Study of Unusual Radar Observations near RAF West Freugh, Wigtownshire, SW Scotland, April 4 1957

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1.) Background

Unusual radar contacts were detected simultaneously on three tracking radars of the Bombing Trials Unit based at RAF West Freugh and followed for 36 minutes. The three radars were located at two different sites near Luce Bay, Wigtownshire, providing tracking and telemetry for the bombing range operated on behalf of the Royal Aircraft Establishment (RAE) Farnborough through the Ministry of Supply. There was a 1000ft cloud ceiling and no visual sightings were made, but the case was very influential.

The radar operators gave interviews to the press, as did the RAF West Freugh CO, Wing Commander Whitworth, and stories appeared in newspapers around the world (see Appendix D). Wing Commander Whitworth stated that a substantial object of unknown nature had been tracked and that there could have been "no mistake". Questions were asked in the House of Commons.

Government responses to inquiries were muted and vague, intimating that a detailed statement would follow completion of expert evaluation. No detailed statement was ever made public. The then Air Ministry stated only that no definite conclusion had been arrived at, offering the suggestions that a weather balloon from RAF Aldergrove, N. Ireland, may have been in the area at the time, or that it was possibly a Soviet spy plane. Another statement prepared for Parliament added that it "may well have been a private aircraft".

Recently obtained government papers indicate some concern at the time about the fact that this case had escaped out of "official secret channels" into the public domain. Cabinet Office papers record that public and Parliamentary questions about the West Freugh incident stimulated an inquiry to the Air Ministry by the Joint Intelligence Committee (JIC) about the number of similar incidents. The Ministry replied in a note to the JIC that it was unable to explain four recent incidents involving radar. Such was the extreme economy of the Air Ministry reply that JIC was obliged to request details a second time, which were then supplied by DDI(Tech) in the form of the briefest possible summaries, with the recommendation that the Secretary of State respond to questions in a manner calculated to mislead Parliament.

When Wing Commander Whitworth was approached by a private researcher in 1971 he contacted the MoD to ask for authorisation to reveal details, reminding MoD that he had 'on instruction submitted a full report to the Air Ministry [which] was classified "Secret"'.[2] Amusingly, this created consternation in MoD since all pre-1962 case files had supposedly been "routinely destroyed" and an S4(Air) memo observed: 'We are therefore unable to discover from our own sources what information Wing Commander Whitworth intends to disclose.' Whitworth gave MoD his own account and a batch of 1957 press cuttings, after which, rather fortunately, 'some of the documents that no longer officially existed were 'found' in a DDI (Tech) folder!' (Clarke and Roberts, 2002),

A 1957 technical intelligence report among these documents shows that neither the "private aircraft" nor the "balloon" was ever seriously considered as an explanation. The event was officially unexplained.

2 Letter from Wing Co. Whitworth to MoD Publications Clearance Branch (Air), 30 May 1971.

2.) Summary of the incident[3]

Time datum 1200:[4] Ministry of Supply radar operators Jim McVey[5] and John Kolosky, stationed in a radar van of the Bombing Trials Unit (Royal Aircraft Establishment, Farnborough) at Balscalloch near Corsewall Point 8 miles NNW of Stranraer, Wigtownshire, observed what appeared to be a stationary high-altitude target on the scope of their tracking radar. It was a very strong echo described as comparable to that from a ship and its position remained "appreciably constant" 50,000ft over the sea 20-25 miles NW of Stranraer (point A on Fig.1). With the tracking antenna locked on to the target they fed the radar output to a plotting board and height meter, which showed the plan position of the target remaining fixed but its height *increasing* from 50,000 feet. During this ascent they switched on a second stand-by radar of identical type, which also locked on to the target. Both radar outputs were now fed interchangeably to the plotting board and height meter, and the operators were able to switch from one to the other repeatedly without observing any discrepancy in the movement of the plotting pen or the reading of the height meter. During this time the plot remained "at one spot" whilst the height reading increased, from 50,000 to 70,000 feet (50,000 - 60,000 ft according to Ref 6)

1210: After 10 minutes the plotting pen began to show a movement in a NE direction (E according to Ref 6) at increasing speed, whilst the height meter showed the target descending. When the target had descended to 54,000 feet its ground speed had risen from zero to 70 mph.

Meanwhile McVey and Koloski had telephoned the BTU base at nearby RAF West Freugh, which was a small airfield with a short runway and no fixed radar facilities. Flt. Lt. Ken England, Air Traffic Control Officer at West Freugh, took the call but exercised only a coordinating function. He telephoned a second Ministry of Supply mobile radar, identical to the one operated by McVey and Koloski at Balscalloch, which was stationed at Ardwell about 18 miles SSE of Balscalloch. There, operators Charles Holland and Stan Farley checked their scope and confirmed a target considerably larger than a normal aircraft target "at the range and bearing given". Their radar too went into track-and-lock-on mode. Thus the three radars at the two sites followed the target moving NE at a speed of 70 mph over a ground track of about 20 miles - implying a duration of 17 minutes - descending to about 50,000 feet.

1227: At point B on Fig.1 (or "near Newton Stewart" according to Ref.6, point C on Fig 1) the target "made a very sharp turn" of 90 degrees "and proceeded to move S.E at the same time increasing speed" to about 240 mph. Radars at both sites continued to track targets on this same heading but at different heights. The two Balscalloch sets remained locked on a single target at 50,000 feet, but the radar at Ardwell began following a target at 14,000 feet. As the ground track

3 Principle source: D.D.I. (Tech)/C.290/3/, April 30 1957, Unidentified Objects at West Freugh, PRO AIR 20/9321 (Appendix B) For other sources and references see p.13. This timeline is a best-guess based on the few reliable times, speeds and distances recorded and there is some margin of uncertainty. See discussion in Section 4.

4 This time is approximate. Accounts of the start time appear on the face of it to be inconsistent. "Noon" appears in one early but undated Reuters dispatch purporting to quote Wing Commander Whitworth. Another undated but later report (week 08-14 Apr) in an unknown newspaper also says "noon" but may have merely been recycling the Reuters report. A third paper, however, the *Evening News* of 06 April - which also contains some purported quotation of Whitworth by a reporter who says he spoke to him "today"- says the event happened on "Thursday afternoon" (see Appendix D). On the other hand the DDI(Tech) report (Appendix B) says "on the morning of April 4th". I am grateful to researcher Brad Sparks (email 04.03.2010) for pointing out that if the incident commenced a few minutes before 12:00 pm, then the official report could state in strict accuracy that "on the morning of April 4th radar operators at West Freugh detected unidentified objects", whilst the bulk of the action would indeed have happened in the afternoon, having begun around noon, as reported more casually in the press.

5 Misidentified as "Jim England" in some contemporary press accounts, presumably through confusion with RAF West Freugh Air Traffic Control Officer Flt Lt Kenneth England.

approached closer to Ardwell four separate targets appeared on the scope at Ardwell strung out "in line astern" with about 12,000 feet separation. Balscalloch continued to track a single large target to the limit of its range, but as this target passed out of range the Balscalloch scopes also revealed four smaller targets before these too passed out of range.

1246: 36 minutes after the first plot began to move all targets were lost from all radars (moving on a course towards the Isle of Man, point D on Fig.1, according to Ref. 6).

3.) Radar equipment type & characteristics

The radars involved were van-mounted tracking radars used for precision blind guidance of aircraft in bombing trials over the Luce Bay bombing range. They were described by the RAF West Freugh Commanding Officer as "extremely accurate and reliable" giving "a true and accurate plot, confirmed by 2 radar operators, 14 miles apart."[6] This statement reflects the fact that radars designed to track individual moving targets are inherently more accurate than the more familiar surveillance radars used for search and air traffic control which are designed to monitor a large volume of airspace.

We do not know the precise specifications of these Bombing Trials Unit radars, but in general tracking radars are short-range (order of a few tens of miles), short-wavelength (S, C- or X-band, in the range 3-10cm), high-prf (pulse repetition frequency) systems. They do not scan 360º of sky with a broad fan beam but instead emit either a single pencil beam from an off-set single-curvature parabolic antenna, spun rapidly in a tight spiral or conical scan pattern, or a pair (or more) of overlapping (squinted) pencil beams from one or more similar antennas. In each case the principle is that the radar gets to estimate the signal amplitude or phase from two or more rapidly-alternating different positions, and difference circuits electronically calculate an antenna position which minimises the error signal generated by the two inputs. In this way the radar can automatically lock-on to and track a selected target.

Short range means low peak power (thus small, mobile units), but high prf. High prf means more pulses delivered per second by a beam whose dwell-time is indefinite because it never scans away. Thus the energy-on-target is high with these radars and the data renewal rate at the display is effectively continuous.

Angle resolution in a surveillance radar is proportional to the number of wavelengths that will fit across the antenna aperture and in practice this is about one main beam width, generally a degree or two. But thanks to the "binocular" difference-taking method of a tracking radar the practical angle error or jitter might be smaller than the theoretical electromagnetic resolution of its antenna, a small fraction of a degree. And pulse lengths on the order of 1/10 those used for surveillance permit better range resolution.

Thus whereas the "resolution cell" of the fan beam from a primary surveillance radar (the volume within which two targets cannot be discriminated on the display) can be miles deep and hundreds or even thousands of feet long and wide, depending on distance from the antenna, the effective resolution cell of a tracking radar will be a small cylindrical volume centred on the line of the boresight with dimensions measurable in perhaps tens of feet.

And a surveillance radar illuminates any target only once every few seconds as the antenna sweeps round, whereas a tracking radar illuminates its chosen target constantly. Thus continuous altazimuth

6 Letter from Wing Co. Whitworth to MoD (S4f(AIR)), London SW1, 06 July 1971

information is available as a set of polar coordinates derived directly from the mechanical positioning of the bore-sighted antenna, and continuous ranging very easily translates these coordinates into Cartesian plan-position and height outputs as required. In addition to scope imaging, real-time data-recording is common, and fully-integrated 3-D target mapping is automatic. In this case the target data were recorded on a paper roll by a pen plotter, so the target track was available for direct inspection by the MoD intelligence specialists at DDI(Tech). The continuous plot of such a pen recorder attached to a tracking radar is inherently more responsive to small displacements than would be (say) photographs of a surveillance radar's PPI display.

