A HISTORY OF THE NEW ZEALAND SIGHTINGS OF DECEMBER 31, 1978 By Bruce Maccabee c. B. Maccabee, 2005 http://brumac.8k.com/index.html

Since 1947 there have been numerous radar-visual UFO sightings. However, there is only a couple of known (to civilian UFO researchers) *radar visual sightings* that were also *filmed in color while a witness was recording his visual impressions on audiotape*. These sightings and several others occurred while the witnesses were aboard a freighter aircraft was flying east of the South Island of New Zealand during the very early morning of December 31, 1978. How these sightings happened is an amazing story which will be told in a brief form below. The history of these sightings has been thoroughly documented in several research papers (Maccabee, 1979 a,b,c; Maccabee, 1980; Maccabee, 1987; Maccabee, 1999) and books (Startup and Illingworth, 1980; Fogarty, 1982).



FIGURE 1 SAFE AIR ARGOSY 4 ENGINE FREIGHTER AIRCRAFT

These sightings are unique in the history of the UFO subject for several reasons: (1) one of the passengers on the freighter aircraft was a TV news reporter who recorded, in real time, his impressions of lights that were associated with a series of radar detections; (2) a TV cameraman obtained color movie film of some of the lights; (3) a tape recording was made of the air crew conversations with the ground radar air traffic controller at the Wellington Air Traffic Control Center (WATCC); (4) information about the sightings was obtained during a year long investigation by this author, starting only a week after the sightings occurred; and (5) analyses of the various sighting events continued for seven years after the sightings. During the initial part of the investigation all the witnesses were interviewed and the information thus obtained was documented and analyzed by this author. Because of the two tape recordings and the movie and the large amount of information from the witnesses it is possible to reconstruct or almost relive these sightings.

The sightings occurred between about 0010 hours (12:10 A.M.) and 0300 (3:00 A.M.) local (daylight saving) time. During this time the airplane, an Argosy 4 engine freighter (see Figure 1), flew southward, carrying newspapers from Wellington to Christchurch, and then northward from Christchurch to its home base in Blenheim. The times and airplane locations of particular events that occurred during the southward flight track of the aircraft is illustrated in Figure 6. There was a second series of events which were visually and photographically more impressive as the aircraft flew northward along the same track between. The times and locations of these events are illustrated in Figure 11. Several of those events have been discussed in depth (see Maccabee, 1979c, 1980, 1987, 1999 for much more detailed descriptions).



FIGURE 2 VIEW OF THE MOUNTAINS ON THE SOUTH ISLAND TAKEN THROUGH THE RIGHT SIDE WINDOW WHILE FLYING SOUTH



Captain Bill Startup First Officer Robert Guard FIGURE 3 THE AIR CREW The witnesses on board the plane during the flight south included the flight crew of two, Captain William Startup, (pilot) with 23 years of experience and 14,000 hours of flying time (for several years Startup was the president of the New Zealand Pilot's Association), and the co-pilot, Robert Guard, with 7,000 hours of flying time. Also on board was a TVnews crew consisting of a TV reporter from Melbourne, Australia, Quentin Fogarty, a New Zealand cameraman, David Crockett, and his wife, the sound recordist, Ngaire Crockett. During the flight north Ngaire was replaced by reporter, Dennis Grant, from Christchurch



Quentin Fogarty

David Crockett FIGURE 4 THE TV NEWS CREW Ngaire Crockett

As far as the air crew was concerned this was intended to be essentially a routine newspaper transport flight, from Wellington to Christchurch followed by a flight to home base at Blenheim. The only non-routine aspect of the flight was the presence of a TV crew on board the aircraft. The TV crew was on board because there had been a series of UFO sightings in the same area ten days earlier. During the night of December 21 there had been a series of radar and visual sightings from Argosy aircraft there were flying along the east coast of the South Island. The witnesses to those events were air crews and radar controllers. Startup and Guard were aware of the sightings of Decemer 21, but they had not been witnesses. Those sightings had caught the interest of a TV station (Channel 0) in Melbourne, Australia, and the station manager had decided to do a short documentary on them to show (in Australia) on New Years eve. (Note: the disappearance of young pilot Frederick Valentich over the Bass Strait south of Melbourne, while he was describing an unidentified object that flew back and forth over his plane (Haines, 1987), had attracted immense worldwide interest in October, 1978. The Melbourne TV station was trying to capitalize on the residual interest in UFO sightings that had been generated by the Valentich disappearance. The disappearance of Valentich is *still* a mystery.) Quentin Fogarty, who was employed by Channel 0, was on vacation in New Zealand, so the station asked him to prepare a short documentary on the December 21 sightings. Fogarty hired a local cameraman and sound recordist (David and Ngaire Crockett) and interviewed the radar controllers and a pilot who were witnesses to the previous sightings. Although these interviews would have been sufficient for the short documentary, Fogarty decided to go one step further: he arranged to fly on one of

the nightly newspaper flights in order to get some realistic background footage for his documentary. Naturally he did not expect to see anything unusual and he was not prepared for what happened. Neither was anyone else!

The crew and passengers on the plane were not the only witnesses involved in these sightings. Radar targets were detected by the Wellington Air Traffic Control Center (WATCC) radar and reported to the plane by air traffic controller Geoffrey Causer. For part of the time, the radar maintenance technician, Bryan Chalmers, was also



FIGURE 5 GEOFFREY CAUSER\ AIR TRAFFIC CONTROLLER

a witness to the radar targets. The radar itself had characteristics that are important to for understanding the WATCC radar sightings (more details are given in Maccabee, 1999). Because of the topography of the South Island, with high mountains (e.g., Mt. Cook, 12,000 ft), it is common to have warm dry air blowing over cool moist air near the east coast which can cause more than the typical downward bending of radar beam radiation. The Wellington radar (51 cm wavelength) was able to monitor air traffic over distances of a hundred miles using an antenna that created a vertical fan beam that was about 2° wide by 8° degrees high (main lobe). The center of the main lobe was tilted upward 4° but there was substantial power radiated at angles below 4 degrees. It is this lower angle radiation that can be bent downwards by atmospheric conditions so that it hits the objects on the ground or ocean. In order to eliminate ground targets not of interest to air traffic controllers the radar system was operated in the "MTI" (moving target indicator) mode in which special electronic circuitry removes from the radar display any reflectors which are moving at a speed less than about 15 nm/hr. (NOTE: distances are given in nautical miles, "nm." One nm = 6077 ft which is about 15% larger than one statute mile, 5280 ft. One nm also equals 1.852 km.)

