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“Charting the aeronautical landscape”

Ronald Blake

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The Charles Close Society was founded in 1980 to bring together all those with an interest in the maps and history of the Ordnance Survey of Great Britain and its counterparts in the island of Ireland. The Society takes its name from Colonel Sir Charles Arden-Close, OS Director General from 1911 to 1922, and initiator of many of the maps now sought after by collectors.

The Society publishes a wide range of books and booklets on historic OS map series and its journal, *Sheetlines*, is recognised internationally for its specialist articles on Ordnance Survey-related topics.

Charting the aeronautical landscape

Part 1: depiction of airfields on Ordnance Survey one-inch maps from the birth of practical aviation to the aftermath of World War 2

Ronald Blake



This essay marks the approximate centenary of the first reference to aviation on an OS ‘popular-scale’ map.¹ Remarkably, while synoptic air navigation charts have inspired several scholarly reviews, the aeronautical content of general-purpose topographical maps remains largely unexplored.² Efforts to narrow this gap began in 1996 with contributions to *Sheetlines* by John Nicholls and Richard Oliver, the essence of which persuaded this writer to promote greater awareness of airfields at two subsequent gatherings of the Charles Close Society.³ Confirmation that the subject was ripe for systematic research was provided by sundry observations on aviation-related landscape change

in the various CCS cartobibliographies on classic OS series.⁴

The aim here is to present an historically and geographically balanced account of airfield depiction practice on Britain’s most widely consulted map, up to the demise of the New Popular Edition, which proved a major threshold in the product’s stylistic evolution. For space reasons, the investigation focuses wholly on the regular coloured format of each series, purposely evading questions of revision policy beyond passing citations of existing CCS studies.⁵ A total of 1,375 officially listed sites are examined to ascertain the full range of written descriptions, footprint traces and collateral alterations to the landscape such as woodland clearance and highway closures.

To quantify patterns and trends, nationwide ‘trawls’ of seven different series were conducted and the yields evaluated against the scope of leading

¹ The study also accords with current commemorations of the outbreak of the First World War (WW1) in 1914.

² Tim Nicholson, ‘An introduction to the Ordnance Survey aviation maps of Britain 1925-39’, *Sheetlines* 23 (1988), 5-18, and CR Perkins and RB Parry, *Mapping the UK: maps and spatial data for the 21st Century*, London: Bowker-Saur, 1996, 212-28.

³ John Nicholls, ‘Depiction of airfields on New Popular and Seventh Series one-inch maps’, *Sheetlines* 46 (1996), 22-6, and comment thereon by Richard Oliver, *Sheetlines* 47 (1996), 47-9, and Ronald Blake, *Sheetlines* 52 (1998), 3-4 and 59 (2000) 2-5.

⁴ Most notably: Yolande Hodson, *Popular Maps: the Ordnance Survey Popular Edition one-inch map of England and Wales 1919-1926*, London: Charles Close Society, 1999; Richard Oliver, *A guide to the Ordnance Survey one-inch New Popular Edition*, London: Charles Close Society, 2000; Roger Hellyer, *A Guide to the Ordnance Survey 1:25,000 First Series*, London: Charles Close Society, 2003.

⁵ Excluded are district, tourist, relief, outline, index and military (except ‘war revision’) variants.

air-historical sources.⁶ In the ensuing discussion the terms ‘popular’ (small ‘p’) and ‘the (OS) map’ automatically imply one-inch (1:63,360) scale, ‘series’ (in anticipation of OS usage) is preferred to ‘edition’, and ‘airfield’ loosely denotes flying venues in general.⁷ For consistency, all *verbatim* examples are in *italic*, followed by the sheet number, grid reference of site, and year of printing.⁸

The Third and ‘Fourth (abandoned)’ Editions

Britain’s first sustained powered aeroplane flight took place in 1908 on Army heathland at Farnborough in Hampshire, and the following year the first purpose-built aerodrome was opened at Leysdown on the Isle of Sheppey in Kent.⁹ By 1914 a dozen or so military flight stations were active, clustered on Salisbury Plain and flanking the Solent and Thames estuaries.¹⁰ The busiest civil flying venues in this ‘pioneer’ period were Brooklands and Hendon on London’s southern and northern rims respectively, while in the provinces public air events were typically staged at race courses such as Lanark, Doncaster and Wolverhampton. A good deal of experimental flying was conducted beyond the public gaze on coastal sands such as Camber in Sussex and Filey in Yorkshire.

In principle, any one-inch Third Edition sheet could have indicated aviation as a ‘minor correction’, but no such amendment was made, doubtless due to flying still being controversial and of negligible landscape impact. Sheet 115 (1911), for example, showed nothing at Brooklands (F8), despite the presence of motor sports and aeroplane experiments.¹¹ Beset by weightier

⁶ For national (UK) completeness the review includes Northern Ireland and the Isle of Man, but excludes Eire before independence and the Channel Islands (which lie outside the British archipelago). Concise historical profiles of individual military airfields are available in two definitive regional series: Ken Delve, *The military airfields of Britain*, 7 vols, Marlborough: Crowood Press, 2005-10 and various authors, *Action Stations revisited*, 7 vols, Manchester: Crécy Publishing, 2000-09. *Airfield Review* (Journal of the Airfield Research Group, 1979-date) fills in much of the detail on civil airfields: see www.airfieldresearchgroup.org.uk

⁷ ‘Airfield’ is a loan-word of American WW2 provenance that has since become the UK preferred collective umbrella for flying establishments of all kinds (aerodromes, landing grounds, seaplane stations, airship bases, gliding sites, heliports). ‘Aerodrome’ (which dominated the inter-war period) now tends to evoke airfields frequented by powered, fixed-wing land-planes and equipped with hangars, a control tower, terminal buildings, etc.

⁸ Place-names bracketed in front of an italic generic label are provided to help readers trace sites via the recommended air-historical sources.

⁹ Claims on behalf of rival locations are well documented, but these can be discounted as involving only ‘hops’ and lacking infrastructure.

¹⁰ In 1912 the Royal Flying Corps (RFC) was created, comprising a Military Wing at Larkhill (Wiltshire) and a Naval Wing at Eastchurch (Sheppey). In 1914 the latter was elevated to an independent Royal Naval Air Service (RNAS), but in 1918 the twin co-equal arms were amalgamated to form the Royal Air Force (RAF).

¹¹ Locations are given here by alphanumeric references (eg F8), the TM yard grid (eg 1,150,000-1,285,000) or the National Grid (six figures), as appropriate for the sheet being discussed.

concerns such as relief depiction, large-scale mapping and competition from commercial rivals, the OS clearly regarded aviation as a low priority. Notwithstanding, a sizeable portion of southern England was revised in 1913-14 with a fresh series in mind, but with Europe on the brink of war the results were shelved for five years.¹²

Thus, for almost two decades into the twentieth century, British aviation had no popular cartographic face – with one modest exception. Prior to the revision initiative of 1913, seven sheets of an aborted ‘Fourth Edition’ were published for east Kent, one of which, 273 (1911), showed *Aeroplane Works & Garage* at Shell Beach near Leysdown (*figure 1A*). Though the flying field itself was not precisely delineated, the buildings plotted were indeed part of the aforementioned pioneer aerodrome and are fittingly acknowledged in the CCS volume on one-inch engraved maps.¹³

The Popular Edition

World War 1 (1914-18) saw more than 500 airfields created on home soil, two-thirds of which were humble landing grounds, seaplane slipways and airship moorings with no popular cartographic legacy. Even the anti-Zeppelin and coastal reconnaissance aerodromes had quite rudimentary buildings and tents, leaving just a few dozen aircraft factories, flying training depots and airship sheds as landmarks likely to figure on a one-inch map.¹⁴

The Popular Edition began with an uneven portrait of this core inheritance. In central-southern England the earliest printings were based on 1913-14 revision material, so only airfields of pre-war origin initially appeared. Typically, sheet 112 (1919) showed (Upavon) *Central Flying School* (*figure 1B*) with buildings (but as yet no boundary). Stronger proof of discriminatory mapping at local level was sheet 122 (1919) which marked *Aeroplane Sheds* at Larkhill (7C) and Netheravon (7A) while omitting any trace of newer aerodromes at Andover, Old Sarum and Boscombe Down. Similarly, sheet 114 (1920) showed *Brooklands Motor & Flying Gd.* (*figure 1C*) and (Farnborough) *Ryl Aircraft Estabt* and *Flying Track* (*figure 1D*) while effectively disguising Feltham air-training base (10C) in pre-war landscape ornament.¹⁵

¹² Hodson, *Popular Maps*, *passim*.