Fig.1 A first best-fit map of radar locations and alternative approximate target hreadings reconstructed from D.D.I.(Tech)/C.290/3/ (white broken lines) and as recalled by Wing Commander Whitworth in 1971 (blue broken line)

4.) Attempted reconstruction of target tracks

Ideally one would rely entirely on contemporaneous official sources, however DDI(Tech)/C.290/3/ (Appendix B) is only a summary of the main features and conclusions, not an exhaustive analysis. No map of target movements survives and the various times, speeds and distances cited leave some room for uncertainty in the reconstruction. So it is worth asking if the picture can be clarified by reference to secondary sources.

Clearly the account recalled by the RAF West Freugh Station Commander after 14 years is in

conflict in certain respects with the contemporaneous intelligence document. The first discrepancy is that whereas the intelligence document gives the maximum height of the target as 70,000 ft Wing-Commander Whitworth recalled it as only 60,000 ft. This is probably easily understood.

Initial press reports referred only to the target's "great height". Subsequently they quoted Wing-Co. Whitworth as saying, "I have been ordered by the Air Ministry to say nothing about the object. I am not allowed to reveal its position, course and speed". Nevertheless the newspapers uniformly quote a target height of 60,000 ft (a little below the official public 1957 world altitude record) based on an unspecified source. Bearing in mind that a Soviet spy flight will have been under consideration it seems likely that the Air Ministry was happy to allow the press to report this more conservative figure, presumably to minimise foreign intelligence gains regarding the altitude performance of UK radars. The collection of newspaper articles found in the official file (Appendix C) was helpfully supplied to MoD by Whitworth in 1971 when he applied for permission to divulge his story, and it is plausible that he had refreshed his own (admittedly imperfect) memory by referring to them.

As one might expect, the large discrepancy in object heading is probably also resolvable in favour of the contemporaneous intelligence report, inasmuch as the track recalled by Whitworth is not entirely coherent with his own description. A track heading due East from point A to make an abrupt turn to the south would not be especially "near Newton Stewart" but approaching a position 17 miles North of Newton Stewart. Also a "very sharp turn to the South West" at Newton Stewart would not align the track with a direction "towards the Isle of Man", which lies due South of Newton Stewart. It is possible to interpret these statements coherently by allowing some latitude, approximately as indicated by track A,C,D in Fig.1, but one would wish to minimise interpretation if possible.

The DDI(Tech) intelligence report, on the other hand, does not contain any definite inconsistency in the course of the track. It describes an initial NE track from point A in an accelerating descent from 0 mph, passing through 54,000ft at 70mph, to 50,000ft. Taking the cited speed to be indicative of the mean groundspeed during this run, the target arrives approximately at B for a "very sharp turn" of 90º and "proceeded to move SE" on a heading which would indeed intersect Newton Stewart, perhaps explaining this geographic reference in Whitworth's recollection.[7] It's possible that a second change of heading did occur near point C, more consistent with Whitworth's recollection, but that this is simply unrecorded.[8] However it is equally possible that Whitworth was recalling a confused version of reports that the target turned "*towards* Newton Stewart" rather than "near Newton Stewart", consistent with the DDI(Tech) report which gives the last target heading as SE before it "passed out of range".

But when we apply the reported speeds and times to this track we find a possible problem. According to DDI(Tech) "the object was tracked for 36 minutes" (Appendix A). Approximately 27 minutes after first detection at point A, the 70mph target at 50,000ft turned sharply at point B then accelerated to 240mph in a southeast direction on leg BE. If the total radar detection time is 36 min then only ~9 minutes is available for motion on this heading until it "passed out of range". Even if 240mph was the average rate along the whole of BE (i.e., if we assume instantaneous acceleration to 240mph at point B) the distance travelled would be only 36 miles. This happens to be almost exactly the distance from point B to Newton Stewart (point C) and would put the position of last

7 Whitworth recalled: "At approx. 60,000 ft the U.F.O. began to move in an Easterly direction, slowly at first, but then accelerating fast and moving towards Newton Stewart". See Appendix C.

8 A *Sunday Dispatch* story, based on an on-site interview with Whitworth, said: "It . . . dropped to 14,000 feet, made *two twirls*, and vanished in the direction of the Isle of Man [emphasis added]". The only manoeuvre in the DDI(Tech) report interpretable as a "twirl" would be the "very sharp turn" at point B, and "two twirls" would seem to imply another sharp turn, perhaps at point C.

contact about 25 miles from both the Ardwell and Balscalloch radars. There is a certain naturalness about this, since one expects similar radars to have similar maximum ranges; but 25 miles seems far too close to be the position at which the target "passed out of range".

One presumes that the phrase "passed out of range", used without qualification, means "passed beyond the maximum operating range of the radar", which we know must be in excess of 40 miles, not 25 miles, since Ardwell acquired first contact at a ground range (approaching point B) of around 40 miles (at ~54,000ft altitude, elevation ~14º, = slant range ~ 42.3 miles).[9] Taking this detection range as a minimum radius of radar cover we can draw the two yellow circles around Balscalloch and Ardwell in Fig.1.

We can make the track on BE (maximum length 36 miles from speed/time) reach this range from Ardwell and from Balscalloch by assuming that the indicated turn onto a "SE" heading at B is only an approximation to a true heading nearer ESE (about 115º) and then rotating BE anticlockwise like BF. But the targets then pass out of range at position F, about *18 miles NE* of Newton Stewart, heading overland south of Dumbarton towards the head of the Solway Firth and Cumbria. This would be grossly inconsistent with what the *Sunday Dispatch* appears to have been told by Wing-Commander Whitworth (and presumably also by radar operators Hollands and Farley, photographed together for the article) only a couple of days after the event - that the targets "vanished in the direction of the Isle of Man, 30 miles to the south" (Appendix D.iii). It would also be somewhat inconsistent with the assurance given to Ministers by DDI(Tech) twice in writing during April 1957 that the target had been "proceeding against the wind" (Appendix A) or exhibited a "sudden change of direction and movement at high speed against the prevailing wind" (Appendix B), inasmuch as records of radiosonde balloon measurements (see Section 5) prove that the wind at the significant levels that morning was from the SouthWest.[10]

There is a margin of error coming from the calculation of elapsed time on leg AB, which assumes that 70mph is representative. In fact of course the initial ground speed was zero and it presumably accelerated through 70mph by some undetermined amount during the remaining 4000ft of descent to 50,000ft at point B.[11] But the DDI(Tech) report seems to be explicit that the significant acceleration towards 240mph occurred *after* the "sharp turn", so it seems highly unlikely that the mean speed on AB can have been significantly greater than 70mph. Even if we assume a mean of 100mph we would only gain 2 minutes for leg BE, allowing a maximum travel (again assuming effectively instantaneous acceleration) of about 45 miles, which takes the targets only a few degrees past the line of sight from Ardwell to Newton Stewart (a few miles of travel) and does not materially change the situation.

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9 Topography might mask radar from low-flying targets in certain directions, but the terrain elevations are modest. The highest elevations lie in the upland area to the E of Loch Ryan, rising to ~ 700ft (213m) due E of Balscalloch at ~6 miles range and 1400ft (426m) NE of Balscalloch at ~9 miles. The horizon elevations from Ardwell in any direction are very much lower. Thus the highest diffraction obstacle we have to consider is in the region of 2.5º above the geometrical horizon. But pencil beams tracking targets inland on the paths indicated at the reported altitudes of 14,000 - 50,000ft would be pointing at boresight elevations between ~4º and ~13º and the main lobe as well as major sidelobes would be well above any diffraction obstacles.

10 Note that the wind is described in one document (Appendix B) as the "prevailing" wind, which might be taken to imply that radiosonde measurements of the true winds aloft were not consulted; but this would be incredible, and we will show (see Section 5) that the true wind was in fact from the prevailing southwesterly direction. The initial northeastward leg of the track could not by any means be described as a "movement at high speed against" this wind, but a broadly southward heading at 240 mph as shown in Fig.2 could. Even allowing for a degree of immprecision in this recinstrecution, interpolating between the various statements, the departure leg of the object(s) must have been broadly-speaking somewhere in the southerly sector from the point of the sharp turn at B.

11 ". . . the object was tracked for 36 minutes continually increasing in speed while losing height." See Appendix B

The author is indebted to researcher Brad Sparks for providing the key which appears to resolve this inconsistency. Sparks points out[12] that the DDI(Tech) statement "the object was *tracked* for 36 minutes *continually increasing in speed* while losing height [emphases added]" strictly speaking only assoociates the duration of 36 minutes to the part of the sighting when the radar plot was showing a ground speed and accelerating, and may not be intended to cover the initial 10 minute period where the plot remained stationary in position. If so, then the total duration becomes 46 minutes rather than 36 minutes and an additional 10 min becomes available for travel along BE at the reported rate of 240mph, taking the plot an additional 40 miles to the point of signal loss. Interpreted in this way the numbers start to make much more sense. Instead of vanishing far short of the known effective radar covereage, or on a final heading much too far east of the headings stated or implied, the final target position can now be located at a sensible range on a more nearly southerly heading not far from the isle of Man. The resulting track is somewhat as suggested in Fig.2.

In conclusion, the contemporaneous DDI(Tech) report should be regarded as controlling over later recollections by the RAF West Freugh Station Commander, and although the scenario it describes is itself not without uncertainty only one significant apparent inconsistency has been identified and it does seem possible to resolve this elegantly with one plausible assumption. Nevertheless we should be careful in what follows to separate unambiguously rcorded facts from inferences that may be only more or less dependable.

Fig.2 - Revised best-fit map of radar locations and approximate target headings

12 Brad Sparks, email to Martin Shough 04.03.2010

5.) Possible Explanations

i) Aircraft.

At the airspeeds required for any aerofoil to achieve positive lift at altitudes of 50-70,000 feet, forward flight would normally be expected to result in significant movement of the tracking antenna as well as causing the height meter to click over. In this case the height meter did indeed click over smartly (~2000ft/min), but the pen "remained at one spot for *about ten minutes* [emphasis added]", which is inconceivable for a fixed-wing aircraft (helicopters cannot operate at this height, but see *Section iv*) climbing from 50,000 to 70,000 feet in still air, even allowing for an outrageous amount of electromechanical "lag" in the plotting table.

