

The Dinsdale Loch Ness Film.

An Image Analysis.

Adrian J. Shine

Loch Ness Project, Drumnadrochit,
Inverness-shire, IV63 6TU

Introduction

At 9am, on 23rd April, 1960, Tim Dinsdale, on the sixth and final day of his first visit to Loch Ness, obtained approx. 50ft of 16mm film, recording the movements of an object on the water surface, opposite to his observation position at Foyers. It is widely believed to be the best filmed evidence for the Loch Ness Monster and not only embarked Dinsdale on a personal 27 year crusade but was one of the critical factors leading to the formation of the Loch Ness Phenomenon Investigation Bureau (LNPIB), a year later. The status of the film was further enhanced in 1966, after the LNIPB submitted the film to Britain's Joint Air Reconnaissance Intelligence Centre (JARIC), for expert analysis and interpretation. The report, subsequently published, was to conclude "that it probably is an animate object".

Dinsdale recounted the event in his 1961 book 'Loch Ness Monster' but the 1968 impression includes, as a postscript, his comments on the JARIC report (Dinsdale 1968). He describes how he set up the camera and tripod in the passenger seat of his car. He drove along the B852 road eastwards from Foyers village, from where the loch becomes visible, for about half the distance towards the Foyers Hotel, to a point where he estimated that the road is approximately 300ft above the loch's surface. It was from here that he observed a stationary object about two thirds of the distance across the loch. It seemed to him to be slightly shorter than the local fishing boats, which are about 15ft long open boats powered by outboard motors, but appeared too high out of the water. He therefore examined it through X7 binoculars, by which time it had turned from a sideways on, to an end on aspect to him. He goes on, "It lay motionless on the water, a long oval shape, a distinct mahogany colour and on the left flank a huge dark blotch could be seen, like the dapple on a cow." Then it began to move. "I saw ripples break away from the further end and I knew at once I was looking at the extraordinary humped back of some huge living creature!" It was based upon these impressions that Dinsdale dropped his binoculars and began to film, with his subsequent impressions limited by the optical viewfinder of the Bolex cine camera.

The film, shot with a 135mm telephoto lens, consists basically of two parts. In the first, the object zigzags away from the observer leaving a wake among the waves on the surface of the water. The object appears to submerge, coincident with its entry into a dark band of water caused by the reflection of the opposite shore. In the second part of the film, the object turns to the left and runs parallel to that shore, across the field of view. Dinsdale and others consider that this latter part of the film shows the wash of the now submerged object. Dinsdale notes "I watched successive rhythmic bursts of foam break the surface - paddle strokes; with such a regular beat I instinctively began to count - one, two, three, four - pure white blobs of froth contrasting starkly against the black water surrounding, visible at 1,800 yards or so with the naked eye; denoting tremendous power!" The object continued west "as straight as an arrow" upon which Dinsdale, in an attempt to close the distance, drove down from his estimated 300ft elevation to the waters edge at Lower Foyers. Upon his arrival here, he could no longer see the disturbance and concluded that the object had completely submerged.

Later that morning, Dinsdale (1968: p.106) filmed one of the Foyers fishing boats, which he had arranged to follow a similar course. Here, he states the boat length as 15ft., though on page 253, that it was measured at 14ft. Using his car speedometer, he estimated the speed of the boat, with a 5h.p. engine, at 7m.p.h. Surface conditions during this filming are much calmer than earlier and the darker water, intermediate in tone with respect to the light and dark water of the previous sequence, extends across most of the film

frame. This sequence is notably better in quality in terms of brightness and focus than the sequence of the unknown object.

The film was released to the public by the BBC's Panorama programme on 13th June 1960 in connection with which, 35mm copies and enlarged sequences were made. These enlarged versions have appeared in many television programmes since. Dinsdale's conviction that the film showed an animal was based upon; the vividness of his visual impressions just prior to filming, his perceived absence of a propeller wash, the apparent submergence of the object and the size of the wash it produced in comparison to the boat.