¹³ Roger Hellyer and Richard Oliver, *One-inch engraved maps of the Ordnance Survey from 1847*, London: Charles Close Society, 2009, 82.

¹⁴ For dimensional data, see Ian M Philpott, *The Royal Air Force: an encyclopedia of the inter-war years 1918-1929*, Barnsley: Pen & Sword, 2005.

¹⁵ Farnborough’s peculiar internal geography (noted by Aidan de la Mare, *Sheetlines* 97 (2013), 34-5) echoes the early use of racecourses for evaluating pilots and planes. Stations like Andover and Feltham were initially excluded by the OS simply because their construction post-dated the last corrections of the OS sheets on which they happened to fall.

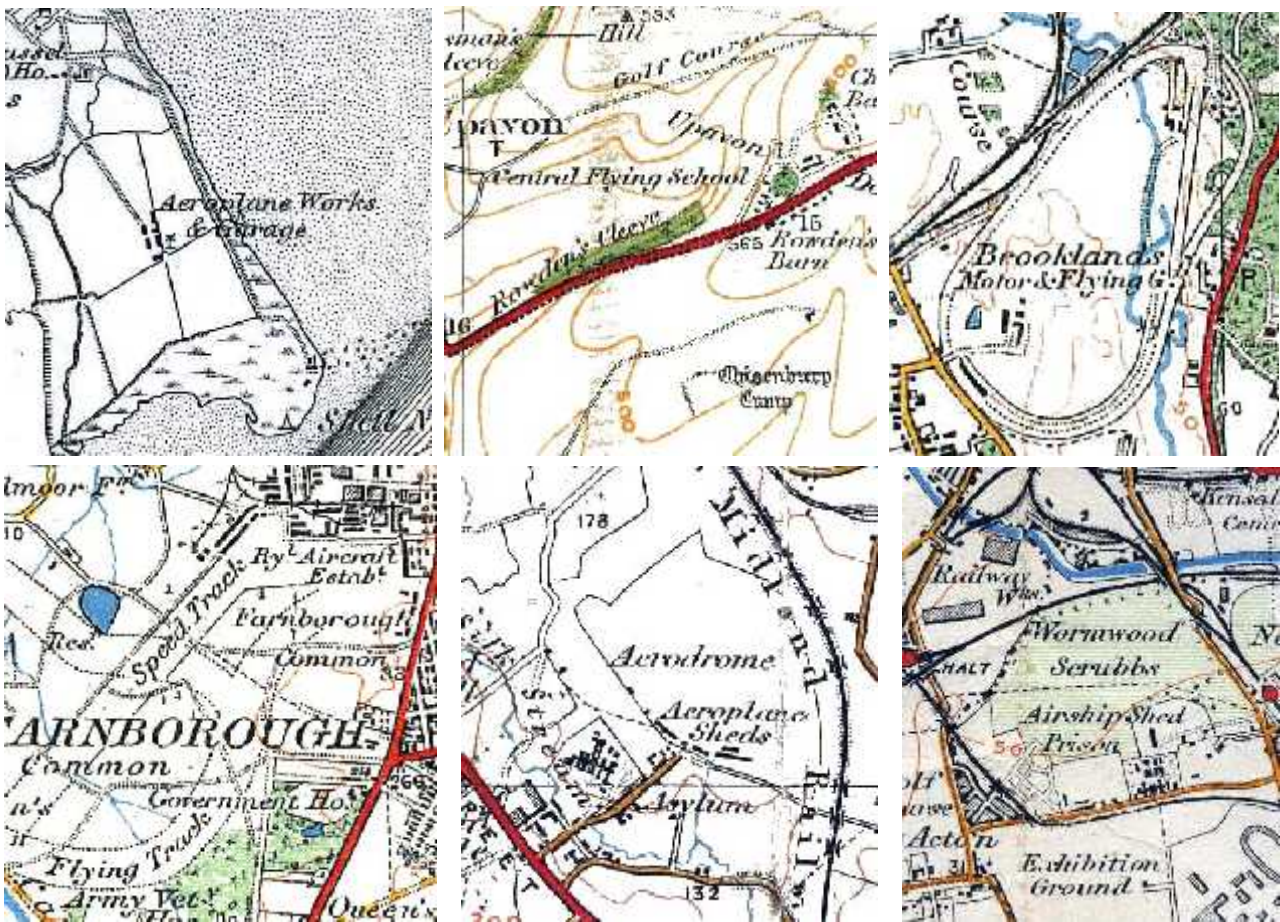


Figure 1: 'Pioneer' airfields on Fourth (A) and Popular Edition (B-F) maps
 1A top left: Shell Beach, Kent: sheet 272 (51°23'N, 0°56'E) (1911)
 1B top centre: Upavon, Wiltshire: sheet 112 (square 7J) (1919)
 1C top right: Brooklands, Surrey: sheet 114 (square 8F) (1920)
 1D lower left: Farnborough, Hampshire: sheet 114 (square 2J) (1920)
 1E lower centre: Hendon, Middlesex: sheet 106 (square 13F) (1920)
 1F lower right: Wormwood Scrubbs, London: sheet 106 (square 13J) (1920)

At this juncture it is tempting to invoke Air Ministry uncertainty on which 'Aerodromes' were to be permanent, given the term's sparse deployment on the earliest batch of sheets issued.¹⁶ There was, however, one prominent exception, namely sheet 106 (1920) on which the pre-war flying mecca at Hendon was doubly labelled *Aerodrome* and *Aeroplane Sheds* (figure 1E), thus demonstrating how cartographic inertia could out-manoeuvre security rules.¹⁷

Across the Thames estuary and south-east peninsula an extended survey period (1914-19) encouraged further nuances, including an apparent Admiralty penchant for *sui generis* descriptions. As examples, sheet 134 (1920) showed (Eastbourne) *Naval Air Sta* (12G) while sheet 116 (1921) identified (Grain) *Marine Aircraft Experimental Sta* (figure 2A) and (Leysdown) *Aerodrome*

¹⁶ Hodson, *Popular Maps*, 152.

¹⁷ One wonders whether the curators of today's RAF Museum are aware of this esoteric link with OS maps.

(*Seaplane*) (12D).¹⁸ Confirmation that sheet 116 was revised during or after the war was a group of (unlabelled) roadside sheds at Detling (G4), a fighter aerodrome opened in 1916. Intriguingly, though, the busy naval air training hub at Eastchurch (116, 10C-D) was initially marked only by a wordless sprawling camp, suggesting either censorship or dormancy. As for (Goldhanger) *Flying Grounds* (*figure 2B*), both the terminology and the activity were anachronistic.

North of the Thames basin most Popular first printings were based on topographic survey completed during or shortly after the war. These ‘northern’ sheets were also typically published a couple of years later than their southern counterparts, allowing a simpler vocabulary to emerge. The largest airfield cluster fell in Lincolnshire on sheet 47 (1923), comprising (Digby) *Aerodrome* (7J) and three unlabelled ex-training camps at Scampton (5B), Waddington (5F) and South Carlton (*figure 2D*). However, the wider picture in this Jurassic sub-region was not perfectly uniform: sheet 64 (1922) included (Wittering) *Flying Ground* (7G), whose variant description was perhaps influenced by the wartime base’s provisional peacetime role as an out-station of CFS Upavon.