THE FLIGHT SOUTH

Figure 6 illustrates the locations of the airplane and the times of various significant events. The plane began its journey by taking off from Blenheim at about 2215 (10:15 PM; this presentation uses 24 hour clock time). At 22:34 the plane landed at Wellington. During the next hour the cargo of newspapers for Christchurch was loaded. The plane took off at about 23:50 and a few minutes later, when it was at point (1) the aircraft passed over Wellington at about midnight. It reached a non-geographical



reporting point just east of Cape Campbell at about 10 minutes past midnight (point 2 on

FIGURE 6

EVENTS DURING THE FLIGHT SOUTH TO CHRISTCHURCH

the event map) where the plane made a left turn to avoid any possible turbulence from wind blowing over the mountains of the South Island. This turbulence had been predicted by the flight weather service, but was not detected at all during the trip. The captain reported that the flying weather was excellent and he was able to use the automatic height lock, which would have automatically disengaged had there been turbulence that would change the altitude of the aircraft. The sky condition was "CAVU" (clear and visibility unlimited). The air crew could see the lights along the coast of the South Island, extending southward to Christchurch about 150 miles away.

At about 0005 (12:05 A.M., local time, December 31, 1978), while they were crossing the Cook Strait, the captain and copilot first noticed oddly behaving lights ahead of them near the Kaikoura Coast. They had flown this route many times before and were thoroughly familiar with the lights along the coast so they quickly realized that these were not ordinary coastal lights. These lights would appear, seem to project a beam downward toward the sea, and then disappear, only to reappear at some other location. Sometimes there was only one, sometimes none and sometimes several. After several minutes of watching and failing to identify the lights the pilot and copilot began to discuss what they were seeing. They were puzzled over their inability to identify these unusual lights and their odd pattern of activity, which made the captain think of a search operation. (Similar activity of unidentified lights nearer to Cape Campbell had been seen by ground witnesses at Blenheim during the UFO sightings of December 21, as mentioned above. See Startup and Illingworth, 1980)

At about 0012 they decided to contact Wellington Air traffic Control Center radar to find out if there were any aircraft near Kaikoura. At this time, point (3) on the map, the plane had reached its 14,000 ft cruising altitude where there was a light wind from the west. The average ground speed was about 180 nm/hr or about 3 nm/minute. Robert Guard was flying the aircraft on this particular part of the journey so Captain Startup did the communicating with Geoffrey Causer at the WATCC. "Do you have any targets showing on the Kaikoura Peninsula range?" he asked. Causer had been busy with another aircraft landing, but had noticed targets appearing and disappearing in that direction for half an hour or more. He knew it was not uncommon to find spurious radar targets near the coast of the South Island. These would be ground clutter effects of mild atmospheric refraction so he had paid little attention to them. About 20 seconds after the plane called he responded, "There are targets in your one o'clock position at, uh, 13 miles, appearing and disappearing. At the present moment they're not showing but were about 1 minute ago." (Note: directions with respect to the airplane are given as "clock time" with 12:00 - twelve o'clock - being directly ahead of the aircraft, 6:00 being directly behind, 9:00 to the left and 3:00 to the right. The "1:00 position" is 30(+/-)15 degrees to the right.) The pilot responded, "If you've got a chance would you keep an eye on them?" "Certainly," was the reply. Shortly after that the other aircraft landed and from then on the Argosy was the only airplane in the sky south of Wellington.

Previous to this time, while the plane was crossing the Cook Strait, the TV crew

had set up a camera in the cargo hold of the aircraft to do a "stand up" which involved filming and recording Mr. Fogarty. During this stand-up Fogarty explained to the (then future) viewers that he was on board the same aircraft that had sightings ten days before and that the TV crew would remain alert for anything unusual. Fogarty intended to do a second stand up immediately after the first, while the camera was still set up. During the second standup he had planned to say that the plane had landed at Christchurch and they hadn't seen anything. However, he didn't get to do the second stand up because very shortly after he finished the first stand-up the captain climbed partway down the ladder into the cargo hold and motioned for the news crew to "get up here fast." Without knowing why the captain indicated some urgency, since verbal information exchange was very difficult because of the noise of the four engine aircraft, Fogarty and the crew moved their equipment up to the flight deck as quickly as they could.

At about 0015 (point 4) WATCC reported a target at the 3:00 position on the coastline. The air crew did not see any light associated with the radar target at 3:00. However it was about at that time that the TV crew came up onto the flight deck. The air crew then pointed out to the TV crew the unusual lights near Kaikoura and also the numerous ordinary coastal lights which were visible through the windshield.



FIGURE 7 INSTRUMENT PANEL AND THE FLIGHT DECK (COCKPIT) OF THE ARGOSY

The TV crew had to adapt to the difficult conditions of working on the cramped and very noisy flight deck. Crockett had to hold his large movie camera (see Figure 4) on his shoulder while he sat in a small chair between the captain (on his left) and first officer. From this position he could easily film ahead of the aircraft but it was difficult for him to film far to the right or left and, of course, he could not film anything behind. He was given earphones so he could hear the communications between the air crew and WATCC. The reporter was not given earphones so, occasionally, Crockett would yell over the noise of the airplane to the reporter, who was standing just behind the copilot, to tell the reporter what the air crew was hearing from the WATCC. The sound recordist, Ngaire, was crouched behind the Crockett with her tape recorder on the floor. Her earphones were plugged into the tape recorder. She was not able to see outside. She could, of course, hear the reporter as he recorded his impressions of what he saw through the right side window or through the front windows of the flight deck. She heard some things that were more than just a bit frightening!