The main dissenting voice at the time was Dinsdale's mentor, the naturalist Maurice Burton, who had studied the Loch Ness question for some twenty years. Burton guided and encouraged Dinsdale since the latter had become interested in 1959 and had lent him the Bolex cine camera for his visit to the loch. Burton (1961: pp. 73-74) disagreed with Dinsdale's interpretation and considered the size, speed and wake of the object to be consistent with a boat. He visited the scene of the filming in June 1960 and observed that this was a regular crossing place for boats. He also witnessed instances of boats apparently disappearing (Burton 1960). A former believer, the author Richard Frere (1988), also recounts how his disappointment on viewing this film marked the beginnings of his own scepticism: "This was no monster but a ten or twelve-foot wooden dinghy with a small outboard motor. I had seen the same thing too recently and too often, from every angle and from every distance, to be mistaken. The fact that I had met Dinsdale and recognised him as an intelligent man of the greatest integrity only added to my sad confusion."

In 1965, the LNPIB submitted Dinsdale's film to JARIC and it is their report, which has given the film such importance to students of the Loch Ness controversy. The report issued in Feb. 1966 was published as a crown copyright pamphlet by the LNPIB (1966) and by Costello (1974: pp. 328-332), though with a few errors.

JARIC first carried out mensuration on the known boat and calculated its length at 13.3ft giving an error of only 5% against Dinsdale's measurement of 14ft. The boat speed was calculated at 6.5mph agreeing well with Dinsdale's estimate of 7mph.

Regarding the object sequences, the findings are made conditional upon Dinsdale's 300ft. elevation estimate for the observation point (OP), above the loch's surface. JARIC also point out the difficulties of measuring in the Y scale, which is the depth of view applicable as the object moves down range, as against the X scale, which is across the field of view, which is applicable to the second part of the film.

JARIC calculate the range to first sighting as 1,667yds, agreeing well with Dinsdale's estimate of 1,500yds. They measure a solid black triangle with a base of approx. 5.5ft and a height of 3.7ft. During the first part of the film, as the object moves mainly downrange, the speed suggested is about 10mph, subject to the stated difficulties of the Y scale measure. During the second part of the film, as the object moves across the field of view in the X scale, the mean speed is given as at least 7mph., which is similar to that calculated for the boat.

Turning from calculation to interpretation, the report acknowledges, that though the object appears to submerge, it is possible for objects to become photo invisible in certain lighting conditions. The report considers however, that the known boat image has a 'broken' shape while the object has a "solid look about it" suggesting a "continuous surface". Crucially, JARIC state, "The boat was photographed on the same morning and light conditions were probably reasonably similar. When travelling parallel to the shore the boat is discernible as a boat shape and can be measured, whereas with the object there is NO visible sign at all."

JARIC consider that the object's 10mph speed (On the Y scale), is too great for a small boat with a displacement hull of the type used in the control sequence, and measured at 6.5mph. A power boat shell with a planing hull could exceed 10mph and could give the appearance of a 'continuous surface'. JARIC

continue, “However, these craft are normally painted in such a way as to be photo visible at any time, and in any case the existence of such a craft on the loch would scarcely be missed by an observer. The assumption is, therefore, that it is NOT a surface vessel.” A submarine vessel is ruled out “which leaves the conclusion that it probably is an animate object.”

Responding to a subsequent enquiry by David James, JARIC reason that the measured 3.7ft. height of the triangular object might represent 3ft. of actual height and 12-16ft of length in the Y scale. Unfortunately, the report does not enter discussion on the characteristics of wake patterns.

Binns (1983 p123) rejects the film as evidence but actually accepts JARIC’s view, that the object is not a dinghy with outboard motor. He points out that the report’s conclusion is conditional upon the assumption that an observer could not be unaware of the existence of a planing hull powerboat on the loch. This is clearly an unrealistic assumption given the size of the loch.