Despite a tightening of national security in 1924 (which saw various arsenals, fortresses and dockyards erased), the OS successfully resisted Service wishes to have aerodromes denied, cleverly invoking the potential for civil aviation as an argument for on-going depiction.¹⁹ Indeed, in a spectacular hyper-correction *Eastchurch Aerodrome* (on the 1925 reprint of sheet 116) became the first permanent military air-base to bear a locality name at one-inch scale.²⁰ Elsewhere in southern England the concise generic label gained currency on second and subsequent printings, eg at Worthy Down which, having at first appeared anachronistically as ‘Old Race Course’ (1919), was remapped as *Aerodrome* (1929) with its special GWR halt also indicated (*figure 2E*).

One sector, however, remained stubbornly inconsistent, namely ‘lighter-than-air’. The oldest such site was (Wormwood Scrubs) *Airship Shed*, dating from the onset of war (*figure 1F*). Next came (Polegate) *RN Airship Sta* (134 (1920), 11F) and *Kingsnorth RN Aviation Depot & Wireless Tel Sta (Admiralty)* (116 (1921), 4-5C), both already defunct when their host OS sheets went on sale.²¹ At Pulham in south Norfolk (77 (1921), 3D) giant sheds fed by a rail spur were repeatedly mapped as *Wireless Tel Sta (Air Ministry)*, suggesting a non-flying peacetime role. Cranwell North (55 (1922), 6B) initially appeared as an unlabelled footprint, then on the 1938 reprint all infrastructure was erased in a botched attempt to deflect attention from the adjoining RAF College at

¹⁸ This ambiguously described site lay about a mile north of the pioneer aerodrome and comprised both a grass landing ground and marine aircraft slipway.

¹⁹ Hodson, *Popular Maps*, 162-3.

²⁰ Toponymic labelling at this stage was confined to four stations (of Admiralty origin) in the Medway area and also proved short-lived.

²¹ The old axiom that ‘the map gets out of date as soon as the surveyor leaves the ground’ is nowhere more apposite than with respect to airfields.

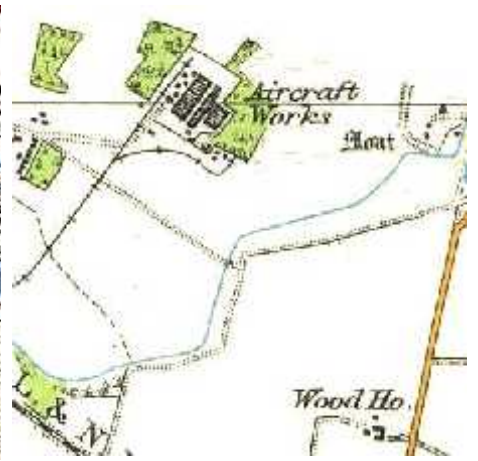


Figure 2: World War 1 and interwar airfields on Popular Edition Maps

2A top left: Grain, Kent: sheet 116 (square 7B) (1921)

2B top centre: Goldhanger, Essex: sheet 108 (square 7A) (1921)

2C top right: Barlow, Yorkshire: sheet 32 (squares 9C-D) (1924)

2D middle row left: South Carlton, Lincolnshire: sheet 47 (squares 4-5C) (1923)

2E middle row centre: Worthy Down, Hampshire: sheet 123 (square 3F) (1929)

2F middle row right: Westwood, Peterborough: sheet 64 (square 11H) (1937)

2G lower left: Fen Ditton, Cambridgeshire: sheet 85 (square 7C) (1932)

Cranwell South (which curiously clung onto its ‘Aerodrome’ label).²² In contrast, Cardington’s legendary airship factory (84, 8G-9G) was left totally blank on the two earliest (1919 and 1924) printings, but eventually marked as *Airship Station* (1936), albeit lacking any footprint details.²³ Finally, two airship development bases south of York were treated quite differently from each other: whereas (Barlow) *Aircraft Works* (*figure 2C*) was described thus over a full footprint on all printings up to and including 1938, Howden was never openly indicated at one-inch scale.²⁴

Remnants of certain defunct airfields could also be discerned from non-aeronautical terminology and footprint evidence. These ranged from (Pembroke) *Admiralty Wireless Station* (99 (1922), 9F) to a row of seaplane slipways and sheds at Killingholme on Humberside (33 (1924), 10G), an (ex-RNAS) camp at Narborough in west Norfolk (66 (1921), 2E), and the buildings and boundary of Rochford ex-RFC fighter base (108 (1922-32), 6G) which later became Southend municipal airport.

By 1930 most entries in *UK Air Pilot* also appeared on the OS one-inch map, suggesting some formal arrangement between government departments.²⁵ State-of-the-art RAF stations included Abingdon bomber base (105 (1934), 3D) and Peterborough flying training airfield (*figure 2F*), each concisely marked *Aerodrome* within clear boundaries. However, in 1935 this routine data transfer was abruptly cancelled when the RAF embarked upon a multi-phased ‘Expansion Scheme’ in response to the rise of Nazi Germany.²⁶ While all existing military airfields continued to appear on Popular reprints up to 1938 or early 1939, none of the now-legendary ‘campus-type’ Expansion stations was ever mapped by the OS in its youthful configuration.²⁷

Civil aerodromes of the 1920s were overwhelmingly conversions of WW1 stations, a poignant example being Didsbury, which appeared fleetingly on the 1924 printing of sheet 36 (10G), just ahead of suburban Manchester’s

²² Christopher Board, ‘Falsification and security’ in Peter Barber and Christopher Board, *Tales from the Map Room*, London: BBC Books, 1993, 106-7.

²³ Cardington was not mapped initially because sheet 84 was compiled before the base opened in 1916. Eventual depiction (in somewhat rough lettering) came well after the notorious R.101 disaster in 1930 and a switch to barrage balloon development.

²⁴ Howden’s footprint was, however, shown on the contemporary quarter-inch map (Third Edition sheet 3, 1921). On the one-inch Popular map (sheet 32, 12C) the only hint was a change in road classification by the entrance to the site.

²⁵ *UK Air Pilot* (from 1924) was the Air Ministry’s loose-leaf manual of flight regulations and site plans of currently active military and civil airfields. OS curtilages usually accord with the inset diagram accompanying each plan.

²⁶ Air Historical Branch, *The Royal Air Force builds for war: a history of design and construction in the RAF 1935-1945*, London: The Stationery Office, 1997.

²⁷ The last pre-Expansion station to be opened, in 1934 (and the first to be withheld from the OS map), was Mildenhall, Suffolk. Continued depiction of pre-1934 air bases was presumably because erasure costs were judged to outweigh the likely security benefits of excision. Ironically, aviation magazines and directories were at liberty to mention new RAF stations till at least 1938. For layout detail see Paul Francis, *British military airfield architecture*, Yeovil: Patrick Stephens, 1996.

southward advance. More durable switches included Castle Bromwich (72, 6B) and Filton (111, 3A) whose viabilities were underpinned by resident aerospace companies and RAF volunteer squadrons. By chance, the civil renaissance of Norwich (Mousehold) *Aerodrome* (67, 4E) has been captured in a neat time-series montage by Yolande Hodson, illustrating the Popular map's value as a source on changing urban morphology.²⁸

Among the few *ab initio* civil aerodromes before 1930 were Woodford (44, 12A), where Manchester plane-maker Avro opened a factory in 1925, and Cambridge Fen Ditton (85, 7C) which enjoyed a short life as a recreational flying venue before urban encroachment (*figure 2G*). The main wave of civil depictions occurred after 1930, driven by fashionable aero clubs, Sir Alan Cobham's 'flying circuses' and 'air-mindedness' campaign, municipal ambitions to have air transport links, and government funding to relieve unemployment through public infrastructure works.²⁹ Among municipal aerodromes created on virgin sites were Grimsby (40 (1935), 5D) and Nottingham (54 (1933), 7F).