At approximately 0016, point 5 on the map, the first radar-visual sighting occurred. WATCC reported "Target briefly appeared 12:00 to you at 10 miles," to which Captain Startup immediately responded, "Thank you." (The previous target at 3:00 had disappeared.) Startup reported that he looked ahead of the Argosy and saw a light where there should have been none (they were looking generally toward open ocean; Antarctica, the closest land in the sighting direction, was over 1,000 miles away; there were no other aircraft in the area). He described it as follows: "It was white and not very brilliant and it did not change color or flicker. To me it looked like the taillight of an aircraft. I'm not sure how long we saw this for. Probably not very long. I did not get a chance to judge its height relative to the aircraft." This target was not detected during the next sweep of the scope. (Note: each sweep required 12 seconds corresponding to 5 revolutions per minute.)

About 20 seconds later, at about 0016:30, WATCC reported a "...strong target showing at 11:00 at 3 miles." The captain responded "Thank you, no contact yet." Four radar rotations (48 seconds) later (at point 7) WATCC reported a target "just left of 9:00 at 2 miles." The captain looked out his left window but saw nothing in that direction except stars. Eighty-five seconds later, at about 0019, WATCC reported a target at 10:00 at 12 miles. Again there was no visual sighting. Captain Startup says he had the impression from this series of targets that some object that was initially ahead of his plane had traveled past the left side. He decided to make an orbit (360 degree turn) to find out if they could see anything at their left side or behind.

At about 0020:30 the captain asked for permission to make a left hand orbit. WATCC responded that it was OK to do that and reported "there is another target that just appeared on your left side about 1 mile....briefly and then disappearing again." Another single sweep target. The captain responded, "We haven't got him in sight as yet, but we do pick up the lights around Kaikoura." In other words, the air crew was still seeing anomalous lights near the coast.

At this time the plane was about 66 miles from the radar station. At this distance the 2.1 degree horizontal beamwidth (at half intensity points) would have been about 2 miles wide (at the half power points on the radiation pattern). The radar screen displays a short arc when receiving reflected radiation from an object, such as an airplane, that is much, much smaller than the distance to the object. The length of the arc corresponds roughly to the angular beamwidth. Hence, at this distance the lengths of the arcs made by the aircraft and the unknown were each equivalent to about 2 miles. If the controller could actually see a 1 mile spacing between the arcs, then the centers of the arcs, representing the positions of the actual targets (plane and unknown) were about 3 miles apart. As the plane turned left to go around in a circle, which would take about 2 minutes to complete (point 9), WATCC reported "The target I mentioned a moment ago is still just about 5:00 to you, stationary."

During the turn the air crew and passengers could, of course, see the lights of Wellington and the lights all the way along the coast from the vicinity of Kaikoura to Christhurch and they could see the anomalous lights near Kaikoura, but they saw nothing that seemed to be associated with the radar targets that were near the aircraft.

During this period of time Causer noticed radar targets continuing to appear, remain for one or two sweeps of the radar, and then disappear close to the Kaikoura Coast. However, he did not report these to the airplane. He reported only the targets which were appearing near the airplane, now about 25 miles off the coast. The TV reporter, who was able to watch the skies continually, has stated that he continually saw anomalous lights "over Kaikoura," that is, they appeared to be higher than the lights along the coastline at the town of Kaikoura. Of course, he couldn't determine the distance to the lights so they could have been closer to the plane than the lights along the coast.

By 0027 (point 10) the plane was headed back southward along its original track. WATCC reported "Target is at 12:00 at 3 miles." The captain responded immediately, "Thank you. We pick it up. It's got a flashing light." The captain reported seeing "a couple of very bright blue-white lights, flashing regularly at a rapid rate. They looked like the strobe lights of a Boeing 737..."(Startup and Illingworth, 1980). At this time he was again looking toward the open ocean in a direction where there should have been no light.

From the moment he was sitting in the little middle seat on the flight deck Crockett had difficulty filming. The lights of interest were mostly to the right of the aircraft and, because of the size of his camera, he was not able to film them without sticking his camera lens in front of the Guard who was in flying the aircraft. When a light would appear near Kaikoura he would turn the camera toward it and try to see it through his big lens. Generally by the time he had the camera pointed in the correct direction the light would go out. He was also reluctant to film because the lights were all so dim he could hardly see them through the lens and he didn't believe that he would get any images. Of course, he was not accustomed to filming under these difficult conditions.

Nevertheless, Crockett did get some film with his Bolex H16 EBM electric drive, 16 mm movie camera (using Fujicolor 8425, ASA 400 color reversal film) and his Kern 16-100 mm zoom lens. He began by filming the airplane on the runway before its initial takeoff from Blenheim. Then he filmed the landing at Wellington and the subsequent takeoff. All of this film provided reference footage that was valuable for the film analysis. The next images on the film, taken at an unrecorded time after the takeoff from Wellington, are the images of a blue-white light against a black background. In order to document the fact that he was seated in the aircraft at the time of filming the blue-white light, he turned the camera quickly to the left and filmed some of the dim red lights of the meters on the instrument panel. Unfortunately Crockett did not recall, during the interview about a month later, exactly when that blue-white light was filmed, nor did he recall exactly where the camera was pointed at the time, although it was clearly somewhat to the right of straight ahead. The initial appearance of the blue-white light is followed by two other appearances, but there are no reference points for these other



FIGURE 8 UNFOCUSED IMAGE OF BLUISH LIGHT SEEN DURING THE SOUTHBOUND TRIP

appearances. They could have been to the right or straight ahead or to the left. The durations of the three appearances of the blue-white light are 5, 1.3 and 1.9 seconds, which could be interpreted as slow pulsing on and off. After the last blue-white image the film shows about 5 seconds of very dim images that seem to show the distant shoreline of Kaikoura with some brighter lights above the shoreline. Unfortunately these images are so dim as to make analysis almost impossible.

Although it is impossible to prove, it is likely that Crockett filmed the flashing light at 0027. He was aware of the appearance of the blue-white light because he could hear the communications between WATCC and the captain. Therefore it is reasonable to assume that he pointed the camera toward that light and filmed even though he thought he would get nothing because the light was dim. The cameraman did not get film of the steady white light that briefly appeared ahead of the aircraft at 0016. However, regardless of whether these blue-white images were made by the flashing light at 0027 or by some other appearance of a blue-white light, the fact is, considering where the plane was at the time, that this film was impossible to obtain from the conventional science point of view because there was nothing near the airplane that could have produced these bright pulses of light. The only lights on the flight deck at this time were dim red meter lights because the captain had turned off all the lights except those that were absolutely necessary for monitoring the performance of the aircraft. There were no internal



FIGURE 9 CROCKETT'S FILM OF THE INSTRUMENT PANEL

blue-white lights to be reflected from the windshield glass, nor were there any blue-white lights on the exterior of the aircraft. The only other possible light sources, stars, planets and coastal lights were too dim and too far away to have made images as bright as these three flashes on the film. These images remain unexplained. Thus the probability is high, although one cannot absolutely certain, that the air crew and cameraman saw and recorded on film the appearance of the light that Causer reported to be at 3 miles in front of the aircraft. If true, then this was a radar/visual/photographic sighting. (A radar/visual/photographic sighting did occur about an hour later as the airplane flew northward from Christchurch.)