Campbell (1986: pp. 56-60), has largely resolved the issue of the object’s 10mph speed. He emphasises that JARIC have ‘perversely’ stated the 10mph object speed on the strength of the doubtful Y scale measurement, while ignoring their more accurate X scale measurement of 7mph. He also argues that the report may not have taken account of the winding times for the clockwork camera motor. This required winding approx. every 20secs. Dinsdale (1968: p. 100) recounts how he was “firing long steady bursts of film like a machine gunner, stopping between to wind the clockwork motor.” Campbell concludes that “As a result there is no necessity for the unknown to have travelled at a speed greater than 3.1m/s (7mph), and there is no reason to conclude that it did so.”

By 1980, members of the Loch Ness Project had considerable experience in observing boats and wake patterns. They realised that JARIC’s contention, stating the lighting conditions during the boat and object film sequences as similar; was incorrect. Not only was the boat sequence filmed some two hours later but the scene is noticeably brighter. Even more important, were the surface conditions, which were manifestly different. In the object sequence, though Dinsdale writes that the water lay “without a ripple” (Dinsdale 1968 : p99), there are actually waves from the SW. There are also contrasting bands of light and dark water. In the boat sequence, the water is considerably calmer and has a more uniform surface tone. This could easily account for the apparent submergence of the object, as it entered the band of dark water towards the far shore and would account for the differences in visibility between the object’s wake and that of the boat.

The Project finally dismissed the film as evidence of unusual animals, having examined a video tape whilst applying contrast adjustment, a facility not used by JARIC. Dinsdale (1968 p.115) had been encouraged when he viewed the enlargements made in connection with the Panorama programme. He noted that “perhaps the most striking improvement on the original film (which was by no means spectacular) was the increase in definition and contrast resulting from a characteristic inherent in TV cameras; which produce a contrasted image on the screen from a low contrast original. As the film was somewhat under-exposed, and therefore short of contrast, it suited television well.” Project members R. Gardiner, A. Harmsworth and A. Shine examined the object as it crosses the field of view (X scale) using contrast adjustment and concluded that the object was indeed a dinghy with outboard engine. A helmsman was visible, sitting at the stern. This image was visible in many frames, slightly lighter than the surrounding water but darker than the front of the ‘wake’, which was actually the hull of the boat. The rhythmic bursts of foam at the head of the ‘wake’ were interpreted as waves breaking on the bow. The present author hinted at this finding while reviewing Binns’ book in *Cryptozoology* (Shine 1985: p. 85). However, the visual interpretation was to some extent subjective. Though most people could see the ‘helmsman’, some have suggested that this may be an effect of the pronounced film grain or random interference introduced during copying and video transfer processes (Hepple 2001: p. 6).

Some empirical work has been undertaken in collaboration with R. Carter and R. Raynor, in which an outboard motor powered dinghy was filmed using a 16mm Bolex cine camera fitted, as in the Dinsdale film,

with a 135mm lens set to infinity. The results (Fig 4a & 4b) suggested that a dingy could account for the significant features seen in the Dinsdale film. A surprising feature of the experiment was the unaccountable improvement in focus over the original. It seems reasonable to assume that Dinsdale had also set his lens to infinity. The question was raised as to whether Dinsdale had filmed the object sequence through the glass of his car window. If this was the case, it would also account for the better focus of his boat sequence which was filmed while he was signalling to the helmsman and so presumably outside his car.

Two peripheral considerations have also been raised in support of the film's claims. These arise through digital examination of the image itself.

Dinsdale (1982: plate 9a), describes how, "Final proof of the reality of my 1960 film came from the computer study of it made by NASA's Jet Propulsion Laboratory in Pasadena, California, in 1972- when a second hump is shown to break surface momentarily." The six pictures presented are of film frames. The first of these is of the known boat, irrelevantly shown broadside on and the remaining five are of the object end on and moving away in the Y scale. The fourth of these frames has a second image, 'below' that of the object, which has been indicated as a 2nd hump. It is not proposed to discuss this in detail, beyond pointing out that the 'second' hump is separated from the first by a distance of no less than 85ft. (R. Raynor, pers. com.). The second image, if part of an animal and visible to a height of a couple feet for 1/24th sec., would be exhibiting a velocity very remarkable in nature. The enhancement also gives the object moving away on the Y axis, a much more broken shape than noted by JARIC and it could be argued that some of the frames are more suggestive of a man in a boat than of a smooth textured animal.