In all, the Popular map depicted about 150 airfields, four-fifths in words and the rest as footprint traces only. As many as 100 were at some point mapped 'Aerodrome', several having switched from *sui generis* descriptions at their first showing. Labelling in the 1920s was typically cramped and in many cases remained so, despite subsequent revision windows for stylistic upgrading. Sheet 87 (1938) still showed (Martlesham Heath) *Aerodrome* (4G) in barely legible lettering while awarding a larger and more elegant font to the younger and less land-hungry Ipswich airport (2-3H). In the case of (RAF) Manston in Kent (117, 7C), the generic placement was shifted (1926-38) one kilometre southward to fit site enlargement. A comparison of Croydon on the 1926 and 1934 printings of sheet 115 (2F) demonstrates how legibility could be improved over time.

The Fifth Edition

On sale from 1931, this re-designed series was distinguished by a new (Transverse Mercator) projection and (5000-yard) grid, a mixture of small-format and awkwardly overlapping large-format sheets, enhancements to road, rail and land-cover classification, and a generally sharper look. Air-historically, its chief shortcomings were a failure to progress much north of Oxford, a disappointing void in Kent and East Sussex, some confusing temporal overlap with Popular sheets, and a rather long-winded site-referencing system.³⁰

In the civil sector fresh *Aerodrome* depictions included Elstree (106 (1939), 1,126,500-1,321,500), St Just (146 (1939), 713,000-1,141,000) and White Waltham (*figure 3A*), each a welcome land-use up-date. Sheet 141 (1937) was

²⁸ Hodson, *Popular maps*, plate 9b-d. See also Chris Higley, *Old Series to Explorer: a field guide to the Ordnance map*, London: Charles Close Society, 2011, 40-1, where Norwich aerodrome is graphically used to demonstrate the map's alphanumeric grid-referencing system.

²⁹ Sir Alan Cobham, *A Time to Fly*, London: Shephard-Walwyn, 1978.

³⁰ Richard Oliver, *A guide to the Ordnance Survey one-inch Fifth Edition*, London: Charles Close Society, 2000.

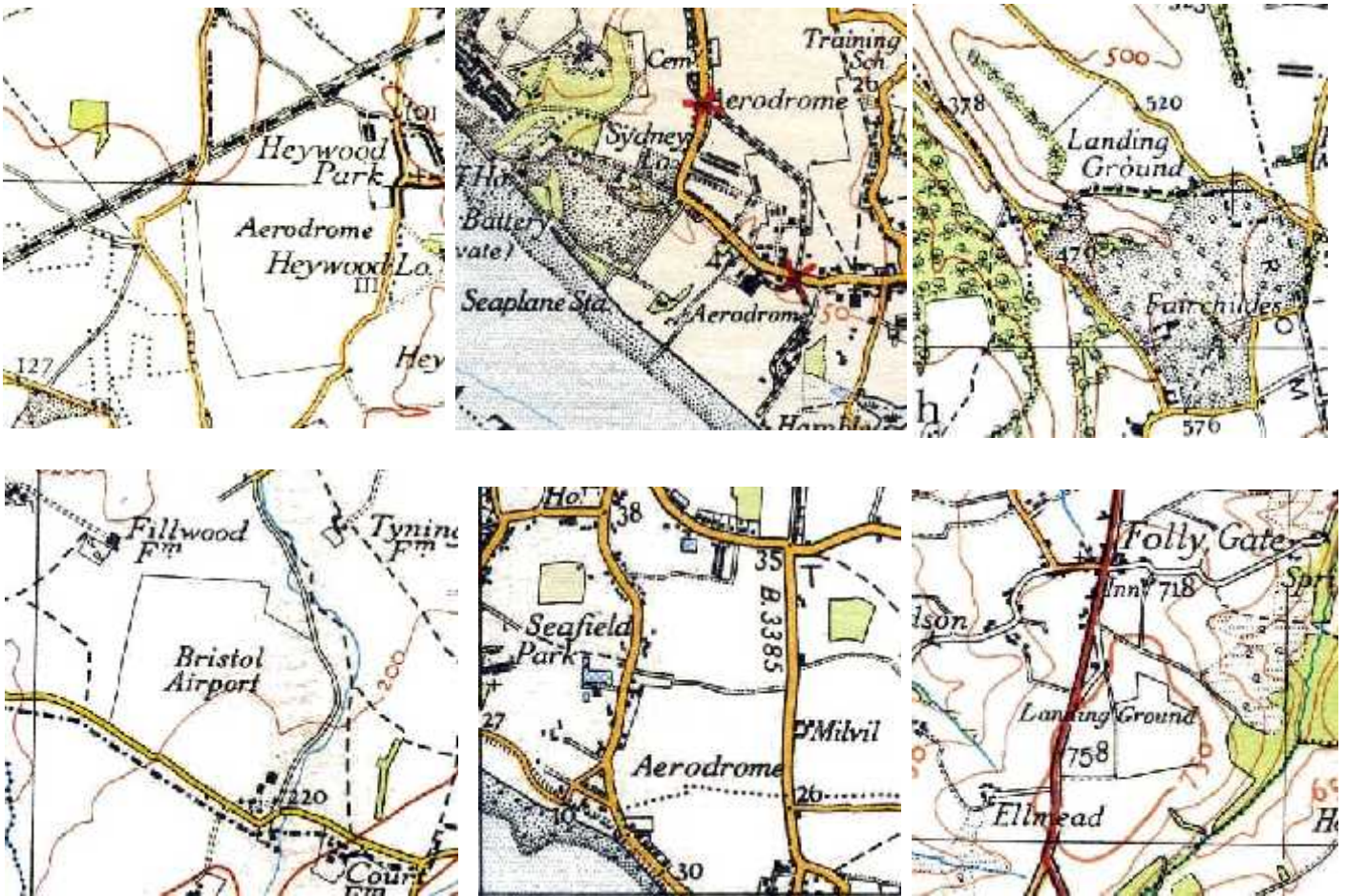


Figure 3: Airfields on Fifth Edition maps

3A top left: White Waltham, Berkshire: sheet 113 (1,093,000-1,304,500) (1939)

3B top centre: Hamble, Hampshire: sheet 141 (1,050,500-1,226,500) (1937)

3C top right: Addington, Surrey: sheet 115 (1,152,000-1,286,000) (1934)

3D lower left: Whitchurch, Bristol: sheet 111 (996,000-1,293,000) (1937)

3E lower centre: Lee-on-Solent, Hampshire: sheet 141 (1,061,000-1,220,500) (1937)

3F lower right: Okehampton, Devon: sheet 137 (844,000-1,215,500) (1936)

notable for its trio at Hamble, comprising a *Seaplane Sta* and two contiguous private aerodromes (figure 3B). On sheets 115 (1934) and 125 (1936) respectively the obsolete wartime term *Landing Ground* was unexpectedly revived at Addington (figure 3C) and Penshurst (1,167,000-1,270,000), these being touch-down fields on the Croydon-Paris air route. Of longer-lasting significance, the novel descriptions *London Air Port (Croydon)* (115 (1934-38), 1,143,000-1,288,000) and *Bristol Airport* (figure 3D) signalled a new OS commitment to showcase emergent air transport hubs. As war approached, a number of civil deletions inevitably occurred, not least on the exposed Isle of Wight and in south Essex. Typically, Stapleford Tawney (107, 1,163,000-1,325,000), a private aerodrome first shown in 1935, was omitted from the 1938 printing, perhaps at the behest of Fighter Command.

In the military aviation sector the Fifth Edition bore relatively few fresh depictions, because the Expansion mainly took place beyond its geographical reach.³¹ The youngest base marked was Lee-on-Solent *Aerodrome* (figure 3E), opened in 1934 next to a WW1 seaplane base and thereby just pre-dating automatic censorship. Elsewhere, new military depictions were confined to a handful of Army Co-operation summer practice camps, eg (Okehampton) *Landing Ground* (figure 3F). Up to and including 1937 this territorially and security constricted picture held steady, but on all final (1938 and 1939) printings new ‘holes’ duly appeared, a prime censorship target being RAF Tangmere on Sussex coastal sheet 142 (1,099,500-1,225,000).