On the PPI of a primary surveillance radar, such as those used in Air Traffic Control, apparent stationarity of a primary echo can in principle hide a steep tangential climb or dive on a course towards or away from the antenna. Although ground range may be changing it might fortuitously happen that *slant* range to the antenna remains constant, so the blip on the scope may move little. In the absence of height information this may be indistinguishable in practice from a target that remporarily stops and hovers. The illusion may be compounded by relatively poor electronic range resolution, and by the operator's limited ability to discriminate small displacements of a blurred target arc on the tube phosphor. But a tracking radar, plotting simultaneous measurements of slant range and changing spherical polar coordinates, would be immune to this illusion.

An alternative possibility is an aircraft climbing straight into very strong headwinds. It would have a reduced groundspeed and might in a special case ascend near-vertically. For example, let us assume severe hurricane force winds from the N with a mean speed of 100 mph across all levels between 50,000 feet and 70,000 feet, and an aircraft climbing steeply NE with a mean forward airspeed of ~100 mph. With these two vectors almost cancelled out against one another, the echo on the Balscalloch radar might appear "appreciably stationary in azimuth and range" during this climb, and having briefly topped out at 70,000 feet it might then begin a descent, still into the winds, during which it picks up a little airspeed and begins to level out, showing a forward groundspeed of 70 mph by the time it reaches the 54,000-foot level, as reported. It continues on this course (true airspeed about 170 mph) for about 17 minutes by which time it has travelled 20 miles from the point of acquisition. At this time it begins a fairly small-radius starboard turn towards the ESE, at which point the headwind becomes a sidewind then falls behind to port. Groundspeed suddenly accelerates as the plane picks up a component of additional forward speed from the 100-mph northerly airstream. Ground radars would see this as an unusually sharp turn, and the resultant vector of the plane's 170 mph ESE airspeed and a 100 mph N airstream might be a 240 mph ground speed on a roughly SE heading.

There are some difficulties with this scenario. A speed in the order of 100 mph would be typical of many low-altitude light aircraft. But as altitude increases, conventional wings stall at higher True Air Speeds because the air density ratio becomes a smaller factor in the lift equation, leading to a critical point in the high-altitude flight diagram where the airspeed and the stall speed approach one another at a so-called Q-corner or 'coffin-corner'. What this means in general is that high altitude planes fly fast to stay up, and therefore the required headwinds need to be proportionately fast to yield zero ground speed.

Given very extreme winds at altitude, the second necessary component of this hypothesis is an aircraft capable of climbing to 70,000ft in the first place, a height well above the official white-world record altitude in 1957. The date of the incident leads one to think of the U2 spyplanes,

several of which were deployed in Europe at this time (although not, as far as is known, in Scotland). The U2 theory has been espoused by some ufologists such as John Heptonstall, Dave Clarke and Andy Roberts (see Clarke & Roberts, 2002) but fails as soon as one considers the speed and altitude profile.

The pen plot began to "move slowly" NE, with the height reading dropping from 70,000 feet and the target only then picking up speed "gradually" to 70 mph, meaning that wind speed and target airspeed would need to be very nearly equal and opposite at this flight level. But the U2 was designed to fly at all times close to the coffin-corner, i.e., its stall speed at this altitude was only a few mph less than its maximum airspeed of nearly 500 mph. This fine margin required continual concentration from the pilot and was just one of the features that made the U2 so hard to fly.[13] Not even very strong jet-stream winds achieve more than about half the speed necessary to keep a U2 flying with near-zero ground speed. Therefore our hypothesis fails in respect of the U2 because for much of the flight track it could not have flown slowly enough.[14]

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13 Even the most experienced pilots found the ungainly craft difficult to control with its dangerously high stall speed at altitude and slow responses. It was said to combine the manoeuvrability of an oil tanker with the balance of a high-wire acrobat. It was incapable of sharp turns and the pilot had little chance of being able to steer out of a steep dive.

A few further points are worth making regarding the U2: It has been claimed that the U2 had an unusually large radar cross-section that could explain the DDI(Tech) report that the size of the principal echo was dramatically larger than any normal aircraft, "nearer that of a ship". Although the U2 was not a large aircraft and had only a modest wing area it certainly had what we would today call poor stealth characteristics. It's survivability depended entirely on altitude. However, saying that the U2 was a good radar target isn't to say that it had a radar cross-section comparable to an ocean-going ship.

It's important to remember that attenuation of radar signal strength reflected from point targets (i.e., aircraft) is proportional to the 4th power of the distance. This large effect means that small aircraft detected at unprecedentedly remote heights by blind-bombing radars, no matter how "unusual" their signatures, certainly won't so exceed the echo strengths of familiar large bombers at much lower heights as to appear "considerably larger . . . more like a ship" to operators described as "fully qualified and highly experienced".

One factor adduced to help explain the operators' mystification is the secret nature of the U2. But whilst the U2's function and true technical specifications were secret, neither the U2's existence nor its UK deployment were secret, even from the public, and this fact is reflected in its operational cover as a "high-altitude weather research" plane. The Weather Reconnaissance Squadrons it was deployed with were established openly, and the National Advisory Committee on Aeronautics (NACA) advertised its deployment to USAF bases round the world in a Press Release on April 30 1956. It was immediately identified by plane-spotters. *Flight* magazine reported its UK arrival at RAF Lakenheath in Suffolk that May.

This is not to say, of course, that radar operators in Scotland in April 1957 would have been accustomed to seeing U2s on radar. The point is that the U2 was a "technical intelligence" project - indeed it could be described as the father of modern technical intelligence projects - and the MoD secured active RAF participation in the overflight programme (which in part grew out of its own earlier Canberra overflight programme and related secret US-UK reconnaissance missions designed to be technically deniable by Washington) by supplying pilots for training as well as agreeing to host the planes on UK soil. The people *least* likely to be uninformed about U2 operations were precisely those - the MoD's technical intelligence directorate - who stated in a SECRET internal document on April 11 1957 that they were aware of no aircraft in the area (Appendix A) and concluded on April 30, again internally, that the West Freugh targets were not aircraft but were "five reflecting objects of unidentified type and origin" (Appendix B).

This statement also highlights the issue of how the several targets detected could be interpreted in terms of a single U2. Clarke & Roberts (2002) have argued that U2s were often chased by support craft, T-33s or T-38s, and that four smaller aircraft at 14,000 ft shadowing the U2 high above would account for the line of four targets to which the Ardwell radar preferentially locked-on after the sharp turn but which the Balscalloch radar continued to ignore in favour of the larger echo (*ex hypothesi*, the U2 itself) at 50,000 feet, only locking onto them after the large echo had itself passed beyond range. But given the implication that this was a secret deployment in UK airspace, unknown even to the MoD, one wonders how likely it might be for four 'chase planes' to accompany (and advertise) a U2 in such circumstances (as opposed to flights in secure Nevada test areas, for example).

14 In any case the temperate jetstream - still usually far south of the UK in April - blows generally W to E in zonal flow. In meridional flow the jet may kink, but a N-S or even NE-SW direction over the UK, as required by the hypothesis, would be highly unusual. Radiosonde balloon data (see later) do not show any evidence of extraordinary jet winds over the area that day.

The extreme altitude changes of the primary target might be less incredible (leaving aside for the moment the echo strength of the primary target and other factors, and focusing solely on the target motion) if we are allowed to imagine instead of a U2 a high-performance military fighter in a semi-ballistic "zoom" climb to 70,000ft. In this sort of climb the aircraft is relying not on aerodynamic lift but on kinetic energy built up by sheer engine thrust.[15]

But we still need to envisage extremely strong winds. A truly vertical zoom climb of this sort with zero forward airspeed requires tremendous power. This is essentially rocketry. No jet fighter in the world at this date would have had the thrust-to-weight ratio necessary to stand on its tail for 10 minutes of vertical ascent from 50 - 70,000ft in still air, then descend back to 50,000 ft with a forward airspeed of only 70mph.

Later zoom climb records set during 1958-59 by F-104, Phantom and Sukhoi jets were typically achieved at around Mach 2 with ~45º ascents, meaning that there was still very considerable forward airspeed. For example, transferring this profile to our case we get Cos 45º = 0.7 x Mach 2 at 50-70k = 0.7 x 2 [(660mph)], or ~920mph, which in 10 mins incurs a forward travel of 154 miles. By 1960 the USAF AST (AeroSpace Trainer), a modifed F-104 with a liquid rocket assist, achieved a zoom from 35,000ft at Mach 2.2, pulling 3.5g in a much steeper 70º ascent and topping out at 118,000ft at Mach 1 with a true velocity V_t = 681mph. The forward airspeed would still have been 232mph at the top of the zoom, covering nearly 40 miles on the ground in still air.[16] [17]

The other altitude record-setter of this era, the English Electric Canberra bomber/reconnaissance plane, achieved its 70,000ft record in Aug 1957, but not in a high-thrust zoom. The Canberra was a closer relative of the U2 and needed plenty of forward airspeed for aerodynamic lift at altitude. Stall speed would have been high - not with a coffin corner as critical as the U2's but still requiring even stronger winds than a zoom-climbing fighter to negate all ground speed.[18]

Clearly, if we are to have any hope of rescuing the aircraft hypothesis in any form we require a very strong headwind at these altitudes. There are two scenarios:

1) Violent NE headwinds comparable to - and thus cancelling out - the forward groundspeed of a powerful jet fighter during a zoom ascent and cancelling all but 70 mph of the forward speed of the same fighter during descent back to 50,000ft. Note that this NE wind direction is *opposite* to the direction of the fast high-altitude jet stream.

2) A somewhat less plausible alternative scenario is an aircraft heading SW against jetstream winds of several hundred mph, making zero headway for 10 minutes despite extreme altitude changes,

15 Always assuming, of course, that there was a fighter capable of achieving this "lob" to 70,000 ft in April 1957 in the first place. The P1.b, the evolved prototype of what would later become the operational English Electric/BAC Lightning F.1, noted for its terrifically powerful climb performance, coincidentally had its first and successful flight in England on the very same day as the West Freugh incident. The service ceiling of the Lightning was 60,000+ft but it was capable of going above 70,000ft for short "zoom" excursions. However it seems unlikely in the extreme that the prototype P1.b could have appeared in Scottish skies on the day of its first test flight. Perhaps a private-venture experiment or an off-the-record RAF junket is a possibility one can't completely rule out, but the likelihood of anyone making the attempt over a MoD weapons range without the knowledge and authorisation of the MoD seems extremely remote

16 http://en.wikipedia.org/wiki/Zoom_climb

17 http://www.nf104.com/stories/stories_01.html

18 The Canberra's stall speed even at low level was 124 mph (108 knots, 200 km/h) and would be much higher at >50,000ft.

trying unsuccessfully to escape the stream, then - either because wind increases still further or because the pilot throttles back - the plane's forward airspeed falls below the windspeed to give a resultant negative groundspeed of 70 mph (i.e., flies backwards). Eventually the pilot gives up his dogged pursuit of a SW heading and turns away from the eye of the wind, crabbing S and recovering a resultant vector groundspeed of 240 mph.