A similar contention was raised by Brian Recce Scientific Ltd, which conducted image interpretation on behalf of a Discovery Channel TV programme describing the activities of Project Urquhart (TDC 1993). The analyst indicated what he interpreted as a 'shadow' within the wake of the object, as it moves downrange. He considered this significant. Again, the 'shadow' extends a very considerable distance behind the object, cannot be a shadow and equally cannot be a view beneath the water given the angle of filming. Bauer (2002b) also rejects the 'shadow' but accepts the 'second' hump as significant.

From the foregoing, it can be seen that doubts about the JARIC Report had certainly arisen but the arguments had become rather confusing to those not in a position to view the film and lacking experience of the loch. As late as 1989, Witchell (1989: pp. 123-4) wrote "In the case of the Dinsdale film I would submit that the probity of the man who took it and the skill of the men who examined it, remain outstandingly more impressive than the arguments of those who doubt the film." This paper, doubts neither the probity of Dinsdale, nor the basic skills of the photo-interpreters. However, by using today's tools of digital image analysis, it may be submitted that the identity of the object filmed may now be placed beyond reasonable doubt.

Method

A method is proposed whereby anybody with a PC/MAC may distinguish between real images and film grain or video noise. Examination was made of video tapes which have entered the public domain. Bauer (2002b) points to a number of broadcast examples. For these purposes, it is contended that almost any video copy of the film will prove suitable, irrespective of quality, provided it includes the Panorama enlargement.

All images were digitally captured as Targa files at 72dpi resolution. The analysis was conducted using the Adobe Photoshop graphics programme. Using this programme, it is possible not only to adjust contrast but to control the opacity of an image, thus permitting the superimposition of frames. In addition, images may be measured to pixel accuracy and grey levels quantified.

By taking a series of consecutive frames and reducing their opacity to the relevant percentage (i.e. 10 frames would be reduced to 10% opacity), a superimposition may be made to reduce the effects of noise

or film grain. Clearly the more frames superimposed the greater the suppression will be, though the image will become more blurred due to positioning inaccuracies and changes in the film image over time.

It is useful to place the first frame at a high opacity and subsequent frames at 50% opacity in order to achieve correct positioning. Positioning of the frames is critical and a reference point must be chosen according to the information desired. When positioned, each frame (which should occupy its own Photoshop layer) should be turned off in order to avoid cumulative errors as subsequent frames are added. When completed, all frames should be reduced to the correct percentage opacity and turned on again to reach the total of 100%. Only then, may contrast adjustment be applied if desired. It is sometimes useful to add a white or black background layer behind the frames.