By 1939 the Fifth Edition had added a modest twenty airfields to the Popular’s accumulation. Conflating the yields of the two series, some 140 explicitly labelled sites testified to aviation’s inter-war development.³² Due to the wholesale censorship of Expansion bases, and a tardy mapping of new airports, the one-inch sheets in public circulation during the final year of peace contained little over half the infrastructure easily seen in the field.³³



Figure 4: Airfields on War and Second War Revision (GSGS 3907) maps

4A left: Barnstaple, Devon: sheet 118 (945565) (1941)

4B centre: Abingdon, Berkshire: sheet 105 (910195) (1941)

4C right: Weston Zoyland, Somerset: sheet 120 (803557) (1941)

³¹ The only sub-region where Expansion hangars and camp buildings might have shown up on OS sheets (assuming no censorship) was the Cotswolds.

³² Dozens of minor civil airfields listed in commercial publications such as *Janes's All the World's aircraft* (occasional) and *Automobile Association Register of Landing Grounds* (1929-38) were eschewed by the OS. As for the ‘big three’ absentees (Luton, Manchester Ringway and Birmingham Elmdon), their respective openings came too late for popular mapping.

³³ No government statistic for the stock of defence-capable airfields in 1939 has yet been found. This writer’s doctoral research (RNE Blake, ‘The development of military and civil airfields in the United Kingdom since 1909, with special reference to land use’, University of London PhD thesis, 1989) gleaned 250 from various military and civil listings, of which 130 were indicated on various OS one-inch sheets circulating on the eve of war.

War Revision and Second War Revision (GSGS 3907, 3908)

Despite (or more likely because of) their titles, these maps were essentially stripped of airfields. Though intended originally for military purposes, their public availability from 1943 has given them a high continuity value in the evolution of modern British topographical mapping.³⁴ As a consequence of being derived from ‘recycled’ Popular and Fifth revision material, a seemingly random handful of airfields were accidentally shown. *Figure 4* exhibits three of these, each captioned by its inherited Popular sheet number and a War Office Cassini grid reference (which bore no direct relation to the post-war National Grid). Sheet 87 *Isle of Man* (standing in for a New Popular sheet that was never issued) usefully marked (Ronaldsway) *Aerodrome* until the Seventh Series eventually came on stream.

The New Popular (or Sixth) Edition

Compiled under conditions of heightened security and austerity, the New Popular was inherently weak in aviation content. Poignantly, its production was seriously impeded by the loss of recent revision and drawing material caused by Luftwaffe attacks on Southampton in 1940. During its sixteen-year span (1945-1961) barely 90 airfields (one in ten) were indicated either explicitly or suggestively. To its credit, the series introduced a truly national grid at 1-kilometre intervals, enabling any site henceforth to be concisely and uniquely expressed to an accuracy of 100 metres and readily compared across a succession of printings both within and beyond the series.

During WW2 (1939-45) the UK’s cumulative tally of ‘airfields on charge’ reached an all-time peak, exceeding 850, arguably Britain’s greatest construction achievement in any five-year period thus far.³⁵ Sadly, due to blanket censorship, regional disparities in the topographic base, and advancing plans for a radical replacement, the New Popular was decidedly makeshift in composition and style, and failed to provide a convincing bird’s-eye view of town and country in any specific year.³⁶ By focusing its ‘selective revision’ on south-east England, the map gave an unfair depictive advantage to civil airfields around the capital while grossly under-recording the scores of elaborately engineered wartime air-bases peppered across the nation’s central-eastern lowlands and coastal pockets further north and west.

The earliest New Popular sheets printed (1945) were overwhelmingly silent on aviation, and even the single prolific exception (sheet 170) was flawed in

³⁴ Roger Hellyer and Richard Oliver, *Military maps: the one-inch series of Great Britain and Ireland*, London: Charles Close Society, 2004.

³⁵ The writer’s estimate of 850-plus is a conflation of several robust sources (there being no known consolidated statistic in print). Most existing air-historical estimates lie in the 600-700 range. The higher figure posited here includes numerous auxiliary landing grounds, but still omits temporary ‘cub strips’ and decoy sites that could push the final count towards 900. For a fully explained WW2 airfield typology see D J Smith, *Britain’s military airfields 1939-45*, Wellingborough: Patrick Stephens, 1989.

³⁶ Oliver, *Ordnance Survey one-inch New Popular Edition*, 17.

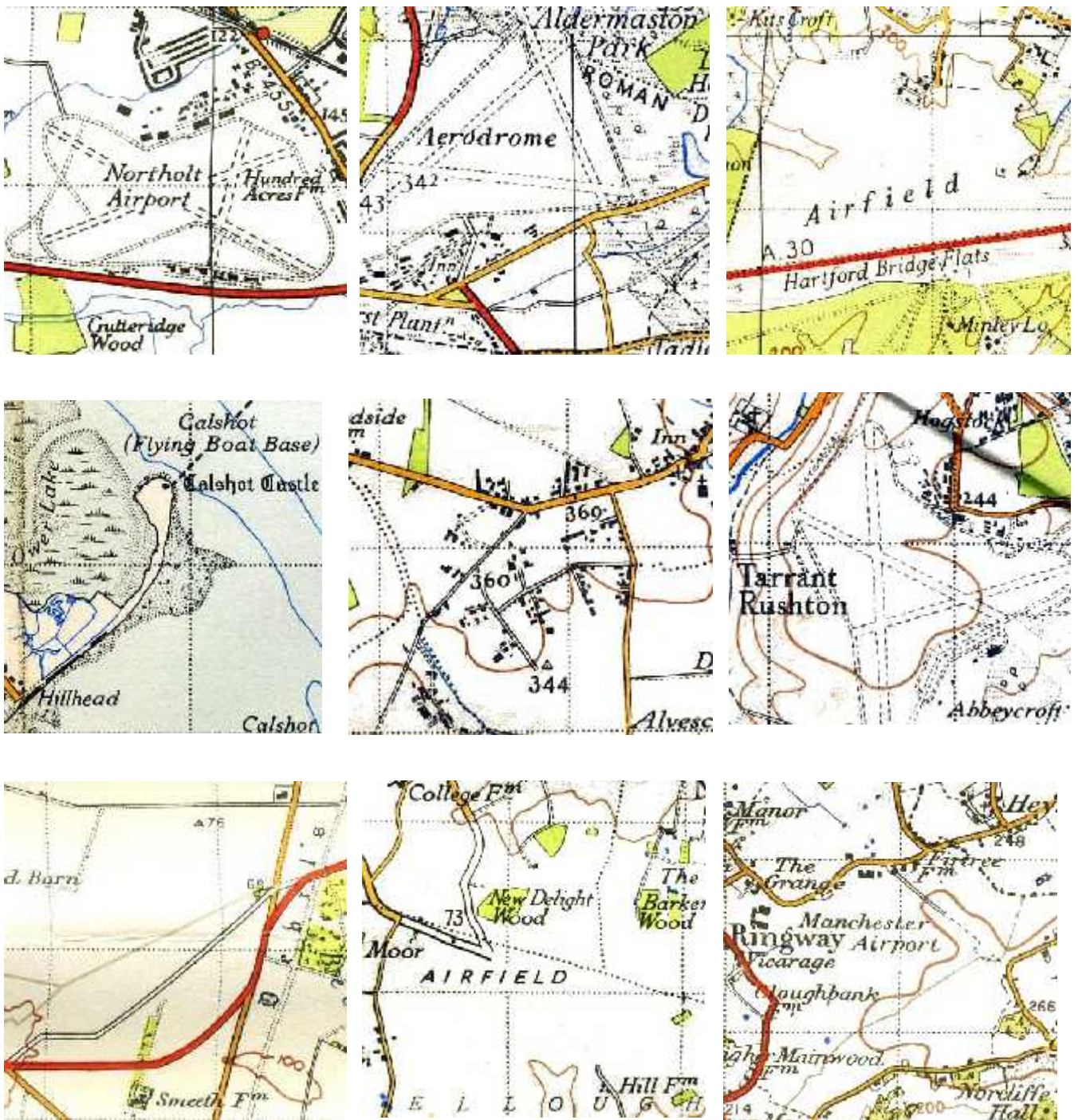


Figure 5: Airfields on New Popular Edition maps

5A top left: Northolt, Middlesex: sheet 160 (100850) (1949)