Either scenario requires severe hurricane-force winds from 50,000ft to 70,000ft over SW Scotland., a prediction we can test.

Radiosonde Measurements of Wind Direction (degrees from N)										
height (metres ASL)	LERWICK		STORNOWAY		LEUCHARS		ALDERGROVE		LIVERPOOL	
	2300*	0500hr	2300hr	0500hr	2300hr	0500hr	2300hr	0500hr	2300hr	0500hr
surface	210	200	210	200	240	240			200	190
900	230	230	210	220	230	240		220	220	230
1500	230	230	220	230	220	230		230	200	220
2100	220	220	220	230	230	230		220	220	230
3000	230	230	220	230	220	230		220	230	220
4200	210	220	220	230	220	220		220	250	240
5400	230	220	220	230	210	230		230	240	250
7200	230	210	220	230	230	230		230	270	250
9000	230	220	220	210	220	240		230	250	250
10,500	210	210	210	220	220	240		240	270	240
12,000	230	230	210	230	240	250		240	250	240
14,100	250	240	220	230	220	230			240	240
15,900	260	250	230	240	250	230			230	240
18,000	270	260	220	290	270	300			240	290
20,400					330					
22,800										
25,200										

*Note: release time 1hr before local midnight on April 03

Table 1. Radiosonde measurements of wind direction aloft at five stations in the north and northwest of the UK, 23:00PM, Weds April 03 and 5:00AM, Thursday April 04, 1957. From original datasheets provided courtesy of The Met Office.

Radiosonde Measurements of Wind Speed (knots)										
height (metres ASL)	LERWICK		STORNOWAY		LEUCHARS		ALDERGROVE		LIVERPOOL	
	2300*	0500hr	2300hr	0500hr	2300hr	0500hr	2300hr	0500hr	2300hr	0500hr
surface	17	13	18	20	09	11			04	09
900	30	31	34	38	28	29		21	16	12
1500	37	30	43	45	30	31		26	08	19
2100	46	39	51	45	37	31		27	23	24
3000	47	42	52	51	38	35		40	26	32
4200	60	55	66	62	35	40		45	28	31
5400	68	60	76	68	30	53		39	25	23
7200	63	60	85	59	34	49		51	34	29
9000	60	61	73	64	36	59		78	39	37
10,500	74	65	70	64	45	57		62	53	52
12,000	59	46	58	55	37	43		59	43	39
14,100	40	33	51	36	36	38			18	23
15,900	27	27	27	28	22	19		40	16	16
18,000	19	14	16	17	11	07			07	03
20,400					05				02	
22,800										
25,200										

*Note: release time 1hr before local midnight on April 03

Table 2. Radiosonde measurements of wind speed aloft at five stations in the north and northwest of the UK, 23:00PM, Weds April 03 and 5:00AM, Thursday April 04, 1957. From original datasheets provided courtesy of The Met Office.

Radiosonde Measurements of Wind Direction (degs from N)										
height (metres ASL)	LERWICK		STORNOWAY		LEUCHARS		ALDERGROVE		LIVERPOOL	
	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr
surface	220	220	240	230	240	250	(still)	180	210	260
900	240	230	230	230	230	240	220	230	230	250
1500	230	250	230	240	230	240	230	250	230	220
2100	230	240	240	240	240	240	230	260	250	240
3000	230	240	240	240	230	250	230	240	230	270
4200	240	240	240	230	230	240	230	230	220	280
5400	230	240	230	240	220	230	220	220	230	240
7200	230	240	230	230	230	230	230	230	230	230
9000	230	240	220	230	250	250	240	230	260	250
10,500	230	240	230	230	240	240	240	240	250	260
12,000	240	240	230	230	240	240	230	230	240	250
14,100	250	240	230		230	240	230	230	240	240
15,900	270	260	240		230	240	240	240	240	250
18,000	270	290	230		240	310	210	280	210	300
20,400		300			310			(still)	220	
22,800					360					
25,200					030					

Table 3. Radiosonde measurements of wind direction aloft at five stations in the north and northwest of the UK, 11:00AM and 5:00PM, Thursday April 04, 1957. From original datasheets provided courtesy of The Met Office.

Radiosonde Measurements of Wind Speed (knots)										
height (metres ASL)	LERWICK		STORNOWAY		LEUCHARS		ALDERGROVE		LIVERPOOL	
	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr	1100hr	1700hr
surface	28	27	22	25	08	08	00	10	06	04
900	38	40	17	27	26	20	22	15	11	13
1500	41	42	42	32	29	23	22	18	15	20
2100	44	42	45	27	37	25	35	23	26	16
3000	50	40	47	40	43	37	44	40	27	18
4200	57	49	32	50	44	44	48	46	32	27
5400	61	60	51	75	45	44	45	43	33	28
7200	65	72	64	74	56	52	57	46	30	27
9000	70	79	68	83	65	63	69	65	38	30
10,500	70	74	69	73	66	63	69	74	44	42
12,000	50	49	49	44	50	51	49	46	33	40
14,100	43	41	36		35	35	27	29	23	20
15,900	31	30	30		15	16	06	17	13	13
18,000	22	20	27		07	06	09	05	07	05
20,400		14			07			00	04	
22,800					07					
25,200					08					

Table 4. Radiosonde measurements of wind speeds aloft at five stations in the north and northwest of the UK on Thursday April 04, 1957. From original datasheets provided courtesy of The Met Office.

Radiosonde balloon ascent records for all UK stations on the morning of April 04, 1957 were obtained from the UK Met Office.[19] Wind directions and velocities measured at five stations in the N and NW of the UK are shown in Tables 1 - 4 for up to 17 levels, extending from the surface to 82,700ft at RAF Leuchars. Fig 3 shows pressure isobars, temperatures and wind vectors measured at midnight GMT on the night of the sighting at an altitude of 17,700 ft and Figs 4 and 5 show the same values for altitudes of 9,850 ft and 29,500 ft respectively at 11:00 GMT later that same morning.

It is immediately evident from the Tables that the strongest winds that morning - peaking at around 70 kt - were to be found at around 35,000ft, dropping with height until at around 50,000ft they were everywhere in the order of 10kt. Above this the speed generally dropped further still at all stations. The Leuchars and Liverpool balloons reached the 70,000ft level of the UAP, measuring just 7kt NW and 4kt SW respectively. Clearly the very severe hurricane-force winds predicted by the aircraft hypothesis did not exist and the hypothesis is rather conclusively falsified.

19 Response from Met Office FOI/Data Protection Manager to FOI request # 28-09-2009-111132-001, 05 November 2009

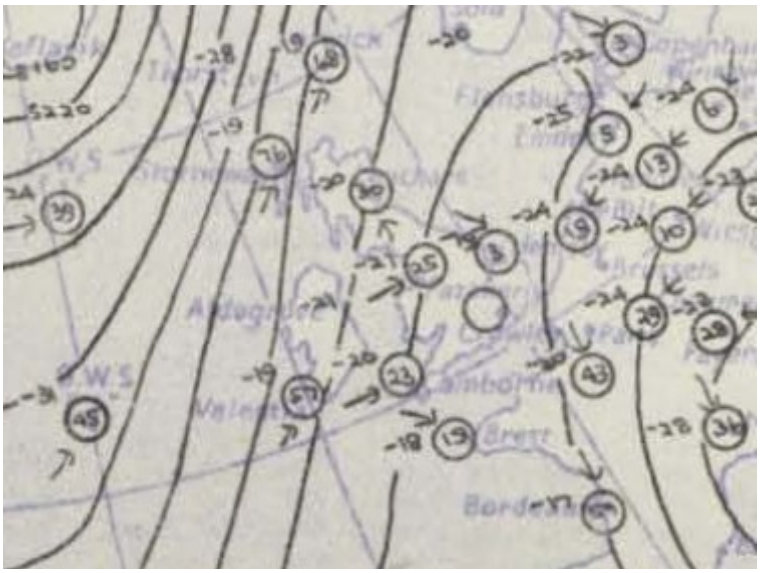

Fig.3. Midnight, 0000hr GMT, Apr 04 1957, 500mbar pressure level (5400m; 17,700ft), temperature in ºC, wind in knots.

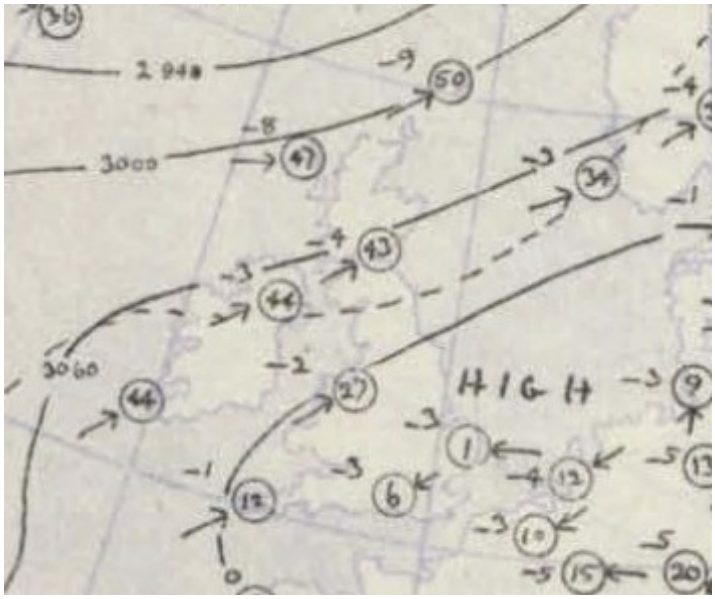

Fig.4. Noon, 1200hr GMT, Apr 04,1957, 700mbar pressure level (3000m; 9,850ft), temperature in ºC, wind in knots.