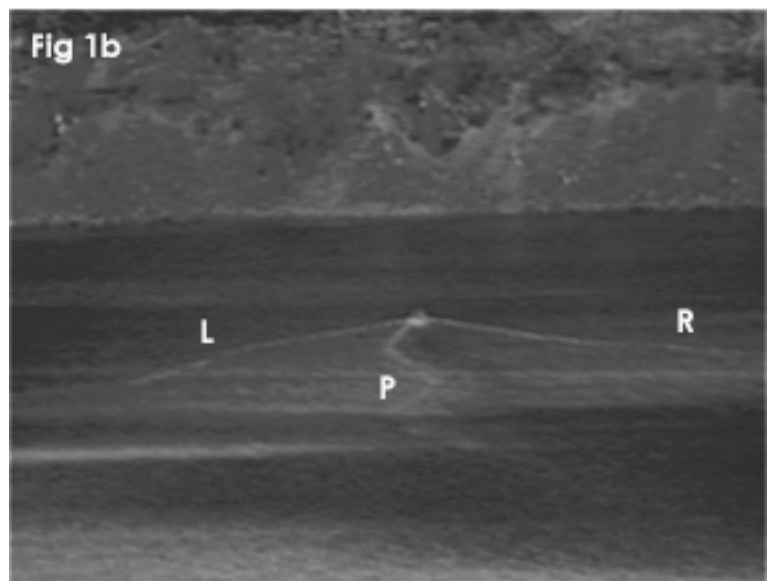
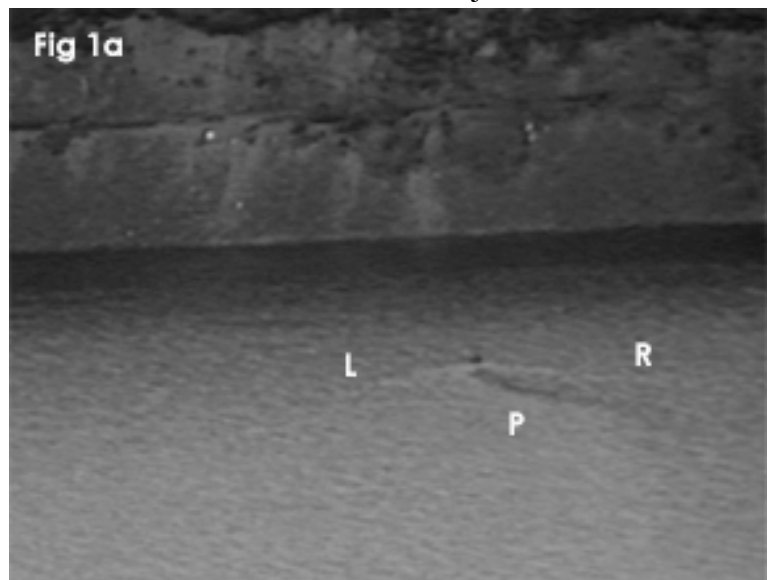
Results

Even before the JARIC Report, Dinsdale and others were convinced that the object filmed was not a boat. Apart from the vivid impression made on Dinsdale by his inspection of the object through binoculars, one of his main contentions was that the wake of the object (Y axis) differed from that of the known boat, in that it lacked a propeller wash as it moved downrange. Bauer (2002a) reasserts this.

A series of 10 frames were taken from this part of the film and superimposed in order to reduce noise. This also allows the effect of the waves to be very slightly suppressed. The object at the head of the wake was used as the reference point. A comparison was then made with the wake pattern of the known boat (10 frame composite) filmed on calm water.

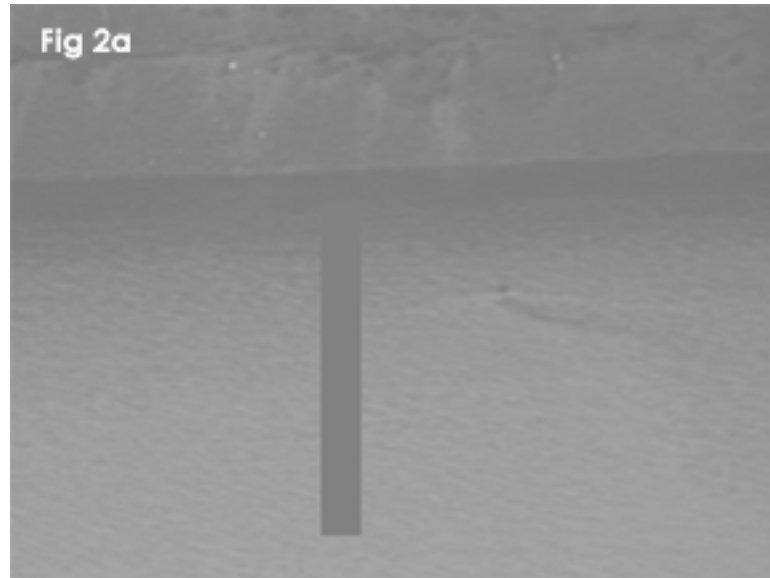
The result illustrates the similarity of the bow waves of both the object (Fig 1a) and the boat (Fig 1b) in terms of the angles they make. Fig 1b, of the boat has been reversed horizontally to make its orientation more similar to that of the object. Both composites have been contrast adjusted overall. In each, the left hand wave is indicated L and the right by R. There is a wash behind the object corresponding to the propeller wash of the boat (P).