5B top centre: Aldermaston, Berkshire: sheet 168 (595635) (1949)

5C top right: Blackbushe, Hampshire: sheet 169 (810590) (1952)

5D middle row left: Calshot, Hampshire: sheet 180 (488025) (1952)

5E middle row centre: Broadwell, Oxfordshire: sheet 157 (250065) (1948)

5F middle row right: Tarrant Rushton, Dorset: sheet 179 (945055) (1948)

5G lower left: Marham, Norfolk: sheet 124 (725085) (1951)

5H lower centre: Beccles, Suffolk: sheet 137 (450880) (1953)

5J lower right: Ringway, Cheshire: sheet 101 (820845) (1951)

what it revealed.³⁷ To meet pent-up demand, sheet 170 (1945) was compiled in haste from uncensored Fifth material, thereby reproducing London's pre-war ring of airfields in blatantly obsolete footprints. Most anachronistic was Heathrow, still shown as a small, square, fenced and nameless *Aerodrome* (080755). Also marked in this purely generic fashion was (RAF) Kenley (330580), a presumed mistake that nonetheless qualifies as the first reappearance of an active air-base on a one-inch sheet after WW2.

Thanks to selective revision, in 1949 Heathrow was duly renamed *London Airport* over its now-iconic stellar footprint, while *Croydon Airport* (305635) and *Airport (Heston)* (115780) were rendered in words indicative of diminished status. Elsewhere on revised sheet 170 at least three further depictions deserve comment: (Wisley) *Aerodrome*, a Vickers test facility (075575), was unusually shown enclosed by an archaic Popular-style fence; Redhill's pre-war airport (300475) was suggested solely by its WW2 perimeter track; and Gatwick (285405), despite having shyly resurfaced on the 1945 printing, was blanked till the end of the series.³⁸ Appropriately, the Kenley *faux pas* was now rectified by a discreet excision.

Though chiefly intended to catch up with new roads and housing estates, selective revision captured key facets of early post-war aeronautics. Sheet 160, which initially (1945) denied the existence of all RAF stations, added *Northolt Airport* over runways to its 1949 revision (*figure 5A*), this adjustment reflecting the historic Battle of Britain station's transfer to Ministry of Civil Aviation control to assist Heathrow's transformation. After the RAF resumed regular flying at Northolt in 1954, the OS blanked the site on its final (F/ 1957) New Popular printing.

Sheet 168 (from 1949) repeatedly showed (Aldermaston) *Aerodrome* over runways, the pretext being the ex-RAF bomber station's early post-war role as BOAC's fleet servicing base (*figure 5B*). By contrast, sheet 169 (F, 1952 and F/, 1957) described (Blackbushe) *Airfield* over blank ground, this sparser image possibly constrained by a lingering US Navy presence (*figure 5C*). Meanwhile, the government's top experimental airfield at Farnborough (169, 860540) was totally denied on every New Popular printing, despite attracting huge crowds to its annual display of the latest military planes.

Coastal sheet 180 (H, 1952) was distinctive in showing *Calshot (Flying Boat Base)* (*figure 5D*), the only maritime patrol asset to figure on a one-inch map after WW2 (and, moreover, the only aeronautical usage of 'base' encountered in this research). Simultaneously, the re-depiction of (Lee-on-Solent) *Airfield* (560020) marked the first application of this quintessentially post-1945 term to

³⁷ Yolande Hodson (ed), *An inch to the mile: the Ordnance Survey one-inch map 1805-1974*, London: Charles Close Society, 1991. This celebratory booklet makes special mention of Middlesex's rich aeronautical landscape.

³⁸ Gatwick's omission may have been related to controversial plans to expand it as London's second international airport.

an exclusively military base.³⁹ Sheet 180 was further notable for inconsistencies on the civilian side: government-owned *Southampton (Eastleigh) Airport* (453170) was marked thus from 1952, yet Portsmouth civic airport (670035) and the Fairey company aerodrome at Hamble (North) (475075) were both blanked (apart from tell-tale buildings) for the rest of the series.

As noted elsewhere, sheet 181 (1948) showed the A2024 road uncoloured in two places due to aviation. At Tangmere (910060) the disruption was eventually explained by the label *Airfield* (D, 1952), but at Ford (990030) no such clarification was offered on any version of 181. However, on the overlap section of sheet 182 (E/, 1959) *Ford Airfield* was at last acknowledged, thanks to the availability of revision material for the impending Seventh Series. At this late stage, Ford proudly became the single Service aerodrome to be identified by its locality name in the New Popular series.⁴⁰

On the northern rim of the ‘roads-revised’ (south-east) region traces of WW2 aviation were sparser but intriguingly diverse. Airfield-rich Upper Thames sheet 157 (1947) showed hangars at Watchfield (253908) and a dispersed camp at Broadwell (*figure 5E*), hinting at transfers to civilian ministries responsible for bulk storage and emergency social housing. On the B// reprint (1952) both Watchfield and its neighbour South Marston (185880) were each labelled *Airfield* (albeit minus hangars), the latter occupied by a censored aircraft factory.⁴¹ In the centre of sheet 157 (1947), (RAF) Lyneham (010785) could be guessed at from a spacious censorship blank, refilled later (1952) by uncolored pre-war landscape detail minus the original yellow road infill.

A row of ‘not straightforward’ sheets extending to the Essex coast bore further cryptic traces of WW2 aviation. As well as road severances at Benson (158, 630915) and Kingston Bagpuize (158, 410970), scattered buildings were added at Bovington (159, 010040) in recognition of temporary civil flying (in support of Heathrow), while at Boreham (161, 740120) depiction of the RAF technical site reflected early land disposal for industrial purposes.

On the western margin of road revision, the former D-Day transport airfield at Tarrant Rushton in Dorset (*figure 5F*) appeared just once (1948) as a wordless three-runway layout plus dispersed hutted sites. Pondering this picturesque anomaly, John Nicholls noted that the site was then tenanted by Sir Alan Cobham’s ‘Flight Refuelling’ enterprise, to which Richard Oliver added that depiction may have occurred because the OS’s vetting officer was unclear as to the base’s security status. Despite bearing no descriptive label (and wiped from all subsequent New Popular printings), this premature image

³⁹ A settlement called *Milvil* appears on all printings up to 1953, but this enticing name has yet to be debated or explained by air historians.

⁴⁰ Richard Oliver’s contextualization of this phenomenon was a key stimulus to the nationwide investigation summarised here.

⁴¹ Defence aerospace factories constitute a possible third primary category of airfield, straddling the simplistic military/civil dichotomy.

affords the earliest glimpse at one-inch scale of a typical full-size WW2 paved aerodrome.⁴²

Beyond southern England most New Popular airfield traces were either ‘fossils’ of inter-war mapping or recent ‘tinkerings’ to incorporate wartime highway realignments. Cartographic inertia certainly explains the three *Aerodrome* placements on sheet 113 (1947), at Cranwell (015490), Spitalgate (940345) and Waddington (990630), whose archaic footprints were clumsy survivals from 1923 copperplates. In East Anglia several ‘aerodrome by-passes’ were indicated on reprints, most visibly at Marham (*figure 5G*), Sculthorpe (125 (1951), 860315) and Lakenheath (135 (1952), 740910). Additionally, at least half a dozen minor road severances were mapped, mainly on sheets 136 and 137 covering large expanses of Norfolk and Suffolk. At Beccles (*figure 5H*) a severed B-road was eye-catchingly overprinted *AIRFIELD* (1953), this all-capitals label being unique not only to the New Popular series but also to the entire aeronautical history of the regular one-inch map.⁴³

As regards provincial civil airfields, scarcely half a dozen were showcased on the New Popular series. Atypically, sheet 156 (1946) included (Filton) *Aerodrome* (600805), presumably an accidental ‘left over’ from Popular/Fifth mapping. *Luton Municipal Airport* (120205) made its *début* on sheet 160 (1949) but never appeared on overlapping sheet 147 (which was not corrected after 1947). Civic airports in Wales, the West Country, Midlands and Eastern Counties were excluded *en masse*, the chief absentee being Birmingham (Elmdon). In the Industrial North just three pre-war airports were added: Liverpool (Speke), Manchester (Ringway) and Leeds-Bradford (Yeadon): *Manchester Airport* (*figure 5J*) was given an improvised ‘farm-size’ label, perhaps to satisfy map-user complaints.