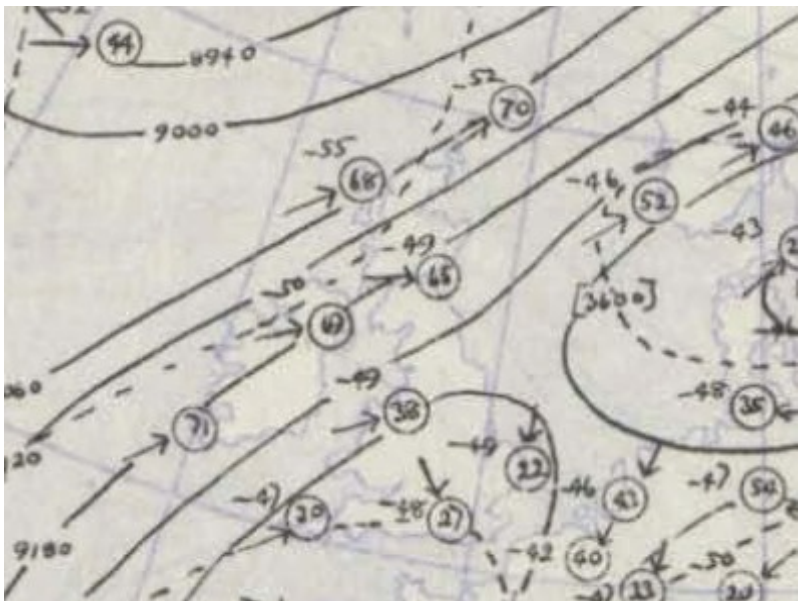

Fig.5. Noon, 1200hr GMT, Apr 04,1957, 300mbar pressure level (9000m; 29,500ft), temperature in ºC, wind in knots.

ii) Electronic Counter Measures (ECM).

Might the radars have been "spoofed" by an experiment in active jamming? Radar spoofing gear could have been deliberately test-flown over the Luce Bay bombing range. John Heptonstall suggests[20] that equipment similar to that deployed a decade later over Vietnam in order to simulate B-52s on Vietcong radars could have been in use in 1957 and could have fooled radars into displaying a U2 over West Freugh as a huge and obvious target instead of a small and fugitive one. The question of why this would have been done remains unanswered. Indeed the weight penalty incurred with the bulky analogue electronics of this period would militate against its use in an aircraft which was stripped to the bone for high altitude endurance (its only protection) and whose delicately counter-balanced camera alone was already as much as it could carry. This was the all-important purpose of the U2 at this time, after all. Why would the CIA need the U2 to simulate a B-52 at 70,000 feet in order to carry out its surveillance mission? They were waiting with dread resignation for the first U2 to get shot down - but why hasten the day?

Motive aside, today's digital electronics do allow ECM spoofing to generate false or modified targets of various kinds. If we are permitted to hypothesise any kind of radar deception *ad hoc* then we can simply cease to concern ourselves with any of the reported echo behaviours and write off the entire event as "possible spoofing". But realistically 1950s analogue technology sets limits to the sophistication of ECM target emulations in this case - particularly given that three ground radars at two sites many miles apart all have to be seamlessly and simultaneously spoofed. This rules out direct physical intervention (i.e., signals injected *via* cables plugged into the receivers) and generating false targets from a remote location by radio requires something akin to the CIA's top secret Palladium project, which is not known to have been conceived earlier than about 1962. So we are looking at enhancement, suppression or distortion of the raw signal returned from an aircraft, and since the only evidence of the presence of an aircraft is the radar track we are analysing, then this track has to be interpretable as that of a conventional aircraft, which appears not to be possible. It's true that the UK state of the art in remote radar spoofing at this time may in principle not be

20 Heptsonstall, J., *The West Freugh Incident Revisited* (privately circulated paper) p.3

unclassified even today. Maybe MoD was a decade ahead of the CIA's secret capability? But any such ECM test theory hardly explains the mystification of the MoD's own technical intelligence staff at DDI(Tech), who would presumably be the least likely people to be in the dark about any such experiment.

iii) Ships at sea

The echo presentation was described as being considerably larger than that of an aircraft and more like that of a ship. It is possible to interpret this as meaning that the operators had experience of ship echoes on these or similar radars when operating at low elevations.[21]

The echo was detected out to sea and was (at least initially) stationary in position. Of course it was shown at high altitude and climbing; but is it possible that an electromechanical fault of some kind caused a false antenna elevation signal to be fed to the plotter, showing the echo of a ship in a spurious apparent climb? No, because a second electromechanically independent radar at the same location showed the same plot during the climb and the operators switched between the two antennas specifically to look for any disparity, finding none.

Anomalous propagation conditions might cause two radars to display an echo received by a common abnormal raypath at the same spurious elevation. The altitude plot is calculated from the antenna boresight elevation assuming a normal raypath. So if the pointing angle of the antennas is a few degrees above the sea, radar beams might be bent towards the sea by unusual refraction and the equipment will still calculate a false altitude from the pointing angle of the antenna. But an echo plot at about 50,000 ft and 20-25 miles range means a minimum antenna boresight elevation (at the start of the climbing plot) of about 27-30 degrees (depending on whether the range given is true ground range or slant range). This is already far too high an angle for any kind of anomalous propagation at the peak of the main beam, and the angle gets larger for the next 10 minutes.

iv) Sidelobe echoes.

Sidelobe returns are an interesting possibility. Remember that the antenna beam pattern of these radars is a narrow pencil beam (or a pair of squinted pencil beams), unlike surveillance radar beams which always emit considerable energy towards the ground. But even a pencil beam will emit some weak sidelobe radiation 30º from the peak of the main beam. If radar pulses are returned from a very efficient surface reflector - such as a ship - illuminated in a sidelobe the radar will still calculate target positions based on the pointing direction of the antenna boresight, resulting in a spurious altitude.

One problem with this hypothesis is that the strongest (first) sidelobes are generally about 30dB down on the peak gain. The strength of a sibelobe return from a surface vessel in a *strong* sidelobe therefore ought to be in the order of 1/1000 the strength of a main beam return from the same ship, or less. Moreover it is unlikely that the near-in sidelobes of a tracking radar beam could be so far from the peak gain as ~30º. Normally reflections received *via* sidelobes start to cause very small problems with multipath tracking errors when the elevation falls below about 6 times the beamwidth, and only become significant (i.e., the strength of the second-path signals reach a fraction of the directly reflected signal strength sufficient to cause large angle fluctuations) below

21 Some idea of the relative RCS implied can be gained from the experimental rule of thumb that the RCS measured in square metres of a ship at or near grazing incidence will approach ten times the displacement in tons (Skolnik, 1980). Thus a Navy coastal patrol vessel or small corvette of 500 tons will have an average RCS in the order of 5000m^2, whilst a destroyer of 1000 tons displacement will have an average RCS in the order of 10,000m^2. By contrast a medium sized bomber or jet airliner will have a mean RCS of only about 20 - 30m^2.

about 0.8 beamwidth.[22] This suggests that the elevation angles in this case must be at least 5 times, and up to about 40 times, the value for sidelobe effects at the -30dB level to occur, meaning that the likely signal strength from a ship in a sidelobe would be many times weaker than 1/1000 of the strength of a main beam return from the same ship. Therefore, even though it may happen that anomalous propagation conditions cause far-out sidelobe returns to be less weak than normal, the operators' reports of an extremely strong echo comparable to a ship appear to be grossly inconsistent with sidelobe echoes from a ship.

More obviously, the subsequent part of the plot showing acceleration to 240 mph ground speed and a 90 degree turn - triangulated by the two radars at Balscalloch and the radar at Ardwell - is wholly unexplainable as a sidelobe echo from a ship or ships. The echo will always display on the true azimuth of the reflector responsible.[23] Note that the radar line of sight moves clockwise during this track, taking the echo across the coast and over land to the N and E of the radars. The rapid departure to the SE (or S) of the radars then takes the line of sight through approximately 180 degrees of azimuth with the LOS pointed still inland, ruling out even the highly contrived hypothesis of a series of multiple-trip echoes from a number of different ships.

We could evade the problems in the last paragraph if we were to suppose that a flight of helicopters operating over Luce Bay at low altitude was picked up in the radar sidelobes. This might explain the hovering, near-vertical climb and slow descent, and multiple targets moving over land and sea. Of course, the exceptional echo strength of the main target would be unexplained, unless this could be a cluster of several helicopters bunched below the resolution of the radar.

A possible clue to an explanation of this type is the separation in target altitudes, when one (nearer) radar began tracking targets at 14,000ft, whilst the others continued to follow the target at 50,000ft. Perhaps one radar for some reason broke lock and switched to correct boresight tracking of a cluster of targets at 14,000ft, whilst the other two continued tracking them as unresolved sidelobe echoes at a large angle to the boresight?

The initial indicated climb as recalled by the Station Commander, Wing Commander (later Group Captain) Whitworth in 1971 (see Appendix C) was from 51,000 to 60,000 ft. This could correspond to a true climb from sea level to 9000 ft in a sidelobe (a vertical angular displacement of only 2º - 3º at the indicated range). There was solid overcast at 1000ft, so this might explain why the helicopters were not seen. But although hover out of ground effect at 9000 ft is possible for many modern helicopters it would exceed the limit for 1957, and a vertical *climb to* this height would be another matter altogether. Worse, the contemporaneous (and presumably more reliable) DDI(Tech) intelligence summary states that the target initially climbed from 50,000 ft to *70*,000 ft., which would require 20,000ft of near vertical ascent out of ground effect. The first turbine-powered production helicopter, the French-built *Allouette*, received its French Certificate of Airworthiness a month after the West Freugh affair, and its record breaking performance, though impressive at altitude in forward flight and in mountain ground-effect (setting a world height record of over 35,000 ft in July 1958), gave it a hover ceiling out of ground effect of only 4,300ft[24] and a maximum speed of only 115mph, less than half the speed of the objects tracked at West Freugh. Moreover one has to question how and why a number of helicopters would be wandering over an MoD bombing range, unbeknown to MoD (and unheard by range staff), with a bombing run imminent.

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22 Skolnik, M. I., *Introduction to Radar Systems* (2nd Ed), McGraw-Hill 1980. pp.172-4

23 The displayed target azimuth will split the difference between the signals generated by the scanned or squinted sidelobes of the tracking radar beam pattern, just as though it were the error signal generated by the main lobes.