There is a similar problem with determining exactly when the Fogarty's audio tape statements were made since his recorder was not synchronized with the WATCC tape. Therefore the timing of the reporter's statements must be inferred from the sequence of statements on the tape and from the content. Recorded statements to this point mentioned lights seen in the direction of the Kaikoura Coast, as well as, of course, the normal lights along the coast. But then Fogarty recorded the following statement: "Now we have a couple right in front of us, very, very bright. That was more of an orange-reddy light. It flashed on and then off again..... We have a firm convert here at the moment." Since he was looking out the right window (at the right side of the copilot) his statement "right in front of us" must be interpreted as meaning in the direction he happened to be looking at the time and not necessarily as meaning in front of the airplane. The air crew did not report an "orange-reddy light" directly in front of the airplane, but they did report such lights appearing and disappearing in the direction of the Kaikoura Coast at the right. Apparently the appearance of these unexplained lights caused Fogarty to undergo a "battlefield conversion" from being a UFO skeptic to believer.

As impressive as this event was, an even more interesting radar/visual sighting was about to occur. At about 0028 (point 11) the Argosy aircraft made a 30 degree right turn to head directly into Christchurch. Causer reported that all the radar targets were now 12 to 15 miles behind them. Then at about 0029 (point 12 on the map) WATCC reported a target 1 mile behind the plane. About 50 seconds later (after 4 sweeps of the radar beam) Causer reported a target about 4 miles behind the airplane. (The previous target could have been an object that remained stationary while the plane traveled away from it at about 3 nm/minute.) Then that target disappeared and about 30 seconds later he reported a target at 3:00 at 4 miles. Two sweeps of the radar beam later, he saw something really surprising. He reported, "There's a strong target right in formation with you. Could be right or left. Your target has doubled in size."

This extraordinary condition of a "double size target" (DST) persisted for at least 36 seconds. This duration is inferred from the time duration between the controller's statement to the airplane, made only seconds after he first saw the DST, and his statement that the airplane target had reduced to normal size. This time duration was about 51 seconds (four radar detections over a period 36 seconds followed by a fifth revolution with no detection plus 3 seconds) according to the WATCC tape recording of the events. According to Goeffrey Causer, the double sized target persisted without any distortion of its shape as it moved radially away from the center of the radar scope. A few minutes earlier Causer had asked the radar technician, Bryan Chalmers, his opinion of the radar targets. Chalmers saw the double sized target and agreed with Causer that it moved along the radar scope just as if there were two aircraft flying side-by-side, so close together that the radar could not distinguish one from the other. Shortly after this Chalmers used another radar scope to test for evidence of unusual radar propagations and "weatherrelated targets." He reported that he saw the normal amount "land and sea clutter" along the Kaikoura coast within about 30 nm of the Wellington radar but no evidence of unusual conditions.

Detailed analysis of this radar event (Maccabee, 1999) has shown that the only reasonable explanation is that there was some unknown radar-reflective object traveling at the same speed as the airplane at that time. Because of the vertical fan beam of the radar it could have been above or below or level with the Argosy. The assumption of a radar-reflective object is, of course, consistent with other detections before and after this event (to be described). The fact that detection of a radar-reflective object did not occur during every sweep of the radar does not prove that the object was not "real" because radar reflectivity of most objects is orientation dependent. Hence if an object were rotating in space while traveling it could be picked up by sweeps of the radar when it presented a small cross-section (e.g., "end- on"). (The doubling of the size of the radar target was not a result of the airplane changing its orientation relative to the radar. The airplane was flying in a straight line away from the radar during this time.)

First Officer Guard heard the WATCC report of a target at the right side and looked out his window. After a few seconds he spotted a light which he described as

follows: "It was like the fixed navigation lights on a small airplane when one passes you at night. It was much smaller than the really big ones we had seen over Kaikoura. At irregular intervals it appeared to flash, but it didn't flash on and off; it brightened or perhaps twinkled around the edges. When it did this I could see color, a slight tinge of green or perhaps red. It's very difficult describing a small light you see at night."

Captain Startup had been looking throughout his field of view directly ahead, to the left, upward and downward to see if there could be any source of light near the aircraft. He saw nothing except normal coastal lights and, far off on the horizon to the left (east), lights from the Japanese squid fishing fleet which uses extremely bright lights to lure squid to the surface to be netted. Neither the Startup nor Guard saw any running lights on ships near them or near the coast of the South Island, which implies that there were no ships on the ocean in their vicinity.

When the Guard reported seeing a light at the right, Startup turned off the navigation lights, one of which is a steady green light on the right wing, so that the Fogarty wouldn't confuse that with any other light. Since the Fogarty could not hear the WATCC communications Crockett yelled loudly (because of the extreme engine noise) to the Fogarty that there was a target at the right side (3:00) at 4 miles. Then Crockett yelled to Fogarty that there was a target flying in formation. Fogarty looked through the right side window for the light. He also saw it and recorded his impression: "I'm looking over towards the right of the aircraft and we have an object confirmed by Wellington radar. It's been following us for quite a while. It's about 4 miles away and it looks like a very faint star, but then it emits a bright white and green light." (Fogarty was not told that the light had come so close to the airplane that the radar could not separate the plane target and the unknown target.) Unfortunately the light was too far to the right for the cameraman to be able to film it (he would have had to sit in the Guard's seat to do that). Startup was also able to briefly see this light. This event was a radar-visual sighting with several witnesses to the light and two witnesses to the radar target.