It should be pointed out that wakes made on rough water are initially visually prominent due to interference effects with waves permitting them to break. Thereafter, the loss of energy caused by this breaking, causes them to disappear rapidly. On calm water, boat wakes exhibit a more uniform appearance but over a much more extended area.



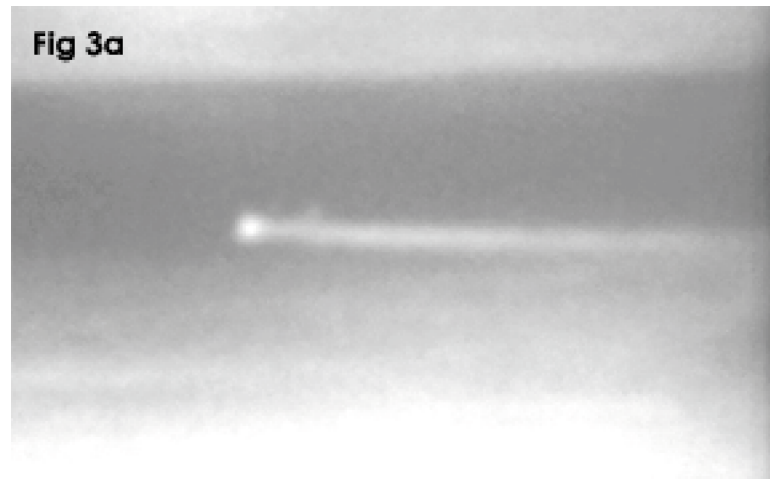
The question of whether the object submerged or simply became photo invisible was examined using the same composites as in Fig1 but without contrast adjustment. The use of a composite has the effect of averaging the tone or grey scale levels within the scene. A comparison was made between the tone of the object and the band of dark water into which it moved. The greyscale level of the object was sampled and a vertical bar, filled with this level, was superimposed on the scene in the direction of travel.

The result (Fig 2a) demonstrates that the object must ‘disappear’ as it moves downrange into the darker water prior to its turn to broadside on. Therefore, there is no evidence that the object submerged during its progress along the Y axis. A similar process applied to the known boat (Fig 2b) establishes that, under these lighting and surface conditions, it cannot become photo invisible.