24 http://www.flightglobal.com/pdfarchive/view/1964/1964%20-%201541.html

v) Balloons

Balloons of various kinds may carry payloads that reflect radar energy[25] and may fly at extreme altitudes, obviously following the wind at their flight level. Generally they will be seen to climb in altitude, but they may reach a stable float altitude (where the outside air pressure drops to the point of neutral buoyancy), burst/shatter at high altitude, or descend due to a slow leak. Envelope sizes vary from common neoprene radiosonde balloons and other small balloons that expand to a few feet or tens of feet diameter, carrying small instrument packages, to giant research and spy balloons sometimes hundreds of feet across and millions of ft^3 in volume carrying larger payloads.

A type of unusual large-volume, high-altitude balloons in use at this period was the so-called "Moby Dick" balloons of Project Genetrix, a USAF "weather research" programme which was expanded to numerous launch sites around the world during 1956, including RNAS (Royal Naval Air Station) Evanton in the north of Scotland.[26] These large plastic balloons carried cubic-metre gondolas to 60,000ft, packed with 400lb of photographic and electronic surveillance gear. They were designed to be cut down by gunfire from friendly aircraft so that balloon and payload would sink to 30,000 ft at which level a barometric switch would release the gondola. The remains of the balloon were then supposed to climb away to shatter harmlessly at high altitude whilst the bright yellow 50" x 35" x 37" gondala plummeted into the sea for recovery.

At first sight some related type of balloon activity might be suspected in this case. An initial ascent to 70,000ft then a fairly abrupt transition to a northeasterly descent (beginning at point A in Fig.2) accelerating from near zero ground speed to 70mph at 54,000ft, has some similarity to the wind profile, which is almost calm at the highest altitude, increasing in velcity with descent towards a max. at 35,000ft. As shown in Tables 1 & 3 the wind direction at the appropriate levels could fit the target direction during this descent. The descent rate, probably in the order of 1000fpm, is too slow to indicate a non-buoyant object (such as for example a Genetrix instrument gondola) falling freely, [27] and the low forward speed, at an altitude where the stall airspeed of a wing aerofoil would be so high (see Section 5.i), certainly tends to suggest positive buoyancy rather than aerodynamic lift.

On the other hand the wind speed (order of 10kt) is about a factor 5 or 6 too low to account for a 70mph drift. The exact morning hour of the sighting is not known so one can speculate that the windspeed peaked between the balloon samples, but it would be fair to say that there is no trend and no evidence suggestive of this in the very similar reeadings over all four sample times. Further, the initial vertical climb of 2,000ft/min, is excessive for large high-altitude polyethylene balloons of a type capable of lofting large radar targets (though not "ship sized" of course), which climb at hundred of fpm.[28] It is even about twice the fastest likely climb rate of small weather balloons, which typically have initial rates of 1000-1200fpm; and we note that buoyancy (therefore vertical lift and climb rate) reduces with increasing altitude and reducing air density. So the measured ascent rate at high altitude, the "very sharp turn" of 90º and acceleration to 240 mph, and the extremely large echo cross-section are all factors seriously inconsistent with a balloon-borne reflector of any kind.

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25 Balloon envelope fabrics are generally not conductive and do not reflect significant radar energy.

26 AIR 2/17903 Project Genetrix balloon-gondola recovery procedure SECRET. From:- Headquarters Coastal Command To:- Headquarters No.18 Group; Headquarters No.19 Group, 3rd December 1955 Ref:- CC/S.5901/25/ATC Project 119L - High Altitude Meteorological Balloons.

27 Terminal velocity $Vt = \sqrt{(2w)/(C_d \cdot \rho \cdot \sigma)}$ where w = weight, C_d = drag coefficient, ρ = gas density, and σ = cross-sectional area. E.g., from 70000ft an object of $12ft^2$ cross sectional area, a C_d of 2.0 typical for a smooth brick shape (i.e., a Genetrix gondola) and 500lb total weight, starts falling at 1g at 1900ft/min and accelerates to Vt = 33,000ft/min.

28 Lally, V.E., *Balloons - Types, Flight Profiles & Visibility*, in: Gilmor (ed.) Scientific Study of Unidentified Flying Objects, Vision Press, London 1970 p.755

vi) Birds/insects

Flocks of birds can present quite large echoing areas and, especially if near the antenna, can return signals as strong as aircraft, moving at tens of knots, possibly in the region of 100kt if with a strong following wind. Surprisingly, even insects, swarming in sufficiently huge numbers as some migratory moths and others do, might give signficant echoes, moving essentially at the wind speed. However the exceptional echo strength observed does not suggest birds or insects, and once again the track ranges, the extreme and varying altitudes and the high speeds on divergent headings are inconsistent with birds or insects in any possible pattern of winds.

vii) Anomalous propagation (AP)/forward scatter

It is possible for special AP conditions to produce the appearance of discrete targets in the air, even without the radar being refracted to pick up surface targets such as ships. If there is an elevated layer of sharp refractive index discontinuity (i.e., abnormal changes in temperature and humidity across a narrow layer) then a radar beam impinging on the layer at a shallow or grazing angle can be *reflected* as from a mirror. This process is called forward scattering. The radar energy reaching the surface can then be scattered back from the surface in the normal way, returning to the radar antenna along the same reflected raypath. The radar may then see a pattern of echoes that is at least partly governed by the pattern of reflective efficiency in the elevated layer, and this may take the form of quasi-stable patches that ripple or sometimes progress under the influence of winds. The effect seen at the radar is generally of intermittent echoes that move across the radar at about twice the speed of the wind at the layer altitude, sometimes slower, sometimes faster.

However the the height recording indicates an antenna elevation (and thus an incidence angle) of some 30deg, about sixty times higher than the limiting grazing angle for efficient forward scattering, and yet the echo was exceptionally strong. Once again, detection of AP echoes in a sidelobe near zero degrees elevation can occur, but as already noted the signal strength would probably be down ~30dB on the main beam gain to start with, so that the observed unusual strength of the echo presentation is added to a list of other characteristics collectively fatal to the forward scatter theory: The steadiness and compactness of the echo, the horizontal speeds, the rapid and extreme elevation changes, the widely divergent headings across land and sea, and simultaneous detection on radars many miles apart.

viii) Meteors

The target kinematics and durations are completely inappropriate for meteor wake returns. Moreover the returned radar power at the necessary range (tens of miles, probably well beyond the unambiguous range of this type of radar) would be small, yet the echoes observed were abnormally strong. Ionisation echo strength also depends on the radar wavelength. The target in this case evidently had a very large cross-section at the wavelength used, but the necessarily short wavelength of the tracking radar would be very unfavourable for returns from meteor-wake ionisation.

ix) Auroral Streamers

The target kinematics are not at all characteristic of auroral echoes, and again the short wavelength would be inappropriate for ionisation returns. Moreover, much of the track is well outside the auroral quadrant - the northerly part of the sky to which auroral echoes are restricted because of the angle it is necessary for the radar line-of-sight to make with the magnetic field lines.

x) Lighting Sferics / Ball Lightning

Lightning sferics are caused by radio emissions from the lightning stroke itself causing interference. On surveillance PPIs they display as speckles and spirals of interference all over the scope, usually lasting fractions of a second and appearing on a single sweep of the antenna. Exactly how such sferics might be recorded by plotting pen and height meter in this case is hard to say, but certainly they would produce very transient and erratic noise spikes, not persistent discrete echoes on the scope or coherent tracks on the plotting table.

Ball lightning (BL) is believed to be a form of electrical plasma that can survive for a matter of seconds in a stable form and move in the air independently of winds. Almost nothing is known with certainty about BL. As an ionised gas it might well be capable of returning radar echoes. As with auroral and meteor echoes, the short wavelength of a tracking radar is far from optimum for ionisation returns, but electron densities in lightning balls may presumably be very high. However all characteristics of the track(s) - altitude, speed, duration, kinematics, echoing area and number of objects - are so very far from median values for ball-lightning reports that to pursue the theory seems ludicrous.

The DDI(Tech) report mentions the theoretical possibility of radar echoes from "charged clouds" only to dismiss it as being unable to explain the phenomena. Ball lightning is of course statistically strongly correlated with electrical storms. There appears to be no indication of electrical storms in the area.

Conclusion

Arguably this case is unique among UFO incidents in the UK in that we have a document detailing an official technical investigation which is known to have had access to hard evidence - permanent radar recordings by multiple independent instruments - and which concluded in secret that real unidentified flying objects were detected.

Air Ministry technical intelligence specialists of A13, an office of the Deputy Directorate of Intelligence - DDI(Tech) - stated in a SECRET internal document on April 11, 1957 that they found no trace of aircraft in the area and had ruled out balloons. After further checks and detailed analysis of the radar recordings they concluded on April 30 (DDI /C.290/3/ - see Appendix B) that the echoes had been caused by "five reflecting objects of unidentified type and origin".

The previous section of this present report considers explanations including - separately or in combination - anomalous propagation, sidelobe echoes, aircraft, helicopters, electronic spoofing, radar interference, ships, balloons, birds, meteors, auroral phenomena, and ball lightning, all without success. There appears to be no satisfactory explanation of these radar targets.

Sources & References

Primary sources:

1. Air Ministry DDI(Tech) memo, April 11 1957 (Appendix A)
2. Air Ministry Summary of conclusions, April 30 1957 (Appendix B)
3. Memo from Wing Co. R.C. Skellon, for DDI(Security), to OC, BTU, West Freugh, c.c Senior Security Officer, Ministry of Supply, 18 June 1957
4. Letter from RAF West Freugh Commanding Officer, Wing Co. Peter Whitworth to Miss A.N.Marks, MoD Publications Clearance Branch (Air), Adastral House WC1, 30 May 1971.
5. Minutes and enclosures from L.W.Akhurst S4f(Air) to Dr Walton, Ops(GE)2(RAF) DI55, 18 June - 06 August 1971
6. Letter from RAF West Freugh Commanding Officer, Wing Co. Peter Whitworth, to Julian Hennessey, 13 Sept 1971, with encl. (Appendix C)
7. Letter from RAF West Freugh ATC Officer Kenneth England to Dr David Clarke, 07 Aug 2001

Supplementary sources:

Contemporary newspaper articles (see Appendix D) quoting Air Ministry spokesmen, "unofficial sources" and interviews with Bombing Trials Unit radar operators Kolosky & McVey, Holland & Farley and RAF West Freugh CO., Wing Co.W. P Whitworth:

'The Mystery of the Object in the Sky', Air Reporter, *Evening Standard*, 06 April 1957

'Radar Spotted Mystery Object', *Evening News*, 06 April 1957

'Radar Sky Riddle Clues', *Sunday Dispatch*, 07 April 1957

'Red Spy Plane Tracked on Radar?', *Sunday Graphic*, 07 April 1957

'Radar Watch Goes On for the 'Blob'', Staff Reporter, *Daily Express*, 08 April 1957

'R.A.F. Probe Object Data,' Peter Vane (newspaper uncertain) 08.04.1957

'Weird Object on Radar Alerts UK', London, Reuters (date uncertain)

'What was the Object Seen On Radar Screen? Report from Air Ministry Still Awaited' (newspaper uncertain; week 08 April - 14 April 1957)

Clarke, D., and A. Roberts, 'Out of the Shadows', Piatkus, 2002.