About 82 seconds after Wellington reported that the airplane target had reduced to normal size, when the plane was approximately at point 17, the captain told WATCC, "Got a target at 3:00 just behind us," to which WATCC responded immediately, "Roger, and going around to 4:00 at 4 miles." This would appear to be a further radar confirmation of the light that the crew saw at the right side.

Fifty seconds after reporting the target that was "going around to 4:00 at 4 miles" the WATCC operator opened the communication channel with the Christchurch Air Traffic Control Center. He told the air traffic controller that there was a target at 5:00 at about 10 miles. He said that the target was going off and on but "...not moving, not too much speed..." and then seconds later, "It is moving in an easterly direction now." The Christchurch radar did not show a target at that location. This could have been because the Christchurch radar was not as sensitive as the Wellington radar, because the radar cross-section (reflectivity) in the direction of Christchurch was low (cross-section can change radically with orientation of an object) or because the target was below the Christchurch radar beam, which has a lower limit to the angular elevation of its radar

beam of 4 degrees.

At about 0035, when the plane was about at point 18, WATCC contacted the plane and asked, "The target you mentioned, the last one we mentioned, make it 5:00 at 4 miles previously, did you see anything?" The captain responded, "We saw that one. It came up at 4:00, I think, around 4 miles away, " to which WATCC responded, "Roger, that target is still stationary. It's now 6:00 to you at about 15 miles and it's been joined by two other targets." The reporter heard this information from the cameraman and recorded the following message: "That other target that has been following us has been joined by two other targets so at this stage we have three unidentified flying objects just off our right wing and one of them has been following us now for probably about 10 minutes." Unfortunately, as already mentioned, the reporter could not hear the communications with WATCC so he did not always get the correct information. These targets were behind the plane and one of them had been "following" the plane for 7 - 8 minutes.

Then the WATCC reported that the three targets had been replaced by a single target. The captain, wondering about all this activity at his rear, requested a second two minute orbit. This was carried out at about 0036:30 (point 19). Nothing was seen and the single target disappeared. From then on the plane went straight into Christchurch. The Christchurch controller did report to the aircraft that his radar showed a target over land, west of the aircraft, that seemed to pace the aircraft but turned westward and traveled inland as the aircraft landed. Guard looked to the right and saw a small light



FIGURE 10 APPROACHING THE AIRPORT AT CHRISTCHURCH



FIGURE 11 EVENTS DURING THE FLIGHT NORTH TO BLEHEIM

near the shore moving rapidly along with the aircraft. However, flight duties during the landing itself prevented him from watching it continually and he lost sight of it just before the aircraft landed.

THE FLIGHT NORTH

The airplane landed at about 0101 and the newspapers were unloaded. Over the next hour preparations for the trip to Blenheim were made. Quentin, David and Ngaire had originally planned to get off the plane and spend the rest of the night in Christchurch. However, because of the sightings during the trip south and because David complained that he hadn't obtained much film footage, he and Quentin decided to return northward with the plane to obtain more film footage if possible. Ngaire had been quite frightened by the sighting events and refused to get back onto the airplane. Therefore Fogarty decided to invite a reporter acquaintance who lived in Christchurch to fly northward in the plane to Blenheim. Fogerty called Dennis Grant on the phone and explained to him what had happened. Dennis was skeptical about having any success in seeing UFOs but he decided it might be worth a try. So he dressed and drove to the airport. In the meantime, Fogarty and the Crocketts did a second "stand up." Fogarty had originally planned a stand up in Christchurch in which he would explain that he hadn't seen anything during his trip from Wellington. The actual standup was quite different from what he had originally planned. In it Fogarty said that Wellington radar had reported more radar targets and so he was going to fly back north with the plane to see if they could get "better film than we did the last time."



FIGURE 12 QUENTIN FOGARTY AND NGAIRE CROCKETT AT THE CHRISTCHURCH AIRPORT, 1:45 AM

Figure 6 illustrates the track of the aircraft and the times of specific incidents

during the flight north. At about 0216 (point 21) the plane took off from Christchurch. As before, David Crockett was seated between the pilot and the copilot. He filmed the landing lights and airplane cockpit during the takeoff. Grant and Fogarty were in the cargo hold during takeoff. About 2 minutes later the plane was about 7 miles north of Christchurch it entered a thin layer of cloud. Shortly after that it climbed through the top of the cloud at about 3,000 ft. Immediately the air crew and Crockett could see a very bright light ahead and about 30° to the right, i.e., northeast of them (see Figure 6). Actually, they saw two lights, one above the other, the upper being brighter. (The lower may have been a reflection in cloud or the ocean.) The captain turned on the weather radar in the mapping mode (M. E. L. Co., EL90; vertical fan beam 4⁰ to 15⁰ down; 3 sec sweep cycle; ranges: 20, 50, 150 nm) and immediately picked up a strong target in the direction of the light at a distance of about 18 nm. The pilot and copilot agreed that the size of the radar target (glowing spot) on the screen was about 3 to 5 times larger than one would get for a large boat. Startup's initial impression was that he was looking at the moon, a slightly squashed moon. Then he realized it couldn't be the moon, which was far in the west. He described it as a white sphere with a tinge of orange that was slightly flattened at the top and bottom. Guard compared it to a squashed orange. The color was similar to that of a sodium vapor lamp.

About this time Fogarty and Grant came up to the flight deck and they, too, saw the bright lights. Grant said his initial impression was of a white-yellow sphere like a ping pong ball in a dark room and illuminated by a ray of light. Grant, who was standing behind Startup, also had a good look at the radar screen. He said that in his mind there was no doubt that the direction to the radar target, as indicated by well defined angle lines on the radar screen, was the same as the direction to the lights. He also noted a light beneath the main bright light which might have been a reflection from a cloud.

Quentin Fogarty recorded his immediate impressions in several statements: "We are now about 3 minutes out of Christchurch and, on our starboard side, we can see two very bright lights, one much brighter than the other. It's like a very, very bright star and just below it is another light not quite so bright." Two or three minutes later he recorded "...those lights appear to be traveling with us. They are still off the starboard wing. The brighter light is still above the other and it has moved slightly ahead of the other. It is extremely bright, much brighter than any of the other stars in the sky." Fogarty recorded that the light would dim and brighten. He thought it was occasionally going behind a cloud, which is a possibility since there was a cloud layer. "It is lighting up the clouds around it," he said. Crockett's film (see below) shows only a single light that is bright lower light, perhaps a reflection in a cloud or in the ocean, was actually too dim to register on the film or perhaps it was below the field of view of the camera lens.