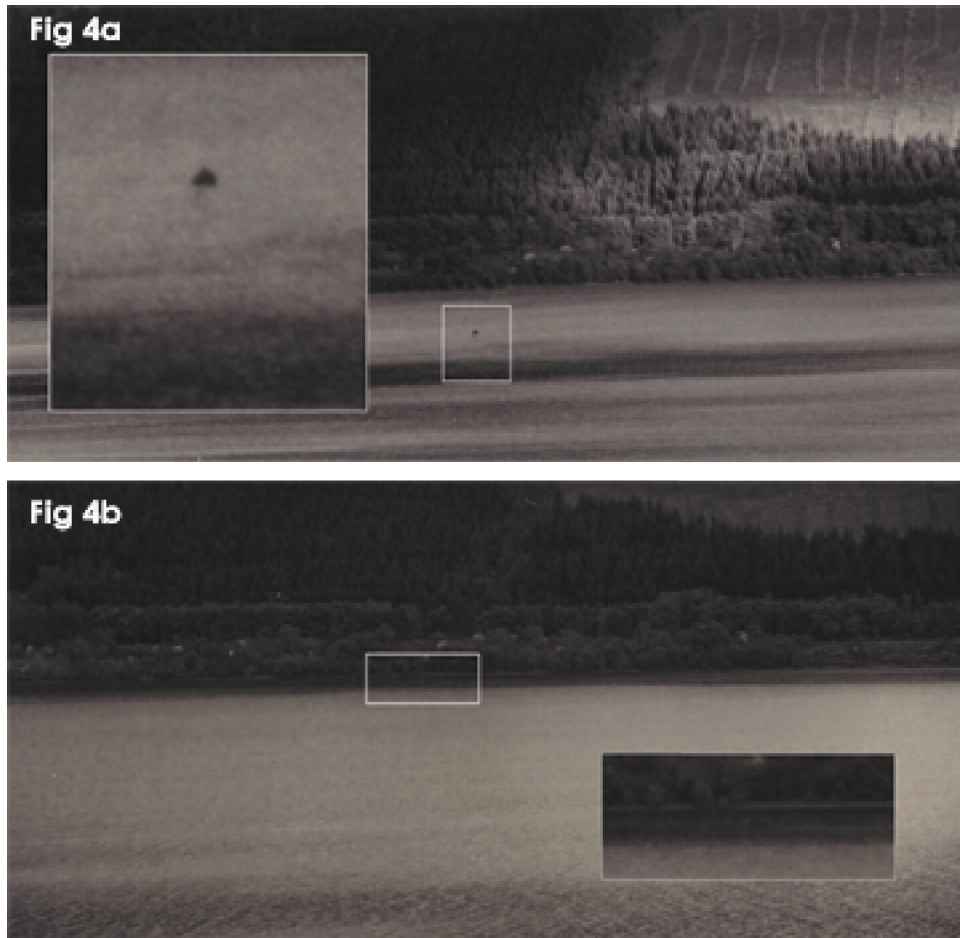
The key question is whether the ‘helmsman’ image, which many can see as the object moves across the field of view, is indeed real or a subjective impression caused by film grain or noise produced after an unknown number of reproduction generations. Bauer (2002a) rejects the helmsman suggestion on the basis of his own examination of a film copy transferred to video.

Because the course of the object is so straight, it is possible to superimpose a large number of frames in order to average out any noise. Since the object moves slightly downrange in addition to its course from right to left, the image becomes progressively very slightly shorter, which blurs the result, as does any yawing. First, 170 frames (7sec.) were selected from the Panorama enlarged sequence just after the object turned to run parallel with the shore. The frames were superimposed in batches of ten, using the front of the wake/bow of boat as the reference point. It is important to the integrity of the method, that the reference point should be an unambiguous feature unconnected with part of the image being examined. The results of the batches were themselves superimposed (Fig 3a) and compared with a similar composition consisting of 30 frames from the film of the known boat and helmsman (Fig 3b).



The result clearly shows an image inconsistent with the wake of a submerged object and in the correct position for a boat helmsman. The boat appears shorter than in Dinsdale's boat sequence, partly due to its oblique course across the field of view. It should be borne in mind that the contention is not that this is the same boat as in the control sequence but a similar one; probably a little shorter, much as Dinsdale describes. It should be remembered that Dinsdale did not see the object surface, nor did he see it finally submerge. In driving down to the loch side, he lowered his horizon to the point where he was not be able to see the disturbance, let alone a boat at a range of some two miles.

During the empirical work referred to earlier, some 35mm still photographs were taken to establish whether higher resolution photography than in the Dinsdale film could resolve the boat profile at a similar range on the Y axis. In the magnified inset of Fig 4a, the boat profile can be seen only as a ‘hump’ and indeed has a less ‘broken’ appearance than in the Dinsdale film despite the higher resolution.



In Fig 4b, the inset shows that a dinghy can ‘disappear’ into darker water while travelling on the X axis. Surface conditions and the characteristics of wake patterns should now be recognised as crucial factors when interpreting images from Loch Ness and it may go some way to explaining the long running controversy over the Dinsdale film by recalling that JARIC addressed neither of these issues.