APPENDIX A

[EXTRACT]

~~SECRET~~

D.D.I.(Tech)/S290/S.6 (Mr. West)

With reference to your loose minute 511/S.6 dated 11th April, 1957 . . . .

2. The four reports, amplifications of which you require, are as follows:

Radar sightings under investigation

(a) . . . .
(b) . . . .
(c) Ministry of Supply, Bomb Trials Unit, West Freugh, Wigtownshire picked up an unusual response from an almost stationary object on the 4th of April, 1957; the object was tracked for 36 minutes continually increasing in speed while losing height. Enquiries, so far, reveal that no service nor commercial aircraft were in the vicinity at the time. We are at present trying to find out whether a private aircraft might have been in the area at the time.

The possibility of a balloon has been eliminated because the object was proceeding against the wind.

3. The Wigtownshire report referred to in para.5 of our minute 3 of folder P.Q. 193/57 is the same incident as reported in the news cutting forwarded with your minute and returned herewith.

4. It is unfortunate that the Wigtownshire incident fell into the hands of the press. The two other radar incidents have not been made public and reached us by means of official secret channels. We suggests that S. of S. does not specifically refer to these incidents as radar sightings. We suggest that in answering the original question s. of S. might reply:-

"Of the fifteen incidents reported this year, ten have been identified as conventional objects, two contain insufficient information for identification, and three are under investigation."

5. If supplementary questions are asked the S. of S. might wish to refer to the answer given to Major Wall on 4th May 1955. Reports received since that date do not suggest that there need be any change in the answer given at that time.

A. GIFFEN PEACOCK

D.D.I. (Tech)
11th April 1957

APPENDIX B

Air Ministry DDI(Tech) Summary of Conclusions, April 30 1957
PRO AIR 20/9321

D.D.I. (Tech)/C.290/3/

Unidentified Objects at West Freugh

1. On the morning of April 4th radar operators at West Freugh detected unidentified objects on the screens of their radars. A summary of this incident is given below.

2. The object was first observed as a stationary return on the screen of the radar at Balscalloch. Although its range remained appreciably constant for about 10 minutes its height appeared to alter from about 50,000 to 70,000 ft. A second radar was switched on and detected the "object" at the same range and height.

3. The radar sets used were capable of following objects automatically besides being manually operated. The information is obtained in the form of polar coordinates but it can be converted to give plan position information together with heights. This information can be fed into a plotting board which displays the position of the object by means of an electronically operated pen, whilst the height is shown on a meter.

4. The unidentified object was tracked on the plotting table, each radar being switched on to the table in turn to check for discrepancies. After remaining at one spot for about ten minutes the pen moved slowly in a N.E. direction, and gradually increased speed. A speed check was taken which showed a ground speed of 70 m.p.h., the height was then 54,000 ft.

5. At this time another radar station 20 miles away, equipped with the same type of radars, was asked to search for the "object". A[n] echo was picked up at the range and bearing given and the radar was "locked-on".

6. After the "object" had travelled about 20 miles it made a very sharp turn and proceeded to move S.E. at the same time increasing speed. Here the reports of the two radar stations differ in details. The [t]wo at Balscalloch tracked an "object" at about 50,000 ft at a speed of about 240 m.p.h. while the other followed an "object" or "objects" at 14,000 ft. As the "objects" travelled towards the second radar site the operator detected four "objects" moving in line astern about 4,000 yards from each other. This observation was confirmed later by the other radars, for when the object they were plotting passed out of range they were able to detect four other smaller objects before they too passed out of range.

7. It was noted by the radar operators that the sizes of the echoes were considerably larger than would be expected from normal aircraft. In fact they considered that the size was nearer that of a ship's echo.

8. It is deduced from these reports that altogether five objects were

detected by the three radars. At least one of these rose to an altitude of 70,000 ft while remaining appreciably stationary in azimuth and range. All of these objects appeared to be capable of speeds of about 240 m.p.h. Nothing can be said of the physical construction of the objects except that they were very effective reflectors of radar signals, and that they must have been either of considerable size or else constructed to be especially good reflectors.

9. There were not known to be any aircraft in the vicinity nor were there any meteorological balloons. Even if balloons had been in the area these would not account for the sudden change of direction and the movement at high speed against the prevailing wind.

10. Another point which has been considered is that the type of radar used is capable of locking onto heavily charged clouds. Clouds of this nature could extend up to the heights in question and cause abnormally large echoes on the radar screens. It is not thought however that this incident was due to such phenomena.

11. It is concluded that the incident was due to the presence of five reflecting objects of unidentified type and origin. It is considered unlikely that they were conventional aircraft, meteorological balloons or charged clouds.

D.D.I. (Tech)
30th April 1957

REPORT ON U.F.O. PICKED UP ON RADAR SCREENS AT R.A.F. STATION WEST FREUGH, NEAR STRANRAER, ON 4th APRIL 1957

1. I was the Station Commander ate R.A.F. West Freugh when twp radar units (connected with bombing trials carried out in Luce Bay) tracked a U.F.O. on 4th April 1957. The radar units were manned by civilian operators, employed by the Ministry of Supply.

2. The radar operators were expecting a bomber from R.A.E., Farnborough, for bombing trials in Luce Bay, but this aircraft was delayed. However, one radar operator left his radar set "on" and when scanning, the U.F.O. was picked up.

3. If my memory is correct, this radar was situated at Balscalloch, near Corsewall Point, north of Stranraer, and the radar operator was puzzled about the object on his screen, which was at a height of approx: 51,000 ft, 20 - 25 miles away, N-West of Stranraer, over the sea, and absolutely stationary in space. The operator therefore called-up his fellow-operator, situated at Ardwell, about 14 miles South, and asked him if he had anything unusual on his screen. The Ardwell operator switched on his set and in a few moments he too located the object, in the same position. After remaining stationary for a short time the U.F.O. began to rise vertically, with little or no forward speed, rising rapidly to approx. 60,000 ft. At the time of the radar sighting there was unbroken cloud over the whole area, at approx. 1,000 ft, and the U.F.O. was not seen or heard by anyone, though the radar response was strong and neither operator had trouble in following the object. At approx. 60,000 ft the U.F.O. began to move in an Easterly direction, slowly at first, but then accelerating fast and moving towards Newton Stewart, losing some height. Near Newton Stewart the U.F.O. made a very sharp turn to the South-West, still at very high speed and losing height to approx. 15,000 ft, and finally heading in the direction of the Isle of Man, and then disappearing from the radar screens.

4. I believe that one of the radar operators said that the sharp turn near Newton Stewart would have been impossible for any conventional aircraft. Also, in the later stages of the radar tracking, there were indications that there were a small number of "satellites" in the vicinity of the U.F.O., but the response from them was very indistinct.

5. I cannot remember the exact time over which the radar operators tracked the U.F.O. but I believe it was approximately 4 minutes, from the first sighting unteil the U.F.O. disappeared from their screens.

s/ W.P.Whitworth, Group Capt., RAF (Ret'd)

i)

The Mystery of the Object in the Sky

Air Reporter, *Evening Standard*, 06 April 1957

The mystery of an unidentified object picked up by a Royal Air Force radar screen at West Freugh, Scotland on Thursday, deepened today.

Was it a weather balloon or was it something else?

An Air Ministry spokesman said today, "We are still investigating the reports. There is no further evidence yet."

Yesterday the Air Ministry had no doubt about it. An official said then that they had checked with the radar station, and that the object was a weather balloon, which had been sent up from Aldergrove airfield, Northern Ireland.

Telephone report

Northern Ireland is only 25 miles across the North Channel from West Freugh.

RAF intelligence officers who deal with reports if unidentified objjects have received a telephoned report from Wing Commander W. Whitworth, comnmanding officer of the West Freugh station.

He is sending a full written report to the Air Ministry.

'Very high'

Radar stations (Britain's watch against any surprise attack) are constantly manned. Other radar sets are used in air traffic control and are not on all the time. Objects which cannot be identified are reported to the Air Ministry.

It is understood that the West Freugh object was plotted at a great height.

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ii)

Radar Spotted Mystery Object

Evening News, 06 April 1957

Radar stations throughout Britain have been ordered by Air Ministry intelligence to keep a special watch for a mysterious object which flew over the west coast of Scotland and has baffled experts.

No one knows what it was. It was not an ordinary plane.

It was never seen by the naked eye. But its position and speed were logged, checked and double-checked.

Wing Commander Walter Whitworth, CO at the RAF bomber trials range at West Freugh, ten miles south of Stranraer, told me today: "I have been ordered by the Air Ministry to say nothing about the object."

Full report

It was at West Freugh that the object was recorded on Thursday afternoon.

Wing Commander Whitworth said: "I am not allowed to reveal its position, course and speed.

"There is no question of the radar playing tricks as the object was caught on the screen and double-checked by another radar 90 miles away."

A full and detailed report has been flown to London and studied by top-level radar and intelligence officers.

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iii)

Air Ministry takes serious view of 'too-fast-for-a-plane' blips and orders probe on - Radar Sky Riddle Clues

By Sunday Dispatch Reporters
Sunday Dispatch, 07 April 1957

That mystery object in the sky which was seen only on radar screens was too fast, too big, and too manoeuvrable (it turned at an "impossible" angle) to have been a plane.

This conclusion was reached yesterday by experts studying the clues of the sky riddle whcih was recorded exclusively by scientific apparatus that cannot lie.