For the next 10 minutes the plane flew in a straight line, continually climbing. According to Startup, who had the best view of the radar screen (which was at his left), the radar target initially moved radially inward (i.e. at a constant angle of about 30° to the right) to a distance on the order of 8 to 10 nm. Startup's observation indicates that the object was traveling a bit faster than the aircraft. Then it slowly dropped back to the right, finally leaving the radar screen at the limit of its sweep (about 60° to the right). The exact time that it disappeared at the right of the radar is not known. However, it was probably at about 0225. At about 0226 (estimated time) Fogarty recorded the following statement: "We must be about 30 miles out of Christchurch ...according to Bill Startup, it came as close as 10 miles to us." At about the same time (point 25 in Figure 6) Bob Guard reported to Wellington that the plane was about 32 nm from Christchurch at about 11,500 ft and that there was "a great big target sitting at 3:00 to us position about 12 nm away."

During this time Crockett filmed this light using his 100 mm zoom lens. In order to be certain that he obtained images he slowed the frame rate from the normal 24 per second to 10 per second (this would more than double the exposure of each frame). Crockett started filming from his middle seat but, within a minute or so of first seeing the light Crockett got out of his seat and crouched behind the copilot. At one time, to document where the film was taken, he unzoomed to show both the UFO and a small, dimly lit meter that is under the right side window (Figure 12).



FIGURE 12 UNZOOMED IMAGE TO SHOW A COCKPIT METER AND THE UNKNOWN LIGHT AT THE SAME TIME

Crockett did not film continuously but he did obtain about 5 $\frac{1}{2}$ minutes of footage at ten frames per second. Initially the images were roughly elliptical and tilted at about 45° to the horizontal as shown in Figure 13A and B. Then they became more or less elliptical or triangular, as shown in Figures 13C and D, and then nearly circular, as shown in Figure E. The shapes illustrated here are believed to be essentially the true shapes of the images that are minimally smeared by camera motion (see discussion below). Unless noted, the relative positions of the images in the sketches below are not related to image motion from frame to frame. However, several sequential series of images are shown to illustrate the effects of image motion.



FIGURE 13A SKETCHES OF SOME IMAGES



FIGURE 13B CLOSE UP OF THE IMAGE IN FRAME 27 (see Fig. 13A)



FIGURE 13C SKETCHES OF SOME ELLIPTICAL AND TRIANGULAR IMAGES



FIGURE 13D FRAME 427 FRAME 747 (see Figure 13C)



SOME TRACED FILM IMAGES WITH FRAME NUMBERS DURING THE FIRST 226 SECONDS OF FILM TIME (10 frames per second)

About 3 minutes into the film, while Crockett was holding the camera on his shoulder, the camera apparently bumped something which caused a momentary oscillation of the camera pointing direction. This motion created the famous "ampersand-shaped" image that was shown around the world. This image was used to calculate the light intensity that was published in the Applied Optics letter (Maccabee, 1979b). Figure 14 shows the ampersand image and the preceding and following images as traced on a projection screeen. The relative image positions on the successive frames are indicated to show the amount of image position shift from one frame to the next. At a frame rate of 10/sec, each frame represents 0.044 seconds of exposure time (open shutter). The shutter is closed for 0.056 sec. Therefore if the pointing direction of the camera is changing for whatever reason, a nominally steady light will make a series of elongated, stretched or "smeared" images. Camera rotation in one direction only (rotation in a plane) will create a linear smear. Complex rotation, which is



FIGURE 14 THE AMPERSAND IMAGE AND PRECEDING AN

THE AMPERSAND IMAGE AND PRECEDING AND FOLLOWING FRAMES SHOWING CONSIDERABLE CAMERA MOTION BEFORE THE AMPERSAND IMAGE

normal for hand-held cameras, can cause curved or bent image smears. In the Crockett film most images were smeared because most of the time he held the camera on his shoulder. (Because the camera was large and the cockpit was small he was not able to mount the camera on his tripod.) Although most images may be distorted by motion, many are not. The undistorted images occur in "stationary frames" when the camera momentarily stops moving. If the camera rotates to the right, for example, the image will move to the left from frame to frame. If the cameraman then reverses the motion in order to bring the image back to the center of the fame, there can be a frame or two at the time of motion reversal when there is little or no motion smear of the images. In Figure 14 the large shift of image position from frame 1763 to 1764, 1764 to 1765, etc. indicates a rather rapid twisting motion of the camera with the pointing direction tipping upward and to the right. The small image shift from 1767 to 1768 indicates that the camera nearly stopped moving. The motion indicated in 1766 is extreme, which suggests to me that the camera hit something, perhaps the back of the copilot's seat, and caused a momentary oscillation of the 100 mm lens. Figure 13 contains several examples of image position

shift in order to illustrate how a stationary frame can occur and to show that the stationary frames are the best representation of the true image shape.



FIGURE 16 FILM TRANSMISSION MEASUREMENT OF THE AMPERSAND IMAGE USE IN THE APPLIED OPTICS PAPER. (The dots show where the optical transmission of the image was measured.)

For most of the time Crockett held the large Bolex electric camera on his shoulder, but for one period of time before the plane turned to the right he rested his camera on the copilot's seat. He then obtained, at full zoom, about 90 seconds of very steady, round, overexposed white or pale yellow images which have a small green, almost triangular green image protruding from the right side, as illustrated in Figure 17. This series of image is called the "steady sequence" because of the small amount of frame-to-frame motion of the images. Figure 18 contains hand sketches of some of the images. (The image positions are not indicative of motion from frame to frame, as in Figures 13 and 14. The sketch paper was moved before each image was traced simply to create a separation between the successive tracings.)









At a time estimated to be about 0227 Fogarty recorded Crockett's impression of what he was seeing: "The bright light is still just off our starboard side. According to the cameraman, David Crockett, who has been filming it for the past few moments, it appears to have a brightly lit bottom and a transparent sort of sphere on top, so it appears to be, well, like a flying saucer. It's extremely bright. It is very hard with the naked eye to pick up any details because the light is so bright. It must have been following us now for close to 10 to 12 minutes." Crockett made a sketch of his impression of the image. This is shown in Figure 19 at the top right corner.