Overall, the New Popular marked just 85 airfields, 45 in explicit language (including 15 with locality names) and 40 by various degrees of cryptic landscape modification.⁴⁴ Significantly, by the time of the final printings the neologisms ‘Airport’ and ‘Airfield’ together came close to outnumbering ‘Aerodrome’. In covering England and Wales the New Popular naturally contributed the vast bulk (90%) of national airfield depictions in the ‘pre-Seventh’ decades, but the UK’s other geographical constituents were not barren and thus merit commensurate reviews for their aeronautical nuances and enigmas.

⁴² This writer suspects that the reviser may have seen Tarrant Rushton on a list of civil aerodromes (many of which had reserve defence roles).

⁴³ The only other use of all-capitals for aviation at one-inch scale are those on the London Passenger Transport Map series (1934) and at *GATWICK AIRPORT STA* on the final printings of sheet 170 (1957) and 182 (1959) which, though standard for railway stations, suggested civil flying nearby.

⁴⁴ ‘Cryptic modification’ in this study means those indirect effects such as the downgrading of roads and blanking out of normal landscape texture.

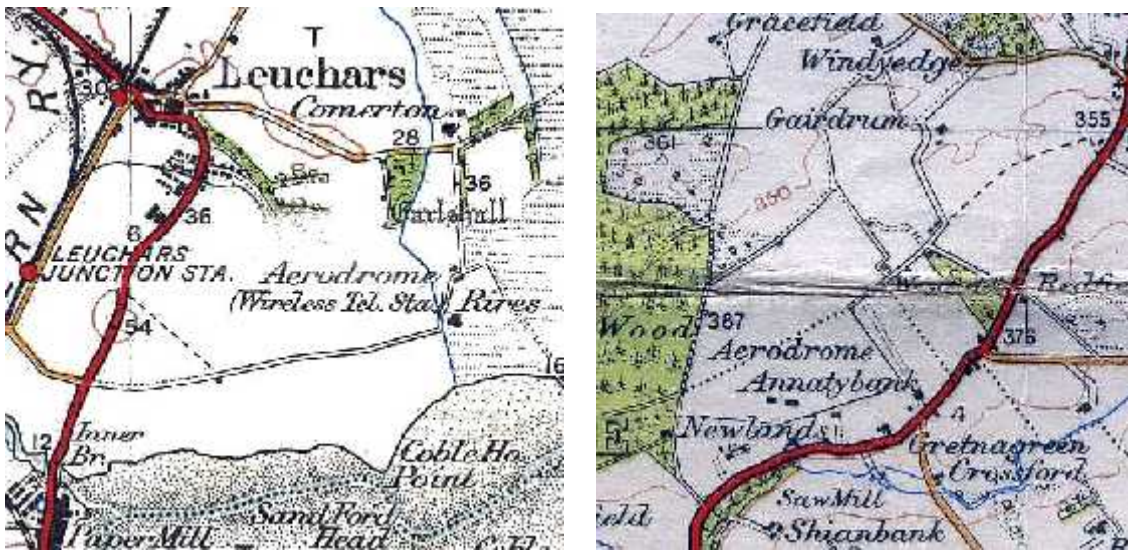


Figure 6: Airfields on Scotland Popular Edition maps

6A upper left: Leuchars, Fife: sheet 64 (square 12E) (1928)

6B upper right: Perth (Scone), Perthshire: sheet 64 (square 2C) (1938)

6C left: Sollas, Harris: sheet 22 (NF 815760) (1947)



Figure 7: Airfields on Northern Ireland Popular Edition maps

7A left: Aldergrove, County Antrim: sheet 7 (squares 2-3D) (1937)

7B centre: Newtonwards, County Down: sheet 7 (square 13F) (1937)

7C right: Sydenham, Belfast: sheet 7 (squares 9-10E) (1937)

The Scotland Popular Edition

The first sheets of the Scotland Popular Edition, with their potential to depict aviation ‘north of the Border’, were issued in 1924, and some were still current as late as 1961.⁴⁵ Just five survivors from WW1 were explicitly marked, namely Leuchars (64 (1928), 12E), Donibristle (68 (1928), 2F-3G) and Turnhouse (68 (1928), 2K-3K, also 74 (1934), 1D-2D) on the military side, and Renfrew (72 (1925), 11F) and Macmerry (74 (1934), 10D) which provided civil air links to the two premier cities. In addition, seaplane sheds at Dundee (64 (1926), 11B) and a rail spur at East Fortune ex-airship station (74 (1927), 14B) could be discerned with local or air-historical knowledge. In the strange case of Leuchars (*figure 6A*) the label *Aerodrome (Wireless Tel Sta)* appeared to have been ‘scraped’ of a prefix (possibly ‘RAF’), and on the 1938 reprint the wireless reference was also erased, leaving only the core generic description *Aerodrome* intact.⁴⁶

Ab initio civil airfields were similarly few and slow to appear, the two inter-war exceptions being Inverness (37, 13A) and Perth (*figure 6B*). Due to Scotland’s paucity of pioneer flying grounds and its generally lagging OS map publication, *sui generis* airfield descriptions were practically non-existent throughout, this being yet another symptom of the national south-north divide in aeronautical detail.

To integrate Scottish mapping with the New Popular, the national 1-kilometre grid was superimposed from 1945. Despite the elegant cartography, scarcely any ‘road and other revision’ was carried out; consequently evidence of Scotland’s considerable WW2 airfield expansion was limited to just two civil sites of contrasting size and importance.⁴⁷ On the 1951 reprint of sheet 78 (Prestwick) *Airport* (365265) was shown with buildings (but no runways), while on sheet 22 (1947) a squeezed and easily missed (Sollas) *Aerodrome* (*figure 6C*) seemed a curiously random choice among numerous deserving islands.

The Northern Ireland Popular Edition

Aviation developed slowly in Northern Ireland, as did the Ordnance Survey of Northern Ireland (OSNI)’s Popular map. The sole survivor from WW1 was (Aldergrove) *Aerodrome*, and only two others (both civil) figured on the province’s inter-war map (*figure 7*). After WW2 a revised sheet 7 (1953)

⁴⁵ Richard Oliver, *A guide to the Ordnance Survey one-inch Popular Edition of Scotland*, London: Charles Close Society, 2000.

⁴⁶ Christopher Board, ‘Things maps won’t show us: reflections on the impact of security issues on map design’, in K Rybaczuk and M Blakemore (eds), *Mapping the Nations: proceedings of the 15th International Cartographic Association Conference*, London: ICA, 1991, I, 136-48, esp. p 143. See also Hellyer and Oliver, *Military maps*, 103.

⁴⁷ During WW2 Scotland contained 120 active airfields, but barely a dozen (10%) were shown on any pre- or post-conflict one-inch sheet. National Library of Scotland website <http://maps.nls.uk/os/one-inch-popular> shows most of those cited here.

showed just one additional site, namely (Nutts Corner) *Airport* (190775).⁴⁸ Discounting its trademark hypsometric tinting, arguably OSNI's most distinctive characteristic was the anticipatory labelling of (Belfast Sydenham) as *Proposed Site of Aerodrome* in 1937 (*figure 7C*), this being the only reference to a future development seen during the present nationwide study. Finally, in 1953 sheet 7 renamed all three pre-war sites *Airfield* as if to harmonise with emerging OSGB practice.

Summary and conclusions

By 1950 roughly two-thirds of Britain's (2000-odd) 'ever-listed' airfields were already embedded in the landscape. Yet, of the 1,375 sites created during what may be dubbed aviation's 'piston' age, only 240 (17%) made any discernible mark on OS popular mapping, either in aeronautical language, by footprint traces or as a collateral topographic change. This low 'hit' rate can be largely explained by three underlying factors.