Full reports of the incident have gone to the Air Ministry in London. Their experts take a serious view of them, it was stated officially yesterday.

The blips on the radar screens were reported from an RAF station at West Freugh, near Luce Bay, on the south-western tip of Scotland.

The operators estimated the object's height at 60,000 feet (just over 11 miles up).

[The official world height record for a plane is 65, 876 feet. Civil planes normally fly at 10,000 - 20,000 feet over Britain.]

Three radar operators independently saw the object cross their screens on Thursday.

Two twirls

It appeared first at 60,000 feet, dropped to 14,000 feet, made two twirls, and vanished in the direction of the Isle of Man, 30 miles to the south.

Nothing could be seen with the naked eye.

A check with other stations showed that there were no planes in that section at the time.

An Air Ministry spokesman in London said: "We do not know what the object was.

"The report is being studied by Air Ministry intelligence. All such reports go to them for investigation."

Inquiry starts at once

When a report of the mystery object in the skies above was flashed to the station commander at West Freugh, Wing-Commander Peter Whitworth, he contacted the Air Ministry, and immediate investigations were started into what may be one of the most scientifically authenticated "flying saucer" reports ever made in Britain.

I drove with Wing-Commander Whitworth down a deserted road to the mobile radar unit at Ardwell.

When the "unidentifiable object" was reported the weather was dull and visibility was poor. Cloud was down to 1,000 feet.

In the tiny green van 22-year-old Charles Hollands of Oxted, Surrey, received a call from Flight-Lieutenant Jim England in the other radar unit at Balscalloch, 14 miles further north.

'Anything odd?'

"Anything odd on your screen?" he asked.

Mr. Hollands, with his colleague 30-year-old Stanley Farley, of Bushmills, Northern Ireland, checked the screen and confirmed the Balschalloch readings. A third, auxilliary unit, also picked up the blips on the radar screen.

Mr. Hollands hurried out of the van to see if he could spot anything with the naked eye. He tried to follow the line of the radar scanner, but visibility was too bad.

Wing-Commander Whitworth told me:-

"Radar can, of course, play funny tricks. That is why it is so fortunate that we have this double check."

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iv)

Red Spy Plane Tracked on Radar?

Sunday Graphic, 07 April 1957

A mysterious object over the Atlantic, off the west coast, picked up by three RAF radar stations, may have been a Russian reconnaissance plane.

It is understood that RAF chiefs are not ruling out the possibility that the object was a long-range Soviet aircraft making a return flight across the Arctic great circle route from Siberia.

It was picked up on Thursday on the screens at the RAF radar post at West Freugh, ten miles south of Stranraer on the lonely shores of Luce Bay.

'no fluke'

Two other radar stations were immediately asked to scan the same area. They also picked up the object.

W/Cdr W. P. Whitworth, who commands the West Freugh station, said yesterday:

"It was no fluke or a technical hitch. A double check was taken by putting on another scanner, and by switching from one to the other the object was still there.

"I am not allowed to say at what speed or in which direction it was travelling." He refused to give its height, and would not say whether it could be seen by the naked eye.

W/Cdr Whitworth denied that all RAF radar stations had been alerted to watch for unidentified objects.

An Air Ministry spokesman in London said the mystery was being fully investigated.

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v)

Radar Watch Goes On for the 'Blob'

Staff Reporter, *Daily Express*, 08 April 1957

Radar-scanners kept special watch yesterday for further sightings of a high-flying mystery object spotted by radar at West Freugh, Stranraer.

Meanwhile full reports and pictures of the mystery "blob" are being flown toLondon today.

Air Ministry intelligence experts will be told that the object was flying at 60,000 feet - more than 11 miles.

The experts will have two independent reports to consider. For the blob was seen on three radar screens - one 20 miles from the others.

Operators Jim McVey and John Kolosky - civilian employees of the Ministry of Supply - saw the object on their screens last Thursday.

They contacted another radar post 20 miles away. Its crew had spotted the "blob" too. A stand-by set was also switched on - and also recorded the blob.

The object was travelling "very fast," was "very big," and turned at an amazing angle - too acute for a plane.

'Important'

Could the radar screens have lied? No, said Wing-Commander W. P. Whitworth, commanding officer of West Freugh RAF station last night.

An Air Ministry spokesman confirmed that the reports are rated as important.

He said last night: "The matter is being investigated at top level and no theory has been rejected so far."

It may have been a Russian reconnaissance plane returning from the Arctic. But usually such planes keep far to the north of Scotland.

Was the object a scientific balloon? The Air Ministry earlier hinted that it was, but the spokesman said:

"We now only include that among other possibilities."

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vi)

R.A.F. Probe Object Data

By Peter Vane [newspaper uncertain] 08.04.1957

'Don't talk' orders to radar operators

The first report on the unidentified object picked up by a Scottish radar station last week will arrive today at the Air Ministry's "hush-hush" department for the investigation on reports of flying saucers and other objects.

A full report from the three radar stations which checked and cross-checked the object's speed and course is expected to follow within two days. Top RAF intelligence officers will examione bith reports and then submit their conclusions to the Secretary of State for Air.

Until then the mystery will remain a mystery. "Don't talk" orders have been issued to the two radar operators, James McVey and John Kolosky, both of Stranraer, and both have refused to comment in any way on the object they picked up on their screen.

But while waiting for the detailed reports from Scotland, experts this week-end have been going ahead with discussions based on the "spot" information they have received so far.

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vii)

Weird Object on Radar Alerts UK

LONDON, Reuters [date uncertain]. Royal Air Force radar statios throughout Britain were ordered today to look out for "any unidentified or strange object" that might appear on their radar screens.

The instruction was flashed by the Air Ministry to all radar stations following a report of a strange object sighted by the bomber command radar post at West Freugh in southwest Scotland.

The Air Ministry has taken the report "extremely seriously," it was said.

Two operators on duty at the post Thursday picked up an "unidentified" object which remained on their sceens for some considerable time."

The Commander of the Station, Wing Commander W. P. Whitworth, said: "we were standing by with our radar screens switched on at noon on Thursday, waiting the arrival of a plane from the south of England.

LASTED SOME TIME

"We got a report stating that the plane would be one hour late, but instead of switching off our sets we kept them on. It was then that this styrange object appeared on the screen and lasted on its 'track' for some considerable time.

"Quite definitely, this was no freak. It was an object of some substance and no mistake could have been made. The two civilians who reported the tracking are fully qualified and highly experienced operators.

"I am not allowed to divulge to you any firther information, as the matter is now in the hands of the Air Ministry.

"They have requested a detailed report of exactly what we have seen on the screen, and other stations throughout the country have been asked to report if anything similar is seen."

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viii.)

What was the Object Seen On Radar Screen?
Report from Air Minstry Still Awaited

[Newspaper uncertain; week 08 April - 14 April 1957]

Considerable speculation and comment took place over the week-end and continued for several more days as to the identity of the object picked up on the radar screens at West Freugh RAF Bombing Trials Range on Thursday.

RAF officers and officials of the Air Ministry at once took up the problem posed by the blob, which suddenly appeared on a radar screen and was checked by another radar station some twenty miles away. The blob was caught and held for some time. An immediate report was made to the Air Ministry, which was followed by a full written statement [. . . .]

All Radar Stations on Look-out

Meantime all the radar stations in the country were instructed to keep a look out for any strange objects. The watch was cancelled on Saturday, as obviously the same object would not then be withi seeing distance.

It was noon on Thursday that two of the civilian operators on duty at West Freugh picked up an unidentified object that remained on the screen for some time. The circumstamces surrounding the appearance of the object were reported to London and immediate action was taken by officials at the Air Ministry.

Shapeless On the Screen

Wing Commander W. P. Whitworth, Station Commander at West Freugh, said the radar was being used to pick up a plane due from the South of England when the strage object appeared and lasted on its "track for some considerable time." It was an object of some substance but was, of

course, shapeless on the screen. There was no question, he said, of the radar playing tricks for the object was checked by another screen some miles away.

Wing Commander Whitworth would not say at what speed or in which direction the object was travelling or at what height it was caught. It had been watchedm however, for some time.

An Air Ministry spokesman said that the mystery would be fully investgated before any official statement was made. The most likely explanation was that the object was a runaway balloon, a meteorite, or a high-flying bomber.

Up to the time of our going to Press the Air Ministry had not issued any statements.

No one in Wigtownshire saw the object with the naked eye abd apart from the blob on the radar screen, nothing was seen of it either over Luce Bay or over the Irish Channel.

Meantime high ranking officers at the Air Ministry were checking the information as it became available.

Possibilities

On Sunday there was a newspaper report that the mystery object had been identified as a weather balloon sent up from Aldergrove, Northern Ireland. This however was denied.

According to unofficial sources the blob was "caught" at 60,000 feet and among the points to be checked and counter-checked along with the radar screen results, were the flying saucer story from Glasgow, the photograph taken in Jersey and the weather balloon from Aldergrove.

The object might, of course, have been a Russian reconnaissance aircraft out of the usual run over the Arctic. [. . . .]

'Another Great "What is it?"'

[Newspaper and date unknown]

Many years ago a freak known as the "Great What Is It"? was a fairground attraction, and the public were asked to decide for themselves whtehre the "anomal" was a man or a monkey. Many came to the conclusion that it was a fraud. Nowadays there is another "Great What Is It"?, but it is not shown in a booth. Sometimes (and most often) it is seen in America, sometimes in England and sometimes in Galloway. If people in earlier times had scope for wonderment, they had always something tangible to look at, but in these modern times the "Great What Is It"? is less accommodating. Very few people see it at the same time and usually it appears only for a brief period. No wonder the bulk of the population shrug their shoulders disbelievingly.

But what of the "blob" that was seen on the radar screen the other day at West Freugh and checked by another station? Radar cannot register a mirage or a queer shaped cloud. The Freugh report set newspapermen agog all over the country - and possibly beyond - and also aroused a great deal of speculation among flying men and those people who are always looking for something sensational. By those who believe in "flying saucers" or Martian visitors the unidentified object was regarded as further proof that their theories are correct. By the disbeliever "it" was dismissed as just another fantasy. Those in the medium band thought it might be an aeroplane off course or one of these rocket that sometimes do not behave as they are meant to. It might even be something from Russia.

The Air Ministry, we are told, will make an announcement in due course. In the meantime one can only say that "it" has fully qualified for the label of another "Great What Is It"?