(The drawings at the right side were made by Crockett.)

At about 0229 the plane reached its final altitude of 13,000 ft and Startup decided to turn toward the light to see what would happen. At this time he had the impression that the light was traveling parallel to the plane and that if he made a "sudden" turn toward it he would have the light "on the nose of the aircraft" before it had a chance to react. He didn't expect to have to turn very far before the plane would be heading toward the light. He initiated a turn at the rate of a 2 minute orbit and watched the instrument panel as well as the sky ahead. If any of his meters on the instrument panel had indicated abnormal operation he would turn back immediately. However, all the meters indicated normal operation. So he continued the turn and was surprised to find that he couldn't get the light "on the nose" of the plane. It seemed to him that the light had stopped its forward motion. After about 30 seconds he had the impression that the light was taking an avoidance action that would prevent him from flying toward the light. Since he didn't want to go around in a circle, he stopped the turn. By this time the plane had turned 92° as illustrated in Figure 6. Although the pilot, sitting in his seat at the left side of the flight deck, didn't have a direct view of the light, he did see a glow from the object to the right of straight ahead. The others on the plane (Grant, Fogarty and Crockett standing and Guard in the right hand seat) could see it directly, clearly at a lower elevation than the

airplane. It did not appear on the radar, suggesting that it was below the mapping mode radar beam, i.e., more than 15° below horizontal. As the plane flew in the southeast direction, again the direction to the light moved toward the rear. The copilot said the light moved so that it was between the plane and Banks Peninsula. (He also said he could see light from the Japanese squid fishing fleet on the horizon about a hundred miles east of the plane.)

Shortly after the right turn, when Crockett realized that the light wasn't leaving, he decided to get his larger, Sun Macro-Zoom 80 - 240 mm, lens. It was in a container in the cargo hold. Over a period of a couple of minutes he obtained the lens and installed it on the camera using the light of a flashlight (it was completely dark on the flight deck except for dim glowing meters). Unfortunately, because of the continual vibration of the airplane and the poor lighting he didn't install it properly with the result that, when he went through the initial process of zooming and focusing the lens on the light, the lens went through focus without realizing it and "out the other side" (this was discovered later during the investigation). Thus, most of the images were out of focus. The out of focus images were very large and had horizontal lines through them which appeared to



FIGURE 20 A SERIES OF FRAMES SHOWING THE DEFOCUSED IMAGES

Crockett to be "rings" around the light. (Note: Crockett had expected the zoom lens to

create larger, more defined images. Therefore, when he actually saw larger images with fine details, "lines," he assumed that the lens was focused.) Crockett made a sketch of one of the defocused images as illustrated in Figure 19. A series of these images is shown in Figure 20, which is a copy of the actual film strip (in black and white). (The horizontal lines through these images, which were shown around the world, caused an Australian amateur astronomer to make the ridiculous claim that Crockett had filmed the rings of Jupiter. The astronomer did not realize that images are about several millimeters in diameter, much larger than the image of Jupiter would be if photographed with a 240 mm focal length lens. The investigation discovered that the horizontal lines resulted from distortions in the airplane window glass.) Fortunately not all of the images were completely out of focus. The few images that are close to focus showed an extremely bright light that appeared to have a large roundish bottom with a smaller top, with an overall shape almost like a bell, as in Figures 21 and 22.

After several minutes of travel along the southeastern path the pilot still didn't have a direct view of the light, so he turned the plane to the left to regain his original heading (point 26 on Figure 6). According to the copilot the light "kept station with us" on the right hand side as the plane turned to the left. That is, the object at the right side traveled at a speed large enough to stay "outside the turn," at about the same "o'clock position" (like 3:00) as the plane turned left. Then it dropped behind the plane and was gone.



FIGURE 21 ONE OF THE NEARLY FOCUSED IMAGES OBTAINED WITH THE 240 mm LENS



FIGURE 22 TRANSMISSION MEASUREMENT OF A NEARLY FOCUSED IMAGE OBTAINED WITH THE 240 mm LENS

This sighting event, which lasted from about 0219 to about 0231, has been the subject of worldwide publicity and intense analysis. It is the only known (to civilian UFO researchers) UFO sighting event which combines multiple airborne witnesses with airplane radar, recorded comments and color movie film. The fact that the light moved in response to actions taken by the plane is an indicator of intelligent control.

Eventually the plane returned to its original track, reaching "Kaikoura East" (a reporting point for aircraft flying this route) at 0246 (point 30 on Figure 6). Before it reached Kaikoura East, WATCC told the plane of radar targets off the coast at 0241 and 0245. There was no visual sighting but Startup, who still had the airplane radar on, said that he saw some targets. However, he had been "saturated" with unknown sightings by that time and decided to ignore them and not tell any of the others about the airplane radar targets (he did tell others after the flight was finished). At 0247 Wellington again reported targets, this time at 11:00 and 15 miles. The plane responded "We don't seem to be picking them up quite so easily...(now)..."

At 0248:30 Wellington reported a target at 9:00 to the plane about 8miles away.

No one recalls seeing a corresponding light. A minute and half later Fogarty, who also was feeling "overloaded" by unidentified lights, recorded the following message: "We've just now passed Kaikoura and there's been no further activity. There are pinpoints of light in the sky but nothing's been confirmed on Wellington radar." (Note: recall that Fogarty could not hear the conversations between the pilot and Wellington radar. The only radar information Fogarty obtained was when Crockett told him there were radar targets. At this time Crockett hadn't told Fogarty about the Wellington radar targets.) Fogarty continued, "I, for one, am hoping that we've seen enough and the rest of our journey back to Blenheim will be uneventful. I've had quite enough of UFOs for one night."