First, for much of the period Britain was either at war or on a war footing, so public mapping of defence-capable installations was perforce restricted. Secondly, faced with a fast-developing transport innovation, the OS map was unavoidably a lagging indicator even without censorship.⁴⁹ Thirdly, for a cocktail of cartographic, administrative and financial reasons, popular topographic coverage involved seven distinctively branded series whose patchwork of unsynchronised revisions was ill-equipped to track such a diffuse and capricious activity as aviation.

Regional disparities in the frequency and quality of airfield depiction were manifest in diverse ways, from the pioneer reliance on *sui generis* labels in southern England, via the mass suppression of large WW2 bases in the eastern counties, to the general omission of civil aerodromes in central and northern areas for several years after 1945. A northward fall-off both in basic coverage and ground detail had rather more to do with national mapping priorities than spatially variable defence imperatives.

While the role-neutral term 'Aerodrome' brought increasing consistency to the map during the 1920s, it also suppressed interesting locational contrasts between military and civil flying⁵⁰. This functional blurring was compounded by the (doubtless intentional) absence of any reference to the RAF (in contrast to several Royal Navy or Admiralty mentions in the early days). Moreover, the failure to deploy the status-qualifier 'disused' left silent footprints as the only

⁴⁸ Nutts Corner served as Belfast's main airport until Aldergrove and Sydenham were released from primarily military roles.

⁴⁹ Inevitably, several historically significant airfields were missed altogether, among them Dagenham (experiments, 1909), Stow Maries (a preserved 'RFC heritage' site), Newmarket Heath (defence-active in both wars and civil-licensed in peacetime), Hounslow Heath and Cricklewood (short-lived proto-airports for London *ca.*1920), and Langley, Bucks (Hawker's manufacturing aerodrome, 1940s).

⁵⁰ From 1919 to 1944 the Air Ministry had responsibility for both military and civil aviation, a fact that may explain the OS's ready acceptance of 'Aerodrome' as a unitary category on its standard public-sale map.

cartographic evidence of abandonment.⁵¹ Compared with the nation's mature railway network, the adolescent infrastructure of aviation was not well represented at popular map scale.

On the positive side, there was a brief 'golden phase' (1925-34) when the great majority of active aerodromes were shown, thus providing a benchmark for gauging earlier and later mapping outcomes. In retrospect, the inter-war practice of interpolating aerodrome curtilages has facilitated the calculation of land-take, and certain sheets are now valued as primary sources for pin-pointing 'forgotten' (and disputed) sites.⁵² Given the tense international climate of the period, posterity should perhaps be thankful that so much about British aviation was conveyed on a publicly-sold topographical map.

The appendix lists almost thirty descriptive variants garnered by this investigation. Noteworthy are the overwhelming long-term dominance of 'Aerodrome' (80%), the array of early *sui generis* categories, the presence of only two institutional titles, and the late appearances of the two modern generic rivals. Also germane (though not tabulated here), are the findings that only twenty sites bore locality names and just four (out of 475) WW2 paved runway layouts were shown by the time the New Popular bowed out.

Finally, from a wider academic perspective, it is not wholly surprising that a definitive historical geography of British aviation has yet to be written. Potential authors could well have been deterred by the weight of omissions and anomalies, while OS surveyors and cartographers might conceivably have fared better with a scholarly memoir to hand.⁵³ Before embarking on this empirical exercise the writer had not appreciated just how broad was the lexicon of airfield description, or how helpful his prior knowledge of site locations and histories would prove to be.

As to the future, at least three tangential studies suggest themselves:

(1) a stratified sample analysis of OS 'job files' to ascertain how internal instructions and guidelines determined *de facto* outcomes;

⁵¹ Up to 1939 Britain had no hard runways, so defunct airfields were not major disfigurements to the landscape. Immediately after 1945 only *active* civil aerodromes were normally shown, the great concrete legacy of WW2 air-bases was under Cold War review, and with a new one-inch series in prospect it hardly seemed worthwhile correcting every sheet in depth.

⁵² An exercise by the writer for 1935 found 30,760 acres (12,450 ha) under airfields. Regrettably, after 1945 curtilages were rarely marked on one-inch sheets, making runway-and-camp layouts and amorphous security blanks the best visual guides to individual and aggregate land-take. Further examples of 'lost' airfields enshrined on Popular Edition sheets are Coal Aston near Sheffield (45 (1923), 13A) and Romford Maylands in south Essex (107 (1934), 10F).

⁵³ Richard Oliver's observation that 'the study of the subject would be much facilitated were there a convenient hand-list of opening, closing, "mothballing" etc. dates' (*OS New Popular map*, 20) remains valid despite the burgeoning air-historical literature of recent decades. See also notes on airfields in Richard Oliver, *Ordnance Survey Maps: a concise guide for historians*, third edition, London, Charles Close Society, 2013, 82.

(2) a comparative study of airfield images and descriptions on larger- and smaller-scale OS series;⁵⁴ and

(3) a review of OS-based thematic maps to gain deeper insights into airfield site selection and development.⁵⁵

As a longer-term prospect, airfield depiction practice by comparable foreign topographic mapping agencies could also prove illuminating.⁵⁶

Meanwhile, a follow-up essay dealing with UK airfield depiction during the ‘jet age’ (covered by the one-inch Seventh and 1:50,000 *Landranger* series) is in preparation. The writer’s two-part effort, combined with those proposed additional perspectives, could form the foundation of a bigger ‘Mapping the Airfield’ project under CCS auspices.

Critical comment on progress so far will be much appreciated.

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About the author:

Dr. Ron Blake is a retired chartered town planner with early local government experience in East Anglia and subsequent lectureships at Manchester and Nottingham-Trent universities. His academic research and publications have focused on land requirements for aviation, the long-term imprint of airfield engineering on the countryside and policies for the conversion of associated buildings to novel purposes including their protection as part of the nation's defence and transport heritage.

⁵⁴ For methodology and ideas see Roger Hellyer, *Ordnance Survey 1:25,000 First Series*, 58-9, 72, and RC Wheeler, ‘The depiction of RAF stations on the Provisional (National Grid) six-inch’, *Sheetlines* 97 (2013), 46-7. Another ‘adjacent’ scale with potential for aeronautical content assessment is the Half-inch. (Quarter-inch maps tend to employ airfield symbols and are therefore less suited to a ground-cover analysis). Bartholomew and Michelin maps are also worthy of examination in this context.

⁵⁵ Thematic series relevant to airfield geography comprise: geology, soils, water-and contour, land utilization, town and country planning, archaeology and local; administrative areas.

⁵⁶ Comparisons with French, German, Italian, Spanish and USA topographical maps would be of especial interest.

Appendix

<i>UK airfields 1911-1952: generic descriptions found on OS one-inch maps</i>	<i>Year of first usage</i>	<i>Number of airfields mapped thus</i>
Aeroplane Works & Garage	1911	1
Seaplane Station	1919	9
Naval Air Station	1919	2
Aeroplane Sheds	1919	4
Central Flying School	1919	1
Airship Shed	1920	1
Motor & Flying Gd.	1920	1
Ryl Aircraft Estabt	1920	1
Flying Track	1920	1
Aerodrome	1920	125
R N Airship Sta	1920	1
Flying Grounds	1921	1
Aerodrome (Seaplane)	1921	1
Marine Aircraft Experimental Sta	1921	1
R N Aviation Depot & Wireless Tel Sta (Admiralty)	1921	1
Wireless Tel Sta (Air Ministry)	1921	1
Flying Ground	1922	1
Admiralty Wireless Station	1923	1
Aircraft Works	1924	1
Seaplane Port	1932	1
Landing Ground	1934	6
Air Port	1934	1
Airship Station	1936	1
Airport	1937	13
Proposed Site of Aerodrome	1937	1
Municipal Airport	1949	1
Flying Boat Base	1952	1
Airfield	1952	9

Note: The sum total of 190 descriptions is slightly more than the number of sites examined due to several double- and re-descriptions during the review period.