was exact. Thayer's conclusion that the real visual elevation angle from the Viscount was 19 degrees, therefore, appears unwarranted, even if we accept the tacit assumption that radar and visual observations were of the same "object".

However, following Thayer's reasoning for the sake of argument, his analysis concludes that 19 degrees is too steep an angle for any temperature inversion to produce an optical mirage of a celestial body; and the above qualification of that reasoning increases the possible angle beyond 19 degrees, so further lessening the likelihood of mirage. Thayer also