Then, at 0251 a bright light appeared, far ahead of the plane. The plane called Wellington to find out if there was a radar target in that direction. Wellington reported "...a strong target at 12:00 at 20 miles..." (point 33 on Figure 6). The plane told Wellington, "We have that one, also, and quite a good visual display at the moment. It looks like a collection of lights." Fogarty recorded the following message over the next 93 seconds, "About 30 seconds after that last statement we have another one right in front of us, very bright. Seems to be a long ways away...and another one just to the left of it. That one flashed extremely brightly. They've both now faded.....The other one's flashing again. It's giving off an orange flashing light. It looks like an aircraft beacon. It's moving off. It's extremely bright... it fades.... and it's dropped. It seems to have just dropped at an incredible speed and it...seems to be rolling and turning. In fact, one light has another beside it.....Oh, I don't know... I really don't know what is going on...It appears to be over the hills.....There appears to be a whole cluster of them, in fact." At this point in the tape, about 1 minute after the sighting started, Crockett yelled to Fogarty (the tape recorder picked up his voice in spite of the engine noise), "I can't see anything." Then Fogarty resumed his commentary: "You can see orange and red among the lights. There's one particular one that keeps flashing to the right hand side of... you can see three distinct lights. In fact it looks very much like the same sort of pattern we saw when we came down over the Kaikoura coast on the way down, but there wasn't as much flashing. It really is, uh, quite strange."

After the bright light seen just out of Christchurch disappeared behind the plane Crockett changed back to the 100 mm lens and sat in the middle seat again. He kept watching the sky for the appearance of lights. He saw some tiny lights but didn't actually film anything until the "good visual display" at 0251. (Note: the exact times of filming can only be deduced from the events reported by the witnesses since the camera was not synchronized with the tape recorder. Everyone saw the flashing lights appear ahead of the airplane, so it is reasonable to assume Crockett did also.) Although Crockett yelled to Fogarty, in obvious frustration, that he "couldn't see anything" (through the camera lens), he did get some film, most probably after yelled to Fogarty. Crockett's film shows thirty cycles of a light which flashed or pulsated at about 1.1 Hz. The initial for or five cycles shows an image which, from frame to frame, moves in a narrow elliptical rotation which might be some form of the "rolling and turning" reported by Fogarty. The brightness and size of the image oscillated as illustrated in Figure 23. Figure 24 provides







frame N 3804 FIGURE 25 frame N 3848 TRIANGULAR IMAGE IN THE FLASHING SEQUENCE



FIGURE 26 TRIANGULAR IMAGE SMEARED SIDEWAYS BY CAMERA MOTION

more details of the cycles. It shows graphs of the size of the pale orange images as separate from the dimmer and smaller red images. The pulsation is unique in that the largest and brightest images in each cycle are overexposed pale yellow or pale orange color. The overexposed "stationary frame" images are round and have no trace of a red color. The smallest, dimmest "stationary frame" images show three lights in a triangular array, with a single orange light above a pair of red lights (see Figures 25 and 26). This correlates with Fogarty's statement that he saw a flashing light or lights and "orange and red among the lights." A careful analysis of all the frames that show the flashing light shows that, apparently, the orange light on top of the triangle oscillated from nearly zero brightness to such a great brightness that it overexposed the film. This sighting and the associated film have been discussed in depth elsewhere (Maccabee, 1987).

After this cluster of flashing lights disappeared there were some other appearances of lights and there were also several radar targets, some of which might have been correlated with the lights. However, sightings happened rapidly and Crockett got no more film of unidentified lights. The last anomalous light was seen when the plane was at point 40. After that the plane landed at Blenheim at about 0305. The last portion of Crockett's film shows the plane approaching and landing at the Blenheim airport.

AFTER THE FLIGHT

Early in the daytime Fogarty interviewed Startup, obtained the film and audio tape from Crockett and flew to Melbourne, Australia where the film was developed and a half-hour documentary was created by Fogarty and others at TV station Channel O. Unfortunately they could not correlate the film with the audio tape recorded by Fogarty and, of course, they did not have the Wellington Air Traffic Control Center audio tape. The result was a rather jumbled presentation of the history of the sightings. Nevertheless, the TV station announced to the world that it had the first color film of UFOs and that caused an extreme skeptical reaction with numerous faulty explanations proposed and publicized. Evidence that could have proved that one or more glowing objects were under intelligent control was ignored and the sightings, perhaps the only civilian sightings in history that can be almost relived minute by minute (using the Wellington and Fogarty tapes and the film), were relegated to being just another annoying UFO report.



FIGURE 27

(left to right) J. ALLEN HYNEK, BRUCE MACCABEE, QUENTIN FOGARTY AND SCIENCE CORRESPONDENT HUGH DOWNS ON THE SET OF GOOD MORNING AMERICA, MARCH 26, 1979

However, before the sightings were forgotten by the scientific community and public at large, they did have another "moment in the sun" when, on March 26, 1979, they were discussed at a press conference in New York and on Good Morning America.

EPILOG

For further information and analysis as well as a discussion of various explanations proposed for the lights, all of which were proven to be wrong, see the web page addresses described in Maccabee (1980), Maccabee (1987) and Maccabee (1999).

REFERENCES

Fogarty, Q. (1982). Let's Hope They're Friendly. Australia: Angus and Robertson

Haines, R. (1987). Melbourne Incident. Los Altos, CA.: L.D.A. Press

Maccabee, B. (1979a). What Really Happened in New Zealand. *Mutual UFO Journal*, May and June

Maccabee, B. (1979b) Technical analysis of the New Zealand Film. (unpublished)

Maccabee, B.(1979c). Photometric Properties of an Unidentified Bright Object Seen off the Coast of New Zealand. *Appl. Optics*, 18, 2527; http://brumac.8k.com/NEW ZEALAND/NZSB.html

Maccabee, B. (1980). Photometric Properties of an Unidentified Bright Object Seen off the Coast of New Zealand: Author's Reply to Comments. *Appl. Optics*, 19, 1745; http://brumac.8k.com/NEW_ZEALAND/NZSB.html

Maccabee, B. (1987). Analysis and Discussion of the Images of a Cluster of Periodically Flashing Lights Filmed off the Coast of New Zealand. *Journal of Scientific Exploration*, 1, 149;

http://brumac.8k.com/NEW_ZEALAND/NZFlashingLight/NZFlashingLight.html Maccabee, B. (1999). Atmosphere or UFO. *Journal of Scientific Exploration*, 13, 421; http://brumac.8k.com/NEW_ZEALAND/RADARUFOS.doc

Startup, W. and Illingworth, N. (1980). *The Kaikoura UFOs*. Auckland: Hodder and Staughton