In Fig.5 an example is given of a traditional wooden Foyers fishing boat photographed in the early 1980s. By 1960, there would also have been fibreglass boats on the loch which tended to be painted white externally. The illustration is intended to show how the complex greyscales of the boat’s paintwork and the varied shades of the occupant’s clothing would produce varying degrees of visibility against different backgrounds. Of particular note, is the lighter and more reflective bow painting of the boat which is further emphasized by the numbered salmon fishing license plate.



Discussion

In summary, it is suggested that there is no remaining evidence for the object filmed by Dinsdale to be anything other than a boat. Campbell (1986) has already drawn attention to the very tenuous nature of JARIC's 10mph speed estimation. The above work demonstrates that the differences between Dinsdale's object and known boat sequences arise primarily due to the demonstrable differences in surface conditions and probable differences in boat's colourations. From Dinsdale's account, it is clear that the object was not seen to surface before the filming and could not be seen to submerge afterwards. The image analysis establishes that there is no evidence that the object submerged while travelling on the Y axis and that its wake characteristics are consistent with a boat's. While the object is travelling on the X axis, the analysis shows an image inconsistent with the wake of a submerged object and most suggestive of a helmsman sitting in a boat. The persistent lighter tone at the leading edge of the object is consistent with the traditional painting of Loch Ness salmon fishing boats.

Now that a case has been made, identifying the object of the Dinsdale film as a boat, an attempt should be made to identify the lessons within the episode. It is difficult to overestimate the influence that this film has had in sustaining the interest of those investigating the Loch Ness controversy. Bauer (2002) considers the Dinsdale film to be one of the three most objective pieces of scientific evidence for the monster. For Mackal (1976: p. 13), deliberating whether to join the LNPIB, "I could not explain it, try as I would. It alone was sufficient for me." It was largely in the hope of repeating and improving on this film, that the LNPIB were to spend a decade of intensive surface surveillance, backed by the highest quality photographic equipment of the times.

In hindsight, it is easy to say that the total lack of repetition, by the LNPIB or by anybody else, might in itself have raised doubts, and to some extent this was true. If an aquatic creature had the behaviour indicated; showing an enormous amount of back and travelling "as straight as an arrow" for such a distance, then surely it might be expected to repeat it.

In fact, a creature capable of exposing a portion of its back above the waterline, 3ft. high and 12-16ft long, whilst remaining stationary, as at first sighting, must have had a positive buoyancy of over a tonne. How such a creature could ever have submerged, was a question seldom raised. Dinsdale, in connection with the variable back contours reported by witnesses, did suggest that the monster might have inflatable air sacs on its back, possibly to store air for diving. Such a dive would of course, be impossible. Secondly aquatic creatures empty their lungs to dive. If they cannot dive with contained air then it is hard to conceive a purpose to an adaptation allowing them to inflate and drift about the surface of the loch. Actually, there are creatures at Loch Ness, which are capable of long straight dashes across the water and they do possess inflatable air sacs. However, they are the heavily built diving birds such as the cormorants. The sacs are emptied for diving and the adaptation serves to make the bird buoyant enough to commence its long take off run across the water!

Perhaps the most important single lesson, is that an inexperienced and expectant observer, such as Dinsdale was at that time, may well see things, which become rationalised as unambiguous and vivid memories. This can be true, no matter what the probity of the individual may be and irrespective of their subsequent experience of the loch. Binns (1983: p. 168) has commented "Monster- hunters who arrive at the loch for the first time do tend immediately to see the beast. Having proved to their own satisfaction that it exists they then devote weeks, months or even years to a barren quest for another sighting." There is no better illustration of this model than Dinsdale. It might be asked whether his filming of the known boat was in itself an act of personal reassurance that his monster was not one. However, having noted differences in the films, which were never more than subtle, it would seem that his conviction remained despite seeing any number of boats in future years.

A further point worth making, is that there often comes a point where 'expert' photo-interpretation turns from calculation to subjective reasoning and that the quality of this reasoning is solely dependent upon the interpreters relevant experience. The present author has endeavoured to show that computer enhancement

is not merely a matter of giving the right answers but of asking the right questions.

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